Annual or perennial herbs, shrubs, less commonly trees or vines, sometimes epiphytes, rarely aquatics, usually gynomonoecious or rarely dioecious or polygam dioecious (in Mesoamerica only in *Archibaccharis*, *Baccharis*, and *Lycoseris*), roots often fibrous or tap-rooted, infrequently tuberous; carbohydrates stored as the oligosaccharid inulin (not as starch), lacking iridoids and instead producing a wide array of sesquiterpene lactones; stems mostly subterete and non-winged, thich typically solid, epidermis often pealing in strips; stipules absent. Leaves usually cauline, sometimes in basal rosettes, typically spreading, alternate and spiral, opposite and decussate, or less commonly whorled, sessile or petiolate; petiole typically unwinged, basifixed or very rarely subpeltate, rarely with paired axillary spines (Barnadesioideae), single spines (occasional in Athroismeae, etc.), or nodal enations (some *Mikania*, some Liabeae), often with 3 vascular traces; blade simple or less commonly dissected. Primary inflorescence a polysymmetric capitulum of 1-numerous florets on a common clinanthium ('receptacle' of the inflorescence) surrounded by 2-many common bracts (phyllaries), capitula solitary or grouped into a capitulescence (the secondary inflorescence). Capitulescence monocephalous to pluricapitulate and then determinate maturing, sessile to pedunculate. Capitula (compact heads) of sessile flowers (florets) homogamous (discoid, ligulate, bilabiate) or heterogamous (radiate, disciform, or variously bilabiate), maturing in an indeterminate manner (when radiate the capitulum typically protogynous), on common, epaleate or paleate, clinanthium subtended by an involucre of 2-many phyllaries, the individual florets sometimes subtended by an internal bracteole (palea) mostly towards the middle of the clinanthium; involucre cylindrical to globose, infrequently flattened longitudinally; phyllaries graduate (to subequal or obgraduate), imbricate (to eximbricate), usually isomorphic (in color and texture, often scarious-chartaceous to hyaline-membranous) or sometimes outer phyllaries various herbaceous and inner thinner, venation commonly subparallel, free (or connate), base often articulated or outer phyllaries infrequently continuous with peduncle, margins typically entire, the outermost phyllaries sometimes termed sterile phyllaries and not subtending florets, the innermost phyllaries are sometimes called fertile because they subtend either ray florets or outermost disk florets; clinanthium typically flat or convex, occasionally conical or clavate, paleate or epaleate, glabrous (setose), typically sclerified between cypselae scars, solid or sometimes internally fistulose; paleae typically external to and subtending an individual disk floret, flat
or more commonly abaxially-radially conduplicate and enclosing the disk floret, typically tapering apically. Florets bisexual, unisexual, or sterile, (3–) 5-merous; calyx usually represented as pappus, typically out-crossing; corolla sympetalous, actinomorphic or zygomorphic, usually with an abscission zone at base of corolla and decidual, venation looping and closed, never prolonging past point of fusion, variously colored. Marginal (ray, ligulate, or outer bilabiate) florets often with a zygomorphic corolla, in disciform capitula actinomorphic; corolla basal tube (rarely absent) typically giving rise to a flat(coiled) radiating bilaterally symmetric longitudinally 2+-nerved limb, limb abaxial surface (at least proximally) often ultraviolet reflectant and thus acting as a pollination guide, adaxial surface smooth for variously papillose, nerves superficial abaxially or immersed, often two support (calyx) nerves very prominent and the limb longitudinally infolded there in bud; style when present generally smooth and without collecting papillae (thereby typically not the styles referred to in dichotomous identification keys; thereby differing from disk floret styles), branch orientation often tangential (in many tangentially compressed Coreopsids style orientation strangely radial). Inner (disk, ligulate, or bilabiate) florets often actinomorphic; corolla generally with distinct tube giving rise to an ampliate limb consisting of a fused throat and (3-) 5 lobes, the lobes usually equal, tube and throat usually 5-nerved with veins along the lines of fusion between corolla segments, veins often associated with 1-2 resin ducts, the 2 lateral veins of each lobe characteristically merging apically and venation closed, never prolonging past point of fusion; stamens synantherous, equal in number to corolla lobes and alternate with them, epipetalous at junction of tube-throat, filaments typically free, smooth, and glabrous, often tangentially flattened, antheropodium (filament collar) occasionally broadened just proximal to connective into a collar, cell walls of collar sometimes irregularly-thickened or beaded, anthers laterally dithecial, characteristically united into tube surrounding style, rarely weakly connivent, dehiscing introrsely by longitudinal slits, the pollen pushed distally through staminal tube by subsequent style elongation and thereby exposed to pollinators (generally insect) or wind, thecae longer than wide, base shorter than collar, truncate to sagittate (and polliniferous) to tailed (caudate without pollen or spurred and polliniferous-calcarate), tails and spurs 1/thecae, 2/stamen, the connective generally apically prolonged past thecae, the apex thereby often variously appendaged, appendages flat and elongate (e.g., Mutisioids) to relatively short and navicular-concave adaxially (e.g., Heliantheae alliance), endothecial cells walls not forming pattern or more commonly either radial or polarized; pollen typically tricolporate (very rarely pantoporate), usually spheroidal to infrequently prolate (in Mesoamerica in Centaurea, Mutisieae, Nassauvieae, Onoserideae), microechinate to more commonly obviously echinate, occasionally (especially Cichorieae and Vernonieae) lophate, collumellae typically evenly distributed (aggregated only in Cichorioideae), internally caveate (Asteroideae, with space between the exine and foot layer) or in basal Mutisioid grades ecaveate, collumellae and tecta with internal foramina (Asteroideae) or in basal (Mutisioid) grades without
internal foramina; gynoecium syncarpous, the ovary inferior, bicarpellate, unilocular; style usually filiform, bifid or 2-branched, branch orientation typically tangential-radial, the style base (stylopodium) immersed within or bulbous above an annular nectary typically atop ovary, trunk generally internally with 2 longitudinal veins and associated resin ducts, epidermis smooth and glabrous (most groups) to distally papillose below branches (Vernonioids), branches (stigmatophores) often elongate and slender (Asteroids), less commonly short and ovate (Mutisioids), stigmatic surfaces adaxial-marginal, continuous (mostly Mutisioids and Vernonioids) or bi-lined and 2-banded (most Asteroids and Helianthoids) along length of branch and fertile to tip or apex sometimes variously sterile-appendaged, pollen collectors represented generally as distal-abaxial sweeping papillae (collecting papillae of disk florets and ligulate florets often associated with plunger pollination mechanism); ovule 1, anatropous, basal, ascending, integument one. Cypselae (fruits, achenes) from inferior ovary, single-seeded, sessile on clinanthium or very rarely pedicellate, surfaces often pubescent with twin trichomes, sometimes also with glandular-trichomes, sometimes glabrous, typically narrowed to a carpopodium where attached to clinanthium, pericarp often adnate to seed wall, pale-colored or often blacked by phytomelanin deposits (carbonized, e.g., Helianthoids); seed single, with fatty oils, integument single, placentation basal, megasporangial walls thin; embryo straight, embryo sac with persistent multinucleate antipodal cells, basically lacking endosperm (endosperm nuclear); pappus (calyx) sometimes absent, commonly of (1-)2-many bilateral or radially arranged stramineous(colored) scales, awns, setae, or capillary bristles, 1(-several)-seriate. 1600+ gen, 23,000+ spp., cosmopolitan except Antartctica and surrounding islands; 23 tribes and 1,054+ species in Mesoamerica.

Asteraceae are the largest family of Angiosperms, contain about 8-10% of its species, and were recognized as a natural Sympetalae order in pre-Linnaean times. Asteraceae are well-known for its ornamentals that include aster, daisy, sunflowers, chrysanthemum, dahlia, coreopsis, gerbera, marigold, Zinnia, and black-eyed susan. For a family of its size of the Asteraceae, however, there are few widespread uses as foods. A few of the more well-known and used Asteraceae foods include lettuce (Lactuca), dandelion (Taraxacum), sunflower seeds and oil (Helianthus), chicory and endive (Cichorium spp.), artichoke (the budding flowering head of Cynara), and chards (Tragopogon). Asteraceae used in beverages include the herbal tea chamomile (Chamaemelum) and the natural sweetener stevia (Stevia). In Asia, Crassocephalum is used as a potherb and Gynura medicinally, but like north-temperate snakeroot (Ageratina s. str. or Eupatorium s.l.), the plants are filled with alkaloids potential toxic to man and livestock. Peripherally used Asteraceae include the red food dye safflower (Carthamus), wormwood (Artemisia absinthium) once widely used as the  liqueur flavoring absinthe, and pyrethrum (Chrysanthemum) and tanacetum (Tanacetum) both of which are used as natural insecticides. More
commonly encountered are the hated weedy Asteraceae, including Ragweed (Ambrosia), the pollen of which is one of the major causes of hay fever. The fact that Asteraceae have a very robust chemistry coupled with the efficient pollination syndrome has led some to speculate that these are among the reasons that the family is so speciose and so common. Heywood et al. (1977) state that the combined occurrence of sesquiterpene lactones, acetylenic compounds, and inulin-type fructans is almost as characteristic of the Compositae as are their sympetalous flowers and involucrate headlike inflorescences.

The oldest known Asteraceae macrofossils date from 47 mya (Eocene) and are from known from southern South America, where Calyceraceae, the sister family to Asteraceae is centered. Indeed both families are presumed to be of South American origin, and are similar by having carbohydrates stored as inulin, centripetally flowering involucrate capitula, lateral corolla veins fused apically, inferior ovaries, and solitary unilocular ovules. Calyceraceae, although superficially similar to Asteraceae, differ by having iridoids, 10-veined corollas with medial veins prolonged past the fused laterals, capitate styles, and apical ovules. Asteraceae, on the other hand, lack iridoids, have 5-veined disk corollas with medial veins never prolonged past the fused laterals, bifid styles, and basal ovules. Henri Cassini (e.g., 1826-1834), was the first to take Calyceraceae as sister to Asteraceae.

Henri Cassini, the father of synantherology, proposed the initial and most widely used (then modern) tribal classification scheme of Asteraceae (Cassini 1819a, 1819b, 1826-1834, 1827, 1829, 1830), wherein he recognized 19 tribes, circumscriptions of which was based primarily upon disk floret style branch characters (viz, Cassini 1813, 1818, 1826-1834, 1827, 1829, 1830). Cassini (1829, 1830) also provided complete generic nomenclators. Useful illustrations of Cassinian stylar characteristics and other important family characters have been widely provided, and several are particularly useful (e.g., Barroso, 1986; Bentham (1873); Bohm y Stuessy, 2001; Bremer (1987, 1989); Cabrera, 1978; Cassini, 1826-1834; D’Arcy, 1975; Funk et al., 2009; Gandhi y Thomas, 1989; Gentry, 1993; Howard, 1989; Lessing, 1832; Pruski, 1997; Pruski y Sancho, 2004; Robinson y Brettell (1973b), Strother, 1997; Tudge (1997) and serve to supplement the present flora.

Among the next most important post-Cassinian overviews by specialists of Asteraceae were provided by Lessing (1832) and Candolle (1836-1838). The most influential post-Cassinian treatments, however, were those by Bentham y Hooker (1873) and Bentham (1873), who recognized 13 tribes, these mostly described and circumscribed a half a century earlier by Cassini. For much of the past century (e.g., Cronquist, 1955, 1977; Heywood et al. 1977) Asteraceae were recognized as comprised of the 13 Benthamian tribes and two subfamilies, the Lactucoideae (Liguliflorae or now the Cichorioideae, and containing a single tribe) and the Asteroideae (Tubuliflorae, containing the remaining 12 tribes). The complete tribal systematic summary of Heywood et al. (1977) also provided an important generic nomenclator. At about the same time, Harold Robinson (e.g., Robinson y Brettell, 1973a, 1973b, 1973c;
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Robinson, 1981, 1994, 2004, 2005; King y Robinson, 1987) was in the midst of the first comprehensive post-Benthamian generic (and suprageneric) limits reevaluation, and basically all of the many Robinson proposals involving plants of Mesoamerica are followed herein. Other particularly useful family level works also include those of Bremer et al. (1992), Bremer (1994), Hind et al. (1996); and Kubitzki (2007).

Beginning with Augier y Mérac (1951), Poljakov (1967), Robinson y Brettell (1973b), Wagenitz (1976), and Carlquist (1976), tribal interrelationships and our subfamiliar classification of Asteraceae changed dramatically from the then-used Benthamian scheme of Liguliflorae as sister to all other Asteraceae. Augier y Mérac (1951) and Robinson y Brettell (1973b) similarly delineated two more or less equal-sized informal tribal groupings distinguished by style branch characters of a single vs. paired stigmatic lines. Their tribal groupings served as the framework for recognition by Poljakov (1967), Wagenitz (1976), and Carlquist (1976) of two more or less equal-sized subfamilies. They aligned ligulate, bilabiate, and discoid tribes together in Cichorioideae and the so called radiate tribes in Asteroideae, each subfamily containing five to eight tribes. The Cichorioideae tribes commonly have a continuous stigmatic surface covering the inner part of the style branches, anthers sometimes with flat apical appendages and spurred or tailed bases, long and narrow disk corolla lobes, and ligulate, bilabiate corolla (when present) limbs 5-lobed (Robinson y Brettell, 1973b). The characters of Cichorioideae tribes contrasts with that of the Asteroideae tribes, which typically have paired stigmatic lines covering the inner surface of the style branches, anthers with boat-shaped apical appendages and rounded bases, short disk corolla lobes, and ray corolla (when present) limbs 3-lobed.

Only about a decade later, Jansen y Palmer (1987) found that virtually all land plants and Mutisieae subtribe Barnadesiinae lack the 22 kb chloroplast DNA inversion found in other Asteraceae, and Bremer y Jansen (1992) formally elevated Mutisieae subtribe Barnadesiinae to subfamily rank as the Barnadesioideae, which is sister to all other Asteraceae. Soon thereafter, Bremer (1994, 1996) provided thorough treatments of all Asteraceae genera and supragenera as then understood. Bremer's (1996: fig. 1) subfamily and tribal diagram recognized 17 tribes in 4 subfamilies, with the Mutisioids not placed in a subfamily. Pruski y Sancho (2004) formally recognized subfamily Mutisioideae, and counted 560 genera and 8040 species in Tropical America. Cronquist (1977) commented that "the weakness in Carlquist's arrangement is that the tribes of his Cichorioideae do not hang together nearly so well as those of his Asteroideae," and indeed not only Mutisioideae, but several other early-divergent subfamilies have since been segregated from Cichorioideae sensu Carlquist (1976). On the other hand, all phyllogenies since (e.g., Bremer, 1987; Bayer y Starr, 1998) have basically recovered Asteroideae sensu Carlquist (1976) as monophyletic, showing the strength of the novel Carlquist arrangement.

The work of Kare Bremer (1994, 1996), Robert Jansen (viz, Jansen et al. 1991; Kim y Jansen, 1995; Jansen y Kim, 1996; Kim et al., 2005), and Jose Panero (viz, Panero y Funk, 2002, 2007, 2008; Panero et
al., 2014) showed early-divergent basal grade Mutisieae were not monophyletic, basically resulting (to date) in descriptions mostly by Jose Panero and recognition by him of a total of 13 subfamilies of Asteraceae. The four subfamilies of Asteraceae in Mesoamerica are those recognized by Pruski y Sancho (2004) except for tribe Barnadesieae, which is endemic to South America. Both Barnadesia or Dayphyllum (of tribe Barnadesieae) occur in Northern Colombia and should be looked for along the frontier with Panama. At the other end of the family phylogeny, basically because recent-divergent tribe Eupatorieae is nested with Heliantheae and so that this monophyletic Cassinian Eupatorieae (which contains 0.05% of the Angiosperms) could continue to be recognized, Bruce Baldwin et al. (2002) segregated several tribes from amongst Heliantheae. Also, following the tribal realignments of Augier y Mérac (1951), Poljakov (1967), Wagenitz (1976), and Carlquist (1976), further tribal adjustments were proposed by Robinson y Brettell (1973a, 1973b, 1973c), Robinson (1994), Panero y Funk (2002, 2007, 2008), Pruski (2004a, 2004b), Carriaga et al. (2008), Katinas et al. (2008), Funk y Robinson (2009), Funk et al. (2009), and Panero et al. (2014). We now recognize 13 subfamilies and 44 tribes of Asteraceae. The early divergent Asteraceae appear to have a base chromosome number of $x = 9$, whereas the later-divergent perhaps arose from polyploidy events and are $x = 19$.

Because many component tribes are as large as or larger than many Angiosperm families, here in our revision of the Asteraceae of Mesoamerica, genera (and, in the case of Heliantheae s. str., subtribes) are arranged alphabetically within an alphabetical hierarchical tribal scheme. The four Asteraceae subfamilies (in bold capital letters, arranged from early divergent Mutisioideae to recent divergent Asteroideae along with their 23 component tribes known to occur in Mesoamerica are given in Table 1.

270 genera and 1054 species of Asteraceae occur in Mesoamerica, of which 21 genera (8%) and 442 species (42%) are endemic (Table 2). Of the 442 endemic species, 283 species (64%) are restricted to a single region (Table 3; the nine regions with species endemic species totals calculated are the seven Central American republics, Chiapas, and Mexican Yucatan). Nine of the 21 endemic genera of Mesoamerican Asteraceae are Eupatorieae; nine genera are single-country endemics, with three each in Costa Rica and Mexico (Table 4). The tribes and genera recognized by us are largely the same as in the monumental Kubitzki (2007) Asteraceae treatment.

Table 1. The four subfamilies and 23 tribes of Mesoamerican Asteraceae.

**MUTISOIDEAE**
3 tribes: Mutisieae, Nassauvieae, Onoserideae;

**CARDUOIDEAE**
1 tribe: Cardueae;

**CICHORIOIDEAE**
4 tribes: Arctoteae, Cichorieae, Liabeae, Vernonieae;

**ASTEROIDEAE**


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**Key to Tribes of Asteraceae in Mesoamerica**

Por J.F. Pruski.

1. Plants dioecious or polygamodioecious.
   
2. Corollas usually white or ochroleucous; (*Archibaccharis* and *Baccharis*).
   
   **III. Astereae** (pro parte lead 1 of 2)

2. Corollas typically orange; (*Lycoseris*).
   
   **XIX. Onoserideae** (pro parte lead 1 of 2)

1. Plants monoecious.

3. Capitula with at least some florets bilabiate or with cypsela stout-stipitate-glandular (*Adenocaulon* of Mutisieae); pollen typically prolate.
   
   4. Style branch apices truncate. **XVII. Nassauvieae**
   
   4. Style branch apices rounded.
   
   5. Rosulate herbs. **XVI. Mutisieae**
   
   5. Leafy-stemmed herbs to scandent or arching shrubs or treelets; (*Onoseris*).
   
   **XIX. Onoserideae** (pro parte lead 2 of 2)

3. Capitula never with bilabiate florets; pollen spheroidal (rarely prolate, only in *Centaurea* of tribe Cardueae).
   
   6. Florets all ligulate (and then capitula not 4-flowered and not with 8 phyllaries in 4 decussate pairs); corolla limb apices 5-dentate; herbage with milky latex and leaves alternate. **VII. Cichorieae**
   
   6. Florets never all ligulate with apically 5-dentate limbs, or only subligulate when capitula 4-flowered with 8 phyllaries in 4 decussate pairs (*Vernonieae: Elephantopus, Orthopappus, and Pseudelephantopus*); herbage typically with clear sap (with milky latex in some Liabeae, but then leaves opposite).
   
   7. Style trunks with a dense-papillose or long-papillose annular ring distally.
   
   8. Capitula radiate; pappus usually of hyaline scales; (native to South Africa and only one species infrequently naturalized in Mesoamerica). **II. Arctotidiae**
   
   8. Capitula typically discoid, less commonly pseudoradiate; pappus often of elongate bristles; (common and mostly native). **VI. Cardueae**
7. Style trunks never with a well-defined distal papillose annual ring although trunks sometimes evenly papillose distally.

9. Style trunks evenly papillose distally.

10. Capitula disciform; marginal pistillate floret style branches with stigmatic surface 2-banded.

XIII. Inuleae (pro parte lead 1 of 2; Mesoamerican genera except Pterocaulon)

10. Capitula radiate or discoid; disk floret style branches with continuous stigmatic surfaces.

11. Leaves opposite; capitula radiate or discoid; corollas usually yellow.

XIV. Liabeae

11. Leaves alternate; capitula discoid or discoid-subligulate; corollas usually white to reddish or purplish, never yellow (Mesoamerica). XXIII. Vernonieae


12. Cypselae not carbonized, not obcompressed; clinanthia epaneate.


14. Capitula radiate; cypselae epappose; ray cypselae obviously rugulose-tuberculate abaxially; (native to Old World, and only two species cultivated and infrequently naturalized in Mesoamerica).

V. Calenduleae

14. Capitula disciform, discoid, or radiate; cypselae typically pappose (epappose only in radiate-capitulate infrequently escaping Euryops of tribe Senecioneae); cypselae never obviously rugulose-tuberculate abaxially; (common and mostly native).

15. Phyllaries 1(-2+)-seriate, subequal, distal halves not obviously scarious nor thinly papery throughout; capitula disciform, discoid, or radiate.

XXI. Senecioneae (pro parte lead 1 of 2)

15. Phyllaries (1-)2-10+-seriate, typically graduate, distal halves often obviously scarious or thinly papery throughout; capitula disciform.

16. Phyllaries with distal lamina obviously scarious or thinly papery throughout; style branch apices typically truncate (sometimes acute in Chionolaena and Xerochrysum but then stems exalate and capitulescences monocephalous or corymbiform or umbellate).

X. Gnaphalieae

16. Phyllaries chartaceous to sometimes membranous or herbaceous, margins and apex sometimes scarious; style branch apices acute;
capitulescences terminal, spicate; stems long-winged.

XIII. Inuleae (pro parte lead 2 of 2; Pterocaulon)

13. Anther bases truncate to sagittate.

17. Phyllaries dry and rather scarious throughout; pappus absent or coroniform, sometimes with a few inconspicuous squamellae; styles exappendiculate, branch apices typically truncate.

I. Anthemideae

17. Phyllaries not dry and rather scarious throughout; pappus present or absent; styles appendiculate or exappendiculate, branch apices truncate to subulate.

18. Phyllaries 1(-2+)-seriate, subequal; pappus usually of bristles, not membranous-scarious scale

XXI. Senecioneae (pro parte lead 2 of 2)

18. Phyllaries (1-)2-several-seriate, subequal to graduate, when phyllaries 1-seriate the pappus of membranous-scarious scales.

19. Style branches appendiculate, appendages deltate to lanceolate; clinanthia epaleate; anther appendage more or less flat, thecae with endothecial tissue typically radial; pappus various, usually of many bristles, not of membranous-scarious scales.

III. Astereae (pro parte lead 2 of 2)

19. Styles mostly exappendiculate and branch apices truncate, when appendiculate (Gaillardia) the clinanthia with setiform enations as long as the disk cypsela; anther appendages carinate, thecae with endothecium pattern usually polarized; pappus typically of several membranous-scarious scales.

XI. Helenieae

12. Cypselae carbonized or when pericarp ornamented with unidentified dark secretions (Electranthera) then cypselae obcompressed; clinanthia paleate or epaleate.

20. Styles obviously long-appendiculate, distally with sterile appendages 1-3x longer than proximal stigmatic portions, branches mostly subterete in fertile proximal portion; leaves mostly opposite; capitula discoid; corollas never yellow.

IX. Eupatorieae

20. Styles exappendiculate to moderately appendiculate but then appendages shorter than stigmatic portions, branches at least slightly flattened in fertile
portion; leaves alternate or opposite; capitula radiate or discoid; corollas often yellow.


22. Herbage often obviously streaked with internal pellucid cavities, when not streaked (*Flaveria*) then capitulescences of compact tight-clusters or glomerules.  

**XXII. Tageteae**

22. Herbage without streaked secretory cavities; capitulescences monocephalous to open, not compact nor of glomerules.

23. Pappus typically of several erose thickened and broad-based squammas or squamellae; cypselae mostly obpyramidal to suberete; disk corollas 5-lobed.  

**IV. Bahieae**

23. Epappose or pappus coroniform and of 1-2 longer narrow-based bristles; at least some cypselae obcompressed or compressed; disk corollas 4(-5)-lobed, when 5-lobed then cypselae epappose.  

**XX. Perityleae**


24. Involucres usually double with a distinct outer series of phyllaries differing from inner translucent chartaceous series in texture and color (involucres not double and phyllaries all yellow-scarious in *Goldmanella*); paleae flat; disk cypselae often obcompressed.  

**VIII. Coreopsideae**

24. Involucres not double or when appearing double the inner series not translucent, all not yellow-scarious; paleae usually conduplicate (sometimes linear or filiform, e.g., *Alepidocline, Eclipta, Selloa, Unxia*); disk cypselae not obcompressed (or if appearing so, *Enydra*, then paleae strongly embracing disk florets forming an indurate cypselae-palea unit).

25. Epappose or more typically pappus present and bilaterally disposed, infrequently radially arranged, coroniform or often of few small awns, aristae, bristles, or squamellae; styles exappendiculate or appendiculate, stigmatic surfaces continuous or 2-banded.  

**XII. Heliantheae**

25. Epappose or more typically pappus present and radially arranged; styles exappendiculate or nearly so, stigmatic surfaces 2-banded.
26. Cypselae usually finely striate (the striae being interruptions in the carbonized layer), carpopodium usually non-sculptured.

**XV. Millerieae**

26. Cypselae without small longitudinal striatulae interrupting the dotted carbonized layer, carpopodium often sculptured.

**XVIII. Neurolaeneae**

**I. Tribus Anthemideae** Cass.

*Ursinieae* H. Rob. y Brettell

Por J.F. Pruski.

Annual herbs to shrubs, often aromatic, insect pollinated or infrequently wind-pollinated; herbage usually with simple trichomes, trichomes infrequently dolabriform. Leaves mostly cauline, typically alternate, generally lobed or dissected to deeply pinnatifid, often amplexicaul or clasping stem; blade usually chartaceous, venation pinnate, third order veins often obscure, apex of blade, lobes and serrations often mucronate. Capitulescence commonly terminal. Capitula radiate, discoid, or disciform, often large and showy when radiate; involucre generally hemispherical or campanulate; phyllaries often with green mid-zone, margins usually scarious-hyaline, persistent or deciduous; receptacle epaleate to less commonly paleate; paleae typically deciduous. Ray florets 0 or 1-(2-+)seriate, pistillate or infrequently sterile; corolla limb often white or yellow, usually 5-7-veined, adjacent veins commonly anastomosing and looping toward apex, adaxial papillose, typically eglandular abaxially. Disk florets bisexual or infrequently functionally staminate; corolla shortly (3-4-5-)lobed, commonly yellow, glabrous or glandular; anthers cream-colored, thecae bases rounded or obtuse, ecaudate (ours) or rarely short-caudate, apical appendage commonly ovate, filaments short; style branches usually short, 2-banded from base to apex, apex typically truncate, often fimbriate, papillae obtuse apically. Cypselae isomorphic or dimorphic, sometimes obcompressed, often costate, pericarp with or without myxogenic (water absorbing) cells but never carbonized, infrequently setose, sessile on receptacle or rarely obviously pedicellate, carpopodium non-sculptured; pappus usually absent, sometimes coroniform or squamulose, never present as capillary bristles. Aprox. 110 genera, aprox. 1800 spp. Cosmopolitan, with concentrations of genera and species in the north temperate Old World; about 25 genera occur in the Americas.
Members of the tribe are widely known due to their use as ornamentals, cut flowers, and medicinals. Garden chrysanthemums, daisies, tansies, pyrethrum, absinthe, sagebrush, and yarrows are all members of this tribe, as are the various medicinal chamomiles spread among several genera. The air-borne pollen of species of *Artemisia* is a main cause of hay-fever. The group is taxonomically difficult and often requires mature fruits for identification. Anthemideae often have aromatic herbage, but great variation exists in the characteristic dissected leaves in single individuals, and they partly or wholly lack a pappus, a feature elsewhere in Compositae commonly used taxonomically. Technical features helping to define the tribe are the 2-banded typically truncate style branches, ecaudate anthers, and when radiate having adaxially papillose ray corollas. The cypselae are unusual in Compositae in that they are often flattened in the plane parallel to that of the phyllaries (tangentially compressed or obcompressed).

Much literature treating Anthemideae uses various generic names for single taxa, but generic restructuring has been summarized by Bremer y Humphries (1993), who also gave a world species checklist. For example, Bremer y Humphries (1993) recognized in *Chrysanthemum* only two of c. 150+ traditional species, transferring many names to *Dendranthema*, but more recently the type of *Chrysanthemum* was conserved and is the same as that of *Dendranthema*. At one point the generic name *Matricaria* was rejected nomenclaturally, but now a type has been conserved, fixing application of the name.

The non-Flora Area chamomile genera *Chamaemelum* Mill. and *Tripleurospermum* Sch. Bip. should be looked for as naturalized in Mesoamerica. Among flora area genera, by paleate receptacles *Chamaemelum* most closely resembles *Anthemis*, and by epaleate receptacles *Tripleurospermum* most closely resembles *Matricaria*. It is possible that Flora Area materials of either or both *Chamaemelum* and *Tripleurospermum* have been misidentified as otherwise similar *M. chamomilla*, which differs from them by its often coroniform pappus.

The widespread and weedy prostrate herb *Soliva* Ruiz et Pav. possibly occurs in Mesoamérica. Both *S. anthemifolia* (Juss.) Lam. and *S. sessilis* Ruiz et Pav. [syn. *S. pterosperma* (Juss.) Less.] have been recorded from nearby Veracruz, México (Rzedowski y Calderón de Rzedowski, 1997). *Soliva sessilis* is an aggressive lawn weed throughout much of S. Estados Unidos. The plants are know as "stickers", and are recognized by the spiny fruits that cut into bare feet, these spines formed from the persistent spinescent styles as well as from lateral wings of the cypselae. The genus resembles *Cotula mexicana* by its low mat-forming habit and by small disciform capitula with outer florets pistillate and inner florets functionally staminate.

*Santolina chamaecyparissus* L. (a griseous subshrub with paleate receptacles and discoid capitula, although it is infrequently seen in flower) is widely used as a foliage border plant in
temperate and tropical urban gardens. It may be grown in Mesoamérica, but should not be expected to become naturalized.

Treatments most frequently consulted for generic and specific circumscriptions, keys to species, and from which part of the following has been adapted include Arriagada y Miller (1997), Bremer y Humphries (1993), Dillon (1981), Jeanes (2002), Rydberg (1934), Rzedowski y Calderón de Rzedowski (1997), Schultz-Bipontinus (1844), Thompson (2007), and Turner (1996).


1. Capitula discoid or disciform, rarely obscurely radiate.

2. Capitulescences pyramidal-paniculate; indumentum often of some dolabriform trichomes; wind pollinated.  

4. Artemisia

2. Capitulescences corymbiform to corymbiform-paniculate or monocephalous; indumentum of simple trichomes, or absent; insect pollinated.

3. Capitulescences flat-topped corymbiform-panicles; corollas 5-lobed.  


3. Capitulescences corymbiform to monocephalous; corollas commonly 3-4-lobed.

4. Decumbent fibrous-rooted herbs; capitula to c. 2 mm at anthesis; corollas cream-colored or sometimes yellowish, ray cypselae slightly pedicellate.  

6. Cotula

4. More or less erect tap-rooted herbs; capitula usually 5-10 mm; corollas greenish-yellow; cypselae sessile on receptacles.  


1. Capitula radiate.

5. Ray florets sterile, rarely styliferous; receptacles paleate on distal c. 2/3.  

2. Anthemis

5. Ray florets pistillate; receptacles usually epaleate.  


5. Chrysanthemum

6. Leaves glabrous or pubescence of simple trichomes.
7. Subshrubs; cypselae winged with wings extending into pappus corona at least adaxially.

3. **Argyranthemum**

7. Usually herbs; cypselae exalate, or when winged the wings not extending into pappus corona.

8. Leaves punctate-glandular and ray corolla limbs either abaxially glandular or usually reddish.


8. Leaves sometimes eglandular and ray corolla limbs commonly eglandular, commonly white or yellow, infrequently pinkish.

9. Rhizomatous herbs; stems simple or few-branched from base; ray corollas white, infrequently pinkish; receptacles epaleate or e paleate.

10. Leaves deeply 2-3-pinnatisect; ray florets (3-)5, corolla limbs short and orbicular or cuneate; cypselae obcompressed, faintly 2(-3)-nerved; pappus absent; receptacles paleate; root tips never red.

1. **Achillea**

10. Leaves simple and entire to pinnatifolobed; ray florets 20-40+, corolla limbs elongate, much longer than broad; cypselae obconical, strongly c. 10-costate; ray cypselae sometimes with a few inconspicuous squamellae adaxially; receptacles epaleate; root tips red.

8. **Leucanthemum**

9. Tap-rooted herbs; stems branched; ray corollas yellow or white; receptacles epaleate.

11. Receptacles convex, solid; cypselae dimorphic; leaves entire to pinnatifid; pappus absent.

7. **Glebionis**

11. Receptacles conical, fistulose; cypselae isomorphic; leaves pinnatisect; pappus sometimes coroniform.


1. **Achillea** L.


Por J.F. Pruski.

Aromatic perennial herbs, rhizomatous, root tips never red; stems mostly simple or few branched from base, mostly erect or ascending, sometimes tufted; herbage when pubescent with simple trichomes. Leaves basal and cauline, few to many from caudex base, commonly deeply 2-3-pinnatisect, sessile or petiolate. Capitulescence commonly of flat-topped, corymbiform panicules,
of many small capitula, rarely monocephalous. Capitula radiate (ours) or rarely discoid, small; involucre cylindrical to hemispherical; phyllaries imbricate, graduate, 3-4-seriate; receptacle convex to short-conical, at least partly paleate; paleae membranaceous, sometimes with central vein. Ray florets mostly 3-12; corolla mostly white, sometimes yellow or pink, tube somewhat compressed, limb short and orbicular or cuneate, spreading, eglandular. Disk florets 8-75(-100), bisexual; corolla white, yellowish, or pink, tube often compressed, limb often broader than tube, limb 5-lobed; anther apical appendage apex often obtuse; style branches flattened. Cypselae obcompressed, oblong or obovate, thin-walled, exalate, faintly 2(-3)-nerved, glabrous, with myxogenic cells, laterally thickened; pappus absent. $x = 9$. Aprox. 115 spp. Old World subtropics to subarctic zones; 1 sp. naturalized in the Neotropics; several spp. cultivated as ornamentals.


Herbs 25-65 cm; stems simple or few-branched from base, striate, villous. Leaves deeply 2-3-pinnatisect, oblanceolate or lanceolate in outline, surfaces sometimes glandular, otherwise glabrate to more commonly sparsely villous-tomentulose; proximal leaves petiolate, petiole to 3 cm; cauline leaves mostly 3-13 × 0.5-2.5 cm, rachis c. 0.8 mm diam., sessile, subamplexicaule, primary lateral segments 15-20+ per side, mostly 5-20 mm, ultimate segments mostly to 5 × 1 mm, lanceolate, spinulose-tipped. Capitulescence usually 50-100-capitulate, held above the distal leaves; peduncles 2-7 mm, villous. Capitula c. 5 mm; involucre 4.5 × 2-3 mm, cylindrical or narrowly campanulate; phyllaries 15-25, 3-4-seriate, or mostly with greenish prominent midrib and stramineous margins, subcarinate, marginally fimbriate; outer phyllaries c. 2 × c. 0.9 mm, ovate to elliptic-lanceolate, lightly villous; inner phyllaries 4-5 × c. 1 mm, lanceolate, apex weakly villous; receptacle convex, paleate; paleae 1.5-3 mm, lanceolate. Ray florets (3-)5; corolla white to infrequently pinkish, tube c. 1 mm, limb 1.5-2 × 1.5-2 mm, weakly exerted from the involucre, faintly 2-veined, adaxially papillose, apex broadly 3-toothed. Disk florets c. 8-25; corolla 2-3 mm, tubular, white, often glandular, lobes c. 0.3 mm; style branches c. 0.5 mm. Cypselae 1.5-2 mm. $2n = 18$, 36, 54, 72. Flowering mostly Jun-Feb. Steep slopes, pine forests,
cloud forests, grassy hillsides, alpine meadows, disturbed areas, páramo, roadsides. Y (Millspaugh 47, F); Ch (Matuda 15422, MO); G (Titus y Diaz 205, MO); H (Nelson Sutherland, 2008: 143); N (Moreno 3411, MO); CR (Pruski et al. 3832, MO). (35-)1400-3500 m. (native of Europa; Canadá, Estados Unidos, México, Mesoamerica, Colombia, Venezuela, Ecuador, Perú, Brasil, Argentina, Chile, West Indies; Asia, Africa, Australia, New; widely cultivated, adventive, and naturalized.)

Several infraspecies (some based on occasional polyploids and ecotypes) are variously recognized (e.g., Huber-Morath, 1974 [1975]), but here I treat the species in the broad sense and recognize no infraspecies. The Yucatan plants were said to have been introduced with imported hay.

2. Anthemis L.

Por J.F. Pruski.

Annual or perennial herbs to subshrubs, often aromatic, insect pollinated, glabrous or pubescent; stems erect (ours) to decumbent, branched, subterete; herbage when pubescent with mostly dolabriform trichomes. Leaves 1-3-pinnatisect, obovate to spatulate, subsessile (ours), surfaces glabrous or pubescent, segments narrow. Capitulescence loosely corymbiform to monocephalous. Capitula radiate or infrequently discoid; involucre hemispherical; phyllaries imbricate, subequal or graduate, 3-5-seriate, persistent, margins scarious or hyaline; receptacle conical or hemispherical, paleate throughout or only distally, rarely epaleate. Ray florets commonly present, sterile or more commonly pistillate; corolla white or less commonly yellow or reddish, tube infrequently setulose, limb mostly oblong. Disk florets bisexual; corolla funnelform, mostly yellow, tube mostly cylindrical basally, non-saccate based, sometimes swollen in fruit, lobes 5. Cypselae isomorphic, obconical to obovoid, exalate, obviously 9-10-costate, surface otherwise smooth or tuberculate, glabrous or glandular, generally with myxogenic cells; pappus absent or coroniform. \( x = 9 \). Aprox. 175-210 spp. (Europa, Africa, Asia; a few spp. naturalized in North America, South America, Australia, New Zealand.)

Anthemis is similar by dissected leaves, paleate receptacles, and usually white ray corollas to Chamaemelum Mill., another chamomile differing by having trichomes always simple, scarious-margined apically-rounded paleae, weakly 2-3-costate (and finely striate between costae) cypselae, and saccate-based disk corollas. Anthemis is also similar to Matricaria, which differs by epaleate receptacles.


N.v.: dog-fennel (lit.), mayweed (lit.).

*Chamaemelum cotula* (L.) All., *Maruta cotula* (L.) DC.

Annual aromatic tap-rooted herbs 10-60(-90) cm; stems branched throughout, striate, sometimes glandular, otherwise glabrous or pubescent. Leaves 1.5-5 × 1-2(-3) cm, deeply 2-pinnatisect, sometimes glandular, otherwise glabrous or pubescent, individual distal segments triangular to linear. Capitulescence open-corymbiform with capitula terminal on ultimate branches; peduncles 2-9 cm, often pubescent especially distally. Capitula usually 5-9 mm, radiate, disk conical; involucre 3-4.5 × 5-9 mm, hemispherical; phyllaries 3-4.5 × 1-1.2 mm, nearly subequal, c. 3-seriate, +/- lanceolate, villosulous; receptacle conical, paleate on distal c. 2/3; paleae 2-3 mm, linear, sometimes glandular. Ray florets 10-16, sterile, rarely styliferous; corolla 5-11 mm, white, limb 4+-veined, eglandular. Disk florets 150+; corolla 1.9-2.6 mm, yellow, sometimes glandular. Cypselae 1.2-1.8 mm, tuberculate, sometimes glandular; pappus absent. 2n = 18. *Cultivated areas, disturbed areas.* H (*Molina 15233*, NY). c. 800 m. (Europa, Africa, Asia; often cultivated and quickly invasive in Canada, Estados Unidos, México, Mesoamerica, Bolivia, Brazil, Uruguay, Paraguay, Chile, Argentina; Australia, New Zealand.)

I follow Yavin (1970) and do not recognize infraspecies of *Anthemis cotula*. The species is similar to equally invasive *Anthemis arvensis* L., which should looked for in flora Area and which differs by pistillate ray florets and non-tuberculate cypsela surfaces. Also similar is *Chamaemelum nobile* (L.) All. (n.v. manzanilla romana), the most economically important chamomile used in herbal teas, which should be looked for as naturalized in the Flora Area, but which is a rhizomatous perennial herb with glandular ray corolla limbs.


*Preauxia* Sch. Bip.

Por J.F. Pruski.

Subshrubs to shrubs, mostly 0.5-1.5 m; stems usually 1, erect or procumbent, branched, often glabrous. Leaves sessile or petiolate, entire to more commonly 1-2-pinnatifid, often obovate in outline, surfaces eglandular, usually glabrous, marginal lobes cuneate to linear. Capitulescence monocephalous or laxly corymbiform; peduncles erect. Capitula radiate, many-flowered; involucre hemispherical; phyllaries 28+, imbricate, graduated, 3-4-seriate, persistent, margins and
apices broadly hyaline, the inner phyllaries sometimes dilated apically; receptacle convex or short-conical, epaleate. Ray florets 12-30+, uniseriate or sometimes few-seriate in cultivated form; corolla white (ours), infrequently to yellow or pink, limb mostly oblanceolate, sometimes glandular abaxially. Disk florets usually 80-150+, bisexual; corolla tubular-funnelform, 5-lobed, yellow, commonly very lightly glandular, lobes without central resin canal. Cypselae dimorphic, winged, costate, glabrous or sometimes glandular between costae, ours with wings extending into pappus corona, without myxogenic cells; ray cypselae triquetrous, 3-winged; disk cypselae compressed, 2-winged; pappus typically coroniform at least adaxially. \( x = 9 \). Aprox. 22-24 spp. Macaronesia, several species widely cultivated globally as ornamentals and naturalized outside of their native range.

The genus was revised by Humphries (1976), who recognized 22 species.


Subshrubs, 0.5-1 m; herbage often glaucous, green or bluish-green. Leaves 2-8 × 1-6 cm, 1-2-pinnatifid often to near midrib, surfaces glabrous, base pectinate or entire, margins with 2-5 pairs of subopposite primary lobes, primary lobes 2-4 × 0.1-1 cm, cuneate to linear, primary lobes irregularly toothed or divided yet again. Capitulaceous 1-10-capitulate; peduncles usually 4-15 cm. Capitula to 7 cm diam. including rays, with disk convex; involucre 7-10 × 6-22 mm diam.; phyllaries c. 3-seriate, 5-7 × 1.5-3 mm, inner phyllaries dilated apically. Ray florets 15-21; corolla white, tube c. 3 mm, limb 6-20 × 2-6.5 mm, oblanceolate to oblong, c. 13+-veined. Disk florets; corolla 2-4 mm. Cypselae body 2.5-5 × 1-4.5 mm, wings to 1+ mm diam.; pappus coroniform, crown to 2+ mm. \( 2n = 18 \). Flowering Feb, Apr, Nov. *Cultivated, roadsides, pine-oak forests.* Ch (Breedlove, 1986: 42); N (Stevens 18518, MO). 1100-2200 m. (native to Macaronesia; cultivated globally and naturalized in Estados Unidos, México, Mesoamérica, Colombia, Ecuador, Perú, Bolivia, Greater Antilles, Europa, Asia, África, Australia, Islas del Pacífico.)

Although Humphries (1976) and Jeanes (2002) recognize infraspecies, I prefer to treat the species in the broad sense and make no decisions on use of infraspecies. It seems the name
Argyranthemum foeniculaceum is sometimes applied to our species when the herbage is glaucous, but I am uncertain as to whether the two species are synonymous or if the names are misapplied. Here, I have adopted the name with priority and list the second name as a possible synonym. I admit that I may be circumscribing the taxon overly broad. This species is becoming increasingly more common in the Americas, has perhaps been modified horticulturally, and is often misidentified as the formerly much more common Glebionis coronaria, which is similar by winged cypselae but which lacks a pappus crown.

4. Artemisia L.


Por J.F. Pruski.

Annual herbs to shrubs, often aromatic, wind-pollinated, indumentum often of some dolabriform trichomes; stems usually erect, many branched, striate. Leaves usually lobed or dissected, less commonly unlobed, venation pinnate, glabrous or glandular to variously pubescent, pubescence often tomentose, typically griseous at least abaxially. Capitulecence many-capitulate, pyramidal-paniculate, the individual branches often virgate, spicate or racemose. Capitula disciform (ours) or sometimes discoid, small; involucre cylindrical to hemispherical, florets not or only slightly exserted; phyllaries imbricate, graduated, few-seriate, free, at least the inner ones somewhat scarious with hyaline margins; receptacle commonly convex, epaleate, glabrous or occasionally pilose. Ray florets 0. Marginal florets: corolla cylindrical, generally lacking a distinct limb, commonly yellowish. 2-4-dentate; style branches penicellate, apically rounded to truncate. Disk florets bisexual (ours) or sometimes functionally staminate; corolla tubular-funnelform, 5-lobed, commonly yellowish; anther appendage triangular, apex acute to narrowly so, pollen spines vestigial; style included or branches exserted, the branches penicellate, apically truncate. Cypselae ellipsoid to obovoid, terete to less commonly slightly obcompressed, glabrous or sometimes pubescent, sometimes with myxogenic cells; pappus absent. \( x = 8, 9, 17 \) 350-520 spp. Nearly cosmopolitan with vast majority of spp. in temperate Eurasia and temperate North America; aprox. 9 spp. in the Neotropics.

I recognize Artemisia in the broad sense as done in Shultz (2006), and do not segregate the genus as done by Ling (1995). Several spp. are of economic importance (e.g., A. dracunculus L. is "tarragon", A. absinthium L. is "absinthe"). Artemisia tridentata of western North America is the famous "sagebrush".
The wind-pollination that characterizes *Artemisia* is a state derived from the typical insect-pollination of Anthemideae. By wind-pollination, dissected leaves, and virgate ultimate capitulescence branches *Artemisia* resembles and is often misidentified as *Ambrosia*, which differs (in addition to technical tribal features) by having separate staminate and pistillate capitula, with the involucre of the staminate capitula cupular and at least connate basally.


1. Receptacles pilose.  
2. Leaf bases without lobules, lobes not dentate.  
3. Leaf bases with 1-2 pairs of lobules, lobes dentate.  


   Aromatic perennial herbs, 0.4-1 m; stems much-branched; herbage finely canescent-sericeous with subappressed trichomes. Leaves gray-green, 1-3-pinnatisect; blade 1.3-3 × 1.5-2.5 cm, broadly ovate in outline, ultimate segments, 1-1.5 mm diam., oblong; petiole to 2 cm. Capitulescence narrow to broadly racemose-paniculate, bracteate. Capitula c. 3 mm, mostly nutant; involucre 2-3 × 3-5(-6) mm, hemispherical or subglobose; phyllaries densely sericeous, the inner ones c. 1.5 mm diam., ovate; receptacle long-pilose, ennations mostly 0.5-1 mm, often mistaken for pappus in non-dissected material. Marginal florets 10-20. Disk florets 15-40; corolla 1-1.7 mm, glandular, otherwise glabrous. Cypselae 0.5-1 mm, glabrous. 2n = 18. *Cultivated and occasionally escaping*. H (Nelson Sutherland, 2008: 150). c. 1000+ m. (Native to Eurasia and N Africa; introduced to Canada, United States, Mexico, Mesoamerica, Andean South America (Colombia to Chile and Argentina) and subtropical Brazil.)


Aromatic perennial suffrutiocose herbs, 0.3-1.5(-2) m; stems densely leafy, brownish, leaves inserted singly or in few-leaved clusters along length of stem. Leaves 1.5-11.5 × 0.5-4 cm, entire to pinnatifid, surfaces green or discolorous, base without lobules, marginal, lobes few, entire, or leaves entire, not dentate. Capitula erect to nutant; involucre 1-5 × 2-5(-8) mm; receptacle glabrous. Marginal florets 5-12. Disk florets 6-45. 2n = 18, 36, 54. United States, Mexico, Mesoamerica.

*Artemisia ludoviciana* contains several loosely defined subspecies (Keck, 1946), but only a single subspecies occurs in Mesoamérica. Our subspecies is distinguished from the nominante subspecies by its more open paniculate capitulescence with longer lateral branches, and by principal stems leaves commonly shallowly pinnately lobed with margins often revolute.


Herbs; stems several arising from a single rhizome, each simple or much branched distally, subterete or angled, striate, tomentulose to glabrate. Leaves mostly 2.5-11.5 × 0.2-1 cm, blade surfaces somewhat discolorous, adaxial surface green, loosely tomentellous with dolabriform trichomes to glabrate, sometimes glandular, abaxial surface griseous-tomentose, often glandular, base attenuate, margins often revolute, apex acuminate, sessile or petiole to c. 5 mm; the lower leaves often shallowly pinnately lobed 3-5(-7) lobed, obovate in outline, lobes entire, slightly directed forward; the distal stem leaves commonly lanceolate to linear-lanceolate, simple. Capitulescence open-paniculate, subcolumnar, lateral branches commonly 4-9 cm, ultimate branches racemose or spicate; peduncles to 1 mm, sometimes basally 1-bracteolate, bracteoles 4-10 mm. Capitula 2.5-4.5 mm, disciform, sometimes resupinate; involucre 2.5-4 × 2-3 mm, campanulate; phyllaries c. 8-10, 2-3-seriate, slightly floccose, margins and apex broadly hyaline, the outer phyllaries c. 2 × c. 1 mm, elliptic-lanceolate, inner phyllaries c. 3-4 × 1-1.5 mm, elliptic-ovate. Marginal florets 5-10; corolla 1.2-1.8 mm, tubular-filiform, lightly glandular, styles well-exserted. Disk florets
bisexual, 8-15(-20); corolla 1.5-2 mm, tubular-funnelform, yellow or sometimes violet-tinted apically, lightly glandular, lobes c. 0.3 mm; style branches to c. 0.6 mm. Cypselae to c. 1 mm, obovoid, slightly compressed, weakly nerved at maturity, glabrous. 2n = 18, 36. Flowering Aug-Sep. Weedy roadsides and fields, forested slopes. ?T (Villaseñor, 1989: 28); Ch (Breedlove 37110, MO); ?C (Villaseñor, 1989: 28); ?QR (Rodriguez et al., 2003: 120 sub Artemisia mexicana); B (Chanek 181, F); G (Castillo y Castillo 1607, MO); H (House 145, MO); ES (Pank 20, MO). (100-)800-2600 m. (SW. Estados Unidos, México, Mesoamerica.)

Our species and the generitype (A. vulgaris L.) are the two most widespread and morphologically variable species in the Americas of this notoriously taxonomically difficult genus. The report by Millspaugh y Chase (1904) of A. mexicana as occurring in Yucatán was countered by Standley (1930), who instead referred the voucher (Valdez 40) to A. vulgaris. Similarly, other literature reports are questioned and perhaps are based on vouchers I would determine as A. vulgaris.


Much like Artemisia ludoviciana: Faintly aromatic perennial herbs, 0.3-1.5(-2) m; stems several, erect, simple proximally becoming branched distally, glabrous to sparsely pubescent. Leaves 1-2-pinnatifid; blade usually 2-10 × (1-)2-8 cm, linear to ovate, base with 1-2 pairs of lobules, margins usually with 2-3 pairs of primary lobes, lobes to 20 mm diam., dentate. Involucre 2-3(-4) × 3-4 mm, campanulate; receptacle glabrous. Marginal florets 6-12; corolla c. 2 mm. Disk florets 5-15(-20); corolla 1.3-2.5 mm. Cypselae 0.5-1.2 mm, glabrous. 2n = 18, 36, 40, 54. Cultivated, and occasionally escaping. Y (Valdez 40, F); C (Rodriguez et al., 2003: 121); QR (Rodriguez et al., 2003: 121); G (Nash, 1976e: 389); H (Nelson Sutherland, 2008: 150); CR (Standley, 1938: 1432). 0-1500 m. (Native to Europe; introduced to Canada, United States, Mexico, Mesoamerica, sporadic in Andean South America; Asia.)

Neotropical material that I would call Artemisia vulgaris is often identified as A. verlotiorum Lamotte.

5. Chrysanthemum L., type cons.

Dendranthema (DC.) Des Moul., Pyrethrum sect. Dendranthema DC.

Por J.F. Pruski.
Perennial herbs to subshrubs, commonly somewhat basally lignified and stoloniferous; stems erect, few-branched to densely branched in some cultivated forms, subterete to strongly angled, commonly pubescent, some trichomes dolabridiform. Leaves often incised or lobed, less commonly entire, surface pubescence of some dolabridiform trichomes. Capitulescence laxly corymbiform or monocephalous, usually long-pedunculate, generally held above the subtending leaves. Capitula radiate, numerous-flowered; involucre hemispherical; phyllaries imbricate, graduated, few-seriate, generally with dark brown margins, ours with inner phyllaries dilated apically; receptacle flat to convex, eulate. Ray florets uniseriate or in extreme cultivated forms pluriseriate; corolla commonly white, pink, or yellowish, limb mostly narrowly oblanceolate to oblong. Disk florets many; corolla tubular-funnelform, 5-lobed, yellow, commonly glandular; anther appendage narrowly acute; style shortly bifid. Cypselae isomorphic, obconical and sometimes curved, exalate, faintly 5-8-striate, transversely rugulose, thin-walled, generally with myxogenic cells in vertical lines; pappus absent. Aprox. 37-41 spp. Mostly Asian, one spp. extending into eastern Europe; a few commonly spp. cultivated and occasionally adventive.

*Chrysanthemum* when typified by *C. coronarium* was treated by Bremer y Humphries (1993) as containing only two species, with 150+ former species transferred to other genera. Among the largest genera newly recognized by specialists was *Dendranthema* (DC.) Des Moul., which included many of the well-known ornamental species, including our species. Other large segregate genera also now recognized are *Argyranthemum*, *Leucanthemum*, and *Tanacetum*. The generitype of *Chrysanthemum* was, however, recently conserved as *C. indicum* (Greuter et al., 2000), which also typifies the later *Dendranthema*. The former lectotype of *Chrysanthemum*, *C. coronarium*, is excluded and treated here as a species of *Glebionis*.

*Chrysanthemum* is closely related to *Tanacetum*, but differs from *Tanacetum* by thinner-walled epappose cypselae with myxogenic cells. *Chrysanthemum* is also closely related to *Glebionis*, but differs from *Glebionis* by isomorphic (vs. dimorphic) cypselae with transversely rugulose (vs. +/- smooth) surfaces. *Chrysanthemum* is perhaps paraphyletic in that some of it species may be more closely related to discoid *Ajania* than to the core of *Chrysanthemum* (Bremer y Humphries, 1993).


(1992). N.v.: Chrysanthemum, crisantemon, margarita, rosa de novia, H; margarita, N; crisántemo, CR.


Perennials, usually herbs to infrequently subshrubby in cultivated forms, 0.2-1(-1.5) m; stems crisped-pubescent, trichomes mostly subappressed, when ascending < 0.5 mm. Leaves petiolate, commonly basally auriculate; blade 2.5-6(-10) × (0.5-)2-5(-7) cm, pinnatifid usually with 2 pairs of subopposite lobes, abaxially pubescent, often glandular, adaxially glabrous or weakly puberulent, basally attenuate, distal pair of lobes larger than proximal pair, commonly ovate or obovate in outline, lobes to c. 2.5 cm, entire or more commonly coarsely and unevenly dentate or secondarily lobed, secondary lobes to 5 mm; petiole 0.5-2(-3.5) cm. Capitulescence most commonly of 1-10 capitula, or to c. 100+ capitula in extreme cultivated forms; peduncles 2-10(-21) cm, pubescent, often 1-2-bracteolate, bracteoles 0.5-1 cm, lanceolate. Capitula c. 3-8(-15) cm diam. including ray corollas, showy, disk convex; involucre mostly to 1 × 3 cm; outer phyllaries 3-6 × ≤ 1 mm, lanceolate to oblong, commonly with pubescent green mid-zone and thin hyaline margin; inner phyllaries 6-9 × 4-7 mm, ovate, margins broadly scarious-hyaline; receptacle 4-10 mm diam., convex. Ray florets 30-200; corolla tube 1.5-3 mm, commonly greenish, limb 15-40(-70) × 3-6 mm, linear-oblancoelate to oblong, generally white, fading to pink, less commonly yellow or violet, sometimes abaxially glandular. Disk florets to 100+, sometimes nearly lacking and represented by pluriseriate "rays" in extreme cultivated forms; corolla usually 3-5 mm, glandular, tube often greenish, limb usually yellow, lobes 0.6-1 mm. Cypselae c.1(-1.5) mm when fertile, often not forming in cultivated plants. 2n = 36, 52-56, 64, 72. Flowering year-round.

*Widely cultivated, sometimes persisting, pine-oak forests.* T (Cowan, 1983: 24 sub *Dendranthema morifolium*); Ch (Breedlove, 1986: 45 sub *Dendranthema morifolium*); G (Santos 2201, USCG); H (Molina 35142, MO); ES (Berendsohn y Araniva de González, 1989: 290-4 sub *Dendranthema grandiflorum*); N (Cardinal 4, MO); CR (Standley, 1938: 1441 sub *Chrysanthemum indicum*); P (D'Arcy 16394, MO). 90-1200 m. (Of parentage native to Asia; introduced into Estados Unidos, México, Mesoamérica, Andean South America [Colombia, Ecuador, Peru], Hispaniola; Europa, Africa.)

This species was first recognized as distinct from *C. indicum* by Ramatuelle (1792), who provided a detailed description under three simultaneously published valid homotypic names. *Chrysanthemum morifolium*, unknown in the wild in Asia, was derived in cultivation and is of mixed parentage of six species, with *C. indica* being the dominant parent. It encompasses both the
common potted chrysanthemum and the common fall-flowering Japanese chrysanthemums, of which hundreds of cultivars are known. This species is that used "en la elaboración de Sillestas" in Antioquia, Colombia. The name of its major parent, *C. indicum*, is often misapplied to our plants (Ramatuelle, 1792), but in the strict sense the later species is not found adventive in Americas. The report by Molina (1975) of *C. indicum* in Honduras is presumably in reference to material of *C. morifolium*. The name used for the species in *Dendranthema* was *D. grandiflorum*, but that epithet is blocked in *Chrysanthemum*.

6. *Cotula* L.


Por J.F. Pruski.

Reduced annual or perennial non-aromatic herbs, insect pollinated, fibrous-rooted, often rhizomatous or stoloniferous; stems decumbent (ours) to erect, simple or branched from base, generally glabrous; herbage with indumentum of simple trichomes. Leaves alternate or rosulate, 1-3-pinnatifid or less commonly entire, sessile to petiolate, commonly amplexicaul to sometimes sheathing, glabrous to pilose or strigose but not densely so, sometimes punctate-glandular. Capitulescence monocephalous, pedunculate; peduncles filiform (ours) or occasionally stout. Capitula disciform (ours) or very rarely obscurely radiate, small (ours to c. 2 mm at anthesis); involucre campanulate to hemispherical; phyllaries subequal, 2-3-seriate, elliptic-ovate, glabrous to weakly pilose, greenish, 1-3-striate, mostly apically rounded; receptacle flat, epaleate, glabrous or pilose, often roughened by persistent marginal floret pedicels. Ray florets 0. Marginal florets usually more than disks, pistillate, (1-)2-4-seriate, shortly pedicellate and about as long as disk florets; corolla usually absent (ours) with the short style naked on top of ovary, or corolla sometimes present (filiform-tubular, 2-4-lobed); style branches exerted, about as long as style shaft, apex obtuse to truncate, base often persistent but never spinescent, pedicels to c. 0.5 mm, sometimes noticeably tangentially flattened. Disk florets sessile on receptacle, bisexual or some seemingly functionally staminate, not much exerted from involucre; corolla funnelform to tubular-campanulate, (3-)4-lobed, cream-colored or sometimes yellowish, sometimes glandular, lobes often with central resin canal, base sometime abaxially saccate and reflexed over top of achene. Cypsela typically dimorphic, outer cypsela slightly pedicellate and obviously obcompressed, often broadly laterally winged, body brownish, wings lighter in color, surfaces smooth or glandular, sometimes with myxogenic cells, sometimes with linear mucilage glands, sometimes with apical shoulders bearing small cornicula, cornicula short, not rigid nor
spinescent; pappus absent (ours) or rarely present adaxially in outer cypselae. Aprox. 55 spp.
Mostly southern hemisphere and Old World, especially speciose in southern African; four spp. in
the Americas, two spp. native to the America.

Our species of *Cotula* were placed by Lloyd (1972) in *Cotula* sect. *Strongylosperma* (Less.)
Benth., which is characterized by pistillate florets without a corolla, and by disk florets fewer than
pistillate ones. The disk florets (at least of our two species) are perhaps functionally staminate, at
least their ovaries (cypselae) are never as long or as flattened as marginal cypselae, nor are they
winged. *Cotula coronopifolia* L. is characterized by erect subcarnose stems, entire to merely
lobed leaves, and capitula with only a single row of marginal florets and should be looked for in
Flora Area.

Vegetatively, the decumbent species with pinnatifid leaves resemble *Soliva* (also tribe
Anthemideae), more so by technical features of their discoid or disciform heads with
obcompressed cypselae, these laterally winged, and by truncate style branches. *Cotula* differs
from *Soliva* by cypselae lacking (vs. having) a rigidly persistent spinescent style. The decumbent
species are occasionally misdetermined as *Plagiocheilus* Arn. ex DC. (tribe Astereae), which is
similar in habit, head size, lack of pappus, female sterility of the inner florets, but *Plagiocheilus*
differs by radially compressed (vs. tangentially compressed) cypselae, marginal cypselae sessile
(vs. pedicellate), marginal florets with (vs. sometimes lacking) a corolla, and style branches with
triangular apical appendages (vs. truncate and without appendages in *Cotula*). Both *Soliva* and
*Plagiocheilus* should be looked for in Flora Area.


1. Capitulescences terminal, long-pedunculate, exserted from subtending leaves;
involucres 3-5 mm diam.; phyllaries 12-20; marginal florets 25-50+; cypselae rounded apically;
disk corollas 4-lobed; petioles sometimes few-pectinate.  

1. **C. australis**

1. Capitulescences mostly axillary, short-pedunculate, held within subtending leaves; involucres
≤ 2 mm diam.; phyllaries 10 or fewer; marginal florets 7-10; cypselae apically bicorniculate; disk
corollas 3-lobed; petioles basally entire.  

2. **C. mexicana**

1. **Cotula australis** (Sieber ex Spreng.) Hook. f., *Fl. Nov.-Zel.* 1: 128 (1852). *Anacyclus

*Cotula villosa* DC., *Lancisia australis* (Sieber ex Spreng.) Rydb., *Soliva tenella* A. Cunn.,
*Strongylosperma australe* (Sieber ex Spreng.) Less.
Infrequent delicate annual herbs 4-28 cm; herbage villous to sometimes glabrescent, trichomes patent or subappressed, to 1+ mm; stems diffuse, much-branched from base, laxly branched distally. Leaves cauline, petiolate or distal ones sessile; blade 1-3.5(-5) × 1-1.5 cm, deeply 2-3-pinnatifid into linear-lanceolate segments, elliptic-obovate or spatulate in outline, rachis c. 1 mm diam., lobes alternate or opposite, first-order segments 5-9, each usually secondarily deeply 3-6-parted, ultimate segments 1.5-4.5 × 0.6-1.2 mm, linear, acute, apiculate, individual trichomes often longer than lobes are broad; petiole sometimes few-pectinate, dilated basally, more or less sheathing. Capitulescence terminal, monocephalous, long-pedunculate, exserted from subtending leaves; peduncle 1-6 cm. Capitula c. 2 mm at anthesis, to c. 3 mm in fruit; involucre 3-5 mm diam., hemispherical; phyllaries 12-20, 1.7-2.2 × c. 1 mm, 2(-3)-seriate, green sometimes with greenish-white margins, midrib sometimes orangish, sparsely long-setose or more commonly glabrate; outer phyllaries narrower than inner, sometimes without obvious scarious margins, apex obtuse or sometimes acute; inner phyllaries with margins 0.1-0.2 mm diam., scarious, greenish-white, apex obtuse; receptacle glabrous. Marginal florets 25-50+, 2-3-seriate, without a corolla, styles 0.3-0.4 mm. Disk florets 20-45, seemingly bisexual; corolla 0.6-0.8 mm, funnelform to campanulate, 4-lobed, cream-colored; style included. Cypselae 1.1-1.5 × c. 0.7 mm, obovoid, rounded apically, the marginal cypselae pedicellate, pale brown with stramineous wings, wings c. 0.1+ mm diam., faces papillose, the inner cypselae dark brown, glabrous or nearly so. 2n = 36, 40. Flowering July, Nov. City lawns, volcano slopes. G (Pruski 4477, MO). 1500-2700 m. (Canadá, Estados Unidos, México, Mesoamérica, Colombia, Ecuador, Perú, Bolivia, Uruguay, Chile, Argentina; Africa, Asia, Australia, New Zealand, Islas del Pacífico.)


*Cotula minuta* (L. f.) Schinz (non G. Forst.); *Cotula pedicellata* (Ruiz et Pav.) Cabrera (non Compton); *Cotula pygmaea* (Kunth) Benth. et Hook. f. ex Hemsl. (non Poir.), *Gymnostyles minuta* (L. f.) Spreng., *Gymnostyles peruviana* Spreng., *Hippia minuta* L. f., *Lancisia minuta* (L. f.) Rydb., *Soliva minuta* (L. f.) Sweet., *Soliva pedicellata* Ruiz et Pav., *Soliva pygmaea* Kunth.

Infrequent low short-lived perennial fibrous-rooted herbs, sometimes seemingly nearly acaulescent or with slender leafy aerial stems ≤ c. 7 cm, stolons sometimes ≥ 15 cm, glabrous to slightly pilose. Leaves 1-3.5 × to c. 1 cm, 1-2-pinnatifid, often ob lanceolate in outline, petiolate; blade with lateral segments opposite or subopposite, c. 3-6 paired, entire or lobed, ultimate segments 3-6 × c. 1-2 mm, ob lanceolate, commonly 3-veined, lateral veins closely paralleling
margins, acute to obtuse, commonly spinulose-tipped; petiole 3-veined, base entire, dilated. Capitulescence mostly axillary, short-pedunculate, held within subtending leaves; peduncle 1-2 cm, sometimes villous, especially distally. Capitula ≤ c. 2 mm; involucre ≤ 2 mm, phyllaries 10 or fewer, to c. 1.5 × c. 0.4 mm, 2-seriate, glabrous to weakly pilose, hyaline margin sometimes apically violet; receptacle slightly setose, setae to c. 0.5 mm. Marginal florets 7-10, 1-2-seriate, without a corolla; styles to c. 0.3 mm. Disk florets 3-6, seemingly functionally staminate; corolla c. 0.8 mm, funnelform to tubular-campanulate, 3-lobed, cream-colored, style present, unbranched. Cypselae c. 1.5 × ≤ c. 1.1 mm, obovoid, partly greenish and resembling phyllaries, glabrous or rarely apically glandular when immature, apically bicorniculate. Flowering Apr, Sep. Between bricks in urban areas, stream banks in páramos, subparamo waterfalls. CR (Pruski et al. 3907, MO); P (Weston 10174, MO). 1400-3400 m. (México, Mesoamerica, Colombia, Venezuela, Ecuador, Perú, Bolivia, Chile, Argentina.)


Xantophtalmum Sch. Bip.

Por J.F. Pruski.

Annual or occasionally short-lived perennial herbs, tap-rooted; stems erect or decumbent with age, few-branched, striate, glabrous or weakly arachnoid pubescent; herbage when pubescent with simple trichomes. Leaves entire to deeply 3-pinnatifid, essentially sessile, subamplexicaule; blade oblanceolate to obovate in outline, surfaces eglandular, glabrous or sometimes arachnoid pubescent, base often with pectinate lobules. Capitulescence monocephalous or occasionally laxly corymbiform; peduncles stout, glabrous or occasionally puberulent, generally exserted from the subtending leaves. Capitula radiate, many-flowered; involucre hemispherical; phyllaries up to 50 or more, imbricate, graduated, few-seriate, scarious, broad, many veined, with hyaline margins especially broad on the innermost series, finely veined, often only midvein colored and obvious, inner phyllaries dilated apically; receptacle convex, ecapeate. Ray florets uniseriate; corolla commonly yellow (ours), sometimes white or cream-colored with red spot proximally, limb mostly oblanceolate, commonly eglandular abaxially. Disk florets many, bisexual; corolla tubular-funnelform, 5-lobed, yellowish, commonly very lightly glandular, tube sometimes compressed, lobes with central resin canal; anther appendage ovate, tip obtuse or broadly ovate. Cypselae dimorphic, sometimes with a ventral wing but wing not extending into a pappus corona, erugulose, without myxogenic cells; ray cypselae 3-angled, angles slightly (ours) to strongly winged; disk cypselae cylindrical to prismatic, surface undulating and seemingly costate; pappus
absent. 2-3 spp. Native to Mediterranean Europa, Asia Minor, and Africa; two spp. are widely
naturalized, one more common in temperate areas, and ours more common in subtropical and
tropical; both widely cultivated and naturalized in the Americas.

The annual or short-lived perennial species of *Chrysanthemum* s.l. are recognized here under
the segregate genus *Glebionis*. Included among these is *C. coronarium*, which was cited as the
generic lectotipo of *Chrysanthemum* (Britton y Brown, 1913; Jarvis et al., 1993), a
lectotypification now conserved against (Greuter et al., 2006). *Glebionis* differs from
*Chrysanthemum* by the technical features of dimorphic (vs. isomorphic), erugulose (vs.
transversely rugulose) cypselae. By its winged ray cypselae *Glebionis* is often mistaken for
*Argyranthemum* (and vice-versa), but in *Argyranthemum* the cypselae wings are contiguous with a
pappus corona.

Although *Chrysanthemum carinatum* Schousb. has been traditionally allied with the species
Turland (2004) noted that the lectotypes of our two species represent the same taxon, and
proposed a conserved type for *Chrysanthemum coronarium* to maintain traditional application of
the name.


1. Leaves deeply (1-)2-3-pinnatifid; cypselae obscurely costate, 1-winged.

   1. *G. coronaria*

1. Leaves unlobed or shallowly 1-pinnatifid; disk cypselae 10-costate, unwinged.

   2. *G. segetum*

coronarium L. *Sp. Pl.* 890 (1753). Type cons. : Greece, Kyriakopoulos y Turland sub Turland
H; conchita, CR.

   *Matricaria coronaria* (L.) Desr.

   Coarse annual or short-lived perennial herbs to c. 1 m; stems erect or decumbent, glabrous or
arachnoid pubescent. Leaves to 7 × 4 cm, deeply (1-)2-3-pinnatifid, oblanceolate to oblong in
outline, rachis narrow, base pectinate with c. 6 pairs of primary lobes usually 0.5 cm, distal 2/3's
of blade usually with up to 4 pairs of subopposite lobes to 2 cm; distal leaves usually to c. 2 cm,
commonly 1-pinnatifid. Capitulescence monocephalous to occasionally laxly corymbiform in
distal few nodes; peduncles to c. 10 cm. Capitula c. 100+-flowered, disk convex; involucre (7-
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10-15(25) mm diam.; phyllaries c. 3-seriate, ovate with large hyaline rounded apices; outer phyllaries to 5 × 2.5 mm, basal central portion to c. 3 mm, herbaceous to scarious; inner phyllaries to 10 × 5 mm, the hyaline apex often to 5+ mm. Ray florets 15-25; corolla yellow or sometimes fading to white at apex, tube 3-4- mm, limb mostly 10-15(-20) × 3-5 mm, c. 10-veined, apex to 5 mm diam., truncate or variously dentate. Disk florets numerous; corolla c. 5 mm, lobes c. 0.5 mm, papillose within. Cypselae body 2-2.5 × 1.5-2 mm, brownish, prominently 1-winged adaxially, wing to 1.5 mm diam., obscurely costate, faces glandular, carpopodium to 1 mm diam., stramineous; ray cypsela obconic-triquetrous; disk cypsela adaxial rib often subalate. 2n = 18. Flowering Mar. Cultivated areas, disturbed areas. T (Turner, 1996: 81 84 sub Chrysanthemum coronarium); Ch (Breedlove 50500, CAS); H (Clewell, 1975: 166 sub Chrysanthemum coronarium); ES (Standley y Calderón, 1941: 277); CR (Standley, 1938: 1441 sub Chrysanthemum coronarium). 500-1500 m. (native of Europa; introduced and escaping in Canadá, Estados Unidos, México, Mesoamerica, Ecuador, Perú, Bolivia, Chile, Greater Antilles; Africa, Islas del Pacífico.)

This species is commonly naturalized wherever cultivated. Glebionis coronaria is treated broadly here, but color forms are sometimes recognized (e.g., Turland, 2004) as varities in the Old World.


Matricaria segetum (L.) Schrank, Pyrethrum segetum (L.) Moench, Xantophtalmum segetum (L.) Sch. Bip.

Much like Glebionis coronaria: Herbs 0.2-0.6(-0.8) m. Leaves to 12 cm, unlobed or shallowly 1-pinnatifid, oblong, lobes 1-4 per margin. Involucre 8-12 × 13-20 mm diam.; phyllaries 3.5-9 mm. Ray florets 1-15; corolla 10-20 mm. Disk florets: corolla 4-4.5 mm. Disk cypselae 2-3 mm, 10-costate, unwinged. 2n = 18. Cultivated areas, perhaps escaping. ES (Standley y Calderón, 1925: 218). Mid elevations. (native of Europa; introduced and escaping in Canadá, Estados Unidos, México, Mesoamerica, Colombia; Africa, Asia, Australia, New Zealand, Islas del Pacífico.)

8. Leucanthemum Mill.

Por J.F. Pruski.
Annual or perennial sometimes aromatic herbs, rhizomatous, roots red-tipped; stems usually 1, erect, simple or few-branched from base, angled, striate, glabrous to hispid; herbage when pubescent with simple trichomes. Leaves simple and entire to pinnatifid, sessile or petiolate; blade surfaces eglandular, glabrous to puberulent; petiole winged or not so. Capitulaceous monocephalous, rarely laxly corymbiform, generally long-pedunculate and held well above the stem leaves. Capitula radiate, rarely discoid, many-flowered; involucre hemispherical; phyllaries many, imbricate, graduated, 3-4-seriate, lanceolate, scarious, one-veined, distally and apically with hyaline margins, this sometimes drying brownish, apex not broadly dilated; receptacle convex or sometimes conical, epaleate. Ray florets (13-)20-40+; corolla usually white, sometimes white with tube green, limb elongate, much longer than broad, mostly oblanceolate, adaxially surface markedly papillate throughout, eglandular abaxially. Disk florets 100+, bisexual; corolla tubular-funnelform, 5-lobed, mostly yellow, sometimes yellow with green tube, tube not winged, sometimes basally inflated or saccate abaxially and covering abaxial apex of the achene; anther appendage apex obtuse or broadly acute. Cypselae isomorphic, obconical, exalate, strongly c. 10-costate, surface brown, thick-walled, generally with myxogenic cells, the ribs evenly spaced, stramineous, prominent at maturity; pappus absent to squamulose, ray cypselae sometimes with a few inconspicuous squamellae adaxially, disk cypselae sometimes with an adaxial auricle. $x = 9$. Aprox. 35-43 spp. Most spp. in Europa and North Africa, with a few in North America; 2 spp are naturalized in the Neotropics.

*Leucanthemum* is a long-time segregate of *Chrysanthemum*, differs from it slightly by having red (with anthocyanin) root tips. Two of the most widely known species of *Leucanthemum* are naturalized in Mesoamérica. In Mesoamérica plants of these two species have often been lumped into *L. vulgare* (generitype) (e.g. D'Arcey, 1975; Nash, 1975; Berendsohn y Araniva de González, 1989), although Standley (1938), Clewell (1975), and Molina (1975) treat the second species as *Chrysanthemum lacustre* (now known as *L. × superbum*). Notable features of the genus is the strongly papillose adaxial surfaces of the ray corolla limbs, a common feature in tribe Anthemideae, but not as obviously manifest as it is here.


1. Plants hirsute or glabrous; stems 4-10 mm diam. at base; leaves sessile, more or less evenly serrate, teeth c. 10-25 per margin, 1-2.4 mm; disk corollas 4-5 mm; ray cypselae pappus squamellae 1-2 mm.  

1. *L. × superbum*
1. Plants glabrous or puberulent; stems 2-3(-4) mm diam. at base; basal leaves often petiolate, marginal lobes or teeth irregularly spaced, usually 8 or fewer per margin, 2-6 mm; disk corollas c. 2.5(-3) mm; pappus of ray cypselae absent or of squamellae to c. 0.7 mm.

2. **L. vulgare**


Perennial herbs, commonly 50-100 cm, glabrous or hirsute; stems 4-10 mm diam. at base, often distally branched, basal leaves usually lacking at anthesis. Leaves (1-)4-20 × (0.5-)1-4 cm, sessile, basally clasping or basal ones long-attenuate and seemingly petiolate, oblanceolate, thickly chartaceous or subcarnose, nitidous, margins more or less evenly serrate, teeth c. 10-25 per margin, 1-2.4 mm. Capitulescence long-pedunculate; peduncles commonly 5-20 cm, moderately stout. Capitula usually 4-8 cm diam. including rays, showy, radiate, disk convex; involucre commonly 10-20 mm diam.; phyllaries usually c. 35-50, 5-10 × 2-3 mm, c. 3-seriate, the hyaline margin commonly less than 1 mm diam.; receptacle usually 1-2 cm diam., convex. Ray florets 25-40+, uniseriate or sometimes pluriseriate in cultivated forms; corolla white or mostly white with tube green, tube c. 1.5 mm, limb 20-40 × to c. 6 mm, apex shallowly and irregularly 2-3-dentate. Disk florets commonly well more than 200; corolla 4-5 mm, tubular-funnelform, lobes c. 0.5 mm; style branches c. 0.5 mm. Ray cypselae 2.2-2.7 mm, pappus of a few elongate squamellae, squamellae 1-2 mm; disk cypselae 2.4-3 mm. Flowering Mar-Aug, Nov. *Cultivated areas, volcano slopes, upland meadows, disturbed moist sites, moist forests, occasionally weedy on road banks, commonly cultivated and now naturalized*. Ch (Breedlove 39777, MO); G (Véliz y Rosito MV99.7003, MO); H (Montoya 173, MO); ?ES (Berendssohn y Araniva de González, 1989: 290-7 sub *Chrysanthemum lacustre*); CR (Wunderlin et al. 706, MO); P (D'Arcy y Hammel 12482, MO). (1000-)1500-3200 m. (Canadá, Estados Unidos, México, Mesoamerica, Colombia, Ecuador, Perú, Brazil, Argentina, Hispaniola; Europa, Asia, Madagascar, Australia, New Zealand, Hawaii.)

*Leucanthemum × superbum* has many usage synonyms and has been variously identified in the literature. Some of the more common published presumed misapplications include *Chrysanthemum lacustre* Brot. (e.g., Clewell, 1975), *C. leucanthemum* L. (e.g., in D'Arcy, 1975; Nash, 1975), and *Leucanthemum maximum* (Ramond) DC. (e.g., Ingram, 1975; Soreng y Cope, 1993). However, this widely known escaping ornamental, which has been in cultivation for about
200 years, in now determined as *Leucanthemum × superbum* [e.g., Jeanes in Spencer (editor) 2002].

*Leucanthemum × superbum* is a stable garden hybrid probably with parentage of *L. lacustre* and *L. maximum*, the latter both occasionally cultivated in their native ranges in the Iberian Peninsula in Europa (Ingram, 1975; Soreng y Cope, 1993). The species appears to be the more common species of the genus in Mesoamérica, except on slopes of volcanoes in Costa Rica, where *L. vulgare* is more frequently encountered.


Perennial herbs commonly 25-60 cm, glabrous or puberulent; stems 2-3(-4) mm diam. at base, commonly simple or few branched distally, basal leaves often present at anthesis. Leaves 2-7(-11) × 0.3-1 cm, petiolate to sessile, chartaceous, marginal lobes and teeth usually 8 or fewer per margin, 2-6 mm, irregularly spaced; basal leaves often petiolate, blade to 7(-11) cm, often spatulate, petiole to c. 3.5(-8) cm; distal leaves sessile, clasping, sometimes pectinate, occasionally subentire. Capitulescence long-pedunculate; peduncles commonly 1-13 cm, somewhat slender. Capitula usually less than 4 cm diam. including rays, showy, radiate, disk convex; involucre commonly 10-20 mm diam.; phyllaries usually c. 30-40, 2.5-8 × 1-2.5 mm, c. 3-seriate, the hyaline margin to 1.5 mm diam.; receptacle usually 0.4-1.2 cm diam., convex. Ray florets 20-30; corolla white, tube 1-1.5 mm, limb 10-30 × to c. 4.5 mm, c. 10-veined, apex shallowly 3-dentate. Disk florets usually 100+; corolla c. 2.5(-3) mm, lobes c. 0.5 mm, style branch c. 0.4 mm. Cypselae c. 1.5(-2) mm, pappus in ray cypselae absent or of squamellae to c. 0.7 mm. 2n = 18, 36. Flowering Sep-Nov, Feb-Mar, Jun. *Volcano slopes, moist forests, road banks, occasionally cultivated.* Ch (Turner, 1996: 81); ?G (Nash, 1976: 389); ?H (Clewell, 1975: 166 sub *Chrysanthemum leucanthemum*); ?ES (Berendsohn y Araniva de González, 1989: 290-7); CR (*Pruski et al.* 3831, MO). 1200-3300 m. (native of Europa; Estados Unidos, México, Mesoamerica, Colombia, Venezuela, Ecuador, Perú, Bolivia, Brasil, Chile, Argentina, Chile, West Indies; now a nearly cosmopolitan weed.)
This species is often an aggressive weed on volcano slopes and in the flora area is known to me from only Costa Rican material. The reports of this species in Guatemala, Honduras, and El Salvador are possibly based on misdeterminations of \( L. \times superbum \), which is known from each of these areas. The voucher documenting the report of \( C. leucantherum \) in Panamá by D'Arcy (1975) and Correa et al. (2004) has been redetermined here as \( L. \times superbum \).


*Chamomilla* Gray

Por J.F. Pruski.

Annual or short-lived perennial herbs, tap-rooted, often aromatic, insect pollinated, glabrous or less commonly pubescent; stems more or less erect, branched, subterete; herbage when pubescent with simple trichomes. Leaves 1-3-pinnatisect, sessile or petiolate, subamplexicaule, base narrowly fringed by decurrent blade; blade surfaces eglandular, segments commonly linear. Capitulescence commonly loosely corymbiform to less commonly monoecephalous; peduncles commonly pubescent, ebracteolate. Capitula radiate or sometimes discoid to disciform; involucre campanulate to hemispherical; phyllaries imbricate, subequal or a few outer phyllaries about 1/2 as long, c. 2-4-seriate, commonly +/- narrow, glabrous or weakly puberulent, mid-zone greenish, margins stramineous-hyaline, rounded apically; receptacle conical (ours) or less commonly merely convex, epaleate, fistulose. Ray florets commonly present, pistillate; corolla white, tube sometimes tangentially flattened, limb adaxially papillose, abaxially eglandular. Marginal florets (when capitula disciform): corolla greenish-yellow. Disk florets numerous, bisexual; corolla tubular-funnelform, sometimes tangentially flattened, yellow to greenish-yellow, occasionally glandular, tube swollen in fruit, lobes 4-5(-6), rarely with resin canals; anther bases obtuse, apical appendage narrowly delate, connectives sometimes resiniferous; style branches to c. 0.3 mm. Cypselae isomorphic, obconical and slightly obcompressed, exalate, sessile on receptacle, basally arcuate, apices often obliquely truncate, moderately 3-5-costate adaxially, surface smooth between nerves, glabrous or finely glandular, without large apical resinous sacs, generally with myxogenic cells, light brown, nerves cream-colored; pappus absent or coroniform. Aprox. 6-7 spp. Cosmopolitan, 1 spp. is commonly cultivated, 3 spp. in the Americas; both spp. in the Neotropics are nearly cosmopolitan and widely naturalized (one is native to W. North America) in the Americas.

The nomenclature and application of the name *Matricaria* and of several species within the genus have been unstable historically. Linnaeus treated five species in the genus in 1753, of
which only two are still referred to the genus. *Matricaria chamomilla* and *M. recutita* were simultaneously validated in *Species Plantarum*, leading to some confusion historically (viz Applequist, 2002). Linnaeus subsequently changed his circumscription of the two most widespread species by proposing two new names, reversing the circumscription of *M. chamomilla*, and dropping *M. recutita* from further usage.

Two different generic lectotipos have been proposed (viz Hitchcock y Green 1929; Jeffrey, 1979) for *Matricaria*. One proposed genericitype (*M. recutita*) has no original material, and the protologue and much original material of the second (*M. chamomilla*, lectotypified by Grierson, 1974) disagrees with the genus description (viz Jeffrey, 1979). Consequently, the name *Matricaria* was rejected as a nom. confusum in favor of the later *Chamomilla* by Rauschert (1974). In turn, Turner (1996) used the names *Chamomilla recutita* and *Chamomilla suaveolens* for our two Mesoamerican Matricarias. Here, I use neither the genus nor species names opted for by Turner (1996), but instead I follow Greuter et al. (2006) and recognize *Matricaria* as typified by *M. recutita*, albeit a synonym of *M. chamomilla*. I recognize our second species as *M. discoidea*, but excluded *M. matricarioides* from synonymy of it. I agree with Gandhi y Thomas (1991) and consider *M. matricarioides* Less. as a replacement name for *Tanacetum pauciflorum* Richardson, and treat both as a taxonomic synonyms of temperate North American *T. huronense* Nutt.

*Matricaria* is similar in dissected leaves, epaleate receptacles, and white ray corollas to *Tripleurospermum* Sch. Bip., another chamomile which differs by having a solid receptacle, corolla lobes with an obvious central resin canal, and abaxial-apical resiniferous cypselae rugulose between the costae.


1. Capitula radiate; peduncles mostly 2-7 cm; leaf segments finely 3-veined; disk corollas commonly 5-lobed; pappus often irregularly coroniform, crowns (0-)0.2-0.6 mm.
   1. *M. chamomilla*
   2. *M. discoidea*


Annual aromatic herbs 20-60 cm, glabrous to less commonly weakly pubescent; stems few to several branched, striate. Leaves usually 2-4(-6.5) × 1-2 cm, mostly deeply 2-pinnatisect, more or less obovate in outline, basally pectinate, pectinate segments often clustered near stem, individual distal segments 2-15 × c. 0.5 mm, linear to filiform, widely spreading, finely 3-veined, margins entire, apex often aciculate. Capitulescence open-corymbiform, commonly several-capitulate; peduncles commonly 2-7 cm, slender, glabrous or nearly so. Capitula usually 3-8 mm, radiate, disk short-conical; involucre 2-3 × 4-7(-8.5) mm, broadly campanulate or hemispherical; phyllaries 25-35+, 2-3.2 × c. 1 mm, 2-3-seriate, oblong to oblanceolate; receptacle to c. 5 mm in fruit. Ray florets 10-15(-25); corolla white, often soon deflexing as receptacle elongates, tube to c. 1 mm, often compressed, limb 5-8 × 2-3.3 mm, ob lanceolate or oblong, exserted from the involucre, faintly 5-7-veined, apex truncate or shortly 3-toothed. Disk florets commonly 200+, rarely a few central-terminal florets filiform-sterile and resembling paleae; corolla 1.2-1.7 mm, commonly 5-lobed, yellow, lobes c. 0.2 mm, erect. Cypselae 0.8-0.9 mm, rarely with linear rust-colored mucilage glands; pappus often irregularly coroniform (ours) or sometimes absent, crown 0.2-0.6 mm, with or without lateral elongations, lighter in color than cypselae. 2n = 18, 36. Flowering Mar-Nov. Roadsides, clearings, burned areas, near wet areas, hillsides. Ch (Breedlove y Raven 13984, NY); G (Lundell y Contreras 20901, MO); H (Valerio Rodriguez 3156, MO); ES (González JCG00291, MO); N (Rueda et al. 13194, MO); CR (Hammel y Aguilar 18571, MO). 900-3900 m. (native of Europa; Estados Unidos, México, Mesoamerica, Colombia, Ecuador, Perú, Bolivia, Brasil, Uruguay, Paraguay, Chile, Argentina, Hispaniola; Africa, Asia, Australia.)

This is the common nearly cosmopolitan Manzanilla (English: false chamomile) that is used in natural medicine and as a tea. The cypselae crown in Neotropical plants has a tendency to be much larger than in plants from North America and Europa, and this form has occasionally recognized
been as *M. chamomilla* var. *coronata*. However, pappus feature are perhaps not consistent, and varieties are not recognized, but rather are loosely treated within the broadly defined species.

*M. chamomilla* is vegetatively very similar to *Anthemis cotula* and some material of *M. chamomilla* from Chiapas (e.g., Breedlove y Raven 13984); was distributed as *Anthemis cotula*. Also similar are the scentless chamomiles *Tripleurospermum inodorum* (L.) Sch. Bip. and *T. maritimum* (L.) Sch. Bip., which should be looked for as naturalized in the Flora Area.


Annual herbs 4-30(-45) cm, pineapple-scented, glabrous or nearly so; stems branched from base, somewhat fleshy, sometimes weakly striate. Leaves mostly 1-3(-5) × 0.5-2 cm, mostly 2-pinnatisect, more or less elliptic in outline, commonly basally pectinate, pectinate segments not clustered, individual distal segments usually 5-10 × c. 0.5 mm, linear to filiform, directed forward, 1-veined, margins entire, apex often apiculate. Capitulescence corymbiform, commonly several-capitulate; peduncles commonly 0.3-2 cm, stout, occasionally villosulous. Capitula usually 5-10 mm, typically discoid, rarely disciform by marginal florets with non-functional anthers, disk conical, involucre mostly 2.5-3.7 × 4-7 mm, broadly campanulate or hemispherical, about 1/2 as long as capitulum; phyllaries 25-35+, mostly 2.5-3.7 × 1.2-2 mm, mostly subequal or a few outer phyllaries about 1/2 as long, 2-3-seriate, with central greenish vein, otherwise more or less stramineous, most phyllaries broadly ovate or subrectangular or a few outer inner phyllaries lanceolate; receptacle elongating with maturity to c. 7 mm. Ray florets 0. Disk florets 100-250+, bisexual or rarely outer ones functionally pistillate, outer most about as long as involucr, inner ones exserted from involucr by conical receptacle; corolla 1.1-1.3 mm, commonly 4-lobed, throat sometimes glandular, lobes c. 0.2 mm, often reflexed. Cypselae 1-1.2 mm, lateral ribs each with a linear rust-colored mucilage gland often c. 1/2+ as long as cypsela; pappus essentially obsolete, represented by minute (≤ c. 0.1 mm) corona. 2n = 18. Flowering Jul-Sep. *Disturbed areas in and near towns*. Ch (Breedlove 10475, CAS); G (Véliz 95.4993, MO). 100-2400 m. (Canada, Estados Unidos, México, Mesoamerica, Chile, Argentina, Chile; Europa, Asia, África, Australia, New Zealand.)
Aromatic annual or perennial herbs (ours), less commonly subshrubs, rhizomatous, insect pollinated; stems decumbent to erect, branched, subterete, commonly striate-costate, glabrous or pubescent; herbage when pubescent with simple trichomes (ours), infrequently with stellate trichomes. Leaves sometimes deeply pinnatifid, commonly petiolate, rarely rosulate; blade pinnatifid to 1-3-pinnately dissected, occasionally merely lobed or toothed, commonly elliptic in outline, commonly punctate-glandular (ours). Capitulescence corymbiform or sometimes monocephalous, pedunculate, generally held above the subtending leaves. Capitula radiate to disciform or discoid, many-flowered; involucre hemispherical to campanulate; phyllaries imbricate, graduate to subequal, 2-3(-5)-seriate, lanceolate to obovate, hyaline margins commonly brownish, ours not dilated apically; receptacle usually convex, less commonly flat or conical, epaleate or less commonly paleate or hairy, sometimes tuberculate. Ray florets (0-)10-21+, pistillate or rarely sterile; corolla usually yellow or white, limb mostly oblong. Marginal florets (when capitula disciform) 8-30, bisexual; corolla nearly actinomorphic, 3-4-lobed, commonly yellow. Disk florets 60-200+, bisexual; corolla usually narrowly funnelform, tube cylindrical, 5-lobed, yellowish, commonly lightly glandular; anther appendage elongate; style slightly basally swollen. Cypselae isomorphic, cylindrical to obovoid when mature, exalate, (3-)5-12-costate, costae usually regularly spaced, pale, commonly glandular, otherwise glabrous, without myxogenic cells; pappus +/- minutely coroniform, less commonly of free squamae, rarely an adaxial auricle or absent. $x = 9$. Aprox. 160 spp. (variously circumscribed historically). Most spp. native to Eurasia, a few are North African or North American; several spp. are widely cultivated; aprox. 3 spp. naturalized in the Neotropics.

*Tanacetum cineareifolium* (Trev.) Sch. Bip. is infrequently cultivated in Mesoamérica, and is characterized by deeply pinnatisect leaves, radiate capitula, and white ray corollas. This is the species cultivated commercially for extraction of insectidal pyrethrins. Other members of the genus are used by native cultures as insect repellents.

1. Capitula disciform.
1. Capitula radiate.

3. *T. vulgare*
2. Leaf blades deeply 2-pinnatifid; ray corollas usually reddish, limbs 11-15 mm.


Like *T. parthenium*: Herb to 0.6 m. Leaf blade deeply 2-bipinnatifid. Capitula radiate, disk convex; involucre 12-15 mm diam. Ray florets 20-30; corolla usually reddish, limb 11-15 mm. Widely cultivated for cut flowers. T (Cowan, 1983: 24). 0-100 m. (native of Europa; cultivated and sometimes persisting in Canadá, Estados Unidos, México, Mesoamerica, Greater Antilles; Africa, Asia, Australia, New Zealand, Islas del Pacífico.)


*Aphanostephus pinulensis* Coult., *Chrysanthemum parthenium* (L.) Bernh., *Pyrethrum parthenium* (L.) Sm.

Perennial aromatic herbs ≤ c. 0.6(-1) m; stems erect, puberulent to glabrate. Leaves petiolate; blade to c. 8 × 6 cm, 1-pinnatifid or shallowly 2-pinnatifid, ovate in outline, venation pinnate, surfaces commonly puberulent, primary lobes 2-4 × 0.5-1 cm, ovate, in 2-5 subopposite pairs, apices rounded; petiole 0.2-2(-3) cm, commonly narrowly winged. Capitulencescence laxly corymbiform, 10-30-capitulate from the distal nodes; peduncles usually 2-7 cm, ascending, puberulent, occasionally 1-2-bracteolate, bracteoles to 2 mm, linear-filiform. Capitula 5-7 mm, radiate, c 100+-flowered, disk convex; involucre 3-5 × 9-11 mm, hemispherical; phyllaries 2-4 × c. 0.5 mm, 2-3-seriate, lanceolate, glandular and puberulent, hyaline distal portions narrow, the outer phyllaries with central herbaceous mid-zone; receptacle commonly paleate. Ray florets 10-21, uniseriate (or pluriseriate in cultivated forms); corolla white, tube c. 1 mm, compressed, limb
4-7 × 2.5-3.5 mm, oblong to obovate, c. 5-7-veined, adaxially finely papillose, abaxially glandular, apex obtuse to rounded, shallowly 3-lobed. Disk florets 100+; corolla c. 1.6 mm, glandular, tube and throat not differentiated from each other, lobes c. 0.4 mm. Cypselae 1.1-1.5 mm, prominently 5-10-costate, glandular; pappus crown c. 0.1-0.2 mm. 2n = 18. Flowering Feb, Apr-Oct, Dec. Mountain slopes, mixed forests, humid forests, pastures, in and about towns. Ch (Matuda 776, MO); G (Smith 2407, US); H (Molina 34411, MO); ES (Villacorta y Calderón 385, MO); CR (Oersted 130, K); P (Dwyer 7014, MO). (?2-)1000-2300 m. (native of Europa; widely cultivated and naturalized in Canada, Estados Unidos, México, Mesoamerica, Colombia, Venezuela, Ecuador, Perú, Bolivia, Brazil, Chile, Argentina, West Indies; Asia, África, Australia, Pacific Islands.)


Chrysanthemum vulgare (L.) Bernh. [non (Lam.) Gaterau], Pyrethrum vulgare (L.) Boiss.

Stout perennial herbs 0.5-1.5 m; stems erect, costate tan, intercostae green, glabrate to more commonly puberulent with simple trichomes. Leaves mostly 4-15 × to 3-7 cm, 2-pinnatifid, elliptic to obovate in outline, surfaces glabrous to puberulent, primary lobes 1.5-5 × 0.5-1 cm, cut to near midrib, lanceolate, in 5-12 subopposite pairs, apices acute, primary lobes usually secondarily 5-8 serrate lobed about half way to rachillus. Capitulescence a flat-topped corymbiform-paniculate; peduncles usually 0.5-3 cm. Capitula 4-6 mm, disciform, disk low-convex; involucre 3-5 × 5–10 mm, hemispherical; phyllaries 2-3 × 0.5-1.5 mm, 3-seriate; receptacle epauleate. Ray florets 0. Marginal florets 20-50, 1-seriate; corolla 1.5-2 mm, cylindrical. Disk florets 150+; corolla 1.6-2.5 mm, narrowly funnelform, 5-lobed. Cypselae 1-2 mm; pappus crown c. 0.1 mm. 2n = 18. Frequently cultivated for cut flowers and quickly invasive. Ch (expected); G (expected); ES (expected); CR (expected). ?1000-?2500 m. (native of Europa; Canada, Estados Unidos, México, Mesoamerica, Colombia, Venezuela, Ecuador, Perú, Bolivia, Brazil, Chile, Argentina, West Indies; Asia, África, Australia, Pacific Islands; widely cultivated and quickly invasive.)

II. Tribus Arctotideae Cass.

Por J.F. Pruski.
Herbs to shrubs; herbage rarely milky. Leaves simple or lyrate-pinnatisect, alternate, sometimes spiny. Capitula radiate (Mesoamerica) or rarely discoid; phyllaries imbricate, free or connate, sometimes spiny; receptacle epaleate. Ray florets pistillate or less commonly sterile, uniseriate, staminodia sometimes present. Disk florets bisexual or less commonly functionally staminate; corolla 5-lobed; anthers ecaudate (Mesoamerica) or caudate and calcarate, endothecium cells thickenings radial (Mesoamerica) or polarized, apical appendage usually short and ovate, flat, thin, and wrinkled; style exappendiculate, truck short-papillose distally and also with a long-papillose annular ring distally, stigmatic surface continuous. Cypselae usually obovoid; pappus usually squamose. 17 genera, aprox. 215 spp. native to the Old World, mostly South African. 1 gen. and 1 sp. in Mesoamerica.

Species of African *Gazania* Gaertn. are often cultivated in the Neotropics, but are not known to escape and become naturalized.

1. **Arctotis** L.

*Venidium* Less.

Por J.F. Pruski.

Annual or perennial herbs to less commonly shrubs, often rosulate and scapose; herbage arachnoid to lanate and/or glandular. Leaves petiolate or sessile, unarmed. Capitulescence monocephalal; scape usually lanate and fistulous. Capitula radiate, many-flowered; involucre campanulate to hemispherical; phyllaries free, margins somewhat scarious; receptacle flat, alveolate, fimbriate, fimbriae sometimes squamulose. Ray florets pistillate; corolla yellow or white to purple or blue, limb oblong, 4-nerved, 3-4-denticulate. Disk florets: corolla funnelform, yellow to purple, lobes usually glandular, apex often dark-pointed; anther bases obtuse to rounded; style conspicuously thickened distally. Cypselae 3-5-ribbed, ribs crescent and becoming wing-like; pappus 1-2-seriate or rarely absent, usually of 5-10 hyaline scales about as long as cypselae body. $x = 9$. 50-60 spp. Southern Africa.

One species is cultivated and sometimes becomes naturalized in the Americas.


Arctotis grandis Thunb., Arctotis venusta Norl.

Perennial herbs, 0.2-0.6(-1) m, with woody taproot; stems sometimes prostrate basally to erect, leafy, few-branched; herbage white-gray-tomentose. Leaves 4-20 × 0.5-4.5 cm, narrow-ob lanceolate to spatulate, subsessile with a winged petiolariform base to distal most sessile and clasping, thick-chartaceous, 3(5)-nerved from distal 1/3-2/3 of blade, margins of distal 1/3-2/3 of blade undulate to 2-5-pinnatifid lobed, apex obtuse. Peduncle 5-15 cm. Capitule 1-2 cm; involucre 1.2-2.5 cm diam.; phyllaries graduated, c. 4-seriate, arachnoid; outer phyllaries 2-3 × c. 1 mm, lanceolate, sometimes spreading-reflexed, chartaceous, apex acute, sometimes herbaceous-tipped; inner series 10-15 × 2.5-6 mm, obovate, scarious-hyaline margins c. 0.5 mm diam., distal 1/3 thinly puberulent, apex obtuse, surfaces also sparsely glandular. Ray florets 15-30; corolla violet or purplish throughout or adaxial surface of limb white to pinkish, limb 15-30 × 2-4(-5) mm, denticulations c. 0.2 mm, abaxial surface sparsely glandular and sometimes arachnoid. Disk florets many; corolla c. 5 mm, narrowly funnelform, purple or infrequently yellow, lobes ca. 1.2 mm, lanceolate; anthers purple-black; style short-bifid. Cypselae 2-3 mm, long-sericeous, trichomes 2+ mm, faces dark, ribs and wings stramineous, at maturity abaxial face with 2 recessed dark oblong furrows bordered by thickened ribs/wings; pappus scales 3-4 mm, oblong. 2n = 18. Flowering July. Fields. G (King 3210, NY). 2300 m. (South Africa; cultivated and sometimes naturalized in Estados Unidos, Mesoamerica, Brazil, Uruguay, Argentina; Europe, Australia; and presumably elsewhere.)

Because I have not seen much material or relevant types, I prefer to circumscribe Arctotis stoechadifolia (syn.: A. grandis) in the traditional broad sense (as in Brown et al., 1992), thus I include the segregate A. venusta in synonymy. [As an aside I should say that the two most commonly used names given here in synonymy]. However, in the strict sense A. stoechadifolia could be seen as a narrow South African endemic characterized by having large capitula with broad-triangular second-series phyllaries. If we circumscribe A. stoechadifolia in such a narrow way, it seems A. venusta (described in 1965) would refer to the more widespread and often cultivated material, as applied by Cullen et al. (2000), unless for stability-sake (on a global scale) we propose a conserved type for A. stoechadifolia.

III. Tribus Astereae Cass.

Por J.F. Pruski.

Monoecious (infrequently dioecious or polygamdioecious), annual herbs to shrubs, infrequently trees or vines; stems leafy or sometimes leaves mostly basal, rarely leafless, usually non-thorny.
Leaves simple to sometimes pinnatifid, alternate (rarely opposite), petiolate or sessile, venation typically pinnate, rarely parallel-nerved. Capitulescence monocephalous to more commonly variously corymbiform or paniculate. Capitula typically bisexual and of one type on all plants, (infrequently unisexual and of two types on different plants), usually radiate or disciform, less commonly discoid; involucre cylindrical or more commonly campanulate to hemispheric, phyllaries usually many, usually unequal, imbricate, (2-)3-5+-seriate, herbaceous to chartaceous or chartaceous-scarious but not dry and rather scarious throughout, nerves usually not orange-resinous, margins sometimes scarious, apex acute to rounded; clinanthium usually flat to convex, less commonly concave or conic, epaleate (rarely paleate, in Mesoamerica only paleate in pistillate capitula of *Baccharis pedunculata* and *B. trinervis*), smooth or alveolate. Ray florets pistillate (rarely sterile); corolla yellow or white to bluish or sometimes reddish, limb usually 3-5-veined, apex acute to subtruncate. Marginal florets (in disciform capitula) pistillate, 1-3+-seriate; corolla actinomorphic, usually yellow or white. Disk florets usually bisexual, rarely functionally staminate or sterile; corolla (4-)5-lobed, usually yellow, often glandular, lobes short to less commonly long, erect to recurved; anther base obtuse to rounded (rarely caudate), apical appendage triangular to lanceolate, more or less flat, typically eglandular (rarely glandular), endothecial tissue typically with radial thickenings; style branches each with proximal 2-banded marginal stigmatic surfaces and a sterile, distal, deltate to lanceolate appendage (appendiculate) typically shorter than stigmatic lines, appendage abaxially papillose with usually rounded papillae, in late anthesis often pronate (crossing over). Cypselae usually monomorphic, terete and obconic to prismatic or less commonly compressed, usually 2-5-nerved, infrequently rostrate, usually setose, usually eglandular, sometimes glandular, carpopodium usually small and symmetric; pappus usually of persistent subequal scabrous bristles, the outer series sometimes of smaller scales or awns but not of membranous-scarious scales, sometimes all or some cypselae epappose. Aprox. 170-220 genera and 2800-3100 spp. Cosmopolitan, but mostly temperate; 23 gen in Mesoamerica with 82 spp., of these 30 spp endemic and 1 genus.

Bentham y Hooker (1873) recognized six subtribes of Astereae (including the often referred to homochromous and heterochromous generic groups), 90 genera, and 2400 species. Noyes y Rieseberg (1999) give evidence that suggests the tribe originated in Old World. Nesom (1994a) and Nesom (2000) recognized 14 subtribes, and more recently Nesom y Robinson (2007) recognized 18 subtribes. But as noted by Nesom y Robinson (2007), not all subtribal limits are fully resolved, and, for example, in South America Sancho et al. (2010) modified the circumscription of Podocominae and as a result of this floristic treatment I find in Mesoamerica
that *Osbertia*, placed in the Chrysopsidinae by Nesom y Robinson (2007), conflicts with the subtribe by its flat (not carinate) phyllaries and subequal (vs. unequal) pappus bristles.

The Astereae are particularly well-developed in Mexico and several extra-Mesoamerican genera occur south to Oaxaca and Veracruz. Such genera include, for example, *Aphanostephus* DC. (e.g., *A. ramosissimus* DC.) and species belonging to formerly broadly defined *Machaeranthera* Nees [e.g., *Leucosyris riparia* (Kunth) Pruski & R.L. Hartm], which should be looked for in Mesoamerica.

In Mesoamerica, the sole endemic genus of Astereae is *Westoniella*. The most speciose Mesoamerican Astereae genus is *Archibaccharis* with 19 species; *Archibaccharis* also has more (12) endemic species than any other genus. *Myriactis* and *Westoniella* are noteworthy for being highly endemic, with 11 of 12 species endemic to Mesoamerica. *Erigeron* is the second most speciose Astereae genus in Mesoamerican having 9 species, 5 of them endemic. About twenty percent of our Mesoamerican Astereae belong to either *Baccharis* and *Conyza*, but each is basically a weedy genus and neither have any endemics. Half of Mesoamerican genera of Astereae are represented by a single species, and of these perhaps most noteworthy is paleotropical-centered *Dichrocephala*, which only recently has been reported as a genus new to the Americas, and is known there from only two localities in Guatemala.

The generic key, in part, is modeled after those in Cuatrecasas (1969) and Nesom y Robinson (2007).


1. Plants dioecious or polygamodioecious (rarely monoecious, *Archibaccharis androgyna*, *Baccharis salicifolia* subsp. *monoica*); capitula unisexual or functionally unisexual, of two types usually on different plants.

2. Plants usually polygamodioecious; capitula usually disciform or sometimes radiate; staminate capitula disk floret anther appendages strongly apiculate. **1. Archibaccharis**

2. Plants usually dioecious; capitula discoid; pistillate capitula isogamous and corollas isomorphic; staminate capitula disk floret anther appendages acuminate to obtuse.

**3. Baccharis**
1. Plants monoecious; capitula bisexual, one type on all plants.

3. Capitula radiate, ray corollas yellow.

4. Herbage resinous; pappus absent, minutely coroniform, or of 2-4 basally caducous awns

5. Shrubs; leaf bases attenuate, margins entire; capitula 4-6 mm, indistinctly radiate, 7-15-flowered. 13. Gymnosperma

5. Perennial herbs; leaf bases subauriculate, margins usually serrate; capitula 10-15(-20) mm, conspicuously radiate usually > 100-flowered. 12. Grindelia

4. Herbage not resinous; pappus at least in disk cypselae containing persistent bristles.

6. Ray cypselae epappose, glabrous to infrequently strigillose; disk cypselae compressed. 14. Heterotheca

6. Ray cypselae pappose, strigose to sericeous; all cypselae terete.

7. Capitulescences of monocephalous capitula; phyllaries short-stipitate-glandular especially apically. 18. Osbertia

7. Capitulescences 3-numerous-capitulate; phyllaries usually eglandular, inner ones rarely short-stipitate-glandular apically.

8. Leaves sericeous; capitula mid-sized (10-16 mm, ray corollas 9-19 mm, limb obviously exserted); disk floret style branches filiform; pappus unequally 2-seriate. 19. Pityopsis

8. Leaves never sericeous; capitula small (3-7 mm, ray corollas 1.5-4(-5) mm, limbs short-exserted); disk floret style-branches lanceolate; pappus bristles subequal. 21. Solidago

3. Capitula disciform, or radiate and with ray corollas white to purplish or reddish.

9. Plants mostly leafless, sometimes thorny. 6. Chloracantha

9. Plants leafy, non thorny.

10. Capitula disciform or sometimes subradiate.

11. Cypselae epappose, low coroniform, or of 1-2(-few) short caducous smooth bristles.

12. Plants with leafy stems, usually erect or ascending. 8. Dichrocephala

12. Cushion-forming herbs, stems decumbent. 16. Laestadia

11 Cypselae with a pappus of bristles.

13. Phyllaries with nerves orange-resinous. 7. Conyza

13. Phyllaries nerves not orange-resinous.
14. Marginal florets with corollas filiform-tubular or less commonly filiform-subradiate; cypselae usually glandular distally. 15. Laennecia

14. Marginal florets with corolla limb tubular-bulbous, directed outwards (somewhat radiating); cypselae eglandular. 23. Westoniella

10. Capitula radiate.

15. Phyllaries with nerves orange-resinous. 11. Erigeron

15. Phyllaries nerves not orange-resinous.

16. Ray floret corollas usually reddish or purplish; cypselae with a pappus of caducous bristles. 5. Callistephus

16. Ray floret corollas white or blue; pappus of persistent bristles.

17. At least disk cypselae with a pappus of bristles.

18. Ray cypselae epappose. 20. Psilactis

18. All cypselae pappose.

19. Shrubs to trees. 9. Diplostephiun

19. Herbs. 22. Symphyotrichum

17. Cypselae epappose.

20. Herbage stipitate-glandular. 10. Egletes


21. At least ray cypselae with a densely glandular short rostrum.

17. Myriactis

21. Cypselae eglandular erosstrate.

22. Leafy herbaceous-stemmed subshrubs; phyllaries apices acute to acuminate. 2. Astranthium

22. Rosulate herbs; phyllaries apices usually obtuse.

4. Bellis

1. Archibaccharis Heering

_Hemibaccharis_ S.F. Blake

Por J.F. Pruski.

Polygamdioecious (rarely monoecious, _A. androgyna_, or andromonoecious in 3 extra Mesoamerican spp.) perennial herbs, shrubs, or vines (at maturity, although initially sometimes procumbent herbs); stems sometimes fractiflex (nodally deflected) or infrequently twining, typically eglandular, leaves usually gradually descrescent. Leaves simple, alternate, infrequently
sessile; blade broad, venation pinnate, 2° veins 3-7 per side, adaxial surface usually dull and not
nitidous, infrequently rugose, bases rarely auriculate-subamplexicaule. Capitulescence
corymbiform or corymbiform-paniculate, terminal or axillary. Capitula of two types usually on
different plants, typically either functionally staminate or functionally pistillate, small or medium-sized,
usually discoid or disciform, infrequently short-radiate with an obvious spreading corolla
limb in marginal florets, florets of the opposite sex (when present) typically sterile; phyllaries
imbricate, graduated, 3-6-seriate, mid-series and inner ones mostly lanceolate to linear-lanceolate,
outer sometimes ovate, mid-zone greenish, margins narrowly hyaline; receptacle flat to convex,
alveolate. Staminate capitula usually unisexual; involucre usually campanulate, usually shorter
than florets; marginal tubular-filiform or short-radiate florets usually absent, ovary sterile (rarely
fertile); disk florets functionally staminate, corolla usually salverform or campanulate,
infréquemment narrowly funnelform, 5-lobed, setulose especially proximally or medially, tube and
limb usually more or less subequal, lobes lanceolate or very infrequently triangular, anther
appendage strongly apiculate, style branches lanceolate to sometimes rhomboidal or infrequently
deltoid, finely papillose to less commonly strongly papillose. Pistillate capitula appearing
heterogamous (but functionally pistillate) or at least with heteromorphic corollas, style usually
obviously longer than corolla, infrequently short-radiate then with style typically shorter than or
more or less subequal to corolla; involucre often turbinate-campanulate, usually about as long as
florets; marginal pistillate florets few-several-seriate, corolla usually tubular-filiform with oblique
mouth or infrequently obviously short-radiate, setulose proximally, limb usually minute and erect,
infréquemment obviously expanded and spreading, style branches linear, glabrous; disks florets with
corollas as in staminate capitula. Cypselae ovate to elliptic (sterile ovary of disk florets
cylindrical), compressed, 2-5(-7)-nerved, hispidulous, sometimes sessile-glandular, somewhat
long-persistent on receptacle; pappus of 20-40 uniseriate capillary scabrid-barbellate bristles,
those of disk florets sometimes clavate, not greatly elongating in fruit. x = 9. Aprox. 30 spp.
Mexico and Central America.

This treatment is mostly adapted from Jackson (1975), but narrowed species limits of
Archibaccharis standleyi by Nash (1976) and of A. hirtella (DC.) Heering by Nesom (1988) are
used here. My floral measurements, however, tend to be smaller for any given taxon as compared
to those in Jackson (1975). Jackson (1975) recognized two sections, Nesom (1991) recognized six
sections, and sectional characters of both authors are incorporated into the present treatment.

1. Leaves sessile with broadly winged green petiolariform auriculate-clasping base; disk floret corollas narrowly funnelform, lobes short-triangular.  
**4. A. Blakeana**

1. Leaves subsessile or petiolate, base attenuate to cordate; disk floret corollas usually salverform or campanulate, lobes usually lanceolate.

2. Scandent shrubs or vines.

3. Leaf blades thickly chartaceous, 2° and 3° veins often raised adaxially.

4. Cypselae subglabrous, ≥ 4-nerved; disk florets of staminate with style branches narrowly oblong-lanceolate; Costa Rica.  
**8. A. Jacksonii**

4. Cypselae setulose, 2-3-nerved; disk florets of staminate with style branches oblong-rhomboidal; Mexico to Honduras.

5. Staminate capitula 3.7-4.3 mm; pistillate capitula 4.5-6 mm; pappus bristles brownish.

**13. A. Salmeoides**

5. Staminate capitula 5-6 mm; pistillate capitula 6.5-7.5 mm; pappus bristles typically stramineous.

**10. A. Lucentifolia**

3. Leaf blades moderately chartaceous, 2° and 3° veins usually not raised adaxially.

6. Leaves usually lanceolate, attenuate basally; stems twining.

**6. A. Flexilis**

6. Leaves usually elliptic to ovate, often obtuse basally; stems fractiflex.

7. Stems striate; adaxial leaf surfaces sessile-glandular, smooth.

**14. A. Schiedeana**

7. Stems terete; adaxial leaf surfaces eglandular, often rugulose.

**18. A. Taeniotricha**

2. Erect to arching subshrubs to shrubs.

8. Pistillate capitula short-radiate; cypselae glandular.

**9. A. Lineariloba**

9. Stems and leaf surfaces eglandular or sessile-glandular.

10. Leaf surfaces eglandular; staminate capitula discoid or disciform; disk corolla limbs essentially cut to base by the long lobes.

**11. A. Nicaraguensis**

10. Leaf surfaces usually sessile-glandular; staminate capitula short-radiate; disk corolla throats distinct, 1/2+ as long as lobes.
11. Leaves usually obviously petiolate, elliptic-lanceolate.

5. **A. corymbosa**

11. Leaves subsessile or short-petiolate, elliptic to elliptic-ovate.

17. **A. subsessilis**

8. Pistillate and staminate (or sometimes bisexual) capitula discoid or disciform; cypselae glandular or eglandular.

12. Leaves glandular either or both adaxially and abaxially.

13. Leaves abruptly descrescent immediately below the capitulescence; leaf blades (4-)6-16 cm, bases cuneate or broadly obtuse.

1. **A. aequivenia** (p.p.)

13. Leaves gradually descrescent into capitulescence; leaf blades 4-6 cm, bases cordate to rounded.

16. **A. standleyi**

12. Leaves eglandular, sometimes with granular (?submoniliform) trichomes or well-developed moniliform trichomes.

14. Leaves glabrous to nearly subglabrous.

15. Stems glabrous throughout; peduncles glabrous; leaf surfaces glabrous throughout; plants monoecious.

2. **A. androgyna**

15. Stems hirtellous at least in the capitulescence peduncles hirtellous; leaf surfaces glabrous or pubescent; plants polygamodioecious.

16. Leaves short-petiolate, 3° veins weakly prominulous but not obviously raised adaxially, petioles 1-4 mm.  

1. **A. aequivenia** (p.p.)

16. Leaves petiolate, 3° veins prominent and obviously raised adaxially, petioles 4-10 mm.  

19. **A. trichotoma**

14. Leaves pubescent.

17. Leaves with abaxial surfaces densely white-griseous-tomentose.

15. **A. serratifolia**

17. Leaves with abaxial surfaces subglabrous to densely pilosulose.

18. Disk floret corolla throats indistinct, minute, lobes incised nearly all the way to base of throat.  

12. **A. panamensis**

18. Disk floret corolla throats distinct, about as long as lobes.

19. Leaf blade bases usually acuminate to sometimes cuneate, margins usually serrate to serrulate; Mexico to Nicaragua.

3. **A. asperifolia**
19. Leaf blade bases usually cuneate or obtuse, margins usually subentire to serrulate; Costa Rica and Panama. 7. *A. irazuensis*


Erect subshrubs to shrubs 1.9-3 m; stems straight and not fractiflex, moderately to densely hirtellous-hirsutulous; leaves abruptly descrescent immediately below the capitulescence; herbage with trichomes c. 0.1-0.2 mm. Leaves short-petiolate; blade (4-)6-12(-16) × (0.8-)1.5-2.5(-3.5) cm, lanceolate to elliptic-lanceolate or sometimes elliptic-oblong, moderately to stiffly chartaceous, 3° veins weakly prominulous but not obviously raised adaxially, surfaces sparsely hispidulous or hirtellous (and then usually also sessile-glandular) to sometimes nearly subglabrous and only puberulent abaxially on larger veins (and then usually eglandular), base cuneate to broadly obtuse, margins subentire to few-serrulate or mucronulate apically, apex narrowly acute to attenuate or even subfalcate; petiole 1-4 mm, subterete to flattened. Capitulescence usually 10-20 cm diam., loosely corymbiform, rounded, several-many-capitulate, lateral branchlets few-several, relatively short, usually only about 1-1.5 × as long as subtending axillary leaves; peduncles to 15(-22) mm, often 1-bracteolate. Staminate capitula 4.5-6 × 3-5 mm, discoid or infrequently disciform; phyllaries hirtellous to subglabrous, green mid-zone moderately broad; sterile marginal florets 0-3, corolla c. 2.2 mm, about as long as longest phyllaries, tubular-filiform, white, limb 0-0.2 mm, indistinct; disk florets 20-30, corolla 3.2-4.3 mm, white, limb cut to near base by long lobes, lobes 1.6-2.3 mm, sparsely glandular-papillose apically, style branches narrowly lanceolate. Pistillate capitula 4-5 × 2.5-4 mm, disciform (indistinctly subradiate), phyllaries hirtellous to subglabrous; pistillate florets 26-31, corolla 2.7-3.5 mm, tubular-filiform (subradiate), white, limb 0.5-1.1 mm, erect and narrow, much shorter than the well-exserted styles, linear, erect; sterile disk florets 1-3, corolla 3.2-3.5 mm, corolla limb essentially cut to base by the long lobes. Cypselae 1.4-1.7 mm, c. 4-nerved, setulose, also glandular; pappus bristles 2.9-3.8 mm, white. Flowering Dec-Mar. *Damp thickets, disturbed pine-hardwood forests, roadside banks*. Ch (*Matuda* 4011, MO); G (*Steyermark* 33893, F). 900-1800 m. (Endémica.)

Stiffly erect monoecious shrubs 0.6-2.4 m; stems straight and not fractiflex, sometimes purplish-brown, glabrous throughout. Leaves short-petiolate; blade 6-12 × 0.7-2(-2.5) cm, narrowly lanceolate, moderately to stiffly chartaceous, 2° veins relatively thin and not strongly raised, 3° veins embedded, not prominent, surfaces eglandular, glabrous throughout (and margins not ciliolate), base cuneate or sometimes obtuse, margins subentire to obviously serrulate distally, apex acuminate to attenuate, petiole 1-3 mm. Capitulescence rounded, usually 5-13 cm diam., several-many-capitulate, lateral branchlets few-several, ascending to sometimes spreading, not longer than the subtending leaves; peduncles glabrous. Capitula 3.4-5 × 3.2-4 mm, mostly seemingly bisexual (some perhaps solely staminate) and thus mostly seemingly disciform; phyllaries 4-5-seriate; marginal florets 17-30, all pistillate, corolla 1.7-3 mm, more or less tubular-filiform, white, limb (0-)0.5-0.9 mm; disk florets (1-)4(-15), functionally staminate although typically producing exserted linear-lanceolate style branches, corolla 3.2-4.4 mm, campanulate, white, throat very short, lobes 1.1-1.5 mm, style branches lanceolate, obviously papillose. Cypselae 1-1.4 mm, setulose, eglandular; pappus bristles 1.8-3.6 mm, white. Flowering Aug-Mar. 2n = 18. Evergreen cloud forest, moist forest, montane rain forests, pine-oak forests. Ch (Jackson 1034, MO); G (Steyermark 51922, F). (?700-)1900-3000 m. (Endémica.)

The capitula are mostly bisexual have fertile staminate disk florets producing pollen and exserted consistently well-developed bifid styles. I believe Jackson (1975) was in error in citing 700 m as the low-end elevation.


Archibaccharis sescenticeps (S.F. Blake) S.F. Blake, Baccharis scabridula Brandegee, Conyza asperifolia (Benth.) Benth. et Hook f. ex Hemsl., Hemibaccharis asperifolia (Benth.) S.F. Blake, Hemibaccharis sescenticeps S.F. Blake.

Stiffly erect shrubs 1-3(-6) m; stems straight and not fractiflex, often reddish-purple, usually loosely to finely villosulous distally to sometimes subglabrous; herbage usually with trichomes 0.2-0.5 mm. Leaves petiolate; blade 4-14 × 1-4.7(-7) cm, usually elliptic-lanceolate, moderately chartaceous, surfaces eglandular, adaxial surface usually obviously scabrous, abaxial surface puberulent at least on veins, base usually acuminate to sometimes cuneate, margins usually
serrate to serrulate, infrequently subentire, apex acuminate; petiole 2-15(-20) mm. Capitulescence rounded, usually 10-18(-25) cm diam., many-numerous-capitulate, lateral branchlets several, ascending to spreading, not over-topping central axis. Staminate capitula 3-5.5(-7) × 3-4(-5.5) mm, discoid or infrequently disciform; phyllaries c. 4-seriate; sterile marginal florets sometimes present, corolla 1.6-2.4 mm, tubular-filiform; disk florets 22-44(-56), corolla 2.5-4.7 mm, narrowly campanulate, white, throat distinct, about as long as lobes, lobes 0.7-1.5 mm, style branches narrowly lanceolate. Pistillate capitula 4-5.5(-7.5) × 3-4.5(-6) mm, disciform; phyllaries glabrous; pistillate florets 25-55(-70), corolla 2-3(-3.5) mm, tubular-filiform, white or cream, setulose distally, limb 0.1-0.6 mm, short, indistinct, much shorter than the well-exserted styles; sterile disk florets 1-7, corolla 2.5-4(-4.5) mm, narrowly campanulate, throat distinct, about as long as lobes. Cypselae c. 1 mm, 2-4-nerved, setulose, eglandular; pappus bristles 2-4 mm, white. Flowering Aug-Apr. 2n = 18. Cloud forests, marsh edges, montane rain forests, open areas, open forests, pine-oak forests, roadsides, thickets, wet meadows. Ch (Purpus 6665, NY); G (Türckheim II 1637, MO); H (Williams et al. 15592, F); N (Moreno 14338, MO). 1200-3000(?-3400) m. (Mexico, Mesoamerica.)

Archibaccharis asperifolia, at least as it occurs and is circumscribed in Mesoamerica (e.g., Jackson, 1975), is similar to and perhaps grades into A. irazuensis. However, to the north in central Mexico A. asperifolia differs by much smaller capitula and less pubescent stems.


Subscandent subshrubs to shrubs 1.5-3 m; stems straight to slightly fractiflex, costate-angled, villosulous to glabrous, internodes often nearly as long as leaves; herbage with trichomes 0.1-0.4 mm. Leaves sessile with broadly winged petioliform base; blade 5-13(-15) × 2-6(-8.5) cm, spatulate-elliptic to spatulate-ovate, moderately chartaceous, eglandular, adaxial surface sparsely scabrous-hispidulous, abaxial surface with veins hispidulous-villosulous and areoles subglabrous, petioliform base (0-)10-30(-40) × 0.2-10 mm, auriculate-clasping, green, expanded portion of blade with obtuse to rounded base thence abruptly contracted into petioliform base, margins denticulate to serrate, apex acuminate to long-acuminate. Capitulescence terminal on axillary branches 10-20 cm, corymbiform-paniculate, ultimate clusters 6-12 cm diam., broadly rounded, slightly leafy, branchlets 2-4 cm, few, longer than subtending leaves; peduncles 2-10 mm, those on pistillate plants generally longer, villosulous, 2-4-bracteolate. Staminate capitula 3.2-4.3 × 2.5-4 mm, discoid; phyllaries sometimes purplish distally, puberulent to inner ones glabrous, margins
sometimes ciliolate, apex usually acute; disk florets 17-25, corolla 3.1-4.2 mm, narrowly funnelform, ochroleucous, tube 1-1.3 mm, throat distinct and well-developed, lobes 0.5-0.8 mm, short-triangular and obviously much shorter than throat, style branches narrowly lanceolate. Pistillate capitula 4.5-5.8 × 3-4.6 mm, disciform; involucre campanulate to broadly so; phyllaries puberulent to inner ones glabrous, apex acute to sometimes obtuse, often ciliolate; pistillate florets 30-53, corolla 3-3.3 mm, tubular-filiform, ochroleucous, limb to c. 0.5 mm, indistinct, erect; sterile disk florets 0-3, corolla 3.4-3.8 mm, narrowly funnelform, lobes short-triangular and obviously much shorter than throat. Cypselae 1.2-1.5 mm, 2-3-nerved, setulose; pappus bristles 2.5-3.8 mm, white to stramineous. 2n = 18. Flowering Dec-Jan. Montane rain forests, pine forest, rocky forests, thickets. Ch (Breedlove y Thorne 31094, MO); G (Jackson 1036, NY). 1500-2300(-3000) m. (Endémica.)

The type label reads “Nov-Feb” but all other available collections are known to flower only in December or January. Jackson described the staminate capitula as to 6 mm, but they always seem to be < than 4.5 mm.


Erect to arching subshrubs to shrubs 1-3 m; stems straight and not fractiflex, tomentellous, sparsely sessile-glandular distally. Leaves usually obviously petiolate; blade 5-9(-12.2) × (1-)2-3(-4) cm, elliptic-lanceolate, moderately chartaceous, adaxial surface hirtellous, sessile-glandular, abaxial surface hispidulous, sessile-glandular, base cuneate, margins serrate to serrulate, apex acute to acuminate; petiole (2-)11-15 mm. Capitulescence usually 6-12 cm diam., rounded to infrequently nearly flat-topped, several-many-capitulate, distal branchlets usually 1-3, ascending, often nearly as long as central axis; peduncles sparsely glandular. Staminate capitula 5-8 × 3-5 mm, short-radiate; phyllaries sometimes purplish; marginal florets 9-12(-23), usually sterile; corolla 4-4.8 mm, short-radiate, sometimes pink maturing purple, limb 1.5-2 mm; disk florets 29-38, corolla 3.4-4.4 mm, narrowly campanulate, usually pink maturing purple, throat distinct, about as long as lobes, lobes c. 1.1 mm, style branches narrowly lanceolate. Pistillate capitula 5-7 × 2.5-4 mm, short-radiate; phyllaries sometimes purplish, outer phyllaries densely villosulous, inner phyllaries subglabrate; pistillate florets 27-40, corolla 3.3-4.8 mm, short-radiate, sometimes pink maturing purple, limb 1.4-2.4 mm, oblong; sterile disk florets 1-4, corolla 3.4-4.2 mm,
usually pink maturing purple, throat distinct, about 1/2 as long as lobes. Cypsela 0.9-1.4 mm, setulose and glandular; pappus bristles 3-3.9 mm, apex sometimes pinkish to red. Flowering Nov-May. 2n = 18. Moist forest, pine forests, pine-oak forests, thickets, volcano slopes. Ch (Breedlove 24352, MO); G (Jackson 1043, MO). 2100-3700 m. (Endémica.)


Scandent vines 3-8(-10) m; stems straight or twining (infrequently fractiflex apically), striate, pilosulous to pilose-hirsute; herbage with trichomes usually 0.3-1 mm. Leaves petiolate; blade 4-12(-15) × 1.5-3.5(-4.5) cm, usually lanceolate to sometimes elliptic-lanceolate or elliptic-ob lanceolate, , moderately chartaceous with 2° and 3° veins usually not raised adaxially, 3° veins somewhat indistinct and venation not distinctly reticulate, with surfaces eglandular, adaxial surface sparsely pilosulous or subglabrous to infrequently moderately hirsutulous to hirsute, dull to subnitudid, abaxial surface pilosulous to sometimes hirsute, base attenuate to cuneate, margins subentire to serrulate, apex acuminate; petiole 2-15 mm. Capitulescence on many short (4-10 cm) axillary branches, corymbiform-paniculate, ultimate clusters usually 3-6 cm diam., rounded, leafy, branchlets usually about as long as subtending leaves; peduncles mostly 2-5 mm. Staminate capitula 4-6 × 2.5-4 mm, discoid or infrequently disciform; involucre 3-4 mm; phyllaries subglabrous or the outer few puberulent, apex usually acute; marginal pistillate florets usually absent; disk florets 10-22, corolla 3.8-5.8 mm, mostly ochroleucous, tube 1.5-2.7 mm, limb cut to near base by long lobes with throat indistinct, lobes 2.2-2.8 mm, obviously much longer than throat, style branches lanceolate. Pistillate capitula 5-6 × 2.5-3.5 mm, disciform; involucre 4-5 mm; phyllaries subglabrous or the outer few puberulent, apex acute; pistillate florets 15-27, corolla 2.5-3.5 mm, tubular-filiform, mostly ochroleucous, limb 0.1-1 mm, indistinct, erect; sterile disk florets 1-4, corolla 3.8-4.8 mm. Cypsela 1-1.6 mm, 3-5-nerved, setulose; pappus bristles 2.7-4.3 mm, stramineous to brownish. 2n = 18. Flowering (Sep-)Nov-Mar(-Apr). Cloud forests, damp forests, forest borders, secondary vegetation, moist thickets, pine forests, wooded slopes. Ch (Matuda 16235, MO); G (Standley 62291, NY); ES (Molina et al. 16865, NY); N (Molina y Williams 31239, MO); CR (Smith A579, MO). 500-2700(-3000) m. (Endemic.)

The US holotype and MO isotype of Hemibaccharis flexilis are dated March 1908, whereas Tuerckheim II-1636 p.p. in GH and NY are dated February 1907 and were not considered type material by Blake (1924). Although Standley 65058 is given as “2250-3000” meters elevation, this collection comes presumably from lower than 2900 meters elevation.
The more southerly populations frequently have hirsute adaxial leaf surfaces (but not to the extent found in *A. taeniotricha*, which differs by smaller staminate capitula with evident disk corolla throats and by secondary leaf veins prominently raised abaxially), whereas those to the north are occasionally subglabrous.


Stiffly erect herbaceous-stemmed subshrubs 1-2 m; stems straight and not fractiflex, usually purplish, simple below the capitulescence, pilosulose to tomentellous; herbage with trichomes 0.2-0.5 mm. Leaves subsessile to petiolate; blade 5-12.5 × 1.5-3.5 cm, lanceolate to elliptic-lanceolate, stiffly chartaceous, eglandular, adaxial surface densely pilosulose, abaxial surface sparsely pilosulose, base usually cuneate or obtuse, margins usually subentire to serrulate, apex usually long-acuminate to long-attenuate; petiole (0-)2-7 mm. Capitulescence usually 9-21 cm diam., somewhat rounded to more or less flat-topped, lateral branchlets few-several, ascending, nearly as long as or sometimes over-topping central axis, less commonly much less shorter than central axis; peduncle pubescence much denser than peduncular bracteole pubescence. Staminate capitula 4.5-6 × 4-4.5 mm, discoid or infrequently disciform; phyllaries ciliolate, outer phyllaries glabrous to sparsely puberulent, inner phyllaries glabrous; sterile marginal florets sometimes present, corolla 0-7, 1.6-2.2 mm, tubular-filiform; disk florets 20-33, corolla 3.3-5 mm, narrowly campanulate, white, throat distinct, throat and lobes more or less subequal, lobes 1.2-1.8 mm, style branches narrowly lanceolate. Pistillate capitula 4.5-6 × 3-5 mm, disciform or infrequently discoid; outer phyllaries puberulent; pistillate florets 32-48, corolla 2.9-3.9 mm, tubular-filiform, white, limb c. 0.3 mm, indistinct, pistillate capitula and style trunk subequal or style trunk sometimes longer than corolla with branches sometimes well exserted; style trunk longer than corolla with branches well exserted; sterile disk florets (0-)3-6, corolla 3.5-4 mm, narrowly campanulate, throat distinct, usually slightly shorter than lobes, lobes c. 1 mm, incised about halfway or slightly more than halfway to base of throat. Cypselae 1-1.8 mm, setulose, eglandular; pappus bristles 2.9-4.5 mm, white. Flowering Jan, Mar-May, Jul, Sep-Nov. *Cloud forest, moist forests, open hillsides, riparian vegetation, secondary areas, subpáramo forest, thickets, wet banks*. CR (*Pruski et al. 3950*, MO); P (*Woodson y Schery 463*, MO). 2300-3400 m. (Endémica.)
Archibaccharis irazuensis, because it was recognized by each Blake (1924) and Jackson (1975) and because of its allopatric distribution, is provisionally accepted here as a weak geographical segregate of *A. asperifolia*.


Scandent shrubs or vines 2-3 m, when immature occasionally described as sprawling shrubs; stems straight and not fractiflex, striatulate, pilosulose to subglabrous; herbage with trichomes 0.2-0.5 mm. Leaves petiolate; blade 3-8 × 1.2-3.3 cm, elliptic-lanceolate to elliptic or sometimes oblong, blade thickly chartaceous with 2° veins raised adaxially, a few widely separated 3° veins slightly raised adaxially, abaxial 3° veins immersed or nearly so, surfaces eglandular, adaxial surface subnitidous, glabrous or larger veins puberulent, abaxial surface hirsutulous or areoles subglabrous, base cuneate, margins serrulate distally, apex acuminate; petiole 5-10 mm. Capitulescence terminal on many axillary branches 20-30 cm, openly corymbiform-paniculate, ultimate clusters 6-10 cm diam., rounded, held above subtending leaves, branchlets 8-15 cm, few-several, longer than subtending leaves, ultimate branchlets often 1-bracteolate.; peduncles 3-10 mm, hirsutulous. Staminate capitula 3.7-4.2 × 2-2.5(-3) mm, discoid; phyllary mid-zone broad, margins narrowly scarious, sometimes pinkish, mid-series phyllaries broadly lanceolate, usually acute; disk florets 8-15, corolla 3.2-3.9 mm, ochroleucous, tube 1.6-2 mm, throat indistinct, lobes 1.6-1.9 mm, cut nearly to top of tube, style branches narrowly oblanceolate, finely to moderately papillose. Pistillate capitula 3.3-4.5 × 1.8-2.8 mm, disciform; involucre turbinate to in fruit campanulate; phyllary mid-zone broad, margins narrowly scarious, mid-series broadly lanceolate, ciliolate otherwise glabrous; pistillate florets 9-11, corolla 2.2-2.8 mm, tubular-filiform, white, minutely setulose in proximal 2/3, limb minute; sterile disk florets usually 1, corolla 3.1-3.6, throat indistinct, lobes 1.2-1.4 mm, incised nearly all the way to base of throat. Cypselae 1.2-1.5 mm, 4-7-nerved, eglandular, subglabrous; pappus bristles 2.5-3.4 mm, stramineous-brownish. Flowering Jun-Sep. CR (*McDaniel 6690*, MO). 2300-2700 m. (Endemic.)


Erect to slightly arching subshrubs to c. 1.5 m; stems straight and not fractiflex, heterotrichous, densely stipitate-glandular, also sparsely hispidulous; herbage stipitate-glandular, also pubescent with non-glandular, usually longer trichomes. Leaves short-petiolate; blade 2.5-6
× 1.5-3 cm, usually elliptic to elliptic-ovate, moderately chartaceous, adaxial surface scabrous, also stipitate-glandular, abaxial surface stipitate-glandular, also sparsely hispidulous, base cordate to rounded, margins dentate to denticulate with often sharp-pointed teeth, apex acuminate; petiole 1-3 mm. Capitulescence usually 4-11 cm diam., rounded to infrequently nearly flat-topped, several-many-capitulate, lateral branchlets few, well-spaced, ascending, usually neither as long as nor over-topping central axis; peduncles stipitate-glandular. Staminate capitula c. 7 × c. 5 mm, short-radiate; outer phyllaries hirsutulous, also sparsely stipitate-glandular; marginal florets c. 9, sterile, corolla 5.1-5.8 mm, short-radiate, limb well-developed; disk florets c. 36, corolla 4.5-5 mm, campanulate white to purplish, throat 0.8-0.9 mm, distinct, lobes 1.7-2.2 mm, longer than throat, style branches narrowly lanceolate. Pistillate capitula c. 6 × c. 3 mm, short-radiate; outer phyllaries villosulous, also sessile-glandular; inner phyllaries ciliate, otherwise subglabrate; pistillate florets 30-40, corolla 3.4-4.6 mm, short-radiate, white to purplish, limb 1.2-2 mm, oblong; sterile disk florets c. 2, corolla 3.7-4.2 mm, campanulate, throat 0.5-0.8 mm, distinct, lobes 1-1.2 mm, longer than throat. Cypselae 1-1.5 mm, 2-3-nerved, setulose and glandular; pappus bristles 3.5-4.5 mm, white or sometimes pale yellow. Flowering Jan-Mar. *Steep rocky slopes in montane coniferous forest zone*. G (Vélez et al. 7943, MO). 3200-3700 m. (Endémica.)

*Archibaccharis lineariloba* is known only from the vicinity of San Juan Ixcoy on the plateau of the Cuchumatanes range.


N.v.: Amargoso, H.

Scandent vines; stems fractiflex or slightly fractiflex, sometimes striate distally, sparsely hirsute to hirtellous distally to glabrate; herbage with trichomes 0.2-0.7 mm. Leaves petiolate; blade (2-)3-12 × (1.5-)3-5 cm, elliptic to elliptic-lanceolate, thickly chartaceous with 2° veins raised adaxially, a few widely separated 3° veins slightly raised adaxially, 2° veins slightly raised abaxially (more so when pressed in EtOH), 3° veins immersed or very slightly raised, surfaces eglandular, adaxial surface subglabrous or midrib hirtellous, subnitiduous, abaxial surface sparsely hirtellous to glabrate, base cuneate to nearly rounded, margins subentire to remotely mucronulate distally, apex acute to acuminate; petiole 2-11 mm. Capitulescence terminal on axillary branches 15-40 cm, corymbiform-paniculate, ultimate clusters 4-10 cm diam., somewhat rounded, somewhat leafy, branchlets 4-6 cm, few, usually about as long as subtending leaves; peduncles 3-9 mm, hirsute to hirtellous, 1-2-bracteolate. Staminate capitula 5-6 × 3-4 mm, discoid; phyllary margins sometimes pinkish, ciliate-lacerate, outer phyllaries usually obtuse grading to the inner
phyllaries usually acute; disk florets 12-15, corolla 4.2-5.3 mm, ochroleucous with purplish tips, tube 2.1-2.5 mm, throat 0.4-0.5 mm, lobes 1.7-2.3 mm, sparsely setulose apically, style branches oblong-rhomboidal, strongly papillose. Pistillate capitula 6.5-7.5 × 2.5-4 mm, disciform; involucre turbinate to campanulate; phyllaries slightly hirtellulous or glabrous, mid-series broadly lanceolate, usually ciliate-lacerate, outer phyllaries acute to obtuse grading to the inner phyllaries acute to long-acuminate or attenuate, margins sometimes pinkish; pistillate florets 8-14, corolla 3-3.6 mm, tubular-filiform, ochroleucous with purplish tips, limb usually to c. 0.5 mm, indistinct, erect; sterile disk florets 2-3, corolla 4-5 mm. Cypselae 1-1.5 mm, 3-nerved, setulose, eglandular; pappus bristles 3.5-4.5 mm, typically stramineous. Flowering Jan-Mar. Cloud forest, rock faces.


Erect shrubs c. 1 m; stems straight and not fractiflex, eglandular, densely hirsutulous; herbage with trichomes 0.1-0.2 mm. Leaves short-petiolate; blade (4-)5.5-8 × (0.8-)1.2-2 cm, lanceolate to elliptic-lanceolate, moderately-stiffly chartaceous with reticulations slightly raised adaxially, surfaces eglandular, adaxial surface glabrescent, abaxial surface sparsely hirtellous on veins, base narrowly cuneate, margins remotely mucronulate, apex narrowly acute to acuminate; petiole 1-4 mm. Capitulescence 10-14 cm diam., corymbiform, slightly rounded to nearly flat-topped, lateral branchlets 6-9 cm, few, subapical, usually slightly longer than subtending axillary leaves.

Staminate capitula c. 4 × 3-4 mm, discoid or disciform; phyllaries linear-lanceolate, slightly hirtellulous or glabrous; pistillate florets 0-2, sterile, about as long as longest phyllaries, corolla tubular-filiform, limb 0-0.2 mm, indistinct; disk florets 20-30, corolla c. 3 mm, white, tube c. 1.2 mm, limb essentially cut to base by the long lobes, lobes c. 1.8 mm, sparsely glandular or papillose apically, style branches narrowly lanceolate. Pistillate capitula 4-5 × 3.5-5 mm, short-radiate; phyllaries linear-lanceolate, slightly hirtellulous or glabrous; pistillate florets several-many, corolla 3.5-3.8 mm, short-radiate, tube c. 2.5 mm, limb 1-1.3 mm, moderately distinct, linear, nearly as long as style; sterile disk florets 2-3, corolla limb essentially cut to base by the long lobes. Cypselae 1.6-1.8 mm, 4-5-nerved, sparsely setulose and finely glandular; pappus bristles 3.5-4 mm, white. Flowering Mar, May. Bosque enano, rock faces. N (Moreno 7803, MO). 1400-1700 m. (Endémica.)


Stiffly erect subshrubs or shrubs c. 1.5 m; stems straight and not fractiflex, simple below the capitulosecence, pilosulose to villous; herbage with trichomes 0.2-0.4 mm. Leaves short-petiolate; blade 5.5-9.5 × 2-3 cm, elliptic-oblong to elliptic-ovate, moderately chartaceous, adaxial surface puberulent, abaxial surface densely pilosulous, minutely granular (?submoniliform, c. 2-celled) trichomes, base cuneate, margins denticulate distally, apex usually short-acute to short-acuminate; petiole c. 3 mm. Capitulosecence to c. 27 cm diam., somewhat rounded to more or less flat-topped, lateral branchlets few-several, ascending, nearly as long as or sometimes overtopping central axis, less commonly much less shorter than central axis; peduncle and peduncular bracteole pubescence equally dense. Staminate capitula unknown. Pistillate capitula c. 5 × 2.5-3 mm, disciform; phyllaries linear-lanceolate, outer phyllaries moderately hirsutulous, the inner series glabrous; pistillate florets 18-24, corolla 2.5-2.8 mm, tubular-filiform, white, limb c. 0.3 mm, minute, erect and shorter than styles, style trunk subequal to corolla with branches moderately exserted; sterile disk florets 1-2, corolla 3.2-3.5 mm, throat indistinct, minute, lobes 1.6-1.8 mm, incised nearly all the way to base of throat, ovary c. 1 mm, style branches narrowly lanceolate. Cypselae 1.5-1.6 mm, eventually becoming 4(?-7)-nerved, setulose, eglandular; pappus bristles 3.3-6 mm, white. Flowering Sep. *Habitat unknown.* P (*Allen 751, MO*). 100-800 m. (Endémica.)

Jackson (1975) described the leaves of *Archibaccharis panamensis* as glandular, but I believe that the surfaces instead are minutely granular with minute c. 2-celled submoniliform trichomes that are not obviously resinous, but nevertheless mimic glands. Although for *A. panamensis* D’Arcy (1975) described a “definite” pistillate floret corolla limb about 1 mm, the corolla is shorter than the style (viz Jackson, 1975: 152, t. 19c) and is not described here as radiate. The protologue of *A. panamensis* describes the cypselae as “immature”, and although Sundberg (1984) described the cypselae having “4-7” nerves, this is not at all manifest obviously on the isotype of *A. panamensis* with immature cypselae in front of me.


*Archibaccharis vesticaulis* G.L. Nesom.
Scandent vines; stems usually nearly straight proximally and slightly fructiflex distally, weakly striatulate, sparsely to densely hirtellous to pilosulous to proximally glabrate; herbage with trichomes 0.2-0.3 mm. Leaves petiolate; blade 4-9 × 2-4(-5.5) cm, elliptic to elliptic-ovate, thickly chartaceous with 2° and 3° veins raised adaxially, surfaces eglandular, adaxial surface subglabrous or midrib hirtellous, subnudulous, abaxial surface sparsely hirtellous on veins to subglabrous, 3° veins very slightly raised, base broadly cuneate to obtuse, margins subentire to remotely mucronulate distally, apex acuminate to apiculate; petiole 2-13 mm. Capitulescence terminal on long slender axillary branches, corymbiform-paniculate, ultimate clusters usually 6-8 cm diam., somewhat rounded, several-many-capitulate, leafy, branchlets 4-6 cm, few, usually about as long as subtending leaves. Staminate capitula (fide Johnson, 1975) 3.7-4.3 × c. 3.5 mm, discoid; phyllaries c. 4-seriate; disk florets 16-24, corolla 2.9-3.4 mm, purplish distally, tube 1.4-1.7 mm, throat c. 0.3 mm, lobes 1.2-1.4 mm, sparsely setulose apically, style branches oblong-rhomboidal, strongly papilllose. Pistillate capitula (3-)4-6 × 3-4 mm, disciform; phyllaries slightly hirtellous or glabrous, apex obtuse to acute or the inner ones sometimes short-acuminate, mid-series elliptic-lanceolate; pistillate florets 8-12, corolla 2.6-2.9 mm, tubular-filiform, purplish-tipped, limb usually to c. 0.5 mm, indistinct, erect; sterile disk florets 1-2(-4), corolla 3.5-4 mm; purplish distally, style branches oblong-rhomboidal, strongly papilllose. Cypselae 1.2-1.8 mm, 2-nerved, setulose, eglandular; pappus bristles 3-4 mm, brownish. Flowering Nov-Mar. Moist forest, secondary forest borders. Ch (Sundberg et al. 2423, NY); G (Tuerckheim II-1657, NY).

1300-1900 m. (Mexico [Veracruz], Mesoamerica.)

The staminate capitula description is adapted from Johnson (1975) and is based on plants from Veracruz. It is possible that these staminate plants are actually the similar and later described Archibaccharis venturana G.L. Nesom, which is otherwise unknown in the staminate condition, and is distinguished by small pistillate capitula. Archibaccharis tuxtlensis G.L. Nesom is very similar to both A. salmeoides and A. venturana, but differs by glandular cypselae.

Plants of A. salmeoides in more open areas tend to have noticeably more densely pubescent stems. Nesom (1991) distinguished A. vesticaulis from sympatric A. salmeoides by its small pistillate capitula, smaller disk corollas, and leaves glandular abaxially, but the NY isotype of sympatric A. vesticaulis has leaves eglandular (although slightly resinous where damaged) and I believe that in Jackson (1975) the large measurements of pistillate capitula in A. salmeoides are a by-product of available Guatemalan specimens being in late-fruit.


Scandent vines (initially procumbent herbs) 2-10 m; stems fractiflex, striate, puberulent to pilosulose, striations stramineous, sulcae usually greenish; herbage with trichomes usually 0.1-0.5 mm. Leaves petiolate; blade 2.5-10 × 1.5-5.5 cm, usually ovate to sometimes elliptic-ovate, moderately chartaceous with 2° and 3° veins usually not raised adaxially, venation finely reticulate, surfaces smooth, adaxial surface pilosulose and minutely sessile-glandular, dull, abaxial surface pilosulose to hirsute, typically also sparsely sessile-glandular, 3° veins more or less immersed, base cuneate to rounded, margins serrate to infrequently subentire, apex acute to acuminate; petiole 1-13 mm. Capitulescence terminal on axillary branches 5-15 cm, corymbiform-paniculate, ultimate clusters 2-15 cm diam., rounded, leafy, branchlets usually about as long as subtending leaves; peduncles mostly 2-9 mm, puberulent. Staminate capitula 4-5.5 × 2.5-3.5(-4) mm, discoid or rarely disciform; involucre 3.5-4 mm; phyllaries puberulent, ciliolate, apex acute; pistillate florets usually absent; disk florets 10-23, corolla 3.5-4.7 mm, mostly ochroleucous, tube 1.5-2.2 mm, lobes 1.6-2.3 mm, obviously much longer than throat, style branches oblanceolate, finely papilllose. Pistillate capitula 4-5(-6) × 2.5-3.5(-4) mm, disciform; involucre 3.5-4 mm; phyllaries subglabrous or the outer few puberulent, apex acute; pistillate florets usually 25-35, corolla 1.3-1.8 mm, about 1/2 as long as style, tubular-filiform, mostly ochroleucous, limb 0.1-0.4 mm, indistinct, erect; sterile disk florets 1-3, corolla 2.8-4 mm. Cypselae 0.9-1.2 mm, 2-3(-5)-nerved, setulose; pappus bristles 2-3 mm, stramineous to brownish. 2n = 18. Flowering (Jul-)Sep-Jan(-Mar). Charral, dry brushy slopes, forest edges, mixed forests, moist forest, montane rain forests, oak forests, pine-oak forests, roadsides banks, secondary forests, selva alta perennifolia, streamside, thickets. Ch (Cronquist y Becker 11218, MO); G (Tuerckheim 1350, NY); ES (Sandoval 1733, MO); CR (Skutch 3444, MO); P (Pittier 2855, NY). 600-2600 m. (Mexico, Mesoamerica.)

The species number of this taxon in the protologue is 318, the type collection number is 320 (as on the isotype in HAL), but the GH fragment of the Berlin holotype (designated by Jackson as the lectotype) gives only “318.” The report by Nelson (2008) of Archibaccharis schiedeana in Honduras is based on misidentified material.


Erect or rarely arching shrubs 1-3 m; stems straight and not fractiflex, sometimes purplish, white-griseous-tomentose; herbage with trichomes 0.3-1 mm. Leaves petiolate; blade 4-12(-17) × 1.5-5.5(-7) cm, elliptic-lanceolate or elliptic to sometimes oblong or ovate, moderately-thickly chartaceous, eglandular, adaxial surface densely hirsute, abaxial surface densely white-griseous-tomentose, base cuneate or obtuse to sometimes rounded, acumen to c. 5 mm, margins serrate to serrulate, apex acuminate to sometimes acute; petiole 5-15 mm. Capitulescence usually c. 15 × 15 cm, more or less pyramidal, lateral branchlets few, spreading to sometimes slightly ascending, not over-topping central axis; peduncles 3-9 mm, paucibracteolate, white-tomentose, strongly contrasting with the glabrous to subglabrous phyllaries. Staminate capitula 3.5-4.5 × 2.5-4 mm, discoid; involucre nearly as long as florets; phyllaries subglabrous; disk florets usually 20-30, corolla 2.5-4 mm, white or cream, throat distinct, usually slightly shorter than lobes, lobes 0.7-1.3 mm, style branches narrowly lanceolate or ob lanceolate. Pistillate capitula 4-5 × 2.5-3.5 mm, disciform; phyllaries glabrous; pistillate florets 18-40, corolla 1.8-2.8 mm, tubular-filiform, white or cream, limb c. 0.5 mm, shorter than styles; sterile disk florets 1-4, corolla 2.5-3.5 mm, throat distinct, about as long as lobes. Cypselae 0.7-1.4 mm, 2-nerved, sparsely setulose, eglandular; pappus bristles 2-3 mm, stramineous-brown. Flowering Oct-Mar. 2n = 18. *Mixed forests, montane rainforests, moist forests, pine-oak forests, rocky slopes, thickets*. Ch (Matuda 0744, MO); G (Nelson 3629, GH). 1200-2600 m. (Mexico, Mesoamerica.)


Erect subshrubs 0.4-1.2 m; stems straight and not fractiflex, often glandular distally, moderately to densely hirtellous, leaves gradually descrescent into capitulescence; herbage with
trichomes c. 0.1(-0.2) mm. Leaves short-petiolate; blade (2-)3-6 × 1.5-2.5 cm, lanceolate-ovate, moderately to stiffly chartaceous with 2° and 3° veins sometimes raised adaxially, proximal secondary veins sometimes thicker than distal ones, surfaces sessile-glandular, otherwise finely hispidulous to subglabrous, base cordate to rounded, margins subentire to few-denticulate apically, apex acuminate; petiole 1-3 mm. Capitulescence usually 8-9 cm diam., somewhat rounded to more or less flat-topped, several-many-capitulate, distal branchlets few. Staminate capitula 4-7 × 3-4 mm, usually indistinctly disciform; phyllaries puberulent also sessile-glandular; sterile marginal florets usually 2-5, corolla 2.6-3.9 mm, tubular-filiform, white, limb 0.7-1.2 mm, erect, nearly as long as style; disk florets 7-15, corolla 4-5 mm, white, limb essentially cut to base by the long lobes, lobes 1.8-2.5 mm; anther appendage c. 0.3 mm, elongate, style branches narrowly lanceolate. Pistillate capitula c. 5.5 × c. 4 mm, occasionally found on otherwise male plants, disciform; phyllaries puberulent; pistillate florets c. 12, corolla 3.5-4 mm, tubular-filiform, white, limb 0.1-1 mm, sometimes moderately developed but not longer than style, erect; sterile disk florets c. 6, corolla c. 3.7 mm, white, throat small, lobes long. Immature cypselae to c. 1 mm, glandular; pappus bristles 3.4-4.6 mm, white. Flowering Feb-Mar. Open rocky banks, secondary vegetation. H (Evans 1389, MO). 1100-1800 m. (Endémica.)


Erect to arching subshrubs to shrubs 1-3 m; stems straight and not fractiflex, eglandular, densely hispidulous, sparsely sessile-glandular distally. Leaves subsessile or short-petiolate; blade 3-10 × 2-5 cm, elliptic to elliptic-ovate, moderately chartaceous, one or both surfaces sessile-glandular, adaxial surface hispidulous, abaxial surface sparsely hispidulous to subglabrous, base cordate to rounded, margins serrate to serrulate, apex acuminate; petiole 1-3 mm. Capitulescence usually 7-18 cm diam., somewhat rounded to nearly flat-topped, several-many-capitulate, distal branchlets few to several, generally well-spaced, ascending; peduncles sparsely glandular. Staminate capitula 4-5.5(-6) × 3-4 mm, short-radiate; phyllaries 4-5-seriate; marginal florets 4-14, sterile, corolla 3-4.5 mm, short-radiate, white to sometimes purplish, limb well-developed; disk florets 17-38, corolla 2.7-4.4 mm, narrowly campanulate, white to sometimes purplish, throat distinct, about 1/2 as long as lobes, lobes 1.2-1.6 mm, usually narrowly linear-lanceolate, style branches narrowly lanceolate. Pistillate capitula 4-6(-8) × 2.5-3.2 mm, short-radiate; outer phyllaries hirsutulous, also sessile-glandular; inner phyllaries often ciliate, sparsely hirtellous to subglabrous, also often sessile-glandular distally, pistillate florets 17-29, corolla 3.2-4.2 mm, short-radiate, white to sometimes purplish, limb 1.2-2.2 mm; sterile disk florets 1-7, corolla 3.3-
4.8 mm, throat distinct, about 1/2 as long as lobes. Cypselae c. 0.7 mm, setulose and densely glandular; pappus bristles 2.5-4.3 mm, white or sometimes pale yellow. $2n = 18$. Flowering (Aug) + Nov-Apr. Oak forests, pine-forests, thickets, wet montane forests. Ch (Jackson 1033, MO); G (Williams et al. 25815, NY); ?H (Nelson, 2008: 149). 1300-3000 m. (Mexico [Oaxaca], Mesoamerica.)

The Honduran material distributed as *Archibaccharis subsessilis* that I have seen is misdetermined, calling into question the correctness of the report of *A. subsessilis* in Honduras by Nelson (2008).


Scandent vines 3-6 m; stems fractiflex, terete and not obviously striate, densely pilose-hirsute; herbage with trichomes 0.5-1.5 mm, usually patent. Leaves short-petiolate; blade 2.5-7(-10.5) × 1.5-3.5 cm, usually elliptic to sometimes elliptic-lanceolate, moderately chartaceous with 2° and 3° veins usually not raised adaxially, 2° veins all about equally thick, 4-7 per side, prominently raised abaxially, 3° veins reticulate, slightly raised, surfaces eglandular, adaxial surface often rugulose, pilosulous-hirsutulous or sometimes sparsely pilosulous-hirsutulous to scabridulous, abaxial surface pilosulous-hirsutulous to densely pilose-hirsute, base obtuse to nearly rounded, margins subentire to more commonly distally serrate, apex acute to acuminate; petiole 1-8 mm.

Capitulescence terminal on axillary branches 5-20 cm, corymbiform-paniculate, ultimate clusters 3-7 cm diam., somewhat rounded, somewhat leafy, branchlets 1-3(-5) cm, few, usually about as long as subtending leaves; peduncles 1-5(-8) mm, pilosulous-hirsutulous to densely pilose-hirsute, 0-1-bracteolate. Staminate capitula 3-4.3 × 2-2.5 mm, discoid; involucre (1.5-)2-3 mm; phyllaries sometimes purplish distally, pubescent, apex usually acute, inner phyllaries quickly deciduous; disk florets 15-25, corolla 2.6-4 mm, ochroleucous to apex purplish, tube 1.4-2 mm, tube and limb subequal, throat usually apparent, lobes 0.9-1.3 mm, usually longer than throat, style branches apically bulbous-deltoid, finely papillose. Pistillate capitula (3.8-)4.5-5.5 × 2-2.5 mm, disciform; involucre 4-5 mm, narrowly campanulate; phyllaries slightly hirtellous to inner ones glabrous, apex acute; pistillate florets 10-18, corolla 1.9-2.8 mm, tubular-filiform, ochroleucous to apex dark purple, limb to c. 0.5 mm, indistinct, erect; sterile disk florets 1-2, corolla 3-4 mm. Cypselae 0.9-1.5 mm, 3-4-nerved, setulose; pappus bristles 2.3-3.4 mm, white to stramineous. $2n = 18$. Flowering Dec-Feb, Jun, Sep. *Cloud forests, moist thickets, pine-oak*
forests, wooded slopes. Ch (Shilom Ton 560, NY); G (Jackson 1042, MO); ES (Molina y Montalvo 21675, NY). 900-3000(?-3800) m. (S. Mexico, Mesoamerica.)

Blake’s paratypes from Oaxaca were excluded by Jackson (1975).

The collections from El Salvador known to me tend to have fewer-flowered capitula than usual. Nesom (1988) gave the pistillate capitula as “2-2.5 mm” but they are about twice as long.


*Archibaccharis caloneura* S.F. Blake.

Stiffly erect shrubs 1.5-2.5 m; stems straight and not fractiflex, sometimes purplish, glabrous proximally becoming hirtellous (trichomes 0.1-0.2 mm) in the capitulescence. Leaves petiolate; blade 5-9 × 1.5-3.5 cm, lanceolate to elliptic, thickly chartaceous, 3° veins prominent and obviously raised adaxially, surfaces subnitidous, eglandular, glabrous or nearly so, base cuneate or obtuse, margins serrulate to sharply serrate, sometimes distally ciliolate, apex acute to attenuate or falcate; petiole 4-10 mm, reddish. Capitulescence 5-11 cm diam., somewhat rounded to nearly flat-topped, several-many-capitulate, usually open and not very leafy, lateral branchlets few, ascending; peduncles hirtellous, trichomes 0.1-0.2 mm. Staminate capitula 4.5-5.5 × 4-6 mm, discoid; phyllaries glabrous or nearly so; sterile marginal florets usually absent; disk florets 24-36, corolla 3.4-5.3 mm, narrowly campanulate, white, throat usually very small, lobes 1.6-2.1 mm, style branches narrowly lanceolate. Pistillate capitula 5-6.5 × 3.5-4.5 mm, disciform; phyllaries 4-6-seriate, glabrous or nearly so; pistillate florets 16-24, corolla 2-2.7 mm, tubular-filiform, white, limb basically absent; sterile disk florets 2-4, corolla 3.8-4.5 mm. Cypselae 1.2-2 mm, setulose, eglandular; pappus bristles 3.4-4 mm, white, sometimes connate into groups.

Flowering Nov, Apr. 2n = 18. *Cloud forest, pine-oak forests, steep moist slope, vertical cliff face.* Ch (Ton 9522, MO). 2400-2800 m. (Mexico [Oaxaca], Mesoamerica.)

2. Astranthium Nutt.

Por J.F. Pruski.

Annual to perennial herbs or subshrubs, tap- or sometimes fibrous-rooted; stems erect to sometimes decumbent, slightly to moderately leafy with no or few basal leaves, few-branched, leaves cauline and basal, or often solely cauline, never in a conspicuous basal rosette, hirsute or strigose to less commonly glabrous. Leaves simple, alternate, sessile or more commonly with a
winged petiolar base, chartaceous, midrib broad, secondaries typically inconspicuously pinnate, surfaces hirsute or strigose to less commonly glabrous, eglandular, margins usually entire; basal and proximal leaves typically spatulate, typically abruptly reduced in length and width distally where ultimately they are often linear-lanceolate. Capitulescence open, monocephalous to paucicephalous, capitula often nodding; peduncles typically elongate. Capitula bisexual, radiate; involucre campanulate to hemispherical; phyllaries 15-30, loosely imbricate, subequal, few-seriate, stramineous, thinly chartaceous, inconspicuously 1-costate, costa not resinous, surfaces strigose or less commonly glabrous, margins broadly scarious, typically ciliate distally; receptacle short-conical, alveolate. Ray florets uniseriate; corolla white throughout or limb sometimes violet-lined abaxially, tube setulose, limb oblanceolate, glabrous, apex 2-4-toothed. Disk florets 40-260, bisexual; corolla funnelform to narrowly campanulate, 5-lobed, yellow, tube short, throat abruptly ampliate, setulose, lobes deltate to short-lanceolate, spreading; anthers cream-colored, basally obtuse, appendage narrowly acute; style branch stigmatic surfaces restricted to the proximal half of branch, apical appendage long-triangular to lanceolate, papillose. Cypsela obovoid, compressed (Mesoamerica), erostrate, glabrous or faces pubescent, eglandular, shoulders rounded, margins sometimes slightly thickened, never winged, faces smooth or papillose, rarely slightly 1-2-striate; pappus absent or minutely squamulose. $x = 3, 4, 5$. 12 spp. 3 in the Estados Unidos, otherwise Mexican with a single spp. extending southeastward into Mesoamerica.

Astranthium differs from Erigeron by inconspicuous and non-resinous (vs. conspicuous and resinous) phyllary nerve, long-triangular to lanceolate (vs. deltate) style appendage, broad (vs. narrow) ray limbs, and convex to short-conical (vs. flat to strongly convex) receptacle. Epappose Astranthium guatemalense S.F. Blake does not have a long-triangular to lanceolate style branch appendage typical of Astranthium, and was thus excluded from the genus by DeJohn (1965). Because of its absence of pappus, Nash (1976) treated this taxon as Achaetogeron guatemalensis, but here it is treated as Erigeron guatemalensis, with Achaetogeron a generic synonym of a broadly defined Erigeron.


Infrequent perennial herbaceous-stemmed subshrubs to 60 cm, caudex fibrous-rooted, never stoniferous, each main branch bearing one to several pedunculate capitula; stems one to more commonly several from the base, leaves cauline and basal, leafy especially proximally, simple to proximally branched, greenish to reddish-brown, striate-angled, typically long-hirsute. Leaves with surfaces typically long-hirsute to sericeous-strigose, trichomes usually antrorse; basal leaves 2.5-9(-13) × 0.6-1.5(-2) cm, narrowly spatulate, basically uninerved, long-attenuate to a winged petiolar base, apex obtuse; cauline leaves several, 1-4 × 0.2-1.2 cm, often about as long as internodes, lanceolate or spatulate-oblancoate, distal-most cauline leaves sessile, margins ciliate, apex acute-cuspidate. Capitulescence monocephalous; peduncles (1)-5-13 cm, typically deeply sulcate, moderately sericeous-strigose apex. Capitula 5-7 mm; involucre campanulate; phyllaries 3-7 × 1-2 mm, 2(-3)-seriate, lanceolate-ovate, centrally strigose to sparsely so, hyaline-scarious margins 0.3-0.5 mm diam., apex acute to acuminate. Ray florets 10-30; corolla 9.7-14.9 mm, white throughout, tube 0.7-0.9 mm, limb 9-14 × 1.5-2.5 mm, c. 4-veined, apex 2-3-denticulate, sometimes coiling; style to c. 3 mm. Disk florets 40-155; corolla 2.5-4.5 mm, narrowly campanulate, tube c. 0.4 mm, throat usually longer than lobes, lobes 0.8-1.3 mm, lanceolate; style branch apical appendage long-triangular, typically about as long as stigmatic surface. Cypselae 1.5-2.3 × to c. 1.3 mm, brown, broad at apex, glabrous or nearly so, faces smooth; pappus squamellae (when present) to 0.1 mm. 2n = 16. Disturbed areas, pastures, oak forests, pine forests. Ch (Ghiesbrecht 548, MO); G (Nash, 1976: 142 as expected). 1600-2300 m. (México, Mesoamérica.)


Neomolina F.W. Hellw. non Neomolinia Honda, Pingraea Cass., Pseudobaccharis Cabrera, Psila Phil.

Por J.F. Pruski.

Dioecious (rarely monoecious, B. salicifolia subsp. monoica), leafy, shrubs or small trees, rarely perennial herbs, stems erect to decumbent or prostrate, sometimes winged; herbage often viscid. Leaves simple, alternate or rarely opposite, sessile or petiolate, borne singly (Mesoamerica) or infrequently in axillary fascicles, rarely absent or reduced; blade linear to ovate, chartaceous or less commonly coriaceous, venation pinnate and often 3-5-veined from near base, entire or variously toothed, commonly glabrous and resinous, sometimes punctate-glandular, rarely floccose. Capitulescence thyrsoid-paniculate or corymbiform, rarely racemiform, spiciform, or monocephalous. Capitula of two types usually on different plants, unisexual, discoid or less
commonly disciform, 15-200-flowered, nearly always unisexual, sessile or pedunculate, with many florets, pistillate capitula larger than staminate ones; involucre cylindrical, campanulate, or hemispherical; phyllaries imbricate, graduate or less commonly subequal, commonly stiff but with scarious margins, 1-nerved (Mesoamerica), sometimes greatly spreading with age, typically glabrous, sometimes fimbriate apically; inner phyllaries sometimes deciduous; receptacle flat to convex, staminate capitula typically epaleate, pistillate capitula usually epaleate, of a few species paleate. Staminate capitula 10-50-flowered; corolla broadly campanulate, deeply 5-lobed, lobes mostly long and backwardly coiled, white, yellowish, greenish, or slightly purplish; anthers obtuse at base, mostly cream-colored or brownish, mostly exerted from corolla; style commonly exerted, branches without marginal stigmatic surfaces, frequently connate; ovaries sterile, pappus of capillary bristles as in pistillate capitula, but shorter and fewer in number, often with enlarged tips, not greatly exerted from involucre. Pistillate capitula without functionally staminate florets, 20-150-flowered; corolla tubular-filiform, apex denticulate, tube white, yellowish, greenish, or purplish; style branches mostly linear-oblong, variously papillose, less commonly nearly glabrous. Cypselae somewhat compressed, glabrous or pubescent, 5-10-costate; pappus of numerous capillary bristles, white to less commonly brown, generally much exerted from the involucre and often greatly crescent in fruit. \( x = 9 \). Aprox. 400 spp. Americas, few north temperate, many Neotropical, 100+ spp in Chile.

*Conyza panamensis* Willd., based on material collected by Humboldt y Bonpland, appears to be a species of *Baccharis*, but presumably was collected in South America rather than in Panama (Nesom y Boufford, 1990). Among Mesoamerican species of *Baccharis, Conyza panamensis* Willd. is most similar to *B. trinervis*, but *Conyza panamensis* differs by sessile leaves and larger capitula.

The treatments of *Baccharis pedunculata* and *B. trinervis* are adapted from Pruski (2010). Cuatrecasas (1969), Matuda (1957), Muller (2006), and Nesom (1990, 1998) also provided useful treatments of some Mesoamerican species of *Baccharis*. I am unsure of the identity of Guatemalan plants called *B. nervosa* DC. by Bentham (1853).

1. Plants monoecious, staminate and pistillate capitula intermixed in the capitulescence of individual plants.

6. B. salicifolia subsp. monoica

1. Plants dioecious, capitula of two types on different plants

2. Leaf blades prominently 3-nerved, margins entire; pistillate capitula with receptacle partly paleate.

3. Erect subshrubs or shrubs; herbage resinous, glabrous; capitulescence terminal with ascending branchlets.

5. B. pedunculata

3. Subshrubs or shrubs often with vining stems; herbage usually not resinous, pubescent; capitulescence with many axillary branches nearly at right angles to main stem.

8. B. trinervis

2. Leaf blades either toothed or venation usually either 1-veined or pinnate; pistillate capitula epaleate.

4. Herbage not resinous, pubescent with non-glandular trichomes; leaf blade venation finely reticulate, margins sharply serrulate to sharply serrate with many teeth.

5. Leaf blade venation pinnate, phyllaries purplish distally; pistillate capitula 6.5-10 mm; cypselae with mature pappus 6-8 mm.

4. B. multiflora

5. Leaf blade venation 3-nerved from base; phyllaries not purplish distally; pistillate capitula 5-7.5 mm; cypselae with mature pappus 3.5-4.5(-5) mm.

7. B. serrifolia

4. Herbage resinous-glandular, otherwise mostly glabrous; leaf blade margins entire to distally remotely 1-2-toothed.

6. Leaf blades 3-nerved from just above base, distal margins remotely 1-2-toothed; all phyllary apices typically having a large distinct dark-resinous zone.

2. B. glandulifera

6. Leaf blades mostly 1-nerved, 2° veins faint, margins usually entire; phyllary apices without a distinct dark-resinous zone.

7. Capitulescence open, with stalked subglomerules exserted from leaf axils and about as long as subtending leaves; plants restricted to coastal areas, 0-10 meters elevation.

1. B. dioica

7. Capitulescence dense, of many axillary fascicles basically subsessile in the axils of distal-most leaves, usually much shorter than longer than subtending leaves; plants inland, 1400-3900 meters elevation.

3. B. lancifolia

*Baccharis vahlii* DC.

Dioecious, erect shrubs 0.5-3 m, restricted to coastal areas; stems moderately- to much-branched, angled-ripare, typically leafy only distally; herbage resinous-glandular, otherwise glabrous or nearly so. Leaves short-petiolate; blade (1.5-)2-5 × 0.5-1.7(-2.2) cm, oblong-linear or obovate to spatulate, stiffly chartaceous or carnose, venation 1-nerved, rarely 3-nerved from above based, both surfaces punctate-glandular and typically resinous, base attenuate, margins usually entire or rarely distally remotely 1-2- toothed per margin, often revolute, apex obtuse to retuse; petiole 0.2-0.5(-1) cm. Capitulescence open, corymbiform-paniculate, apically rounded, with several stalked subglomerules exserted from leaf axils and about as long as subtending leaves, each subglomerule of several sessile or subsessile capitula; peduncles 0-4(-17) mm, angled-sulcate. Staminate capitula 4.5-6 mm, 18-28-flowered; involucre 2.5-4 mm diam., turbinate; phyllaries 0.7-4.5 mm, 4-5-seriate, elliptic-lanceolate to lanceolate, glabrous, with a broad central green portion, apex without a distinct dark-resinous zone, obtuse or sometimes acute to acuminate, margins thinly scarious-erose; corolla 3-4 mm, tube 1.7-2.3 mm, slightly papillose distally, lobes 1-1.3 mm, typically recurved; anthers c. 1.1 mm; ovary 0.2-0.4 mm, sterile, glabrous, pappus 3-3.5 mm. Pistillate capitula 6-8 mm, 30-54-flowered; involucre 3-4 mm diam., turbinate-campanulate; phyllaries 1-4.5(-5.5) mm, 5-6-seriate, elliptic-lanceolate to lanceolate, glabrous, with a broad central green portion, apex without a distinct dark-resinous zone, obtuse or sometimes acute to acuminate, margins thinly scarious-erose; receptacle epaleate; corolla 3-3.5 mm, glabrous, lobes c. 0.2 mm; style long-exserted. Cypselae 1-1.7 mm, 10-costate, glabrous; pappus bristles 4-6 mm. Flowering May-Nov. *Manglar, matorral de duna costera, selva baja con cactaceas, secondary vegetation on sandy soil.* Y (Gaumer et al. 1376, MO); QR (Sousa y Cabrera 11217, MO). 0-10 m. (Estados Unidos [S. Florida], Mesoamérica, Cuba, Jamaica, Hispaniola, Puerto Rico, Virgin Islands, Lesser Antilles.)

In the Yucatán Peninsula, *Baccharis dioica* was cited by Millspaugh y Chase (1904) as *B. halimifolia* L., and by Standley (1930) and Sousa y Cabrera (1983) as *B. heterophylla* Kunth. Howard (1989) cited a plate of Vahl as “Type,” but because the original collections are extant Howard’s citation does not establish lectotypification.

Dioecious, shrubs to small trees to 1-4.5 m; stems moderately- to much-branched, branches sulcate-angled; herbage somewhat resinous-glandular, otherwise glabrous. Leaves subsessile to petiolate; blade 1.5 -5 × 0.4-2 cm, oblanceolate, stiffly chartaceous, 3-nerved from just above base, midrib sometimes impressed adaxially, surfaces punctate-glandular, subresinous, otherwise glabrous, base usually attenuate, distal margins remotely 1-2-toothed, rarely entire, sometimes revolute, apex obtuse to less commonly acute; petiole 0.2-1 cm. Capitulescence dense, in small spicate-glomerate clusters on distal-most axillary branches, 3-15-capitulate, distal-most leaves sometimes deciduous so that clusters are long-stalked, individual capitula subsessile or short-pedunculate; peduncles 0.5-2.5 mm. Staminate capitula 4.5-6 mm, 15-28-flowered; involucre 3-4 mm diam., campanulate; phyllaries 1.5-4 mm, 3-4-seriate, lanceolate, all phyllary apices typically having a large distinct dark-resinous zone, apically obtuse or sometimes acute, margins often thinly scarious, inner phyllaries often apically erose or ciliate; corolla 3.5-4 mm, glabrous or sometimes tube slightly papillose, tube 2.2-2.5 mm, lobes c. 1 mm, recurved; anthers 1-1.2 mm; ovary c. 0.2 mm, sterile, glabrous, pappus 3-3.3 mm. Pistillate capitula 4-10 mm, 35-70-flowered; involucre 3.5-5 mm diam., campanulate; phyllaries 1.7-4.5 mm, 4-5-seriate, lanceolate or sometimes outermost elliptic-lanceolate, all phyllary apices typically having a large distinct dark-resinous zone, obtuse and sometimes erose, inner phyllaries sometimes merely violet-streaked distally; receptacle epaneate; corolla 2-2.7 mm, glabrous or nearly so, lobes c. 0.1 mm; style long-exserted. Cypselae 0.8-1.5 mm, c. 10-costate, glabrous; pappus bristles 4.5-6.5 mm, greatly elongating in fruit. Flowering Jan-May. Pine-oak forests, riverbanks, seasonal evergreen forest, selva alta perennifolia. Ch (Breedlove 35077, MO); G (Pruski y Ortiz 4273, MO). 1000-3300 m. (Mexico [Oaxaca], Mesoamérica.)

*Baccharis glandulifera* is an allopatric segregate of *B. heterophylla* Kunth.


*Baccharis confertoides* G.L. Nesom.

Dioecious, shrubs to small trees 1-5(-10) m occurring inland, typically with short trunks and dense rounded crowns; stems moderately- to much-branched, branches angled-striate, leafy distally; herbage resinous-glandular, otherwise generally glabrous. Leaves subsessile or subpetiolate; blade 1-3(-4.2) × 0.6-1.4 cm, lanceolate-elliptic to elliptic-obovate, stiffly chartaceous, 1-veined or faintly pinnately veined, 2° veins 1-4 per side but without distinct 3° reticulum (a few 3° veins sometimes very faint between 2° veins), midrib often slightly raised
adaxially, both surfaces resinous when immature, punctate-glandular, sometimes granular, otherwise glabrous, base usually attenuate into a subpetiolar base 0.1-0.4 cm, margins entire, flat to sometimes subrevolute, sometimes minutely papillose, apex obtuse to acute, sometimes apiculate. Capitulescence dense, of many axillary fascicles basically subsessile in the axils of the closely spaced distal-most leaves, usually much shorter than longer than subtending leaves, each fascicle 2-10-capitulate; peduncles 0.5-1 mm. Staminate capitula 4-6 mm, 25-40-flowered; involucre 3-4.5 mm diam., campanulate; phyllaries 1.5-5 mm, 4-5-seriate, outer phyllaries triangular or elliptic-deltate grading to inner phyllaries lanceolate, nerve sometimes reddish distally, margins often thinly scarious and fimbriate, apex without a distinct dark-resinous zone, acute or the outer phyllaries obtuse, outer phyllaries sometimes granular; corolla 3.3-4.5 mm, tube and throat sometimes slightly papillose, tube 2.3-3 mm, lobes 0.7-1 mm, often recurved; anthers c. 1.2 mm; ovary c. 0.2 mm, sterile, glabrous; pappus bristles 3-3.7 mm. Pistillate capitula 5-8 mm, 45-70-flowered; involucre 3.5-5 mm diam., campanulate; phyllaries 0.8-4.5 mm, 5-6-seriate, outer phyllaries triangular or elliptic-deltate grading to inner phyllaries lanceolate, nerve sometimes reddish distally, outer phyllaries often granular proximally and faintly reddish distally, margins often fimbriate, apex without a distinct dark-resinous zone, acute or the outer phyllaries obtuse; receptacle epaleate; corolla 2-3 mm, glabrous to slightly papillose distally, lobes c. 0.1 mm; style long-exserted. Cypselae 1-1.3 mm, 10-costate, glabrous; pappus bristles 4.5-7 mm. Flowering year-round. Baccharis shrublands, cloud forest, disturbed oak forests, pine-oak forests, pinelands, rocky slopes, scrub-forests, secondary forests. Ch (Breedlove y Thorne 30436, MO); G (Pruski y Ortiz 4271, MO); H (Nelson et al. 1593, MO); ES (Martínez 727, MO). 1400-3900 m. (México, Mesoamérica.)

Matuda (1957) and Nash (1976) used the name B. vaccinioides Kunth for our entire-leaved Mexican and Mesoamerican material. I agree with Nesom (1990) that use of the name B. vaccinioides in Mesoamerica is misapplied, but can discern but a single entire-leaved taxon, for which the name B. lancifolia has priority. As restructured, B. lancifolia remains infrequent in south-central Mexico, but is much more frequent in Mesoamerica, where it extends southeast into Honduras and El Salvador.


Neomolina multiflora (Kunth) F.H. Hellw.
Dioecious shrubs 1-2.5 m; stems angled-striate, angles sometimes lightly colored, pilosulose to pilose; herbage not resinous, pubescent with crisped non-glandular trichomes. Leaves short-petiolate; blade 1-4(-6.2) × 0.3-1.8(-2.5) cm, oblong to obovate, venation pinnate (Mesoamerica) or 3-nerved, 2° veins 4-7 per side, venation finely reticulate, surfaces typically eglandular, adaxial surface glabrous or veins sometimes puberulent-hirtellous, abaxial surface sordid-puberulent-hirtellous, base narrowly cuneate to more commonly obtuse or rounded, margins sharply serrulate or sharply serrate with many teeth, apex acute to more commonly obtuse; petiole 0.2-0.5 cm. Capitulescence 4-10(-15) cm diam., corymbiform-paniculate, somewhat compact, apically nearly flat-topped or broadly rounded, lateral branches 2-10 cm, capitula obviously pedunculate; peduncles 3-15 mm, puberulent, sometimes few-bracteolate. Staminate capitula 5-6 mm, 19-31-flowered; involucre 4.5–5.5 × 3.5-5 mm, turbinate-campanulate; phyllaries c. 4-seriate, lanceolate or oblanceolate, purplish distally, nerve darkened distally, glabrous, margins distally ciliate-fimbriate, apex acute; corolla 4-6 mm, tube setulose, pappus bristles 4-5 mm. Pistillate capitula 6.5-10 mm, 21-33-flowered; involucre 4.5–7 × 4.5-6 mm, turbinate to turbinate-campanulate; phyllaries 3(-4)-seriate, oblanceolate, purplish distally, nerve indistinct both proximally and distally, surfaces glabrous, margins distally ciliate-fimbriate, apex acuminate to obtuse; receptacle epaleate; corolla 3.6-4.8 mm. Cypselae 1.5-3 mm, c. 5-costate, glabrous; mature pappus 6-8 mm. 2n = 18.

I have seen no material of *Baccharis multiflora* var. *herbacea* McVaugh, which is provisionally accepted, albeit having leaf blade venation 3-nerved as in the similar *B. serrifolia*.

4a. *Baccharis multiflora* var. *multiflora*

Leaf blade venation pinnate, 2° and 3° venation imbedded. *Conifer forests*. Ch (Matuda, 1957: 170). Probably c. 2500 m. (México, Mesoamérica.)


*Baccharis braunii* (Pol.) Standl., *Eupatorium braunii* Pol.

Dioecious, erect subshrubs or shrubs to 4(-7) m, sometimes vining; stems few- to moderately-branched, sometimes subsucculent and reddish, striate, rarely tomentulose distally; herbage resinous and glabrous. Leaves petiolate; blade 3.5-15(-18) × 1-5.5(-6.5) cm, elliptic to oblanceolate, venation prominently 3-nerved from base, larger veins often reddish, surfaces
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glabrous, base cuneate, margins entire, apex acute to acuminate, rarely obtuse; petiole 0.5-3(-4) cm. Capitulescence corymbiform-paniculate, terminal with ascending branchlets, many-capitulate, often large, generally ebracteolate; peduncles 1-20 mm, slender, sulcate, occasionally tomentulose distally. Staminate capitula 4-6 mm, 20-50-flowered; involucre 3-4.5 mm diam., campanulate; phyllaries 2-5 mm, 4-5-seriate, deltate to lanceolate, apically obtuse to inner ones acute; corolla 3-4.1 mm, sparsely glandular throughout, tube 1.5-2 mm, lobes to c. 1.3 mm, often apically puberulent; anthers c. 1.2 mm; ovary sterile, puberulent, pappus 3-4 mm. Pistillate capitula 6-10 mm, 70-200+-flowered; involucre 3.5-5 mm diam., campanulate; phyllaries 2.2-6.5 mm, 5-6-seriate, deltate to lanceolate, apically obtuse to inner ones acute; receptacle partly paleate; corolla 2.5-3 mm, sparsely puberulent throughout; style long-exserted. Cypselae c. 1.4 mm, c. 5-costate, commonly glabrous; pappus bristles to c. (6-)9 mm, greatly elongated at cypsela maturity. Flowering year-round. Bosque húmedo subtropical, bosque mixto premontano húmedo, bosques seco tropical, bosque secundario, bosque tropical húmedo, cloud forest, disturbed areas, forest edges, lava flows, montane rain forests, pastures, pinares, premontane wet forest, roadsides, rocky semiarid-scrubland, savannas, steep slopes, stream sides, swampy meadows, trail side. Ch (Breedlove 19891, MO); C (Anon., BM); G (Nee et al. 47349, MO); H (Nelson et al. 5720, MO); ES (Carballo 79, MO); N (Robleto 112, MO); CR (Polakowsky 508, W); P (Valdespino et al. 602, MO). (200-)300-2100 m. (Mesoamérica, Colombia, Venezuela, Ecuador, Perú, Bolivia, Lesser Antilles.)

Although typified by material from México (Campeche), Baccharis pedunculata is uncommon north of Costa Rica and Panama. Synonymy is given in Pruski (2010), whose circumscription is followed here. The pistillate capitula rarely appear to be bisexual.


Pingraea salicifolia (Ruiz et Pav.) F.H. Hellw.

Shrubs to small trees. 2n = 18, 36. 3 subspecies. (United States, Mexico, Mesoamerica, Colombia, Venezuela, Ecuador, Peru, Bolivia, Brazil, Uruguay, Paraguay, Chile, Argentina.)

The typical subspecies is dioecious and occurs from Oaxaca north into the Estados Unidos and from Colombia south to Chile and Argentina. Our monoecious plants are geographically interspersed between the two “typical elements” and appear to deserve subspecific status, as in Müller (2006).

Isotipo: México, Chiapas, *Breedlove* 28727 (MO!). Illust.: no se encontró. N.v.: Antizl chilkan, wol nich te’, Ch; chilca, G; chilca, jaboncillo, lengua de gallina, lik, H; chilca, sauce, ES; chilca, N.

Monoecious, erect shrubs to small trees 1.5-5 m; stems moderately-branched, striate, reddish; herbage resinous, otherwise glabrous or nearly so. Leaves sessile or subpetiolate; blade 5-12.7 × 0.3-1.4 cm, narrowly lanceolate to lanceolate, inconspicuously 3-nerved from basal acumination, both surfaces resinous and punctate-glandular, otherwise glabrous, base usually attenuate into a subpetiolar base 0-1 cm, margins subentire to serrulate, rarely serrate, apex acuminate.

Capitulescence corymbiform-paniculate, several-many-capitulate, lateral clusters on stalks c. 5 cm, staminate and pistillate capitula intermixed in the capitulescence of same plant, usually with terminal capitulum staminate and lateral capitula pistillate; peduncles 1-7 mm, bracteolate.

Staminate capitula 4.5-6 mm, 15-30-flowered; involucr 3-4.5 mm diam., campanulate; phyllaries 1-4 mm, 6-7-seriate, elliptic to linear-lanceolate, distal portion of nerve and apex reddish-brown, apically acute to obtuse, margins often thinly scarious, sometimes fimbriate; corolla 4.3-4.8 mm, tube-throat juncture typically papillose, tube 2.6-2.8 mm, lobes to 1.2-1.5 mm, often recurved; anthers c. 1.5 mm; ovary 0.3-0.4 mm, sterile, glabrous, pappus c. 4 mm, clavate apically.

Pistillate capitula 5.5-7 mm, 50-150-flowered; involucr 3.5-5 mm diam., campanulate; phyllaries 1-5 mm, c. 7-seriate, elliptic to linear-lanceolate, nerve reddish distally, apically acute to obtuse, receptacle epaleate; corolla 2.2-2.8 mm, glabrous, lobes c. 0.1 mm; style long-exserted. Cypselae 0.7-1.1 mm, 5-costate, glabrous; pappus bristles 3.5-4.5 mm. Flowering year-round. *Bosque húmedo prémontano, bosque húmedo subtropical, bosque seco subtropical, bosques seco tropical, campo abierto, disturbed gallery forests, dry hillsides, oak forests, roadsides, seasonal evergreen forest, secondary pine forests, steep rocky slopes, streamsides. Ch (Matuda 4875, MO); B (Davidse y Brant 32404, MO); G (Pruski et al. 4523, MO); H (Williams y Molina 10514, MO); ES (Rohweder 3489, MO); N (Rueda 12500, MO). 300-2800 m. (Mexico [Oaxaca], Mesoamérica.)

I believe the low end elevation of “sea level” given by Nash (1976) refers to extra-Mesoamerican material.

7. **Baccharis serrifolia** DC., *Prodr.* 5: 403 (1836) as “serraefolia.” Holotipo: México, *Anon.* (G-DC, photo in MO!). Illust.: no se encontró. N.v.: bak te’, ch’uy akan, ch’aal wamal, Ch; té, té de montaña, té de monte, G; canutillo, H.
Dioecious, erect xylopodial subshrubs to shrubs 1-3 m; stems subterete to sometimes slightly compressed, angled-striate, angles sometimes lightly colored with greenish faces in between, pilosulose to pilose; herbage pubescent with crisped or moniliform, non-glandular trichomes. Leaves short-petiolate; blade 2-4(-5.5) × 1-1.7(-2.5) cm, lanceolate to elliptic-lanceolate, venation 3-nerved from base, venation finely reticulate, both surfaces typically eglandular or sometimes young leaves slightly punctate-glandular, commonly non-resinous, sordid-puberulent but often glabrate adaxially, base attenuate, margins sharply serrulate or sharply serrate with many teeth, apex obtuse to acute, sometimes apiculate; petiole 0.2-0.9 cm. Capitulescence corymbiform-paniculate, moderately open, apically rounded, 4-30-capitulate, lateral branches 5-15 cm, capitula obviously pedunculate; peduncles 3-10(-20) mm, puberulent, minutely 1-3(-8)-bracteolate. Staminate capitula 3.5-6 mm, 12-25-flowered; involucre 3-4 mm diam., turbinately campanulate; phyllaries 1.1-4 mm, 4-5-seriate, lanceolate, nerve darkened distally, glabrous to puberulent, not purplish distally, margins often thinly scarious, apically obtuse or sometimes acute; corolla 2.7-4 mm, tube 1.2-1.8 mm, slightly papillose distally, lobes 1-1.3 mm, often recurved; anthers c. 1.1 mm; style branched, exserted up to 1 mm from anther thecae, branches papillose, ovary 0.3-0.9 mm, glabrous, pappus 3-3.5 mm. Pistillate capitula 5-7.5 mm, 18-30-flowered; involucre 2.5-3 mm diam., campanulate; phyllaries 1.3-5.5 mm, c. 5-seriate, lanceolate, nerve darkened or indistinct proximally, glabrous to puberulent, not purplish distally, apex obtuse or sometimes acute, often ciliate, often reddish over entire distal portion; receptacle epaleate; corolla 2.5-3 mm, glabrous or nearly so, lobes c. 0.1 mm; style long-exserted. Cypselae 1-1.7 mm, c. 5-costate, glabrous or nearly so; mature pappus 3.5-4.5(-5) mm. 2n = 18. Flowering year-round with peak Oct-Feb. Cafetal, montane forests, oak forests, pastures, pinares, pine-oak forests, roadsides, steep slopes. Ch (Méndez 797, MO); G (Kellerman 5356, F); H (Nelson et al. 3982, MO); ES (Nash 1976: 146); N (Moreno 14348, MO). 800-3100 m. (México, Mesoamérica.)

Nash (1976) treated B. prorepens as a good species and listed B. parviflora Less., non (Ruiz & Pav.) Pers., in synonymy of B. serrifolia. However, the Lessing name appears to be a synonym of the closely related, albeit glabrous, B. mexicana Cuatrec. Nesom (1998) provided a useful key to B. serrifolia and some of its close relatives.

xik’, sakil xijch, siban te’ wamal, walak’ xik’, xijch, Ch; arnica, barba fina, bisib, bisik’am, chilca, crucito, t’isib, G; alcotán, barba fina, chilca, comida de yegua, corrimiento, crucito, lengua de gallo, lengua de vaca, san antonio, santo domingo, tárara de montaña, trastrás, valeriana, H; canutillo, guarda-barranca, hierba de santo domingo, tapa barranco, ES; alcotán, largo trapo, santo domingo, CR; santa maría, P.


Weedy dioecious subshrubs to shrubs 0.4-5 m; stems often vining, moderately- to much-branched, branches often nearly at right angles to stem, subterete to angled, prominently striate, puberulent to loosely tomentose, becoming glabrate proximally; herbage generally not resinous, when tomentulose the indumentum often tufted. Leaves short-petiolate; blade (1-)2-7.5 (11.5) × 0.5-4(-5.5) cm, elliptic to less commonly lanceolate or elliptic-ovate, venation prominently 3-nerved from near base, adaxial surface glabrous to puberulent, less commonly tomentulose, abaxial surface puberulent to tomentulose, less commonly puberulent, base cuneate to obtuse, margins entire, apex acute to attenuate, rarely obtuse to rounded; petiole 0.3-1 cm. Capitulescence corymbiform, several-capitulate, with many axillary branches < c. 20 cm, nearly at right angles to main stem, naked or leafy; peduncles 0.5-10 mm, generally puberulent to tomentulose. Staminate capitula 4-5 mm, 22-36(-44)-flowered; involucre 2.5-4 mm diam., campanulate; phyllaries to c. 4.2 mm, 3-4-seriate, elliptic to elliptic-lanceolate, outer phyllaries puberulent, inner phyllaries glabrous to distally puberulent, apically obtuse or rounded to inner ones acute; corolla 3.3-4.5 mm, sparsely glandular or puberulent on throat and generally also at apex of lobes, tube 1.5-2.1 mm, lobes 1.3-1.9 mm; anthers c. 1.2 mm; ovary sterile, sparsely puberulent, pappus 3-4 mm, occasionally slightly barbellate apically. Pistillate capitula 4-9 mm, 40-250-flowered; involucre 2.5-4 mm diam., campanulate; phyllaries to c. 4.5 mm, 4-6-seriate, elliptic-lanceolate to inner ones lanceolate, puberulent to inner ones distally so, apically obtuse to acute; receptacle partly paleate; corolla 2-2.5 mm, sparsely puberulent distally; style long-exserted. Cypselae 1-1.5 mm, c. 5-costate, commonly puberulent; pappus bristles to c. 6.5 mm, moderately elongated at cypsel maturity. 2n = 18. Flowering year-round. _Boggy ground, bosque enano, bosque húmedo subtropical, bosque húmedo tropical, bosques mesófilo, bosque premontano, bosques seco subtropical, bosques seco tropical, cafetal, campo abierto, cloud forest, cultivated areas, disturbed areas, disturbed forest, fields, forest edges, matorrales, oak forests, pastures, pinares, potreros, quebradas secas, roadsides, rocky areas, savannas, selva alta subcaducifolia, secondary vegetation, selva alta perennifolia, selva mediana, steep hillsides, stream sides, thickets_. T (Cowan, 1983: 24); Ch (Pruski et al. 4192, MO); Y (Cabrera y Cabrera 15620, MO);
This widespread species appears to be absent from the West Indies. *Baccharis trinervis* var. *rhexioides* (Kunth) Baker is often recognized as distinct (e.g., Müller, 2006), but was referred to synonymy by Pruski (2010), who is followed here and where fuller synonymy is given.

4. **Bellis** L.

Por J.F. Pruski.

Low annual or short-lived perennial, fibrous-rooted, often acaulescent, rosulate herbs 2-15(-25) cm, sometimes stoloniferous; stems with basal rosette or leaves sometimes cauline and reduced, strigose; herbage eglandular. Leaves simple, alternate, with a petiolariform base; blade chartaceous, 1-veined or few-pinnately veined, strigose, margins usually entire to crenate-serrate. Capitulescence monocephalous; peduncle elongate. Capitula bisexual, radiate; involucral hemispherical to campanulate; phyllaries subimbricate, subequal, 1-2(-3)-seriate, appressed or apex flaring, flat, oblong, herbaceous, 1-nerved, apex often obtuse, strigose; receptacle broadly conical to convex, alveolate. Ray florets 35-90, 1(-2)-seriate; corolla usually well-exserted, white throughout or limb slightly pinkish abaxially. Disk florets 60-80+, bisexual; corolla tubular-funnelform, shortly (4-)5-lobed, yellow, tube shorter than throat, lobes erect, deltate; anthers stramineous; style branch stigmatic surfaces restricted to the proximal 1/2 of branch, apical appendage deltate, papillose. Cypselae obovate, compressed, the 2 margins thickened, sometimes ciliate, faces strigose or rarely glandular; pappus absent or very reduced (minutely fimbriate-coroniform). $x = 9$. 8-15 spp. 1 sp. Cultivated and naturalized in the neotropics; native to Europa; North America, Central America, Suramérica, África, Asia, Islas del Pacífico.


Erect perennial rosulate scapose herbs 4-18(-25) cm, rhizomes short with 1-few rosettes, aerial stems usually absent, when present to c. cm 5 tall to base of peduncle with leaves much longer than internodes. Leaves ascending or repent; blade 2-7(-9) × 0.6-1.5(-2.2) cm, spatulate to obovate, subparallel 3-nerved proximally to few-ascending pinnately veined distally, surfaces sparsely strigose, base abruptly long-attenuate into a petiolar subclasping base typically as long as...
or longer than expanded portion of blade, margins few-crenate, apex rounded to sometimes broadly acute. Capitulescence one per rosette; peduncle 4-15(-25) cm, lax to stiffly erect, rarely filiform, usually more than twice as long as leaves, sparsely pilose proximally to strigose distally. Capitula (including rays) 1.5-3 cm diam., ray corolla limbs laterally well-exserted and disks forming a low dome; involucre usually 5-8 mm; phyllaries 13+, (3-)4-6 × 1.4-2 mm, sparsely villous, margins sometimes ciliolate, apex usually obtuse; receptacle to 5+ mm × 3-5 mm. Ray florets many, the cypselae generally in a single series, but the corolla limbs often overlapping distally; corolla tube c. 0.5-0.7 mm, setose, limb (4-)6-11 × 1-1.5 mm, linear-oblancoolate, 2-3-nerved, entire apically. Disk florets with corolla and cypselae subequal; corolla c. 1.5 mm. Cypselae 1-1.5 mm, eglandular, the rays generally more pubescent than the disks. 2n = 18. 

Disturbed areas, grassy areas, open forest, pastures, potreros, slopes of volcanoes. CR (Pruski et al. 3856, MO). 2100-3200 m. (Canadá, Estados Unidos, México, Mesoamerica, Ecuador, Bolivia, Brazil, Chile, Argentina; Europa, Asia, New Zealand, Hawaii.)

The species is widely planted as an ornamental, and then the ray florets are sometimes biseriate, with the limb shortly oblong and sometimes strongly bicolored or dark red throughout.

5. **Callistephus** Cass., nom. cons. 


Por J.F. Pruski.

Annual tap-rooted herbs; stems erect, pilose-hirsute. Leaves cauline, alternate, petiolate or distal ones sessile; blade chartaceous, triplinerved from near base, eglandular, otherwise glabrous to sparsely strigillose to strigose. Capitulescence terminal, leafy, monocephalous to loosely corymbiform. Capitula bisexual, radiate; involucre hemispheric; phyllaries imbricate, 3-4-seriate, mostly oblong, flat, outer phyllaries foliaceous, inner phyllaries usually slightly shorter, subhyaline or at least scarious-margined; receptacle convex, sometimes with alveolae margins resembling squamellae. Ray florets 1-2-seriate (seemingly pluriseriate in some cultivars via zygomorphy of disk corolla); corolla usually reddish or purplish. Disk florets bisexual; corolla funnelform, yellow, lobes 5, short-lanceolate, erect; anther thecae obtuse basally, appendage elongate; style branch apical appendage delate to triangular, papilllose. Cypselae oblong to obovate in outline, compressed, shoulders rounded, faces finely c. 3-striate, strigose distally; pappus double (biseriate), caducous, outer series squamulose, inner series of barbellate bristles. x = 9. 1 sp. Native to Asia [China, Japan, Korea], widely cultivated.
In Mesoamerica specimens of multiple-ray cultivars of *Callistephus chinensis* are often misdetermined as *Chrysanthemum morifolium*, which differs vegetatively by sometimes glandular (vs. eglandular) leaves at mid-stem pinnatifid (vs. commonly coarsely 2-7-dentate), and stems crisped-pubescent (vs. pilose-hirsute) with trichomes mostly subappressed (vs. patent), when ascending < 0.5 (vs. 0.5-1) mm.


Herbs 0.3-1 m; stems single, simple to few-branched, internodes usually about 1/2 as long as leaves, trichomes 0.5-1 mm, patent. Leaves: blade 2-6 × 1-5 cm, rhomboidal-ovate grading to distal ones oblong-elliptic, base subcordate or more commonly truncate to cuneate, margins of mid-stem leaves 2-7-crenate to more commonly coarsely 2-7-dentate, distal leaves sometimes subentire, apex acute to acuminate; petiole of proximal leaves 2-4(-6) cm, narrow-winged, non-clasping. Capitulescence 1-2-capitulate; peduncles not much longer than capitulum diam.

Capitula 4-8(-12) cm diam. (as measured from ray corolla limb apex to apex); involucre 1.5-3.5 cm diam.; outer phyllaries 10-15(-22) × 2-4 mm, often spreading or reflexed, ciliate, cilia to 1+ mm; inner phyllaries, eciliate, reticulate. Ray florets 25-100+; corolla well-exserted, tube 2-3 mm, limb 10-30 × 2-7 mm, c. 9-nerved, narrowed to 3-denticulate apex. Disk florets: corolla 4-6.5 mm, lobes c. 1 mm; style branches c. 1 mm. Cypselae 3-3.5 × c. 1.5 mm; pappus bristles 3-4.5 mm, squamellae to c. 0.2 mm. 2n = 18. Flowering Feb-Apr, Sep. *Cultivated, sometimes escaping to fields, roadsides, and open forest.* H (Haylock 143, MO); ES (Standley y Calderón, 1941: 276). 1100-1500 m. (Asia, widely cultivated and sometimes escaping; Canadá, Estados Unidos, Mexico, Mesoamerica, Surinam, Peru, Brazil, Argentina; Europa, Australia, New Zealand, Pacific Islands.)


Por J.F. Pruski.
Colonial mostly leafless herbaceous-stemmed subshrubs with woody base, proximal axils often thorny with lateral branches modified into stout thorns; stems erect, slender, green, usually glaucous and glabrous, branches ascending. Foliage leaves proximal-cauline (mostly withered at anthesis), simple, alternate, sessile, oblong-lanceolate or squamose, chartaceous and flaccid, 1-nerved, margins entire or rarely 1-5-toothed. Capitulescence corymbiform-paniculate from the many single-capitula stems, infrequently also lateral; peduncles short. Capitula bisexual, short-radiate; involucre turbinate to hemispherical; phyllaries imbricate, graduated, 3-5-seriate, mostly 3-nerved; receptacle flat to convex. Ray florets 1-seriate; corolla white, limb short-radiating. Disk florets bisexual; corolla 5-lobed, tube longer than throat, veins orange; style-branched with paired stigmatic lines proximally, apical appendage deltate. Cypselae obovoid-fusiform, sometimes slightly compressed, 5(-6)-nerved; pappus of numerous persistent capillary bristles, 1(-2)-seriate. $x = 9$. 1 sp. S. and SW. Estados Unidos, México, Mesoamérica.

Chloracantha, generally placed in either Aster (e.g., D’Arcy, 1975; Nash, 1975; Jones, 1980) or Erigeron (e.g., Blake, 1924; Nesom, 1989), was described by Nesom et al. (1991) based on molecular evidence. It differs from Aster s. lat. and Erigeron by sometimes thorned stems and 3-nerved phyllaries lacking distinct chlorophyllous zones. Tropical populations generally have longer spines than do more temperate material. Collections made at flowering are usually leafless or with only squamose leaves, but occasional collections (e.g., the types of Aster spinosus var. jaliscensis and Erigeron ortegae) from central Pacific coastal México are leafy. I take differences such as the thorned vs. non-thorned condition, mid-series phyllary apex shape, and pappus length as regional races characters and not taxonomically significant, although the monographer (Sundberg, 1991) recognized four varieties. The determinate nature of the capitulescence in Chloracantha was emphasized by Nesom (1991), but it is the norm for the 25000 species of Compositae (Pruski, 2004).


Aster spinosus var. jaliscensis McVaugh, Aster spinosus var. spinostissimus Brandegee, Chloracantha spinosa var. jaliscensis (McVaugh) S.D. Sundb., Chloracantha spinosa var. spinosissima (Brandegee) S.D. Sundb., Chloracantha spinosa var. strictospinosa S.D. Sundb., Erigeron ortegae S.F. Blake, Leucosyris spinosa (Benth.) Greene.

Rhizomatous subshrubs 0.5-1.5(-2.5) m; stems usually single from base, densely branched distally, rarely branched basally, striate, angled, branches ascending at c. 45°, thorns 0.5-7 cm, flat to subterete, simple or rarely trifid, each subtended by a lanceolate squamose leaf 2-4 mm. Foliage leaves (when present) 1-6 × 0.5-1 cm, narrowly oblanceolate to spatulate, glabrous or nearly so, margins sparsely ciliate, apex acute to rounded. Capitulescence few-bracteolate, bracteoles resembling the squamose leaves; terminal peduncles 2-7(-11) cm, lateral peduncles 0.1-3 cm. Capitula 5-8 mm; involucre 4-6(-7.5) × 5-6 mm; phyllaries 1-6(-7.5) × 0.5-1.5 mm, lanceolate, midzone broadly greenish-tan, surface glabrous, margins scarious, sometimes ciliate, apex acute or sometimes obtuse; receptacle 1.5-2.5 mm diam. Ray florets (10-)20-33; corolla 6-8 mm, white, tube 3-4 mm, setose, limb 3-4 × c. 1 mm, glabrous. Disk florets (15-)20-70; corolla 3.5-6 mm, tubular-funnelform, yellow, tube setose, lobes 0.4-1 mm, erect, triangular; style branches c. 1(-1.5) mm. Cypselae 1.5-3.5 mm, pale brown, glabrous; pappus bristles 2.5-6 mm, white, shorter than or sometimes slightly longer than the disk corolla. 2n = 18. Rocky streambeds, riversides, ditches, wet places. Ch (Sanchez 1078, MO); G (Heyde y Lux 3424, MO); H (Williams 23285, NY); ES (J. R. Martinez 330, MO); N (Neill 1165, MO); CR (Tonduz 7060, NY); P (White y White 108, MO). 200-1600 m. (S. y SW. Estados Unidos, México, Mesoamérica.)

The distribution of this species is uncommon among Mesoamerican Compositae in that it occurs in the gulf-coastal Estados Unidos, yet is unknown in the Yucatán Peninsula.


Por G. Sancho y J.F. Pruski.

Annual or biennial (rarely perennial) herbs, often weedy; stem often simple, leaves typically cauline and gradually descrescent, basal leaves sometimes present at anthesis; herbage usually pubescent. Leaves simple to pinnatisect, alternate, mostly sessile, chartaceous, pinnately veined, usually pubescent, sometimes also glandular. Capitulescence mostly variously paniculate, less often racemose or subsperate, rarely monocephalal. Capitula bisexual, inconspicuously heterogamous, usually disciform to sometimes subradiate, small, subsessile or slender-pedunculate; involucre mostly campanulate; phyllaries subimbricate, usually graduate or sometimes subequal, in 2-several series, 1(-3)-nerved, linear to lanceolate, midregion herbaceous,
nerves orange-resinous, margins hyaline; receptacle mostly flat, weakly foveolate-fimbriate; subreceptacle sometimes swollen or inflated. Marginal florets numerous and pluri-seriate, pistillate; corolla filiform-tubular with style exerted past corolla apex or filiform-subradiate with limb slightly longer than style, white to weakly purplish distally. Disk florets few to several(-many), bisexual, very rarely functionally staminate; corolla veins orange, narrowly funnelform, usually short-(4-)5-lobed, yellowish or sometimes white; anthers tan, obtuse at base; style branch appendage triangular, papillose, apex acute to obtuse. Cypselae oblong to obovoid, compressed, eglandular, pubescent or glabrous, each margin commonly 1-costate, disk florets rarely with sterile ovaries; pappus of rays and disk typically present and similar, 1(-2)-seriate, of 8-30 white or stramineous to rarely brownish-pink, scabrid capillary bristles about as long as the disk corollas. \( x = 9 \). 50-60 spp. Aprox. 25-40 of these American.

*Conyza* is recognized here mostly as circumscribed by Cronquist (1943), but with *Laennecia* removed, as in Zardini (1981) and Nesom (1990). Noyes (2000) noted that *Conyza* as currently defined is not monophyletic. Greuter (2003) did not recognize *Conyza*, but Pruski y Sancho (2006) and Nesom y Robinson (2007) recognized *Conyza*. However, it is likely that neither *Conyza* nor *Erigeron* are monophyletic, and that further species will be removed from each. For example, *C. chilensis*, a synonym of *C. primulifolia*, is the conserved genericitype, but by its setose disk corollas this taxon is anomalous among Mesoamerican species.

The names *Conyza apurensis* and *C. chilensis*, each used in Nash (1976) and D’Arcy (1976), were synonymized under earlier names by Pruski (1998) and Lourteig y Cuatrecasas (1985), respectively. Application of the names (and consequently their common names) *C. bonariensis* and *C. canadensis*, each also used in Nash (1976) and D’Arcy (1976), were modified by Pruski y Sancho (2006), who adopted the name *C. sumatrensis* for some materials.


1. Disk corolla lobes setose; basal leaves persistent at anthesis, cauline leaves remote and quickly descrescent. 6. *C. primulifolia*

1. Disk corollas glabrous; leaves mostly cauline and gradually descrescent, basal leaves typically absent at anthesis.
2. Phyllaries mostly subequal.
   3. Capitula usually 5-7 mm; involucres usually 5-7 mm diam.; stems sometimes stipitate-glandular; capitulescences somewhat congested.  
   3. C. coronopifolia
   3. Capitula 3-3.5 mm, involucres 3-4.5 mm diam.; stems eglandular; capitulescences corymbiform-paniculate, more or less flat-topped.

5. C. microcephala

2. Phyllaries unequal, some outer phyllaries reduced.
   4. Proximal leaves spatulate; stems few(-several)-branched distally.
   4. C. laevigata
   4. Proximal leaves linear to elliptic; stems usually simple into capitulescences.
   5. Capitula subradiate; disk corollas generally 4-lobed; central colored portions of mid-series phyllaries about as broad as (or narrower than) stramineous margins.

(2. C. canadensis)

6. Leaf blades usually linear-lanceolate or linear-oblancoate, 0.2-1.6 cm diam.; phyllaries usually not purple-tipped.

2a. C. canadensis var. canadensis

6. Leaf blades linear, 0.1-0.3(-0.5) cm diam.; phyllaries commonly purple-tipped.

2b. C. canadensis var. pusilla

5. Capitula disciform; disk corollas generally 5-lobed; phyllaries green throughout or central colored portions of at least mid-series phyllaries generally broader than the stramineous margins.

7. Herbage typically gray-pubescent; capitulescences corymbiform, pyramidal or flat-topped; marginal florets 5-7-seriate; receptacles 2.5-4 mm diam.

1. C. bonariensis

7. Herbage not commonly gray-pubescent; capitulescences cylindrical-paniculate, numerous-capitulate; marginal florets 3-4-seriate; receptacles 1.5-2.5 mm diam.

(7. C. sumatrensis)

8. Phyllaries hirsute.

7a. C. sumatrensis var. sumatrensis

8. Phyllaries glabrous or subglabrous. 7b. C. sumatrensis var. leiotheca


Weedy annual tap-rooted herbs to 1 m; stems 1(-few) from base single, usually simple into capitulecence, stiffly-erect, typically evenly and densely leafy along length of stem, basal leaves absent at anthesis, green, pale-costate, sparsely to densely pilose, also often heterotrichous with shorter strigillose indumentum; herbage typically densely gray-pubescent, eglandular. Leaves simple or less commonly proximal ones 1-2-pinnatisect from mid-blade to apex, sessile; blade 2.5-15 × 0.2-1.2(-2.5) cm, oblanceolate or elliptic to distal ones often linear-lanceolate, venation pinnate, surfaces hirsutulous-substrigose, also often heterotrichous with sparse pilose indumentum especially on veins abaxially, base attenuate to long-attenuate, margins few-serrate or distal ones often entire, when pinnatisect lobes directed apically, lobes to c. 1.5 cm, lobe apex obtuse, blade apex acute. Capitulecence 8-20 × 5-10 cm, corymbiform, pyramidal or flat-topped, open, few-several-capitulate, sometimes linear-leafy; peduncles 5-15(-30) mm, densely hirsutulous-substrigose. Capitula 5-6.5(-8) mm, relatively large, disciform, to 250-flowered; involucre 5-7 mm diam., hemispherical or urceolate when immature, base typically rounded; phyllaries (2-)4-5 × 0.3-0.4 mm, unequal with a few short phyllaries on subreceptacle, 2-3-seriate, linear-lanceolate, densely hirsute-pilose, green throughout or at least central colored portion of mid-series phyllaries broader than the stramineous margin; receptacle 2.5-4 mm diam. Marginal florets numerous, 5-7-seriate; corolla 3.7-4 mm, filiform-tubular, whitish, apex bifid. Disk florets c. 20; corolla 4-4.5 mm, 5-lobed, pale-yellow, glabrous, lobes c. 0.2 mm. Cypselae 1-1.3 mm, brown, sparsely setulose; pappus bristles c. 20, c. 4 mm, white to pinkish. Flowering year-round. 2n = 54. Disturbed areas. G (Pruski y Vega 4478, MO); CR (Rodriguez 2509, MO). 1200-1500 m. (Estados Unidos, México, Mesoamérica, Colombia, Venezuela, Ecuador, Perú, Bolivia, Brasil, Uruguay, Paraguay, Chile, Argentina, Cuba, Jamaica, Hispaniola, Puerto Rico, Lesser Antilles; Europa, África, Asia, Australia, Islas del Pacífico.)

Pruski y Sancho (2006) note that most usages of the name C. bonariensis in Mesoamerica refer to other species.


Weedy annual herbs 0.2-2.5 m, tap-rooted or fibrous-rooted; stems single, usually simple into capitulescence, stiffly-erect, typically evenly and densely leafy along length of stem, basal leaves absent at anthesis, green, costate, costae pale, glabrous to sparsely pilose; herbage eglandular. Leaves simple, sessile to subsessile, ascending; blade 2-9 × 0.1-1.6 cm, linear to lanceolate or oblanceolate, venation pinnate, surfaces subglabrous to hisrule especially abaxial surface of midrib, base attenuate to long-attenuate, margins usually entire (infrequently few-serrate), often hisrule-ciliate, apex acute. Capitulescence 5-30+ × 3-20+ cm, cylindric-paniculate, usually numerous-capitulate, usually linear-leafy; peduncle 2-10 mm, slender, hisrule-tulous-strigillose to sparsely so. Capitula 3-4.2(-4.6) mm, small, subradiate, 40-64 flowered; involucre 2.5-4 mm diam., campanulate; phyllaries 1-4 × 0.3-0.4 mm, unequal, graduate, 3-4-seriate, usually linear-lanceolate, glabrous or sparsely setose, central colored portion of mid-series phyllaries about as broad as (or narrower than) stramineous margin, resin canal irregularly resinous; receptacle 1.5-2.3 mm diam. Marginal florets 30-50, 2-3-seriate; corolla 2.5-3 mm, filiform-subradiate, white to cream-colored or limb sometimes violet abaxially, tube distally setulose, limb 0.5-1 mm, bidentate, style about as long as corolla. Disk florets 10-14; corolla 2.2-3 mm, 4-lobed, pale-yellow, glabrous, lobes 0.2-0.3 mm. Cypselae 1-1.2 mm, stramineous, sparsely setulose; pappus bristles c. 15, 2-2.5 mm. 2n = 18. 2 vars. Cosmopolitan.


Conyza canadensis var. glabrata (A. Gray) Cronquist, Erigeron canadense var. glabatus A. Gray, Erigeron canadense var. strictum (DC.) Farw., Erigeron paniculatus Lam., Erigeron strictus DC., Senecio ciliatus Walt.

Herbs usually 1-2.5 m, robust; stems glabrous or sparsely pilose. Leaf blades 0.2-1.6 cm diam., usually lanceolate or oblanceolate, margins entire or remotely serrate. Phyllaries usually not purple-tipped. Flowering year-round. Disturbed forest, rocky roadside, outcrops. Ch (Pruski et al. 4251, MO); Y (Cabrera y Cabrera 13664, MO); B (Croat s.n., MO); G (Pruski y Ortiz 4295, MO); ES (Croat 42182, MO); N (Stevens 10486, MO); CR (Grayum 4803, MO); P (Croat 10413, MO). (200-)1000-2000(-2700) m. (Canadá, Estados Unidos, México, Mesoamérica, Colombia, Venezuela, Ecuador, Perú, Bolivia, Brasil, Uruguay, Paraguay, Chile, Argentina, Cuba, Jamaica, Hispaniola, Puerto Rico, Lesser Antilles, Trinidad and Tobago; Europa, África, Asia, Australia, New Zealand, Islas del Pacífico.)


Herbs usually 0.2-0.8(-1) m; stems subglabrous. Leaf blades 0.1-0.3(-0.5) cm diam., linear, margins entire. Phyllaries commonly purple-tipped. Flowering year-round. *Disturbed areas, brushy slopes, cultivated areas, grassy open areas, near rock outcrops, roadsides, sandy areas, scrubby forested hills, secondary vegetation, wet seepage areas.* T (Cowan, 1983: 24 sub *Conyza canadensis*); Ch (King 2776, NY); Y (Gaumer 846, MO); QR (Sousa 11246, MO); B (Schipp 815, MO); G (Standley 60879, NY); H (Evans 1301, MO); ES (Croat 42179, MO); N (Atwood 3975, MO); CR (Haber 10220, MO); P (Davidson 603, MO). 0-2000 m. (Estados Unidos, México, Mesoamérica, South America, West Indies.)

Most Mesoamerican and West Indian material of *C. canadensis* may be referred to var. *pusilla*, which we provisionally recognize, as did Cronquist (1980) and McVaugh (1984). However, the purple-tipped phyllary character is neither consistent nor striking, and var. *pusilla* may prove to be an ecotype adapted to poor soils.


Annual herbs 0.2-1 m; stems erect or ascending, simple to many-branched from base, leaves mostly cauline, more or less evenly spread along length of stem, basal leaves absent at anthesis, green, pale-costate, hirsute-pilose to densely so, often also very short-stipitate glandular; herbage with non-glandular trichomes to 1 mm. Leaves simple or apex trifurcate to less commonly pinnatifid in distal 2/3; blade 2.5-8(-10) \times 0.5-2(-3.5) cm, oblanceolate to elliptic-obovate, venation basically pinnately reticulate, finely 3-5-plinerved from near base, these fine veins strongly ascending but soon reticulate, surfaces eglandular, hirsute-pilose, base usually subamplexicaul, margins subentire to 1-5-lobed per side, lobes to 1.2 cm, linear to oblong, lobe margins entire, lobe apex obtuse, typically at least some leaves per plant trifurcate, apex obtuse. Capitulescence 10-20 cm, in distal 1/3 of plant, somewhat congested, 5-20-capitulate, cymose, lateral branches few or none; peduncles 1-10(-25) mm, sparsely hirsute-pilose, also often
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stipitate-glandular, subreceptacle often obviously acrescent in fruit. Capitula usually 5-7 mm, relatively large, disciform; involucre usually 5-7 mm diam., hemispherical, truncate base somewhat carnose; phyllaries 3.5-5 × 0.7-0.9 mm, mostly subequal, (2-)3-seriate, linear-lanceolate, 1(-3-nerved), hirsute-pilose, often also short-stipitate-glandular, midregion broad-green, margins narrow-hyaline, sometimes purplish distally, apex attenuate; receptacle 3.5-5.2 mm diam. Marginal florets 200-400+, several-series; corolla 2.5-3 mm, filiform-tubular (or less commonly filiform-subradiate), white, apex denticulate. Disk florets (10-)20-35; corolla 3-4 mm, 4-lobed, yellow, glabrous, lobes 0.2-0.4 mm. Cypselae 1-1.2 mm, oblong, pale brownish, glabrous to sparsely setulose on angles and near carpopodium, less so on faces; pappus bristles several, 3-3.5 mm. Flowering Jun-Aug, Oct, Feb, Apr. 2n = 18. Disturbed areas, roadsides, weedy fields, alpine meadows, volcanic slopes, open to degraded pine-oak forests. 2n = 18. Ch (Ghiesbreght 485, MO); G (Pruski y Ortiz 4297, MO); CR (Tonduz 12199, GH). 1000-3800 m. (México, Mesoamérica, ?Colombia)

Blake (1917) referred to the marginal florets as “ligulate” but we find them rarely to be even subradiate. Immature material of Conyza coronopifolia often is confused with C. microcephala. The citation of C. coronopifolia in Colombia by Cuatrecasas (1969) may possibly be based on material of the similar C. cardaminifolia Kunth. Similarly, we believe the material from Argentina called C. obtusa by Cabrera (1979) and C. coronopifolia by Sancho (2003) may also be referred to C. cardaminifolia.


Weedy annual herbs 0.15-1 m; stems single, erect or ascending, few(-several)-branched distally, basal leaves absent at anthesis, green, pale-costate, pilose to sparsely pilose so, less commonly densely pilose especially proximally; herbage eglandular. Leaves 1.5-7(-13.5) × 0.4-3(-6) cm, sessile, proximal leaves spatulate grading to distal ones often ob lanceolate, venation ascending-pinnate, surfaces moderately to sparsely pilose, base attenuate and often winged-petiolariform, sometimes subclasping, margins few crenate-dentate to distal-most leaves entire,
rarely basal leaves lyrate-lobed with acute to obtuse lobes 1-1.5(-3) cm, apex acute or less commonly obtuse. Capitulescence typically to c. 5+ cm diam., openly corymbiform, more or less flat-topped, several-many-capitulate; peduncles 4-25 mm, filiform, hirsutulous to densely so. Capitula 4.5-6(-7) mm, subradiate; involucre 5-8 mm diam., hemispherical; phyllaries 3-4.1 × 0.4-0.5 mm, unequal, 2-4-seriate, linear-lanceolate, hirsutulous, green midregion narrow, about as wide as stramineous margins or narrower in inner series, apex sometimes purplish; receptacle 3-4 mm diam. Marginal florets 200-250, 3-5+-seriate, the outer most filiform-subradiate gradually grading to the inner most filiform-tubular; corolla 2-2.6 mm, white or inner series yellowish, limb 0.6-1 mm, apex bidentate, the inner marginal florets with corollas c. 1.5 mm, sometimes yellowish, apex dentate, sometimes setulose. Disk florets 20-50; corolla 2-2.5 mm, 4(-5)-lobed, yellowish, glabrous, lobes 0.1-0.2 mm. Cypselae c. 1 mm, oblong, pale brownish, sparsely setulose; pappus bristles 20-25, c. 2 mm. Flowering year-round. 2n = 36, 40. 

Cafetales, disturbed areas, forest edges, gardens, gravel bars, open places, pastures, roadsides, rocky areas, savannas, steep-walled canyon, streamsides, swampy meadows, veg. Encinar. T (Magaña y Zamudio 182, NY); Ch (Breedlove 34310, MO); B (Gentle 1486, NY); G (Pruski et al. 4505, MO); H (Yuncker 5679, MO); ES (Standley 19381, MO); N (Molina y Williams 20092, NY); CR (Brenes 20411, NY); P (Woodson y Schery 775, MO). 0-1800(-2800) m. (United States [Florida], México, Mesoamérica, Colombia, Venezuela, Perú, Bolivia, Brasil, Argentina, Cuba, Hispaniola, Puerto Rico, Virgin Islands, Lesser Antilles, Trinidad and Tobago.)

The type, LeBlond 338 was originally mislabeled “Guyane-française” (Pruski, 1998).


Annual herbs 0.4-0.8 m; stems single to less commonly 2-3-branched from base, simple, erect, moderately leafy, basal leaves absent at anthesis, costate, eglandular, sparsely hirsute-pilose; herbage with non-glandular trichomes usually to c. 0.5 mm. Leaves sessile; blade 2-4.5 × 0.3-0.5(-0.7) cm, linear-lanceolate to oblong, indistinctly 3-5-plinerved from very base, surfaces eglandular, marginally ciliate, otherwise glabrous to sparsely hirsutulous adaxially or hirsute-pilose abaxially on veins, base slightly narrowed, usually subamplexicaul, margins typically subentire or infrequently proximal leaves 1-3(-4)-dentate per margin in the distal third of blade, apex acute or obtuse. Capitulescence 5-10 × 3-5 cm, corymbiform-paniculate, more or less flat-topped with strongly ascending branches to c. 25 cm, several-many-capitulate; peduncles 1-6 mm, densely hirsute. Capitula 3-3.5 mm, small, disciform; involucre 3-4.5 mm diam.,
campanulate to hemispherical, truncate to rounded at base; phyllaries 2-2.5 × 0.3-0.4 mm, mostly subequal, 2-3-seriate, linear-lanceolate, hirsutulous, pale green midregion broader than the hyaline margins, apex sometimes erose; receptacle 1.5-2.5 mm diam. Marginal florets c. 100, c. 5-seriate, sometimes seemingly sterile; corolla 1.3-1.5 mm, filiform-tubular, white, apex denticulate. Disk florets 3-8; corolla 2.5-3 mm, 5-lobed, cream-colored or pale-yellow, glabrous, lobes 0.5-0.7 mm. Cypselae 0.7-0.9 mm, oblong, pale brownish, setulose, marginal florets sometimes seemingly with sterile ovaries; pappus bristles 7-12, 2-2.2 mm. Flowering Jul-Aug. Cloud forests, weedy fields, sunny places, roadsides, open pine-oak forests on slopes. Ch (Breedlove 26210, MO); G (expected, Nash 1976b: 153). 2200-2300 m. (México, Mesoamérica, ?Colombia.)

The citation of Conyza microcephala in Colombia by Cuatrecasas (1969) may possibly be based on material of the similar C. cardaminifolia Kunth.


Conyza chilensis Spreng., Conyza myosotifolia Kunth, Conyza scabiosifolia Remy, Conyza yungasensis Rusby, Erigeron buchii Urb., Erigeron chilensis (Spreng.) G. Don, Erigeron pinetorum Urb., Erigeron primulifolia (Lam.) Greuter, Marsea chilensis (Spreng.) V.M. Badillo.

Biennial or perennial subcapose fibrous-rooted herbs (0.3-)0.4-0.9(-1.5) m; stems simple or less commonly to 5 from base, rarely 1-2-branched just below capitulescence, erect, leaves largely in basal rosettes, cauline leaves remote and quickly descrecent, costate, densely subtrigose-hirsutulous, trichomes to c. 0.4 mm, antrorse. Leaves sessile; basal leaves 2-6(-10), blade (4-)6-17(-21) × (0.9-)1.5-3.5(-4.5) cm, oblanceolate, subulate, surfaces subtrigose-hirsutulous, base long-attenuate, subamplexicaule, margins crenate, apex rounded to obtuse; cauline leaves 2-10(-15) × 0.2-1.5(-3) cm, oblanceolate to most distal ones linear, surfaces subtrigose-hirsutulous, base attenuate, margins crenate to most distal ones entire, apex obtuse to acute. Capitulescence 2-12 cm, cymose, of 5-12, typically clustered, short-pedunculate to subsessile capitula; peduncles 2-10(-20) mm, densely subtrigose-hirsutulous. Capitula 7.5-8 mm, relatively large, disciform; involucre 10-12 mm diam., hemispherical; phyllaries weakly imbricate, graduated, 3-4-seriate, linear-lanceolate, subtrigose to strigose, midregion green, broad, margins broad stramineous, indurate, apex narrowly acute; outer phyllaries 3-3.5 × 0.5-0.6 mm; inner phyllaries to c. 7 × to c. 0.8 mm, apex sometimes purple; receptacle 4-5 mm diam.
Marginal florets to c. 400, many-seriate; corolla 5-5.5 mm, white, glabrous or subglabrous, apex dentate. Disk florets 20-50; corolla 4.5-5 mm, 4-5-lobed, yellowish, tube and limb not conspicuously differentiated, lobes 0.3-0.5 mm, setose. Cypselae 1.5-1.8 mm, oblong, pale brown, subglabrous, margins slightly thickened; pappus bristles c. 20, c. 5 mm. Flowering year-round. 2n = 72. Disturbed areas, streamsides, cafetales, grassy bank, mixed forest, moist slopes, oak forests, pine forests, pine-oak forests, potreros, roadsides, rocky hillsides, secondary growth thickets. Ch (Breedlove 25510, MO); G (Seler y Seler 2666, NY); H (Williams y Molina 10080, MO); ES (Standley 23551, US); N (Standley 10596, F); CR (Pruski et al. 3890, MO); P (Woodson y Schery 778, MO). (200-)400-2200 m. (México, Mesoamérica, Colombia, Venezuela, Guyana, Surinam, Ecuador, Perú, Brasil, Uruguay, Paraguay, Chile, Argentina, Hispaniola, Puerto Rico; África, Australia.)


Common weedy annual herbs 1-2 m, stems single, usually simple into capitulescence, stiffly-erect, typically evenly and densely leafy along length of stem, basal leaves absent at anthesis, costate, subglabrous to hirsute or pilose; herbage not commonly gray-pubescent. Leaves sessile, subglabrous to densely hirsute especially at the margins and middle vein; proximal leaves with blade 6-12 × 0.6-2 cm, elliptic to linear-elliptic, base long-attenuate, margins entire or commonly serrate, apex acute; distal leaves with blade 3-4 × 0.2-0.5 cm, linear-elliptic, base attenuate, margins entire, apex acute. Capitulescence cylindrical-paniculate, numerous-capitulate; peduncles 3-11 mm, usually hirsute. Capitula 4.5-6 mm, disciform, many flowered; involucre 4.5-5.5 × c. 6 mm, campanulate, base narrow; phyllaries unequal, graduate, 3-4-seriate, ovate-acute, glabrous or with few trichomes to densely pubescent, central colored portions of at least mid-series phyllaries generally broader than the stramineous margins; outermost phyllaries 2-2.5 × c. 0.5 mm; innermost phyllaries 4.5-5.5 × 0.5-0.6 mm; receptacle 1.5-2.5 mm diam. Marginal florets 3-4-seriate; corolla 4-4.3 mm, tubular, white or cream, tube sometimes pubescent, limb when present, very short, apex 2-3-dentate; style branches exserted from the corolla. Disk florets few; corolla 3.8-4 mm, 5-lobed, pale-yellow, glabrous, lobes c. 0.4 mm. Cypselae 1.2-1.4 mm, compressed, 2-edged, densely pubescent; pappus bristles few, c. 4 mm, pale. 2 vars. Cosmopolitan.

Baccharis ivifolia Blanco, Conyza albida Willd. ex Spreng., Conyza altissima Naudin ex Debeaux, Conyza bonariensis var. microcephala (Cabrera) Cabrera, Conyza bonariensis fo. subleiotheca Cuatrec., Conyza floribunda var. subleiotheca (Cuatrec.) J.B. Marshall, Conyza erigeroides DC., Conyza groegleri V.M. Badillo, Conyza naudinii Bonnet, Erigeron albidus (Willd. ex Spreng.) A. Gray, Erigeron bonariensis fo. grisea Chodat, Erigeron bonariensis var. microcephalus Cabrera, Erigeron crispus subsp. naudinii (Bonnet) Bonnier, Erigeron musashensis Makino, Erigeron naudinii (Bonnet) Humbert.

Phyllaries hirsute. Disturbed forest, roadsides. T (Spellman et al. 118, MO); Ch (Breedlove 34981, MO); B (Croat 24366, MO); G (Ortíz 729, MO); H (Yuncker et al. 8448, MO); ES (Villacorta 1075, MO); N (Stevens 11940, MO); CR (Quezada 454, MO); P (Antonio 4581, MO). 10-1300 m. (Estados Unidos, Mexico, Mesoamerica, Colombia, Venezuela, Guyanas, Ecuador, Peru, Bolivia, Brazil, Uruguay, Paraguay, Chile, Argentina, West Indies; Europa, Africa, Asia, Australia, New Zealand, Pacific Islands.)


Phyllaries glabrous or subglabrous. Disturbed forest, roadsides. Ch (Croat 40455, MO); ?C (Martínez et al., 2001: 24 sub Conyza bonariensis); G (Pruski y Ortiz 4279, MO); H (Nelson y Vargas 2528, MO); N (Williams et al. 23886, NY); CR (Pruski et al. 3118, MO); P (Hamilton y Krager 3722, MO). 200-3200 m. (Mexico, Mesoamerica, Colombia, Venezuela, Ecuador, Peru, Bolivia, Brazil, Uruguay, Paraguay, Argentina, West Indies.)

8. Dichrocephala L’Her. ex DC.

Por J.F. Pruski.
Monoecious, shrub; stems leafy. Leaves simple to lyrate-pinnatifid, alternate, sessile or petiolate; blade coriaceous, venation pinnate, base sometimes subauriculate. Capitulescence in open cymes, racemes, or panicles, rarely monocephalous. Capitula small, globose, disciform; involucre campanulate to hemispherical; phyllaries imbricate, subequal, c. 2-seriate; receptacle convex to conical or obovoid, epaleate, sometimes enlarged in fruit. Marginal florets many-numerous, pistillate; corolla tubular, sometimes bulbous proximally, sparsely glandular, apex 2-3(-4)-denticulate. Disk florets bisexual; corolla campanulate or salverform, 4(-5)-lobed, lobes usually ascending to erect; anthers obtuse to sagittate basally, apical appendage obtuse-triangular; style branch stigmatic surfaces short, appendage lanceolate. Cypselae isomorphic, obovate, terete, pale brown, glandular usually at least apically and/or basally, otherwise glabrous, margins thickly costate, faces smooth or 1-2-striatulate, fruit sometimes shortly stipitate-pedicellate; pappus low coroniform.

10 spp. Mexico, Mesoamerica.

1. **Dichrocephala integrifolia** (L.f.) Kuntze Illustr.: None. N.v.: None.

Shrubs to 1.3 m; stems erect or ascending to less commonly decumbent, simple or few-branched distally, sparsely villous or pilose to glabrate. Leaves usually petiolate; blade (2-)3-10 × (0.5-)1-6.5 cm, ovate to elliptic, often 5-nerved, surfaces tomentose, densely glandular, base obtuse to attenuate, marginal lobes 1-2(-3) per side, each usually 1-3.5 × 0.3-2 cm but the proximal pair obviously the smallest, oblong to obovate, irregularly serrate or crenate, terminal lobe 3-5.5 cm, ovate, apex acute to obtuse; petiole 1-3.5 cm. Capitulescence 4-7 × 3-6 cm, loosely pyramidal paniculate, of several axillary branchlets usually terminated by a 3-9-capitulate cyme; peduncles 0.3-2.5 cm, slender, often 1-2-bracteolate; bracteoles 1-2.5 mm, linear-lanceolate. Capitula 2-4 × 2-4 mm, in early anthesis slightly bicolored with the corollas of the disk florets darker than in the pistillate florets; involucre 1-1.3 mm; phyllaries 10-15, 0.4-0.7 mm diam., ob lanceolate to oblong, glabrous, margins slightly scarious, sometimes fimbriate, apex acute to obtuse; receptacle convex to in fruit becoming globose or obovoid. Marginal florets 4-8+ -seriate; corolla 0.4-0.7 mm, tubular, cylindrical throughout, white, apical denticulations < 0.1 mm, moderately persistent and in fruit often deflected upwards; style weakly exserted. Disk florets: corolla 0.6-1.2 mm, campanulate, 4-lobed, ochroleucous or chloroleucous (or lobes sometimes pinkish), tube shorter than limb, lobes 0.2-0.4 mm; anthers c. 0.3 mm, ovate, yellowish, appendage minute; style branches 0.1-0.2 mm, papilllose abaxially to near base, apex acute. Cypselae 1-1.5 mm, longer than corollas, in fruit the outer often directed downward and obscuring the much shorter involucre, sparsely glandular distally or especially apically, apex obtuse to sometimes emarginate, readily deciduous. Flowering time not recorded. *Riverbanks*. G (Smith 244, USCG). 1000 m. (Mexico, Mesoamerica.)
9. **Diplostephium** Kunth

Por J.F. Pruski.

Shrubs or trees to 12 m; stems often much branched, leafy distally with internodes much shorter than leaves, leaf scars prominent; herbage with simple and/or sessile-glandular trichomes. Leaves simple, alternate, sessile or petiolate; blade linear to broad, chartaceous to subcoriaceous or sometimes subcarnose, margins entire or less commonly few-toothed, flat to revolute, surfaces often strongly discolorous, abaxial surface densely tomentose. Capitulescence monocephalous to more commonly corymbiform or paniculate, terminal. Capitula radiate (Mesoamerica) or rarely disciform; involucre cylindrical to hemispherical; phyllaries imbricate, graduated, 4-7-seriate, typically rigid, the inner usually lanceolate; receptacle flat to convex, smooth to ray areoles alveolate. Ray florets 1-3-seriate; corolla white, violet, bluish, or purple, tube usually papillose, limb usually elongate and exserted from involucre, less commonly short and nearly included.

Disk florets functionally staminate (rarely bisexual); corolla tubular-funnelform to campanulate, 5-lobed, ochroleucous, yellow, greenish, or violet, lobes deltate to lanceolate; anthers auriculate basally, appendage elliptic-oblong; style branches typically without marginal stigmatic surfaces, short and more or less appressed (Mesoamerica) or spreading and linear-subulate, apex obtuse to acuminate, ovaries sterile, c. 5-striate. Cypselae obovoid-oblong, compressed, margins typically costate, faces (0-)1-2-striate; pappus of many scabrous bristles, 2-seriate, subequal and about as long as disk corollas or sometimes outer ones much shorter. $x = 9$. 70+ spp. Costa Rica to Venezuela and south to Bolivia and Chile; mostly montane

Mesoamerican species of *Diplostephium* have filament insertion within what appears outwardly to be the mid-point of the tube, the consequently bizonal throat is only ampliate well above this attachment point. Most species of *Diplostephium* have conspicuously radiate capitula, whereas our two species have ray corolla limbs only slightly exserted from the involucre.


1. Pappus bristles purple-tipped; corollas violet to reddish-purple; capitula 26-70-flowered, ray florets 16-34; cypselae obviously glandular-papillate. **1. D. costaricense**
1. Pappus bristles stramineous throughout; corollas white to ochroleucous; capitula (10-)14-21-flowered, ray florets (5-)7-11; cypselae subglabrous or sparsely glandular-papillate.

2. **D. floribundum**


Rounded shrubs to sometimes trees 1-3(-4.5) m, branches often fastigiate distally; stems more or less densely leafy distally, tomentose becoming glabrate proximally. Leaves subsessile with long petioliform base narrowly fringed laterally by abaxially grayish-tomentose blade tissue; blade 2-5 × 0.1-0.7(-1) cm, oblong-oblanceolate to linear-oblanceolate or infrequently oblong, stiffly chartaceous, venation pinnate to obscurely so, 2° veins usually 4-8 per side, spreading from midrib at about 45-60°, adaxial surface tomentulose to glabrous, midrib impressed, abaxial surface and veins grayish-tomentose throughout or midrib rarely with a glabrous line, midrib c. 0.5+ mm diam. and prominently raised, base attenuate, margins strongly revolute, entire (rarely 1-4+-denticulate per side), apex acute to obtuse or infrequently rounded, callous-apiculate.

Capitulescence 2-5 cm diam., corymbiform, several-capitulate, broadly rounded, not held much above leaves; peduncles white-tomentose, strongly contrasting with phyllaries. Capitula 6-10 mm, radiate, 26-70-flowered; involucre 5-8 mm diam., campanulate; phyllaries 2-6.5 × 0.9-1.4 mm, all usually persistent, the outer phyllaries positioned 1-2.5 mm proximal to the inner ones, outer phyllaries narrowly triangular, brownish or the inner ones purplish, floccose-tomentose (especially the outer series and distal c. 2 mm of inner series) becoming glabrous (more quickly so in proximal 2/3), apex acute to acuminate. Ray florets 16-34, 1-3-seriate; corolla violet, tube 3-3.5 mm, limb 2-4 × 0.4-0.8 mm, linear-oblanceolate, rarely teratomatically 2-parted to base, slightly exserted laterally from involucre, occasionally shorter than the style, glabrous abaxially, apex 3-denticulate; style branches c. 0.6 mm. Disk florets 10-36; corolla 4.5-5 mm, funnelform-campanulate, reddish-purple, glandular-papillate in proximal 1/2, distal part of throat glabrous, lobes 1.2-1.8 mm, erect or slightly spreading, often sparsely sessile-glandular, glands often golden; anthers 1.2-1.5 mm, included or partly exserted, tan; style nearly cylindrical to tip, apex slightly exserted, purplish, branches appressed or weakly spreading, finely papillose, ovary c. 2 mm, terete, cylindrical, obviously glandular-papillate. Cypselae 1.5-2.5 mm, obviously glandular-papillate, also sometimes sparsely setose; pappus bristles 4.5-5.5 mm, purplish distally (often stramineous proximally). Flowering Sep-Mar. *Bogs, montane forests, páramos, steep rocky*
slopes, streamsides, subparamo forests, volcano slopes. CR (Pruski et al. 3922, MO); P (Munro et al. 4082, MO). (?1500-)2400-3700 m. (Endemic.)

Costa Rican material of *Diplostephium costaricense* was cited by Klatt (1892) as *D. rupestre*, but would key in Cuatrecasas (1969) to, and was cited by Greenman (1904) as, *D. schultzii* Wedd., which differs by strongly ascending 2° veins and eglandular cypselae. *Diplostephium costaricense* and *D. schultzii* are noteworthy for the wide variation in numbers of disk florets per capitula, sometimes resulting in the unusual condition of capitula having fewer disk florets than ray florets.


Shrubs to trees 1-5 m, branches sometimes fastigiate distally; stems moderately to densely leafy distally, sparsely tomentulose apically to quickly glabrate. Leaves subsessile short-petiolate; blade 1-3 × 0.3-0.8 cm, oblanceolate to oblong, stiffly chartaceous, venation pinnate, 2° veins to c. 10 per side, inconspicuous, spreading from midrib at 80-90°, adaxial surface slightly tomentulose to usually glabrate, sometimes seemingly resinous-subglandular (although not manifest in EtOH-collected specimens), midrib more or less flat, abaxial surface and 2° veins yellow-brown-tomentose, midrib 0.2-0.7 mm diam., prominently raised, commonly glabrous for much of its length or infrequently tomentose, base cuneate to attenuate, margins flat or slightly revolute proximally, moderately revolute distally, entire, apex obtuse or sometimes broadly acute, callous-apiculate; petiole 2-4 mm, stout and broad, typically green and glabrous. Capitulescence 2-2.5 cm diam., dense-corymbiform, few-capitulate, rounded to nearly flat, usually not held above leaves; peduncles tomentulose and similar in indument to outer phyllaries. Capitula 8-9.5 mm, radiate, (10-)14-21-flowered; involucre 3.5-4.5(-6) mm diam., narrowly campanulate; phyllaries 1.6-6.5 × 1.3-1.5 mm, persistent or the inner often deciduous post fruit, the outer phyllaries positioned 1-1.5 mm proximal to the inner ones, outer phyllaries broadly triangular, tan-brown or the mid-series and inner ones purplish distally, outer series of phyllaries tomentulose, mid-series tomentulose distally, inner series subglabrous but commonly fimbrillate distally, apex acute. Ray florets (5-)7-11, 1-seriate; corolla white, tube 2.8-3.8 mm, limb 3-3.5 × 0.3-0.6 mm, linear to oblanceolate, slightly exserted laterally from involucre, slightly longer than the style, glabrous abaxially, apex subentire to 2-3-denticulate; style branches 0.4-0.6 mm. Disk florets (5-)7-10; corolla 4.5-5.2(-5.8) mm, campanulate, ochroleucous, setulose-papillate in proximal 1/2, distal part of throat glabrous or setulose-papillate, lobes 1.2-2 mm, spreading to
reflexed, apex sometimes sparsely sessile-glandular; anthers 1.7-2.2 mm, mostly exserted, tan, endothecium radial; style tan-ochroleucous, exserted 1-2 mm, apical c. 0.7 mm bulbous, coarsely papillose, branches c. 0.6 mm, appressed, ovary 1.8-2.5(-3.6) mm, terete, cylindrical, sparsely to moderately glandular-papillate. Cypselae 1.5-2.3 mm, subglabrous or sparsely glandular-papillate; pappus bristles 3.5-4.5(-5) mm, stramineous throughout. Flowering Aug-Apr. Bogs, elfin forests, meadows, montane forests, oak forests, páramos, subparamo forests. CR (Chacón 568, MO). 2400-3500 m. (Mesoamerica, Colombia, Ecuador.)


Por J.F. Pruski.

Annual or short-lived perennial herbs; stems simple or more commonly alternate-branched, erect to decumbent or repent, subterete to angled, pubescent or infrequently glabrate, often stipitate-glandular, sometimes arachnoid-pubescent; herbage often viscid and aromatic, commonly stipitate-glandular. Leaves simple, alternate, sessile or petiolate; blade oblanceolate to more commonly obovate or spatulate, variously dentate, lobed, or pinnatifid (rarely entire), chartaceous, pinnately veined, commonly stipitate-glandular, pubescent or rarely glabrate, sometimes auriculate-clasping. Capitulescence monocephalous and axillary or occasionally as few-capitulate terminal corymbiform cymes; peduncles present, typically ebracteolate or 1-bracteolate. Capitula bisexual, radiate to obscurely so, many-numerous-flowered, short- or long-pedunculate; involucre campanulate or low-hemispherical; phyllaries 10-25, imbricate, subequal, slightly 2-3-seriate, lanceolate, pubescent, acute to acuminate, outer phyllaries thinly herbaceous, inner phyllaries thinly herbaceous medially, margins sometimes thinly scarious; receptacle usually conical to sometimes convex, glabrous. Ray florets typically inconspicuous, 1+-seriate; corolla limb slightly to moderately exserted from involucre, filiform to narrowly oblanceolate, white or cream-colored, entire or minutely 2-3-lobed. Disk florets bisexual; corolla tubular-funnelform, 3-5-lobed, yellow, often glandular-resinous, limb only slightly broadened; anthers cream-colored, apical appendage apiculate, basally obtuse; style branch apical appendage triangular-papillose. Cypselae epappose, oblong, often slightly compressed, 2-costate, erose-striate, pilose or stipitate-glandular, infrequently glabrate; pappus commonly represented by a low coroniform ring, bristles absent. \( x = 9.6 \) spp. New World tropics and subtropics.

Shinners (1949) revised the extra South American species. The West Indian and South America _E. prostrata_ (Sw.) Kuntze is the only species that may have stems and leaves glabrate.
The two taxa in Mesoamerica are similar in their conspicuously clasping leaves and capitula sometimes in terminal clusters, whereas the other taxa have non-clasping leaves and axillary, solitary capitula. The plants are sometimes used in folk medicine. For example, in the protologue of *Platystephium graveolens* (= *E. viscosa*), Gardner mentions that the entire plants often have “a powerful smell of Chamomile, and it is used as a substitute for it.”


1. Capitula with more ray florets than disk florets; ray florets 3-5-seriate, limbs filiform, 0.1-0.2 mm diam.

1. **E. liebmannii**

1. Capitula with distinctly fewer ray florets than disk florets; ray florets uniseriate, limbs narrowly oblanceolate, 0.5-0.8 mm diam.

2. **E. viscosa**


Tap-rooted herbs to 0.7(-1) m; stems erect, simple or more commonly few-branched, sometimes narrowly fistulose; stems and leaves heterotrichous, viscid with short-stipitate glandular trichomes, also sparsely villous with longer non-glandular trichomes. Leaves typically sessile and auriculate-clasping, or proximal ones sometimes with subpetiolar base; subpetiolar base, when defined, narrowly winged to base, slightly clasping, 1-3 cm; blade 2-10 × 0.7-4 cm, typically obovate or spatulate, base narrow or attenuate, auriculate-clasping, margins coarsely toothed, sublyrate to deeply 1-pinnatifid, when pinnatifid lobes to 10 mm deep, sometimes cut to near midrib, entire to serrate. Capitulescence few-capitulate to less commonly many-capitulate; peduncles (3-)6-16(-28) mm. occasionally 1-bracteolate. Capitula 150-200-flowered, with more ray florets than disk florets; involucre 3-4 mm; phyllaries c. 1.5 mm diam., 2-seriate, villous, sometimes also slightly short-stipitate glandular, narrowly acute apically. Ray florets 100-150, 3-5-seriate; corolla 1.5-3 mm, tube 0.7-1.1 mm, slightly puberulent, limb 0.8-1.9 × 0.1-0.2 mm, filiform. Disk florets c. 50; corolla 1.1-1.3 mm, tube typically glandular, lobes 0.2-0.3 mm. Cypselae 1.1-1.4 mm, oblong, 4-5 angled, glandular, slightly puberulent; pappus corona c. 0.1 mm, often wider than the body of cypselae. Flowering Feb-May. *Acahual de selva mediana, cultivated areas, disturbed areas, franga, lugares pantanosos, muddy ditches, roadsides, selva baja caducifolia, selva baja subcaducifolia inundable, streamsides, wet areas. T (Novelo y Ramos*


Herb to 0.6 m, tap-rooted or roots diffuse; stems erect to ascending or sometimes slightly decumbent; stems and leaves typically heterotrichous, long-villous, also viscid with sparse short-stipitate glandular trichomes, infrequently sessile-glandular, sometimes narrowly fistulose. Leaves sessile or proximal ones sometimes with a narrowed but broadly winged subpetiolar base; blade 1.6-7(-12) × 2-6 cm, oblong or obovate in outline, sublyrate or subspatulate to shallowly 1-pinnatifid, infrequently deeply 1-pinnatifid or bipinnatifid, base auriculate-clasping, sometimes narrowed into a subpetiolar base, margins sharply dentate to lobed, when pinnatifid lobes usually 5-10 mm deep, cut c. half way to the midrib, typically with a few serrations. Capitulescence few- to more commonly many-capitulate, axillary or more commonly terminal near stem apex; peduncles 3-10(-20) mm. Capitula c. 98-160-flowered, with distinctly fewer ray florets than disk florets; involucre 3.2-4.5 mm; phyllaries 1.1-2 mm diam., 2-3-seriate, villous and short-stipitate glandular, narrowly acute to acuminate apically. Ray florets 18-30, 1-seriate; corolla 2.5-3.5 mm, tube c. 1 mm, limb 1.2-2.5 × 0.5-0.8 mm, narrowly oblongolate. Disk florets c. 80-130; corolla 1.2-1.6 mm, tube puberulent or glandular, lobes 0.2-0.3 mm. Cypselae 1.1-1.7 mm, puberulent or glandular; pappus corona 0.1-0.2 mm. 2n = 54. Flowering Dec-Aug. Bosque húmedo tropical, lake shores, low scrub forest, roadside ditches, sabana inundado, seasonally inundated swamp, secondary forests, secondary swamp, streamsides. Ch (Breedlove 29058, MO); C (Martínez et al., 2001: 24); B (Balick 1884, NY, as cited by Balick et al., 2000); G (Harmon y Dwyer 3318, MO); H (Hernández y Mancías 1160, MO); ES (Rosales 1918, MO); N (Oersted 83, K); CR (Tonduz 13877, MO). 5-1000 m. (Estados Unidos [S. Texas], México, Mesoamérica, Colombia, Venezuela, Ecuador, Perú, Brasil, Bolivia, Paraguay, Argentina, Cuba.)
Nash (1976b) gave the ray corolla limb width as “0.4-1.6 mm” but I never find them to be more than 1 mm diam.

11. Erigeron L.


Perennial herbs, less commonly annuals, biennials, or shrubs, rarely acaulescent; stems usually erect or at least distally ascending-erect, subterete, glabrous to pilose. Leaves simple, alternate or rarely all basal, sessile or short-petiolate; blade linear to broad, chartaceous, pinnately veined, surfaces commonly eglandular, margins variously toothed or divided. Capitulescence monocephalous or typically few-capitulate, corymbiform or thyrsoid-paniculate, capitula typically borne on leafless erect branches. Capitula bisexual, radiate or rarely disciform; involucre campanulate to hemispherical; phyllaries weakly imbricate, subequal or 2-(5)-seriate, linear to lanceolate, herbaceous to subscarious, nerves orange-resinous; receptacle flat to slightly convex. Ray florets many, usually 1-2-seriate; corolla white to pink or purplish, limb nearly always present or rarely absent, typically long, narrow. Disk florets numerous, bisexual; corolla tubular to campanulate, shallowly 5-lobed, veins orange-resinous; anthers yellowish to cream-colored, obtuse at base; style branches short, oblong, appendage triangular, papillose, acute to obtuse. Cypselae oblong, mostly compressed, eglandular, pubescent or glabrous, each margin commonly strongly and thickly 1- costate, the faces also sometimes 1-(to variously-)ribbed; pappus of rays and disk typically present and similar, 1-2-seriate, typically of several to many fragile stramineous capillary scabrid bristles about as long as the disk corollas, usually an outer series of shorter bristles, scales, or a crown also present. $x = 9$. Aprox 400 spp. Mostly American and Eurasian, a few African.

The cypselae of _Erigeron_ are tardily maturing, and most specimens have immature fruits not yet showing the marginal nerves. Several weedy disciform species were transferred from _Erigeron_ to _Coryza_ by Cronquist (1943), who has generally been followed. Nash (1976b) recognized _Achaetogeron_ as distinct, but Nesom (1982) reduced _Achaetogeron_ to synonymy of _Erigeron_. Nash (1976) treated _E. pacayensis_ in synonymy of _E. karvinskianus_ and D’Arcy (1975) treated both _E. irazuensis_ and _E. maxonii_ as synonyms of _E. karvinskianus_, but we follow Nesom.
y Pruski (2011) who resurrected *E. pacayensis*, *E. irazuensis*, and *E. maxonii* from synonymy of *E. karvinskianus*.


1. Stems prostrate, often rooting at the nodes; pappus essentially absent or ray cypselae occasionally with 1-7 fragile bristles 0.1-0.7 mm. 

   4. *E. guatemalensis*

1. Stems usually erect or at least distally ascending-erect; capitula borne on erect branches; both ray and disk pappus of bristles or less frequently ray pappus minutely coroniform and without bristles.

2. Ray and disk pappus dissimilar, ray pappus minutely coroniform and without bristles, disk pappus of bristles c. 2 mm and also short outer squamellae.

   1. *E. annuus*

2. Pappus of rays and disk similar, of bristles.

3. Stems usually unbranched; ray corolla limbs tightly coiling or usually coiling at least distally.

   4. Annual herbs; leaves mostly in a persistent basal rosette, caudine leaves mostly bracteate; involucres 3-7 mm diam. 

   3. *E. cuneifolius*

   4. Perennial herbs; leaves basal and caudine or the basal absent, caudine leaves not bracteate; involucres 10-15 mm diam. 

   7. *E. longipes*

3. Stems branched; ray corolla limbs usually not coiling or only slightly coiling apically.

5. Stem vestiture spreading to deflexed.

6. Leaf margins 2-4-toothed or 2-4-lobed, bases not clasping; ray corolla limbs not coiling.

   5. *E. irazuensis*

6. Leaf margins entire or less commonly remotely serrulate distally, at least the mid-stem leaves basally subclasping; ray corolla limbs slightly coiling apically.

   2. *E. aquarius*

5. Stem vestiture antorsely appressed to ascending.

7. Leaves linear to linear-oblongate.

   9. *E. pacayensis*

7. Leaves elliptic to obovate or spatulate-ovulate obovate to distal ones becoming lanceolate.
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8. Perennial herbs; stems with axillary leaves often tufted, leaves not clasping; involucres 2.5-5 mm; ray corolla limbs (0.5-)0.8-1.3 mm diam.

6. E. karvinskianus

8. Subshrubs; stems with clusters of axillary leaves absent, leaf base subclasping; involucres 4.8-6.8 mm; ray corolla limbs 0.1-0.3 mm diam.

8. E. maxonii


Fibrous-rooted or weakly taprooted annual herbs 30-150 cm; stems erect, with leaves basal and cauline, basal leaves quickly deciduous or withered, sparsely pilose-hispid, sometimes strigose on the distal portion, eglandular. Leaves mostly lanceolate to oblanceolate or ovate, base not clasping, margins coarsely serrate to nearly entire; cauline leaves 1.5-8 × 0.3-2 cm, little reduced until midstem, lanceolate to oblong, sparsely strigose-hirsute, eglandular. Capitulescence loosely paniculate or corymbiform-clustered, usually 5-50+-capitulate. Capitula radiate; involucre 3.5 × 6-12 mm; phyllaries 2-3(-4)-seriate, sparsely villous to villous-hirsute, minutely glandular. Ray florets 80-125, 1-2-seriate; corolla 4-10 mm, white, limb 0.3-0.6 mm diam., slightly coiling. Disk florets: corolla 2-2.8 mm. Cypselae 0.8-1 mm, 2-nerved, sparsely strigose; ray and disk pappus dissimilar, ray pappus minutely coroniform and without bristles, disk pappus of bristles c. 2 mm and also short slender outer squamellae. 2n = 27[18+9]. Flowering year-round except Feb. Roadsides, disturbed sites. N (Moreno 17052, MO); CR (Pruski et al. 3829, MO); P (Luteyn 1506, MO). 1000-2400 m. (Canadá, Estados Unidos, Mexico, Mesoamerica; introduced into Europa, Asia.)


Short-lived perennials herbs to subshrubs 15-50 cm, from a short, slender, lignescent, fibrous-rooted rhizome; stems 1-several from the base, 2-6 branched from midstem or more distally, erect, basal leaves absent at anthesis, tufts of small leaves rarely present in leaf axils, cauline
leaves relatively even-sized along the stems, greenish, vestiture deflexed, moderately hirsute-pilose with trichomes 0.2-0.6 mm. Leaves 1.8-4 × 0.2-1.2 cm, oblanceolate to elliptic-oblanceolate, secondary venation often prominently visible, surfaces hirsute-pilose, basally subclasping at least in mid-stem leaves, margins entire or less commonly remotely serrulate distally, narrowly revolute or slightly thickened, ciliate with spreading trichomes on the proximal half. Capitulescence 1-6-capitulate; peduncles 5.5-8 cm. Capitula radiate; involucre 4.8-5.5 × 7-9 mm; phyllaries subequal to graduate, 3-4-seriate, sparsely strigose with thin-based trichomes 0.2-0.5 mm, sparsely to moderately minutely glandular, trichomes not prominently flattened or twisted, midrib golden-brown, midregion greenish-brown, dull, margins stramineous, neither broad nor scarious. Ray florets 80-180, 1-2-seriate; corolla 3-6 mm, white, drying white or purple-tinged, limb 0.2-0.3 mm diam., nearly filiform, slightly coiling apically. Disk florets: corolla 3.4-4.5 mm. Cypselae c. 1.6 mm, 2-nerved, sparsely strigose; pappus bristles 18-24, also with a few outer setae 0.2-0.3 mm. Flowering Jul-Sep. Meadows, thickets, pine-sweetgum forests. G (Standley 65164, F); H (Molina 22247, NY). 1500-2500 m. (Endemic.)


Fibrous-rooted annual herbs 10-32 cm, caudex simple or slender; stems 1-10 from the base, ascending, usually unbranched (sometimes with 1-2 short branches from above midstem), stems with leaves mostly in a persistent basal rosette, leaves abruptly reduced in size distally, glabrate to sparsely strigose distally, trichomes spreading proximally. Leaves 1.2-5.5 × 0.4-1.6(-1.9) cm, broadly oblanceolate or spatulate to cuneiform, margins often shallowly crenate or serrate on the distal half, apex rounded; cauline leaves mostly bracteate, more or less even-sized, sometimes subclasping. Capitulescence monocephalous, 1-10 capitula per plant. Capitula: involucre 3.8-5 × 3-7 mm; phyllaries graduate, 2-3-seriate, often connate basally and inserted on a narrow ring of tissue, glabrous to sparsely strigose, sometimes minutely glandular. Ray florets 40-80(-100), 1-2-seriate; corolla 3-4.5 mm, limb 0.1-0.2 mm diam., white, tightly coiling. Disk florets: corolla 2.5-3 mm. Cypselae 1.1-1.4 mm, 2(-3)-nerved, one face sometimes with a median nerve, sparsely strigose; pappus bristles 17-24, sometimes with a few outer setae. 2n = 18. Flowering Jun-Jul, Sep-Dec. Open savannas, roadsides, wet fields. G (Nash, 1976b: 157 sub E. jamaicensis); H (Williams y Molina 10150, MO); N (Seymour 5532, MO); CR (Rivera 1408, MO); P (Davidson 730, MO). 0-1200 m. (Mexico [Veracruz, Oaxaca], Mesoamerica, Cuba, Jamaica, Hispaniola, Puerto Rico, Virgin Islands; introduced on Pacific Islands.)
Collections of this species from the American mainland often have been misidentified as *E. jamaicensis* L. (e.g. by Nash, 1976, Standley, 1938). *Erigeron belliioides* Griseb. and *E. domingensis* Urb., although cited by D’Arcy (1975) as synonyms of *E. cuneifolius*, are treated here as distinct species, as is *E. jamaicensis*, endemic to the Greater Antilles.


*Suffruticose perennials 20-55 cm, fibrous-rooted, caudex simple, often with a short woody rhizome; stems prostrate, often rooting at the nodes, ascending at the apex, leaves basal and cauline, sparsely hirsute, eglandular. Leaves with surfaces sparsely strigose-hirsute, margins entire to shallowly serrate or crenate; basal leaves 1.5-9.5 × 0.4-1.6 cm, spatulate; cauline leaves 0.5-2 cm, obovate, relative even-sized, base usually clasping to subclasping. Capitulescence terminal, monocephalous. Capitula radiate; involucre 4-5 × 8-10 mm; phyllaries subequal, 2-3-seriate, hirsute, sparsely minutely glandular. Ray florets 55-75, 1-seriate; corolla 5.5-8 mm, white, limb 0.6-1.2 mm diam., not coiling. Disk florets: corolla 2.4-3 mm. Cypselae 1.2-1.6 mm, 2-nerved; pappus essentially absent or ray cypselae occasionally with 1-7 fragile bristles 0.1-0.7 mm. 2\(n = 18\). Flowering Jul-Aug. Openings or meadows in pine woods to alpine meadows. G (Beaman 3207, MSC). 2800-3400 m. (Endemic.)


*Suffrnuticose perennials 17-45 cm, from a woody taproot; stems usually several from the base, at least distally erect to ascending-erect (sometimes procumbent proximally), usually 1-5 branched from midstem or more distally, basal leaves absent at anthesis, clusters of axillary leaves absent, purple to reddish, hirsute-pilose, vestiture spreading to deflexed, trichomes 0.1-1 mm. Leaves 2.5-9 × 0.5-1.2 cm, spatulate-obovate, surfaces hirsute-pilose, base not clasping, margins 2-4-toothed or 2-4-lobed distally, very narrowly revolute. Capitulescence 1-5-capitulate; peduncle 0.5-5.5 cm. Capitula radiate; involucre 5.2-6.8 × 9-14 mm; phyllaries graduate, 3-4-seriate, lanceolate, sparsely strigose-pilose with flattened, vitreous, ascending trichomes 0.5-1.2 mm, eglandular, margins broadly scarious and minutely lacerate-ciliate, midregion usually with a golden sheen, apex acute to acuminate, purplish, inner phyllaries thin with 3 orange veins often
prominent-. Ray florets 40-115, 1-2-seriate; corolla white to pinkish or purplish, usually drying with purple apex or adaxial surfaces, limb 0.1-0.3 mm diam., filiform, not coiling. Disk florets: corolla 3.3-4.5 mm. Cypselae 1.5-1.9 mm, 2-nerved, sparsely strigose; pappus bristles 15-23, outer series of setae 0.2-0.5 mm, conspicuous. Flowering Feb-May, Oct. **Disturbed areas, pastures, roadsides, volcano slopes. CR (Rodriguez y Ramirez 2164, MO). 2200-2800 m. (Endemic.)


Perennial herbs 10-100 cm, roots woody, sometimes with an evident taproot, caudex usually simple, sometimes rooting adventitiously; stems erect to sprawling or sometimes decumbent proximally, usually branching from midstem or more distally, with leaves basal and cauline, basal leaves deciduous before flowering, axillary leaves often tufted, cauline leaves usually relatively even-sized along the stems, vestiture antrorsely appressed to slightly ascending, sparsely strigose to glabrate, eglandular. Leaves mostly 1-4(-5) × 0.5-1.3 cm, sparsely elliptic to obovate, and loosely strigose to hirsute villous, not clasping at base, margins entire or with 1-2 pairs of acute, mucronulate teeth or shallow lobes distally. Capitulescence diffusely arranged, usually 1-5-capitulate from long branches distal to midstem; peduncles 2.5-13 cm. Capitula radiate; involucre 2.5-5 × 7-10 mm; phyllaries subequal to graduate, 3-4-seriate, often basally fused into a narrow ring, margins narrowly scarious, surfaces sparsely strigose to hirsute-villus to glabrate, eglandular to minutely glandular. Ray florets 45-80, uniseriate; corolla 5-11 mm, white, sometimes drying pinkish, limb (0.5-)0.8-1.3 mm diam., linear-oblancoleate, not coiling or only slightly coiling apically. Disk florets: corolla 2-3.3 mm. Cypselae 1-1.4 mm, each margin 1-nerved, each face also sometimes 1-nerved, sparsely strigose; pappus bristles 15-27, outer setae 0.2-0.3 mm. 2n = 18, 27 (18+9), 36. Flowering year round. **Moist to wet habitats, often rocky cliff faces or ravine slopes, various types of vegetation, often in areas of oak or pine, often in cut-over or second-growth areas. Ch (Pruski et al. 4206, BRIT); G (Standley 84384, MO); H (Molina 10124, MO); ES (Montalvo 4794, MO); CR (Gomez 20733, MO). 900-3200 m. (Mexico, Mesoamerica, Colombia, Venezuela, Ecuador, Peru, Chile, Jamaica, Hispaniola, Lesser Antilles; widely cultivated and naturalized in California (USA), Europe, Africa, Asia, Australia, New Zealand, Pacific Islands.)
The common names of *E. karvinskianus* cited by Nash (1976) cannot be applied with certainty to either *E. karvinskianus* or *E. pacayensis*. All material cited by D’Arcy (1975) as the too broadly circumscribed *E. karvinskianus* is redetermined here as *E. maxonii*.


Short-lived perennial rhizomatous herbs 4-45(-80) cm, producing slender, lignescent, scale-leaved rhizomes; stems strictly erect, usually unbranched (uncommonly 1-2-branched near midstem), leaves basal and cauline or the basal leaves absent at anthesis, sometimes proximal-most leaves well-spaced by elongate internodes, cauline leaves gradually reduced in size distally, strigose with thin-based trichomes, usually retrorsely appressed but less commonly antorsely appressed or spreading, eglandular. Leaves 2-6(-9) × 0.4-1.9(-2.4) cm, oblong-obovate to obovate, narrowly elliptic, or ovate-lanceolate, , surfaces loosely strigose to strigose-hirsute, basally clasping, margins serrate to crenate, apex rounded to acute, cauline leaves not bracteate. Capitulescence monocephalous, nodding in bud; peduncles elongate. Capitula radiate; involucre 5-7.5 × 10-15 mm; phyllaries subequal, 3-4-seriate, strigose-hirsute to moderate villous, usually minutely stipitate-glandular. Ray florets (120-)175-350, 2-4-seriate; corolla 7-11 mm, white but turning pink to purple with maturity, limb usually 0.2-0.4(-0.6) mm diam., tightly coiling or usually coiling at least distally. Disk florets: corolla (3-)3.3-5.5 mm. Cypselae 1-1.2 mm, 2-nerved; pappus bristles usually 18-24, with a few outer setae. 2n = 18, 27 (18+9), 36. Flowering *May-Sep*(-Nov). *Meadows, fields, commonly in disturbed sites, cloud forests to areas of oak or pine woodlands. Ch (Breedlove 26399, MO); G (King y Renner 7057, MO); H (Williams y Molina 10158, F); ES (Berendsohn et al. 1989: 290-5 sub *E. scaposus*); N (Kral 69403, MO). 800-2600 m. (Mexico, Mesoamerica.)

This species was treated by Nash (1976) under the name *E. scaposus*. *Erigeron longipes* was treated as a synonym of *E. scaberrimum* (Less.) G.L. Nesom (non Gardner) by Nesom y Sundberg (1985), but recognized as distinct by Nesom (1989)

Erigeron chiquensis Standl.

Subshrubs 17-45 cm, from a woody taproot; stems usually several from the base, erect or rarely procumbent, usually 1-5 branched, without basal leaves at anthesis, clusters of axillary leaves absent, purple or reddish, sparsely strigose to hirsute-pilose, vestiture antrorsely appressed to ascending, trichomes 0.1-1 mm. Leaves 2.5-7.5 × 0.5-1.2 cm, spatulate-obovate to distal ones becoming lanceolate, base subclasping, the proximal leaves long-attenuate and petiolariiform based, margins 2-4-toothed or 2-4-lobed distally, very narrowly revolute and ciliate with ascending hairs, apex indurate-mucronulate. Capitulescence few-capitulate; peduncles 5-55 mm. Capitula radiate; involucre 4.8-6.8 × 9-14 mm; phyllaries 3-4-seriate, outermost about 1/2 as long as the inner, lanceolate with acute to acuminate apex, thin with 3 orange veins often prominent on the inner series, inner with purple tips, margins narrowly scarious and minutely lacerate-ciliate, sparsely strigose-pilose with flattened, vitreous, ascending trichomes 0.5-1.2 mm, eglandular. Ray florets 40-115, 1-2-seriate, corolla usually erect to ascending-erect, white to pinkish or dark red, usually drying with purple tips, limb 0.1-0.3 mm diam., filiform, not coiling. Disk florets: corolla 3.3-4.5 mm. Cypselae 1.5-1.9 × 0.4-0.5 mm, 2-nerved, sparsely strigose; pappus bristles 15-23, outer series of setae 0.2-0.5 mm, conspicuous. Flowering year-round. Oak forests, páramos, rock faces, thickets. CR (Pruski et al. 3910, MO); P (Davidson 872, MO). (1700-)2000-3800 m. (Endemic.)


Lectotype (designated by Lowden, 1970): Guatemala, Kellerman 6111 (F!). Illustr.: None. N.v.: none.

Erigeron deamii B.L. Rob., Erigeron tripartitus S.F. Blake.

Subshrubs 6-55 cm, from a woody, usually horizontal, fibrous-rooted rhizome or from a taproot; stems 1-numerous, erect, branching from near the base or distally, stem with leaves relatively even-sized along the stem, basal leaves deciduous before flowering, clusters of axillary leaves absent, vestiture antrorsely appressed, moderately to sparsely strigose with trichomes 0.2-0.8 mm, eglandular. Leaves 1-3.5(-6.5) × 0.1-0.3(-0.6) cm, linear to linear-oblancoate, 1-nerved, both surfaces sparsely strigose, base attenuate to a petiolar region, not clasping, margins sometimes widely variable on a single plant, entire or with 1-2(-3) pairs of mucronulate-tipped teeth or linear lobes, often very narrowly revolute. Capitulescence usually 1-6-capitulate; peduncles 2.8-4.8(-9) cm. Capitula radiate; involucre 3.5-5 × 6-10 mm; phyllaries subequal to graduate, 3-4-seriate, often basally fused into a narrow ring, sparsely strigose, eglandular, apex sometimes purplish. Ray florets (50-)80-120, 1-2-seriate; corolla 4-4.8 mm, tube often hispid-
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pilose with sharp-pointed trichomes, limb 0.1-0.3 mm diam., filiform, white, maturing or drying pink to purplish, not coiling. Disk florets: corolla 2.3-3.3 mm. Cypselae 1.3-1.5 mm, 2(-3)-nerved, one face sometimes with a median nerve, sparsely strigose; pappus bristles 17-23, outer setae few, 0.2-0.4 mm. Flowering Dec-Aug. Roadsides, road cuts, usually in disturbed vegetation, oak-pine. G (Pruski y Ortiz 4284, MO); ES (Montalvo 6251, MO). 1000-2900 m. (Endemic.)


Demetria Lag.

Por J.F. Pruski.

Annual or perennial herbs, infrequently subshrubs; stems erect to infrequently decumbent; herbage usually resinous, typically glandular, otherwise mostly subglabrous. Leaves alternate, petiolate to the distal ones sessile, chartaceous to stiffly so; proximal leaves sometimes pinnatifid; cauline leaves lanceolate to oblone or spatulate, sometimes linear, 1-veined, surfaces sometimes pubescent or stipitate-glandular, margins usually serrate. Capitulescence monocephalous to corymbiform. Capitula bisexual, radiate or infrequently discoid, usually > 100-flowered; involucre usually hemispheric or campanulate; phyllaries imbricate, usually 5+-seriate, chartaceous with herbaceous, erect or recurved apex, resinous-sticky (Mesoamerica), usually glabrous, persistent. Ray florets (0-)12-50+; corolla yellow, limb linear-lanceolate. Disk florets usually 100-200, typically bisexual throughout; corolla tube short, throat gradually to abruptly ampliate, lobes 5, deltate; style branch appendage deltate to lanceolate, papillose. Cypselae ellipsoidal to obovoid, subcompressed or sometimes prismatic, faces smooth or striate to rugose, apex truncate; pappus of 2-8 subulate scales or awns, basally caducous. x = 6. Aprox. 30-60 spp. Estados Unidos, Mexico, South America; introduced into the Old World.

The North America species of Grindelia were revised by Steyermark (1934), who recognized many species subsequently reduced to synonymy by Barkley et al. (2006), where full synonymy for our species (albeit perhaps overly lumped) is given.


Grindelia nana Nutt., Grindelia perennis A. Nelson.
Perennial herbs 0.3-1 m; stems branched distally, sometimes reddish, pubescent to glabrous; herbage resinous. Leaves 1-8 × 0.3-2.5 cm, those of lateral branches much smaller than main stem leaves, oblanceolate to spatulate, surfaces not stipitate-glandular, base subauriculate, margins usually serrate (distal leaves sometimes entire), apex usually obtuse or rounded. Capitulescence usually 4-10-capitulate, sometimes nearly flat-topped; peduncles usually 1-3 cm, or sometimes capitula immediately subtended by 1-2(-3) bracteate leaves. Capitula 10-15(-20) mm, conspicuously radiate (rays rarely absent); involucre 12-22 mm diam., campanulate to subglobose; phyllaries 2-13 × 0.5-1.4 mm, strongly graduated, 4-7-seriate, lanceolate to linear-lanceolate, usually not stipitate-glandular, the narrow subsquarrose apex of outer few series generally strongly recurved. Ray florets (0-)20-40+; corolla limb usually 10-25 mm. Disk florets: corolla usually 5-6 mm. Cypselae 3-5 mm; pappus awns 2-4, 3-5 mm, 2/3+ as long as disk corolla. 2n = 12, 24.

Flowering time unknown. Hábitat desconocido. Y (Steyermark 1934: 487 sub G. perennis). 0-100 m. (Canada, Estados Unidos; introduced into Mesoamerica.) The sole voucher known to me of this taxon in Mesoamerica, Millspaugh 33 (F), was cited by Millspaugh y Chase (1904: 97) as Grindelia nana and by Steyermark (1934: 487) as G. perennis, both names treated by Barkley et al. (2006) as synonyms of G. hirsutula.


Selloa Spreng. (not Kunth)

Por J.F. Pruski.

Shrubs (less commonly subshrubs); stems straight, striate, leafy distally with internodes much shorter than leaves, sometimes with axillary fascicles of young leaves; herbage resinous, subglabrous. Leaves simple, alternate, sessile; blade chartaceous, 1-veined or venation trinerved directly from stem, both surfaces punctate-glandular. Capitulescence a nearly flat-topped many-capitulate corymbiform-panicle, ultimate 2-7 capitula in bracteolate clusters. Capitula bisexual, small, indistinctly radiate; involucre cylindrical to narrowly turbinate; phyllaries imbricate, graduated, 3-4-seriate, stiff, conduplicate, outer series subcarinate in proximal 2/3. Ray florets: corolla short-radiate, shorter than disk corollas, yellow, limb very short, basically included within involucre or nearly so. Disk florets mostly bisexual (sometimes a few functionally staminate); corolla narrowly campanulate, 5-lobed; anthers yellowish, obtuse at base, thecae narrowed to near connective apically, appendage triangular; style branch apical appendage about as long as fertile portion, long-triangular or lanceolate, papillose. Cypselae obconic or cylindrical, slightly
compressed, indistinctly 6-8-nerved, densely white-substrigillose; pappus absent or rarely minutely coroniform. \( x = 4, 8 \). 1 sp.; SW. Estados Unidos, México, Guatemala.

*Gymnosperma*, a resinous shrub with entire narrow leaves, is similar in these features to *Gutierrezia* Lag. (Lane, 1982), which differs only slightly by having obvious radiate (sometimes discoid) capitula and a pappus usually of squamellae but sometimes absent. West Indian *Gundlachia* A. Gray is also a similar resinous shrub with entire narrow leaves, has small few-flowered (shortly radiate) capitula, and a similar capitulescence form, but differs from *Gymnosperma* by its white corollas, well-developed pappus, and base chromosome number of \( x = 9 \).


Shrubs (less commonly subshrubs) 0.4-2 m. Leaves (1.5-)2.5-6(-8) × 0.2-0.7 cm, usually narrowly lanceolate, base attenuate, margins entire, scabrellous, sometimes revolute. Capitulescence usually to c. 15 cm diam.; peduncles 0.5-1.5 mm. Capitula 4-6 mm, 7-15-flowered; involucre 1.5-2 mm diam.; phyllaries 10-15, 1.5-4 × c. 1 mm, lanceolate or outer ones sometimes elliptic, stramineous with hyaline margins, outer phyllaries green apically, nervation obscure, apex obtuse to acute. Ray florets 4-9; corolla 2-3 mm, limb 0.5-1 mm, elliptic to orbicular. Disk florets 3-6, slightly exserted from involucre; corolla 2.5-3.5 mm, tube slightly shorter than limb, lobes lanceolate, reflexed; style branches c. 1 mm. Cypselae 1.2-1.8 mm; pappus corona (when present) c. 0.1 mm. \( 2n = 16 \). Flowering Mar-Aug. *Matorral crassicaule*, *open juniper or pine-oak forests*, *rocky slopes*, *serpentine outcrops*, *thickets*. Ch (Breedlove 27024, MO); G (*Pruski y Ortiz* 4285, MO). 1000-2300(-2800) m. (SW. Estados Unidos, México, Mesoamérica.)


*Ammodia* Nutt.

Por J.F. Pruski.
Annual or perennial tap-rooted herbs; herbage not resinous, sessile-glandular or short-stipitate-glandular, also generally strigose to hispid or hirsute with elongate non-glandular trichomes. Leaves basal and cauline or basal withered at anthesis, simple, alternate; blade chartaceous, 1-veined or pinnately veined, surfaces hispid to strigose, glandular, non-glandular trichomes of basal and proximal stems leaves stiff and gradually tapered, base tapered or distal leaves often clasping or auriculate; petiole (when present) ciliate. Capitulescence open, monocephalous to corymbiform or sometimes paniculate. Capitula bisexual, radiate or rarely discoid; involucre turbinate to hemispheric; phyllaries imbricate, graduate, 3-6-seriate, appressed to spreading, lanceolate or linear-lanceolate, stiff, 1-nerved, strigose or strigillose and eglandular or short-stipitate glandular; receptacle often pitted. Ray florets 4-35, 1-seriate; corolla yellow, tube sometimes setose, limb exserted, eglandular or less commonly stipitate-glandular proximally, often coiled. Disk florets 10-100, bisexual; corolla narrowly funnelform, infrequently glandular, tube shorter than throat, lobes erect to spreading, delate to lanceolate; anthers stramineous, appendage lanceolate; style branches filiform, apical appendage linear-lanceolate. Cypselae all suberete or sometimes disks compressed, 4-12-striate, brown, glabrous to strigose; rays epappose (Mesoamerica) or with few short bristles, disk pappus 2-3-seriate, outer series of few-several persistent short bristles or scales, inner 1-2 series of many elongate, stramineous to brown, persistent, scabrid or barbellate bristles, apex of innermost series sometimes weakly clavate. $x = 9$. 25-30 spp., 1 sp. in Mesoamerica, aprox. 10 spp. in México, most species in Estados Unidos and Canadá.

*Heterotheca subaxillaris* is the generitype, and *Heterotheca* sect. *Heterotheca* was revised by Wagenknecht (1960). Traditionally (e.g., Wagenknecht, 1960) *Heterotheca* usually was broadly circumscribed, but Semple et al. (1980) redefined *Heterotheca* as usually having epappose ray florets, whereas segregates *Chrysopsis* and *Pityopsis* have all florets pappose. Additionally, *Heterotheca* has leaves with gradually tapered stiff (neither filamentous nor flagelliform) non-glandular trichomes (Semple et al. 1980).

*Heterotheca subaxillaris* is similar to Mexican *H. inuloides*, which is sometimes used medicinally and reaches south into Veracruz and Oaxaca. *Heterotheca inuloides* should be looked for in Mesoamerica, and differs by herbage with dense vestiture and by inner phyllaries typically $\geq 9$ mm. *Heterotheca graminifolia* was recognized by Nash (1976), but has more recently been transferred to *Pityopsis*.


Infrequent annual or biennials herbs to 1(-1.5) m, procumbent to erect; stems usually few-branched basally, strigate, strigose to hispid with non-glandular trichomes to 0.5 mm in Mesoamerica, to 2 mm outside of Mesoamerica, also usually distally short-stipitate-glandular. Basal and proximal cauline leaves frequently withered by anthesis, blade to 6 × 4 cm, lanceolate to ovate, petiole 1-3 cm, narrowly winged; cauline leaves (0.5-)1-4(-6) × 0.5-2 cm, becoming remote and bracteate distally, sessile, lanceolate to ovate, surfaces scabrous, also sparsely substipitate-glandular, base often subauriculate, margins subentire. Capitulescence few-capitulate and corymbiform to paniculate; peduncle 0.3-4(-6) cm, sometimes bracteate, strigose, also short stipitate-glandular. Capitula to c. 10 mm, radiate; involucre 6-8 mm diam., campanulate to hemispheric; phyllaries many, 4-6-seriate, lanceolate, outer phyllaries 1-3 mm, inner phyllaries 5-8(-9) × to c. 1 mm, surfaces sessile-glandular or substipitate-glandular especially apically, also apex hirsute, papillose, to sometimes glabrous, margins and base scarious, apex green; receptacle with pit borders to c. 0.5 mm. Ray florets 15-35; corolla glabrous, tube 2-4 mm, limb 4-8 × 1-2 mm, usually 4-veined. Disk florets 20-50; corolla usually 3-6 mm, glabrous or throat sometimes setulose, lobes 0.5-0.7 mm, glabrous. Ray cypselae 1.5-2.5 mm, epappose, obconic-triquetrous, glabrous to margins infrequently strigillose; disk cypselae 2-4 mm, pappose, compressed, faces strigose, outer pappus ≤ 0.6 mm, inner pappus bristles usually 3.5-6 mm, usually tan to pale brown. 2n = 18. Flowering June. Savannas. B (*Gentry 8053*, MO). 0-10 m. (Estados Unidos, México, Mesoamérica.)

*Heterotheca subaxillaris* as recognized is treated here provisionally without infraspecies (as done by Nesom, 1990), although based upon phyllary pubescence features Gandhi y Thomas
(1989) recognized two varieties and Barkley et al. (2006) recognized two subspecies. Wagenknecht (1960) described *H. subaxillaris* var. *procumbens* B. Wagenkn. from sandy beaches of the central Gulf Coast of the Estados Unidos, but Harms (1965) suggested it not be recognized. It is treated here as a provisional synonym. Plants from coastal areas and Mesoamerica typically have stems with non-glandular trichomes < 1 mm, whereas in inland populations the trichomes are often to 1.5(-2) mm. *Heterotheca chrysopsidis* DC., was treated in synonymy of *H. subaxillaris* by Nesom (1990), but seems to differ by its consistently rust-brown inner disk pappus and larger capitula.


Por G. Sancho y J.F. Pruski.

Annual tap-rooted herbs or less commonly perennial herbs; stems with leaves cauline (sometimes also basal persistent at anthesis) and more or less evenly spread along length of stem, sparsely villous to densely tomentose; herbage often glandular, the glandular trichomes much shorter than non-glandular trichomes. Leaves simple or infrequently pinnatifid, alternate, sessile; blade typically small and narrow, chartaceous, venation pinnate, surfaces tomentose to subglabrous. Capitulescence typically narrow paniculiform to spiciform, less commonly openly corymbiform-paniculate. Capitula bisexual, disciform or subradiate, many-flowered; involucre campanulate to hemispheric, sometimes urceolate when immature; phyllaries stramineous with midregion greenish, never with an orange-resinous midvein, often apex violet, loosely imbricate, graduate or subequal, 2-4(-5)-seriate, typically linear-lanceolate, tomentose or villous to infrequently subglabrous; receptacle and subreceptacle neither swollen nor inflated. Marginal florets pistillate, many, 2-5-seriate; corolla filiform-tubular or less commonly filiform-subradiate with short limbs that usually are not much exserted above pappus bristles, white or white-green, dentate or fimbriate at the apex. Disk florets bisexual, few; corolla tubular-funnelform to narrowly campanulate, typically white or yellow, veins lightly colored (not orange), 5-lobed, tube elongate, narrow, lobes lanceolate, about as long as limb; anthers obtuse basally, appendages narrow, subacute; style linear, branch appendage long-triangular to lanceolate, papillose. Cypselae typically obovate in outline, compressed, margins sometimes slightly thickened, apex typically broad, body often moderately setose on margins and distal portions of each face, faces usually also glandular distally, less commonly entire cypsela body long-sericeous; pappus 1-2-seriate, at least with and inner series of many elongate subequal bristles about as long as the disk corollas,
often also with a much shorter inconspicuous outer series of short scales or bristles (pappus double), bristles and scales typically cream-colored to stramineous, scabrid. \( x = 9 \). 19 spp.

Estados Unidos, México, Mesoamérica, Andean South America from Venezuela south to northern Argentina, Hispaniola.

\textit{Laennecia} was resurrected from synonymy of \textit{Conyza} by Zardini (1981), who diagnosed \textit{Laennecia} by its 2-seriate (double) pappus. Nesom (1990) expanded \textit{Laennecia} to include species with a 1-seriate pappus. Nesom (1990) stressed the long disk corolla lobes, phyllaries without an orange-resinous midvein, and glandular cypsela (as illustrated by Sancho y Pruski, 2004) as distinguishing characters of \textit{Laennecia}.


1. Capitula subradiate.

2. Leaf surfaces typically discolorous, abaxially tomentose, eglandular, margins typically subentire; marginal floret corolla limbs 1-1.5 mm. \textbf{1. \textit{L. confusa}}

2. Leaf surfaces concolorous, villous, glandular, few-toothed-lobed distally; marginal floret corolla limbs 0.4-0.6 mm. \textbf{4. \textit{L. schiedeana}}

1. Capitula disciform.

3. Stems and leaves hirtellous to villous; pappus bristles 1-seriate, subequal; leaf blades typically pinnatifid to bipinnatifid. \textbf{5. \textit{L. sophiifolia}}

3. Stems and abaxial leaf surfaces tomentose; pappus often 2-seriate and unequal; leaves subentire to weakly pinnatifid.

4. Cypselae densely long-sericeous, reddish-brown to purplish; involucre 5-6 mm diam.; peduncles slender. \textbf{3. \textit{L. filaginoides}}

4. Cypselae setulose, brown; involucre 6.5-9 mm diam.; peduncles stout. \textbf{2. \textit{L. gnaphalioides}}


\textit{Heterochaeta gnaphalioides} (Kunth) DC.
Perennial fibrous-rooted herbs (12-)20-65 cm; stems simple or 2-5-branched from base, erect, somewhat angled, tomentose. Leaves cauline and basal, most basal rosette leaves withered at anthesis; blade 1-3(-5.5) × 0.2-0.8(-1.3) cm, oblanceolate to spatulate, surfaces eglandular, typically discolorous, adaxial surface sparsely tomentose to subglabrous, abaxial surface densely white-tomentose, base broad, margins typically subentire or basal leaves sometimes few-serrulate distally, apex acute to obtuse. Capitulescence 7-35 cm, few-several-capitulate, openly corymbiform-paniculate or sometimes narrowly cylindrical and spiciform, lateral branches 2-5.5 cm, typically present, ascending, each 1-5-capitulate; peduncles 2-20 mm, stout, tomentose. Capitula 6.5-8 mm, subradiate; involucre 6.5-8 mm diam., campanulate; phyllaries c. 0.5 mm diam., graduate, c. 3-seriate, linear-lanceolate, usually sparsely tomentose; outer phyllaries 2.5-3.2 mm; inner phyllaries 4.2-5.5 mm. Marginal florets 67-104, 2-3-seriate; corolla 3.3-4 mm, filiform-subradiate, white, limb 1-1.5 mm, narrow, apex bidentate. Disk florets 13-21; corolla 3.5-4.5 mm, funnelform, yellow, lobes 0.8-1 mm. Cypselae 1.2-1.6 mm, narrowly obovate, brown, setulose and glandular, margins sometimes slightly thickened; pappus 1-seriate and subequal or 2-seriate and unequal, longer bristles 18-23, 3.2-3.8 mm, sometimes with small outer bristles-squamellae c. 0.2 mm. Flowering Jun-Aug. 2n = 18. Grassy or brushy slopes, open pine or oak forests. Ch (Breedlove 26368, MO); G (expected, Nash, 1976b: 151 sub Conyza confusa); CR [Bentham, 1853: 81 sub Erigeron (Heterochaeta) gnaphalioides]. 1400-2400 m. (México, Mesoamérica.)

Reports of L. confusa in South America are based on nomenclatural (epithet) confusion with Laennecia gnaphalioides.


Conyza filaginoides (DC.) Hieron., Laennecia parvifolia DC., Laennecia pinnatifida Turcz.

Annual tap-rooted herbs 10-60 cm, typically simple or less commonly few-branched especially from or near base in damaged plants; stems erect or ascending, tomentose. Leaves with blade 1.5-2.5(-3) × 0.1-0.2(-0.4) cm, oblanceolate, surfaces concolorous, tomentose to rarely weakly so, also sparsely glandular, base subamplexicaul, margins slightly revolute, distally 1-5-serrate distally or weakly pinnatifid to apical most leaves sometimes subentire, apex typically obtuse. Capitulescence 3-25(-40) cm, to about half of the length of plant, many-capitulate, narrowly spicate or occasionally paniculate with a few branches; peduncles 3-5(-15) mm, slender, tomentose, sometimes exerted from subtending leaves after flowering and fruiting. Capitula 5.5-
5.6 mm, disciform; involucre 5-6 mm diam., campanulate, usually tomentose, typically subtending closely by a leaf; phyllaries graduate, 2-3-seriate; outer phyllaries 1.8-2 × c. 0.5 mm, linear-lanceolate, tomentose basally, distal margins sometimes laciniate; inner phyllaries 4-4.8 × c. 0.8 mm, typically elliptic, sparsely pubescent basally, margins broadly hyaline. Marginal florets c. 40, 2-3-seriate; corolla 1.1-1.6 mm, filiform-tubular, much shorter than the style, white or pale greenish, dentate at the apex. Disk florets 3-6(-10); corolla 2.2-2.8 mm, narrowly campanulate, white or lobes often violet, lobes 0.5-0.8 mm. Cypselae 1.4-1.6 mm, obovate, reddish-brown to purplish, densely long-sericeous, the indumentum typically obscuring the glands; pappus 2-seriate, unequal, outer series of c. 25 bristles, 0.8-1.2 mm, inner series of c. 20 bristles, 2-3 mm. 2n = 18. Flowering Sep-Nov. Disturbed areas, pastures, steep ravines, pine or oak forests. Ch (Breedlove 41278, MO); G (Standley 58375, NY). 1500-3100(-3300) m. (Estados Unidos, México, Mesoamérica, Colombia, Venezuela, Ecuador, Perú.)

Although *Laennecia parvifolia* is based on a mixed collection, the holotype is *L. filaginoides*, as treated by Zardini (1981). Cuatrecasas (1969) and Nesom (1990) treated *L. parvifolia* in the synonymy of *L. gnaphalioides*, seemingly based on non-type material mounted on an isotipo in P.


Annual tap- or fibrous-rooted herbs (5-)10-45 cm; stems simple or few-branched from base, erect or ascending to mush less commonly decumbent, costate, tomentose. Leaves with blade 1-2.5 × 0.2-0.7 cm, oblanceolate, surface concolorous with glandular trichomes often obscured, adaxial surface tomentose, abaxial surface densely tomentose, base subamplexicaule, distal margins 2-4-serrate, apex obtuse to broadly acute. Capitulescence 10-20(-30) cm, to about half of the length of plant, 3-60-capitulate, narrowly paniculate or occasionally spicate; peduncles 2-15 mm, stout, tomentose, typically exserted from subtending leaves. Capitula 5.5-7 mm, disciform; involucre 7-9 mm diam., hemispheric, typically densely tomentose basally, often subtending by a leaf; phyllaries slightly graduate, c. 3-seriate, linear-lanceolate, margins laciniate, apices often purplish; outer phyllaries 3-3.5 × c. 0.5 mm, tomentose, most densely so basally; inner phyllaries 3.8-4 × c. 1 mm, sparsely tomentose, apices often purplish and long-attenuate. Marginal florets c. 90, 3-4-seriate; corolla 1.1.2 mm, much shorter than the style, filiform-tubular, white, dentate at
the apex. Disk florets 4-20; corolla 2.5-2.8 mm, narrowly campanulate, white, lobes 0.5-0.8 mm. Cypsela 1.3-1.8 mm, obvate to broadly so, brown, eglandular, margins and distal part of each face setulose, margins sometimes slightly thickened; pappus 2-seriate, unequal, outer series of scales 0.1-0.6 mm, inner series of c. 15 bristles 2.8-3.5 mm Flowering Jun-Aug. 2n = 18.

Disturbed areas, wet high-elevation meadows. Ch (Nesom, 1990: 221). 2000-2700 m. (México, Mesoamérica, Colombia, Venezuela, Ecuador, Perú, Bolivia.)

The key in Nesom (1990) says the cypselae in *L. gnaphalioides* are glandular, whereas we find them to be eglandular. *Heterochaeta stricta* is a synonym of *L. gnaphalioides* (viz Zardini, 1981; Cuatrecasas, 1969), but the type (*Hartweg 1145*) is a mixed collection and some duplicates are redetermined as *L. filaginoides*.


Annual to short-lived perennial herbs 10-60(-90) cm; stems simple or few-branched from base, erect or ascending, densely leafy, brownish or drying reddish, costate, sparsely to densely villous. Leaves with blade 1-3.5(-5) × 0.2-0.8(-1.5) cm, simple to rarely pinnatifid, typically few-toothed-lobed distally, lanceolate to oblanceolate, surfaces concolorous, villous, often glandular, base of distal leaves dilated, subamplexicaul, marginal segments triangular, apex obtuse to broadly acute. Capitulescence 3-25 cm, racemose or spicate cylindrical-paniculate from distal 5-30 nodes, sometimes leafy, capitula usually single in axils, subsessile to pedunculate; peduncles 2-8(-20) mm, villous. Capitula 5-6 mm, subradiate; involucr 5-6 mm diam., campanulate, often subtending closely by a stem leaf; phyllaries graduated, c. 3-seriate, the broad midrib sometimes glandular, margins hyaline, apex sometimes laciniate and purplish; outer phyllaries 2-3 × 0.5 mm, linear-lanceolate, villous, often also glandular; inner phyllaries 4-5(-6) × 0.7-0.8 mm, elliptic, sparsely villous to subglabrous. Marginal florets c. 135, 4-5-seriate; corolla 3-3.2 mm, filiform-subradiate, about as long as style, white or greenish-white, limb 0.4-0.6 mm, short, ascending, bidentate. Disk florets 5-15; corolla 3.5-4 mm, narrowly campanulate, pale yellow, lobes 0.7-0.9 mm. Cypselae 1.1-1.4 mm, narrowly obovate, brown, sparsely setulose, sometimes glandular near apex, infrequently subglabrous, margins not thickened, apex narrowed; pappus bristles 13-22, 3-4
mm, subequal, 1-seriate, rarely bronze. Flowering Sep-Mar, Jun. 2n = 18. *Alpine meadows, scrub forest, Juniperus forest, slopes, pine-oak chaparral, grassy banks, degraded vegetation areas, volcanic soils.* Ch (Breedlove 29343, MO); G (Skutch 1214, GH); CR (Örsted 268, GH); P (White 49, MO). 2000-3600. (Estados Unidos, México, Mesoamérica.)

The synonymy here is basically that of Blake (1917). Nash (1976b) included *Laennecia prolialba* (Cuatrec.) G.L. Nesom in synonymy, but that South American species appears to differ by denser pubescence.


Annual tap-rooted herbs 20-80(-200) cm; stems simple or few-branched from base, erect or ascending, densely leafy, costate, sparsely villous and glandular. Leaves with blade 2-4(-5.5) × (0.2-)0.8-1.5 cm, typically pinnatifid to bipinnatifid, typically ovate to spatulate in outline (sometimes distal leaves simple and linear), surfaces hirtellous to villous, often also glandular, base attenuate, marginal segments (when pinnatifid) linear-oblong, apex subacute. Capitulescence 5-30 cm, to about half of the length of plant, many-capitulate, narrowly paniculate (or young plants with cylindrical racemiform-panicles); peduncles 1-3(-5) mm, villous. Capitula 2.8-3.8 mm, disciform; involucre 1.8-3 mm diam., campanulate or hemispherical to urceolate when immature; phyllaries subequal, c. 2-seriate, linear-lanceolate, margins hyaline; outer phyllaries, 1.5-2 × c. 0.4 mm, villous; inner phyllaries 2-2.7 × 0.2-0.3 mm, midregion sparsely villous. Marginal florets 20 to numerous, 3-4-seriate; corolla 0.8-1.4 mm, much shorter than the style, filiform-tubular, white, apex dentate. Disk florets 2-6; corolla 2.2-3 mm, funnelform, white, tube and throat sometimes setulose, lobes 0.6-0.7 mm. Cypselae 0.6-0.8 mm, broadly oblancoate, pale brown, sparsely pubescent to subglabrous, usually eglandular or minutely glandular, margins sometimes slightly thickened; pappus bristles 8-12(-20), 2-2.4 mm, subequal, 1-seriate, not contiguous at base. Flowering Mar-Aug. *Pinares, roadsides, disturbed areas.* 2n = 18. Ch (Breedlove 26211, MO); G (Pruski y Ortiz 4296, MO); ES (Nesom, 1990: 226). 1200-2300(-3000) m. (SW Estados Unidos, México, Mesoamérica, Colombia, Venezuela, Ecuador, Bolivia, Argentina.)
16. **Laestadia** Kunth ex Less.

Por G. Sancho y J.F. Pruski.

Perennial herbs to low subshrubs; stems branched, usually procumbent decumbent or occasionally erect, densely leafy, internodes typically much shorter than leaves; herbage commonly glandular. Leaves simple, alternate, essentially sessile; blade small, narrow, chartaceous to subcoriaceous, surfaces glabrous, glandular, or sparsely pilose. Capitulescence of solitary pedunculate capitula at the apex of branches; peduncles short to long, typically bracteolate. Capitula bisexual, disciform; involucre campanulate to hemispheric; phyllaries loosely imbricate, subequal, (2-)3-4-seriate, herbaceous or chartaceous, flat, usually oblong with a subobtuse apex, glandular, sparsely pilose, or glabrous, the innermost commonly with hyaline margins; receptacle low-convex. Marginal florets many to numerous, 2-4-seriate, pistillate; corolla campanulate, white or purplish, glabrous or glandular, tube very short, limb ampliate, 4-5-lobed, lobes straight or slightly revolute; style base sometimes slightly broadened, branches ovate, apex acute, externally papillose, papillae sometimes extending proximally near to point of bifurcation. Disk florets many, functionally male, ovaries sterile; corolla broadly campanulate, 5-lobed, white or purplish, glandular especially on tube and lobes, tube long, lobes erect or slightly revolute; anthers with thecae rounded basally, appendages narrowly ovate-obtuse to lanceolate-acute; ovary cylindrical to narrowly obovoid, 6-10-costate, not noticeably tapered, slightly glandular basally and apically. Cypsela epappose, of marginal florets subterete (when immature sometimes slightly compressed), obovoid, strongly 7-10-costate, glabrous or sparsely glandular, slightly tapered basally and apically, base glandular, apex cupular, densely glandular, cupule short to or long, typically slightly broader than apical portion of cypsela body. 6 spp. High-elevational Neotropics; 4 spp. Andean; 1 sp. Mesoamerica; 1 sp. on Hispaniola.


Cushion-forming fibrous-rooted herbs 15-25 cm; stems several from the base, 0.5-1 mm diam., decumbent, leafy to branch apex, subterete, brownish, glandular, older stems also sparsely villous. Leaf blades 5(-11) × 1-1.6(-2.4) mm, oblong or obovate, surfaces densely glandular, often also sparsely pilose, base attenuate, semiamplexicaule, margins entire, often ciliate, apex subobtuse, apiculate. Capitulescence monocephalous, usually several to many per plant; peduncles 2-6 cm, sometimes violet, internodes much longer than bracteoles; bracteoles few, 2.5-4 × less than 1 mm diam., leafy. Capitula 3.5-4.5 mm; involucrre 4-5 mm diam., sometimes
closely subtended by 1 or 2 bracteoles; phyllaries c. 3(-4)-seriate, herbaceous, greenish or less commonly tinged violet, apically glandular, otherwise glabrous; the outermost 3-3.2 × c. 0.5 mm, elliptic-oblong, narrowly acute; the innermost 2.2-2.5 × c. 0.5 mm, oblong, broad darkly colored central region often discernable especially apically, distal margins hyaline, apex acute to obtuse, typically fimbriate. Marginal florets 35+, 2-3-seriate; corolla c. 0.8 mm, violet to white, glandular, tube 0.1-0.2 mm, limb ampliate, 3-5-lobed, style well-exserted, branches 0.3-0.5 mm, apex acute. Disk florets 15-23; corolla 1-1.8 mm, violet, sometimes greenish basally, glandular especially on lobes, tube 0.5-0.7 mm, lobes to c. 0.6 mm; anthers to c. 0.7 mm, elliptic-ovate, stramineous; style exserted, unbranched or branched, violet apically; ovary 1-1.4 mm, narrowly obovoid. Cypselae 1.3-2 mm, apical cupule c. 0.2 mm. Flowering year-round Marshy páramo or subpáramo. CR (Pruski et al. 3948, MO); P (Weston 10160, MO). (2000-)2600-3500 m. (Endemic.)

Laestadia linearis E. Bommer et M. Rousseau, also based on a Costa Rican Pittier collection, is a fungus described under the latter homonym Laestadia Auerswald 1869 (non Kunth ex Less., 1832).

17 Myriactis Less.

Lagenophora sect. Pseudomyriactis Cabrera

Por G. Sancho y J.F. Pruski.

Annual or perennial herbs, commonly with rhizomes; stems branched or single, usually leafy, sometimes subscapose, leaves commonly basal and cauline. Leaves usually simple or infrequently pinnatifid, alternate, surfaces glabrous or densely sericeous-pubescent, margins toothed to lobed; basal leaves usually long-petiolate; cauline leaves usually sessile. Capitulescence monocephalous to few-several-capitulate in open racemes or cymes, capitula pedunculate. Capitula bisexual, radiate, small; involucre campanulate to hemispheric; phyllaries subequal, 2-3-seriate, usually oblong, herbaceous, midvein usually conspicuous, glabrous or sparsely pubescent, ciliate and hyaline at the margins, apex usually subobtuse. Receptacle slightly convex, epalete. Ray florets few-many, 1-2(-4)- seriate, pistillate; corolla white to brownish-purple, glandular or glabrous, tube very short, limb narrow, 2-3-dentate. Disk florets many, bisexual; corolla funnelform, (4-)5-lobed, white to greenish or brownish purple; anthers rounded basally, appendages narrowly ovate; style branches linear or ovate, papilllose abaxially from apex to near trunk, apex acute. Cypselae epappose, obovate (or sometimes disk cypselae subcylindrical), compressed, 2-margined, short-rostrate, rostrum densely glandular or rostrum of
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disk florets smaller and glabrous, cypselae of both ray and disk florets usually fertile, similar or sometimes those of central florets narrower. Aprox. 20 spp. Americas, Asia.

*Lagenophora* Cass. was revised by Cabrera (1966), who treated then three described Mesoamerican species. Cuatrecasas (1982) described three additional Mesoamerican species within *Lagenophora*, and Cuatrecasas (1986) transferred these Neotropical species as *Myriactis*.


1. Plants subscapose, cauline leaves proximal, remote and bracteate.
   2. Basal leaf blades glabrous, obovate, bases long-attenuate. **3. M. minuscula**

1. Plants not subscapose, stems leafy.
   4. Ray florets 1-seriate, corolla tubes obviously glandular-pubescent. **2. M. cuchumatanica**
   5. Basal leaves long-petiolate, blades ovate to elliptic, surfaces villous, bases short-attenuate.
      1. M. andina
   5. Basal leaves pseudopetiolate, blades oblanceolate or clavate, surfaces glabrous, bases long-attenuate.
      4. M. panamensis


Perennial matted herbs 7.5-18 cm, not subscapose; stems ascending, single, leaves in basal rosettes but stems leafy with leaves only slightly decrescent to near capitula, villous. Basal leaves long-petiolate, blade 2.5-3 × 1.3-2 cm, ovate to elliptic, surfaces villous, base short-attenuate, margins 7-8-toothed, apex subobtuse, petiole 3-4 cm; cauline leaves 1.5-2.5 × c. 4 mm, sessile, surfaces pubescent to villous, base clasping, vaginate, margins 1-3-toothed, apex subobtuse to obtuse. Capitulescence in cymes, 1-3-capitulate; peduncles 3-30 mm, sparsely villous. Capitula: involucre 4-5 × 5-7 mm, hemispheric; phyllaries subequal or the outermost shorter, 2-3-seriate; outer phyllaries 3.5-4.5 × 0.8-1 mm; inner phyllaries 4-4.5 × 0.9-1 mm. Ray florets 35-45, 2-seriate; corolla c. 2 mm, white to brownish-purple, tube glabrous or subglabrous with some
glandular trichomes, limb c. 1.8 mm, apex bidentate. Disk florets c. 2 mm, yellow-green, lobes 0.8-0.9 mm, papillose. Cypselae 1.8-2 mm, cypselae of central florets narrower (fertile?) and with few-glandular rostrum. Páramo, shrub-Páramo, wet cliffs. CR (Pruski et al. 3926, MO). 3100-3500 m. (Mesoamerica, Venezuela.)


Perennial herbs 8-15 cm, not subscapose; stems decumbent, single, only branched at the very base, cylindrical, sparsely pubescent, leafy, cauline leaves gradually descrescent. Leaves with blades glabrous adaxially, pilose abaxially below and at the margins; basal leaves long-petiolate, blade 1-1.5 × 0.9-1.1 cm, elliptic to orbicular, base rounded to subattenuate, margins 4-5-toothed, apex obtuse-mucronate, petiole 0.8-2 cm, villous, vaginate at the base; mid-cauline leaves sessile to subpetiolate, blade 1.5-1.8 × 0.7-0.8 mm, base subclasping, margins 2-3-toothed; distal cauline leaves sessile, blade 0.9-1.2 × 0.4-0.6 cm, obovate, base clasping, margins 1-2-toothed. Capitulescence monoecephalous, rarely more than one capitulum per stem. Capitula 18-34-flowered; involucre 3.5-4 × c. 5 mm, broadly campanulate; phyllaries subequal or the outermost shorter, c. 3-seriate, glabrous or subglabrous, sometimes purplish at the tips; outer phyllaries c. 3 × c. 0.8 mm, inner phyllaries 3.5-4 × c. 0.9 mm. Ray florets 10-20, 1-seriate; corolla c. 2.5 mm, white becoming brownish-red in age, limb c. 2 mm, narrow, glabrous, tube obviously glandular-pubescent. Disk florets 8-14; corolla 1.8-2 mm, yellow turning brownish-red in age, limb glandular-pubescent, lobes 0.7-0.8 mm, papillose. Cypselae 2.5-2.8 mm, similar in both marginal and central florets. Open areas in alpine Pine forest. G (De Jong 694, NY). 3200-3700 m. (Endemica.)


Perennial subscapose herbs 3-28 cm; stems ascending, single, costate, glabrous or subglabrous, cauline leaves proximal, remote and bracteate. Basal leaves long-petiolate, blade 1-2 × 0.3-1 cm, obovate, venation obscure abaxially, surfaces glabrous, base long-attenuate, margins 2-5-toothed, apex subacute, petiole 1-5 cm, glabrous, vaginate at the base; cauline leaves very few, 0.6-0.9 × 0.1-0.2 cm, sessile, oblong, surfaces subglabrous, base clasping, margins 1-3-
toothed distally, apex acute. Capitulescence monocephalous. Capitula c. 27-flowered; involucre 3-4 × c. 4 mm, broadly campanulate; phyllaries subequal or the outermost shorter, c. 3-seriate, glabrous, sometimes purplish distally; outer phyllaries 2.5-3.5 × c. 0.8 mm; inner phyllaries 2.5-3.5 × 0.8-0.9 mm. Ray florets c. 17, 1-seriate; corolla 3-4.5 mm, white turning purplish, limb 2.5-4 mm, narrow, glabrous, tube glabrous. Disk florets c. 10; corolla 2-2.5 mm, funnelform, white to white-pale, mostly glabrous, lobes 0.6-0.8 mm, papilloise. Cypselae 1.8-2 mm, cypselae of central florets with rostrum eglandular. Marshy páramo areas. CR (Davidse et al. 25873, MO); P (Weston 10154, MO). 2900-3300 m. (Endemic.)


Perennial tufted herbs 8-25 cm, not subscapose; stems ascending, single, cylindrical, subglabrous or glabrous, leafy, cauline leaves gradually descrescent. Leaves sessile, margins sometimes ciliate; basal leaves 4-5.5 × 1-1.4 cm, oblanceolate or oblong, surfaces glabrous, base long-attenuate and long-pseudopetiolo, vaginate, margins 5-8-toothed, some teeth double, apex subacute; cauline leaves 1.7-2.5 × 0.4-0.5 cm, oblanceolate to oblong, surfaces glabrous, base clasping, margins 1-4-toothed, apex subobtuse. Capitulescence in cymes; peduncles 4-15 mm, usually hairy. Capitula 1-5, c. 85-flowered; involucre 4-4.2 × 7-9 mm, hemispheric; phyllaries subequal or the outermost shorter, c. 3-seriate, glabrous or subglabrous, sometimes purplish distally; outer phyllaries 3-3.2 × c. 0.8 mm; inner phyllaries c. 4 × 0.8 mm. Ray florets c. 57, 2-seriate; corolla c. 4.5 mm, pale-pink, limb c. 2 mm, narrow, glabrous, tube glabrous. Disk florets c. 28; corolla 2-2.5 mm, mostly glabrous, lobes 0.6-0.8 mm, papilloise. Cypselae 1.8-2 mm, cypselae of central florets narrower (fertile?). Potrero, Páramo, P (Davidson 1037, GH). 2500-3400 m. (Endemic.)


Perennial rhizomatous subscapose herbs c. 25 cm; stems ascending, single, slightly costate to cylindrical, sparsely pilose, cauline leaves proximal, remote and bracteate. Basal leaves long-petiolate, blade 2-2.5 × 0.9-1.5 cm, ovate, surfaces sericeous, base short-attenuate, margins shortly 4-6-lobed, apex obtuse, mucronate, petiole 1-1.8 cm, pilose, vaginate basally, purplish;
cauline leaves sessile, blade 0.5-1 × 0.1-0.2 cm, oblong, surfaces subglabrous, base subclasping, margins 1-2-toothed distally, apex obtuse to acute. Capitulescence monocephalous. Capitula c. 40-flowered; involucre 3.5-4 × 4-5 mm, broadly campanulate; phyllaries subequal or graduate, 2-3-seriate, glabrous; outer phyllaries 2.5-3 × 0.7-0.8 mm; inner phyllaries 3.5-4 × 0.8 mm. Ray florets c. 25, 1-seriate; corolla c. 3.5 mm, white to brownish purple, tube glabrous or with a few glandular trichomes, limb 2.8-3 mm, narrow, glabrous. Disk florets c. 15; corolla 2-2.2 mm, white to brownish purple, papillose. Cypselae 2-2.2 mm, cypselae of central florets reduced, narrow, erostrate, eglandular. Alpine meadows, páramo, river sides. CR (Pruski et al. 3857, MO). 2400-3300 m. (Endemic.)


Perennial herbs 17-32 cm, not subscapose; stems ascending, single, cylindrical, leafy, villous, branched in the capitulescence, cauline leaves gradually descrescent. Basal leaves long-petiolate, blade 6-7 × 2.5-3 cm, pinnatifid to bipinnatifid, lobes oblong and subobtuse, surfaces villous, margins ciliate, petioles 3-4.5 cm, villous, vaginate at the base; cauline leaves sessile, blade 2.5-3 × 0.4-1 cm, base clasping, the proximal cauline leaves mostly pinnatifid, the distal cauline leaves mostly 2-3-lobed, lobes oblong. Capitulescence in racemes or cymes; peduncles 5-18 mm, villous. Capitula 2-5, c. 54-flowered; involucre 3.3-5 × 5.5-8 mm, campanulate to hemispheric; phyllaries 2-3-seriate, glabrous, apex purplish; outer phyllaries c. 3 × 0.8-0.9 mm; inner phyllaries c. 4 × 0.8-0.9 mm. Ray florets c. 40, 2-seriate; corolla 2.4-2.8 mm, white to purplish, limb 1.8-2 mm, glabrous, tube glandular-pubescent. Disk florets c. 14; corolla 2.5-3 mm, yellow-green, lobes 0.8-1 mm, papillose. Cypselae 1.5-3 mm, similar in both marginal and central florets. Flowering sporadically year round. Paramos. CR (Weston 6064, US); P (Gomez et al. 22645, MO). 3000-3500 m. (Endemic.)

18. Osbertia Greene

Por J.F. Pruski.

Perennial herbs, caudex with 1-several stems; stems simple to few-branched, leafy proximally; herbage not resinous. Leaves simple, alternate, sessile or petiolate; blade typically spatulate to oblanceolate, chartaceous, surfaces pubescent, margins usually entire. Capitulescence open, of monocephalous capitula. Capitula bisexual, numerous-flowered, radiate; involucre campanulate
to broadly hemispherical; phyllaries loosely imbricate, moderately graduate, flat, herbaceous with narrow scarious margins, 1-costate; receptacle convex to hemispherical, alveolate. Ray florets 1-3-seriate; corolla typically yellow at anthesis, occasionally setose. Disk florets bisexual; corolla shortly 5-lobed, glabrous to sparsely setose, tube short; anthers cream-colored, basally obtuse, appendage lanceolate, apex narrowly acute; style branch stigmatic surfaces restricted to the proximal 2/3s of branch, apical appendage long-triangular, moderately papillose. Cypselae terete, subfusiform, slightly 4-16-nerved, sericeous; ray and disk pappus typically 1-seriate, bristles 15-40, persistent, Mesoamerica all elongate and subequal. $x = 5$. 3 spp. Mexico; 2 spp. regional endemics, 1 sp. widespread and extending southeastward into Mesoamerica.

*Osbertia* was revised by Turner y Sundberg (1986). *Osbertia* was placed in the Chrysopsidinae by Nesom y Robinson (2007) with phyllaries of members of the subtribe being described by them as “keeled,” a feature not seen by me in *Osbertia*. Also, *Osbertia stolonifera* has a pappus of subequal bristles differing from typical Chrysopsidinae.


Stoniferous herbs 10-60 cm, from thick caudex; stems fertile and erect or lateral and stoniferous, subterete, pilose to densely so, often scattered stipitate-glandular, rarely glabrate, the lateral stems leafy and producing new rosettes distally; herbage often heterotrichous, stipitate-glands (when present) longer than occasionally matted indument of peduncles but much shorter than pilose-sericeous indument. Leaves basal and proximal-cauline; basal rosette leaves several, blade 2-8 × 0.4-2.7 cm, uninerved to ascending-pinnate, surfaces pilose-sericeous, rarely also stipitate-glandular or glabrate, base attenuate into narrowly winged petiolar base (0-)1-4(-10) cm, margins entire to less commonly serrulate, apex obtuse; stolon leaves 1-3 × 0.1-0.9 cm, spatulate to oblong; fertile cauline leaves 0.5-2.5 × 0.1-0.8 cm, generally bracteate and remote distally, elliptical to linear-lanceolate, surfaces of both stolon and erect cauline leaves pilose to densely so, often scattered stipitate-glandular, broad-based to subclasping. Capitulescence on stout bracteate
peduncle, typically pilose, sometimes also short stipitate-glandular. Capitula 0.9-1.6 × to c. 3.5
cm including rays; involucre broadly hemispherical; phyllaries many, 8-15 × 0.8-1.3 mm, 4-6-
seriate, linear-lanceolate, surfaces pilose, the outer surface much more densely so, also short-
stipitate-glandular especially apically, rarely glabrate, scarious margins 0.1-0.3 mm diam.,
sometimes reddish, apex long-acuminate; receptacle 5-10 mm diam., alveolae to 0.5 mm, deep-
cupular. Ray florets 34-70(-120); corolla 9-18 mm, yellow throughout (or sometimes limb reddish
abaxially pre-anthesis), glabrous, tube 2-3 mm, limb 7-15 × 1.6 mm, linear-lanceolate, 4-
veined, apex acuminate, 2-3-denticulate, occasionally asymmetrically so. Disk florets numerous;
corolla 4-5.8 mm, narrowly funnelform, deep yellow, glabrous, tube c. 1.2 mm, limb only slightly
broadening, throat 2.8-3.4 mm, lobes 0.7-1.2 mm, lanceolate; style branches c. 1.1 mm. Cypselae
1-2 mm, trichomes c. 0.5 mm; pappus bristles c. 40, 4.5-6 mm, fragile, scabridulous. 2n = 10.
Flowering Aug-Feb. Disturbed rocky subalpine areas, grasslands, rocky pine forests, subalpine
shrublands. Ch (Ghiesbreght 872, MO); G (Pruski y Ortiz 4264, MO). 2000-3600 m. (México,
Mesoamérica.)

This species was treated by Nash (1976) as Haplopappus “stoloniferus”. She gave the upper
elevational limit as “4600 m”, this in reference to collections from outside Mesoamerica.

19. Pityopsis Nutt.

Harms, Heyfeldera Sch. Bip.

Por J.F. Pruski.

Perennial herbs; stems subterete, sericeous or less commonly pilose, to glabrate, sometimes short-
stipitate glandular; stipitate-glands (when present) much shorter than sericeous indument, but
typically held above these often matted trichomes; herbage not resinous, with non-glandular
trichomes filamentous and often anastomosing. Leaves basal and caulescent, simple, alternate,
 sessile; blade typically lanceolate or oblanceolate, chartaceous, parallel-nerved, surfaces griseous-
to silver-sericeous (rarely glabrate), margins usually entire. Capitulescence open, corymbose
(rarely flowering when monocephalous), often more or less flat-topped. Capitula bisexual,
radiate; involucre turbinate to campanulate; phyllaries loosely imbricate, graduate, 3-5(-8)-seriate,
 appressed to spreading or reflexed with age, linear-lanceolate, stiff, 1-nerved, midregion or apex
greenish, surface typically sericeous or pilose to short-stipitate glandular or glabrescent, not
resinous-sticky, margins usually broadly scarious, typically fimbriate distally, apex acuminate;
receptacle convex, smooth or sometimes crested. Ray florets 8-35, 1-seriate; corolla yellow, limb
obviously exserted from involucre although sometimes coiling. Disk florets many, bisexual; corolla very narrowly funnelform, shortly 5-lobed, glabrous to less commonly sparsely setose, lobes erect to spreading, deltate; anthers slightly exserted, stramineous, appendage lanceolate; style branches filiform, stigmatic surfaces restricted to the proximal 1/2 of branch, apical appendage linear to linear-lanceolate, papillose. Cypselae terete, subfusiform, finely 8-10-striate, brown to black, strigose; ray and disk pappus present, unequally 2-seriate, persistent, outer series of few-several very short linear-triangular persistent bristles-scales, inner series of many elongate persistent, scabrid to barbellate bristles, apex sometimes weakly clavate. \( x = 9.7 \) spp.; 1 sp. neotropical; S.E. Estados Unidos, México, Mesoamérica, Bahamas.

*Pityopsis*, variously treated within *Heterotheca* (e.g., Nash, 1976) or *Chrysopsis* (Nutt.) Elliott (e.g., Cronquist, 1980), was revised Semple y Bowers (1985), who recognized seven species. The yellow goldenaster genera *Chrysopsis, Heterotheca,* and *Pityopsis* are similar by sharing the technical feature of a biseriate pappus in disk florets. Among these genera, *Pityopsis* differs by sericeous graminoid parallel-veined leaves. Semple et al. (1980) further distinguished *Pityopsis* by filamentous non-glandular trichomes.


Stems ascending to much more commonly stiffly erect; stems, peduncles, and leaves not stipitate-glandular. Leaves usually 3-5-nerved; basal leaves longer than the cauline leaves, cauline leaves generally more than 10. Capitulescence branching usually at c. 45° angles; peduncles bracteolate. Capitula mid-sized; phyllaries very unequal, usually eglandular, inner phyllaries infrequently short-stipitate-glandular apically, outer phyllaries spreading to reflexing with age; receptacle sometimes crested. Ray corollas typically setose or pillose near tube-limb juncture. Disk florets 15-50. Pappus inner series of bristles 25-40. \( 2n = 18, 36, 54 \) (S. y E. Estados Unidos, México, Central America, Bahamas. 2 vars.

Fernald (1942) stated that a “glandular or nonglandular involucre” is of “less fundamental” taxonomic importance than habit, whereas Cronquist (1980) stressed the taxonomic significance
of glandular trichomes more than habit. Within *Pityopsis graminifolia* var. *graminifolia* has stipitate-glandular phyllaries, whereas the much more common and *P. graminifolia* var. *tenuifolia* is eglandular.

In the United States, *P. graminifolia* var. *tenuifolia* is mostly sympatric with *P. graminifolia* var. *graminifolia*, but also occurs in the Bahamas and as a disjunct in eastern and southern México and Central America. It should be noted that *P. graminifolia* var. *graminifolia* has no apparent heterotypic synonyms.


Fibrous-rooted herbs 0.2-0.6(-0.9) m, stolons (when present) rarely flagelliform; stems 1-5 per rhizome, few-branched distally, sericeous to less commonly glabrate, proximal internodes much shorter than proximal leaves. Basal leaves few or very rarely withered, 8-25(-42) × (0.1-)0.3-1(-2) cm, spreading; cauline leaves often 2-10 × 0.2-0.8 cm, remote to overlapping, ascending to nearly erect. Capitulecence (2-)6-20(-50)-capitulate; peduncles 1-10(-15) cm, typically sericeous to pilose-villous; bracteoles 3-15, mostly 3-5(-8) mm, appressed, often grading into phyllaries. Capitula 10-16 mm; involucre (4.5-)7-12 × 3-8 mm, campanulate (in Mesoamerica) to turbinate; phyllaries many, 2.5-12 × 0.6-1.4 mm, eglandular, sparsely or moderately pilose-villous to rarely glabrate, apex sometimes purplish. Ray florets 8-13(-16); corolla 9-19 mm, tube 4-5 mm, slightly shorter than pappus bristles, limb 5-14 × 1-2(-2.5) mm, narrowly lanceolate, 5-7-veined, apex obtuse, 2-3-denticulate. Disk florets: corolla (4-)6-8.5 mm, tube usually 3-3.7 mm, throat glabrate
to sparsely setose, lobes 0.5-0.8 mm, glabrate to sparsely setose; style branches c. 1.5 mm. Cypselae 2.5-4.5 mm; pappus bristles stramineous to sometimes brownish, outer series 0.4-0.9 mm, inner series 5-9 mm. Flowering Jun-Oct. *Sandy areas, savannas, lagoon margins, roadsides, pine-oak forests.* Ch (Breedlove 27105, MO); B (Gentle 4091, MO); G (Steyermark 31650, US); H (Davidse et al. 34988, MO). 500-2500 m. (S. y E. Estados Unidos, México, Mesoamérica, Bahamas.)

*Pityopsis graminifolia* var. *latifolia* was recognized by Semple y Bowers (1985) for Mesoamerican material, but appears to be an environmental influenced ecotype with an open capitulescence of large capitula.

20. *Psilactis* A. Gray


Por J.F. Pruski.

Annual or perennial herbs; stems ascending to erect, subterete, stipitate-glandular, also usually with appressed or patent non-glandular trichomes. Leaves mostly cauline at anthesis (basal usually deciduous), alternate, grading from proximal ones petiolariform to the distal ones sessile or clasping, chartaceous to distal ones stiffly so. Capitulescence terminal, loosely cymose (ours). Capitula bisexual, radiate; involucre broad-turbinate to hemispheric; phyllaries imbricate, chartaceous, 1-nerved, typically chlorophyllous and stipitate-glandular distally, margins scarious-stramineous, at least the outer ones with base indurate, reflexed post fruit. Ray florets c. 2-seriate, epappose; corolla white or limb sometimes bluish or violet, usually tightly recoiled post pollination. Disk florets bisexual, pappose; corolla tubular-funnelform, pale yellow, lobes 5, triangular, erect; anther thecae rounded basally, appendage ovate; style branches short-linear, apical appendage deltate to lanceolate, papillose. Cypselae ellipsoidal to obovoid, uniformly short-substrigillose (Mesoamerica); ray cypselae slightly triquetrous-compressed; disk cypselae subterete; pappus absent in ray cypselae, disk cypselae with 1-seriate pappus of 20-40 contiguous slightly unequal scabrid bristles. $x = 3, 4, 9, 6$. 6 spp. Estados Unidos, Mexico, Mesoamerica, Andean South America.

*Psilactis*, which may be recognized by its epappose rays, was treated as *Machaeranthera* sect. *Psilactis* by Turner y Horne (1964), but was reinstated at the generic rank by Morgan (1993).


Annual taprooted herbs 14-60(-70) cm; stems single or few from base, few-branched distally; herbage with stipitate-glandular trichomes 0.1-0.2 mm. Basal leaves (when present at anthesis) few, 4-6 × 0.8-1.7 cm, pinnatifid, oblanceolate in outline, lobes 2-4 per side in distal 1/3 of blade, lobes to 1 × 0.2(-0.3) cm, linear-oblanceolate, substrigillose; cauline leaves (0.4-)1-4(-6) × 0.1-1 cm, linear-oblanceolate to linear-lanceolate and bracteate, veins usually 3 from base, surfaces substrigillose and short-stipitate-glandular, petiolariform base not much narrowed, entire or the proximal ones sometimes 1-2-pinnatifid, apex acute or obtuse. Capitulescence 5-50-capitulate, somewhat flat-topped, lateral branches bracteate, sometimes over-topping central axis; peduncles 0.3-2 cm, few-bracteolate, densely short-stipitate-glandular. Capitula 4-5(-6) mm, subglobose; involucre 3-5(-7) mm diam.; phyllaries c. 25, 1.5-3.5 × c. 0.5 mm, subequal to slightly graduated, 2-3-seriate, linear-lanceolate, apex acute to attenuate, sometimes purplish. Ray florets 15-33(-40); corolla short-exserted, sometimes papillose, tube 1-1.5 mm, limb 1.5-3 × 0.3-0.6 mm, c. 3-nerved. Disk florets 12-30; corolla 2.2-2.7 mm, lobes c. 0.3 mm, sometimes sparsely papillose; anthers c. 0.6 mm; style branches c. 0.5 mm. Cypselae 1-2 mm, inconspicuously 6-10-nerved; disk pappus bristles 2-2.5 mm. 2n = 18. Flowering Jun. *Fields.* Ch (*King 3012*, MICH). c. 1500 m. (SW Estados Unidos, Mexico, Mesoamerica, Colombia, Perú.)

Our species, which resembles *Conyza* in *gestalt*, is the sole species of *Psilactis* known from South America.

21. *Solidago* L.


Por J.F. Pruski.

Perennial fibrous-rooted herbs, from rhizomes or caudex; stems erect or ascending to sometimes decumbent, typically simple until capitulescence, glabrous or pubescent, with leaves basal and/or cauline; herbage in Mesoamerica neither resinous nor stipitate-glandular. Leaves simple, alternate, petiolariform-based to at least the cauline ones clearly sessile; blade often lanceolate or oblanceolate, venation sometime 3-nerved, surfaces glabrous or pubescent (Mesoamerica never
sericeous), rarely glandular, not resinous-sticky, base sometimes subclasping, margins entire to serrate or dentate. Capitulescence usually terminal and pyramidal panicle, infrequently flat-topped corymbiform, less often virgate, sometimes axillary, few-numerous-capitulate. Capitula small, typically short-radiate, infrequently discoid; involucre 1.7-12 × 1.5-10 mm, cylindrical to campanulate or sometimes hemispherical; phyllaries 10-35, imbricate, graduated or rarely subequal, 3-5-seriate, usually bases somewhat cartilaginous grading to distally subherbaceous, margins scabrous, mid-nerve usually prominent, infrequently few-striate, glabrous to lightly pubescent, sometimes glandular or resinous; receptacle flat to convex, alveolate. Ray florets (0-1)-1-18, 1-seriate; corolla yellow (rarely white), typically glabrous, limb short-exserted from involucre. Disk florets 3-25(-60), bisexual; corolla funnelform, 5-lobed, typically glabrous, limb longer than tube, lobes triangular to lanceolate, sometimes longer than throat, erect to spreading; style-branches lanceolate, appendage nearly as long as stigmatic lines, triangular, abaxially papilllose. Cypselae small (Mesoamerica), cylindrical to narrowly obconic, terete or rarely slightly compressed, typically 5-8(-10)-costate, glabrous or strigose; ray and disk pappus of 20-40, persistent, scabrid to barbellate bristles, elongate and subequal (Mesoamerica), (1-)2-seriate, attenuate or the inner most sometimes clavate, rarely an outer series of setiform scales present. x = 9. Aprox. 100 spp., mostly North America, several Neotropical, 4 spp. temperate austroamerican, 1-few spp. Eurasian.


1. Leaves usually pubescent; basal absent at anthesis, proximal-cauline usually withering at anthesis; involucres 1.7-3 mm; disk florets usually 3-6(-7) per capitulum.

1. S. canadensis

1. Leaves glabrous or subglabrous; basal and proximal-cauline leaves usually present at anthesis; involucres ≥ 3 mm; disk florets ≥ 8 per capitulum.

2. Leaves gradually descrescent; capitulescences usually pyramidal-paniculate, proximal branch tips recurved; involucres 3-4(-5) mm; rhizomes absent.

2. S. sempervirens
2. Leaves usually abruptly descrescent; capitulescences virgate to club-shaped, branches erect; involucres 4-5.5 mm; rhizomes present.  

3. S. stricta


*Aster canadensis* (L.) Kuntze.

Herbs 0.3-2 m, leaves cauline, basal absent at anthesis, proximal-cauline usually withering at anthesis, rhizomes present; stems erect, strigose-villous or hispidulous to proximally glabrate. Leaves numerous, 3-15(-19) × 0.5-2(-3) cm, gradually descrecent and usually leafy into the capitulescence, subsessile, lanceolate, chartaceous, 3-nerved from base to well above base, adaxial surface glabrous or scabrous, abaxial surface glabrous of more commonly scabrous or hispidulous sometimes mostly only on nerves, trichomes 0.1-0.2 mm (often curved), margins serrulate to often mid-stem leaves sharply serrate, scabrous-ciliolate, apex acuminate. Capitulescence pyramidal-paniculate, numerous-capitulate, sometimes leafy, apex sometimes recurved, lateral branches patent, recurved, capitula insertion on branchlets sometimes 1-sided and adaxial; peduncles 1-3.5(-5) mm, thin, usually strigose-villous or hispidulous, 0-3-bracteolate. Capitula 3-4 mm, usually 11-20-flowered; involucre 1.7-3 mm, narrowly campanulate; phyllaries 3-4-seriate, linear-lanceolate, glabrous or sparsely hispidulous, margins ciliate, apex mostly acute. Ray florets usually 8-14; corolla 1.5-2.8 mm, yellow, limb 0.5-1.5 × 0.2-0.3 mm, lanceolate. Disk florets usually 3-6(-7); corolla 2.2-3 mm, lobes 0.4-0.8(-1) mm. Cypselae 1-1.5 mm, strigose; pappus bristles 2-2.5 mm. 2n = 18. Roadsides. N (*Rueda 18020*, MO). 100-600 m. (Canada, United States, Mexico, Mesoamerica; introduced to Europe.)

Croat (1972), Cronquist (1980), Dillon et al. (2001), and Taylor y Taylor (1984) treated *S. canadensis* as including *S. altissima* in synonymy, but *S. altissima* is recognized here as distinct, as in Melville y Morton (1982) and Barkley et al. (2006). Although the sole Mesoamerican specimen I have seen is an immature top-snatch, it has large leaves (with curved trichomes 0.1-0.2 mm) into the capitulescence, ray corollas only 2.5-2.8 mm, and capitula (although immature) only 3-3.5 mm, as is typical of *S. canadensis* s. str. The similar *S. altissima*, which should be looked for in northern Mesoamerica, differs by leaves often abruptly descrescent immediately below the capitulescence, by patent abaxial leaf trichomes 0.2-0.9 mm, and by larger capitula.

*Aster sempervirens* (L.) Kuntze.

Herbs 0.4-1(-1.5) m, leaves mostly basal or sometimes basal and cauline, basal and proximal-cauline leaves usually present at anthesis, rhizomes absent; stems erect, glabrous to scabrous-puberulent in the capitulescence. Leaves gradually descrecent, thick or subcarnose, surfaces glabrous, margins entire, apex acute; basal leaves 10-40 × 1-6 cm, usually narrowly ovate to oblanceolate, base narrowly winged petiolariform, clasping or nearly so; cauline leaves 4-6 × 0.5-1 cm, lanceolate, sessile, margins not ciliolate or scabrous-ciliolate. Capitulescence usually 5-15 × 3-9 cm, usually pyramidal-paniculate (infrequently club-shaped), numerous-capitulate, sometimes leafy, at least proximal branches spreading and recurved; peduncles 2-3 mm, glabrous to sparsely hispidulous, bracteolate. Capitula 17-39-flowered; involucre 3-6 mm, campanulate to narrowly so; phyllaries 3-4-seriate, lanceolate, glabrous or sparsely hispidulous, margins ciliate, apex acute. Ray florets 7-17; corolla 2-4(-5) mm, yellow, limb 0.5-0.8 mm diam., elliptic-lanceolate. Disk florets 10-22; corolla 3-3.2 mm, lobes 0.5-1.2 mm. Cypselae c. 1.5 mm, strigose; pappus bristles 3-4 mm. 2*n* = 18. 2 vars. SE Canada, United States, Mexico, Mesoamerica, West Indies, Azores.


Cauline leaf margins often scabrous-ciliolate. Capitula 4-7 mm; involucres 3-4(-5) mm. Ray florets 7-11. Disk florets 10-16. 2*n* = 18. *Marshes.* T (Villaseñor, 1989: 97); “Central America” (Barkley et al., 2006: 20: 137). 0-100 m. (E United States, Mexico, Mesoamerica, West Indies.)

Gray (1882) noted that the type of *S. mexicana* “came in all probability” from the United States, not from Mexico. Although McVaugh (1972a) treated the specimens known to him from maritime habitats in Gulf Coastal Veracruz and Tabasco (including that cited by Cowan, 1983, as *S. sempervirens*) as *S. stricta*, true *S. sempervirens* var. *mexicana* does occur in Veracruz (e.g., *Sinaca et al.* 945, MO). Villaseñor (1989) subsequently reported *S. sempervirens* var. *mexicana* from Tabasco based on more recent collections.
Solidago sempervirens var. mexicana is similar to S. stricta, and indeed Fernald (1935) said that “much of the southern material of var. mexicana has been misidentified” as S. stricta. Correll y Correll (1972) treated S. stricta as a synonym of S. sempervirens var. mexicana. Although Fernald (1935) declared that from S. sempervirens var. sempervirens we may at once distinguish S. sempervirens var. mexicana “by its narrower leaves and smaller heads”, I find the immature LINN 998.1 (the lectotype of the nominante variety) to seemingly have smaller leaves and smaller capitula than does LINN-998.13 (the lectotype of S. mexicana).


Aster strictus (Aiton) Kuntze, Lepiactis virgata (Michx.) Raf., Solidago virgata Michx.

Herbs 0.5-1 m, leaves mostly basal or sometimes basal and cauline, basal and proximal-cauline leaves usually present at anthesis, rhizomes present; stems erect, glabrous or subglabrous to sparsely pubescent in the capitulescence. Leaves greatly descrescent, usually abruptly so with the capitulescence ultimately with bracteate leaves, surfaces glabrous, margins typically entire, sometimes scabrous-ciliolate distally, apex acute; basal leaves 7-20(-35) × 0.5-2.4 cm, spreading to ascending, usually narrowly spatulate to oblancoelate or oblong, base narrowly winged petiolariform, subclasping; cauline leaves 1-5 × 0.2-0.5 cm, appressed, lanceolate, sessile. Capitulescence 5-30 × to c. 5 cm, virgate to club-shaped, usually narrowly paniculate or narrowly thyrsoid-paniculate, numerous-capitulate, branches usually erect or a few branch tips slightly recurved; peduncles 2-10 mm, sparsely puberulent or hispidulous (Mesoamerica) to glabrous. Capitula 5-7 mm, 11-19-flowered; involucre 4-5.5 mm, narrowly campanulate; phyllaries 3-4-seriate, oblong, glabrous, apex acute to obtuse. Ray florets 3-7(-11); corolla 2-4 mm, yellow, limb 0.5-1.3 mm diam., elliptic-lanceolate. Disk florets 8-12; corolla 3-5 mm, lobes 1-1.2 mm. Cypselae 1.5-2.2 mm, strigose; pappus bristles 3-4 mm. 2n = 18, 36, 54. Flowering Apr, Jun-Nov. Coastal dunes, bogs, coconut groves, marshes, pinelands, secondary vegetation. T (Conrad y Conrad 2935, MO); Ch (Breedlove y Thorne 21282, MO); B (Barkley et al. 2006: 20: 138); G (Contreras 2135, MO). 0-2200 m. (E United States, Mexico, Mesoamerica, West Indies.)

Solidago stricta is recognized here without infraspecies as in McVaugh (1972a), who first treated the species in Mexico. Barkley et al. (2006) recognize two infraspecies, and referred to the Mesoamerican material as S. stricta subsp. stricta.

22. Symphyotrichum Nees
Perennial or less commonly annual herbs; herbage often glabrous, infrequently distally stipitate-glandular; stems ascending to erect, alternately few-branched distally, subterete, few-striate, glabrous or occasionally puberulent in lines especially in the capitulescence. Leaves cauline and basal or basal absent at anthesis, simple, alternate, usually progressively reduced distally, the distal ones commonly sessile and clasping, rarely cordate, the proximal ones commonly with tapering winged petiole, chartaceous, venation usually pinnate, margins entire to serrate. Capitulescence open thyrsoid-panicles, few-many-capitulate; peduncles bracteate or bracteolate. Capitula bisexual, radiate or rarely disciform, many-flowered; involucre hemispherical to turbinate; phyllaries imbricate, unequal to subequal, strongly graduated or less commonly only slightly so, 1(-3)-nerved, typically indurate basally and at least most series with a sharply delimited distal chlorophyllous zone, outer phyllaries sometimes leafy or involucre sometimes closely subtended by bracteoles; receptacle rarely weakly paleate in some horticultural plants of \textit{S. novae-angliae}. Ray florets typically present; corolla lavender or pink to white, often showy, exserted from involucre, usually 1-seriate. Disk florets bisexual, usually more in number than the rays; corolla funnelform (at least Mesoamerica), glabrous (at least Mesoamerica), tube usually shorter than limb, short-lobed, lobes erect to reflexed; anthers slightly exserted, pale brown; style branches erect or ascending, linear-lanceolate, apical appendage lanceolate, papillose. Cypselae narrowly obovoid to less commonly fusiform, slightly compressed, often tapered apically, brown, (3-)5(-10)-nerved, usually eglandular, puberulent when young or more commonly glabrous; pappus of numerous persistent capillary attenuate bristles, typically free to base, slightly shorter than disk corollas, but longer than cypselae. $x = 5, 7, 8, 13, 18, 21$. c. 90 species, Native to the Americas, a baker’s dozen or so species neotropical.

The genus \textit{Aster} s. lat. is largely American, and was recognized in most earlier American floras (e.g., Cronquist, 1980; Nash, 1976; Clewell, 1975). Most American species have obovoid to slightly compressed 5-nerved fruits. \textit{Aster}, however, is typified by Old World \textit{A. amellus} L. (Jones, 1980), which has strongly compressed 2-nerved fruits. American species have been segregated into several genera, as suggested by Jones (1980) and initiated by Semple y Brouillet (1980), who transferred 11 American species to \textit{Lasallea}. Nesom (1994b) treated \textit{Lasallea} as a synonym of the earlier \textit{Symphyotrichum}. 


1. Distal cauline leaf bases auriculate-clasping and obviously much broader than stems; ray corollas usually blue or lavender.  

   2. *S. laeve*

1. Distal cauline leaf bases not clasping, usually about as broad as stems; ray corollas usually white.

   2. Cauline leaves ≤ 3 cm, strigillose to hirsute; peduncles minutely stipitate-glandular.

   4. *S. trilineatum*

   2. Cauline leaves 2-17 cm, usually glabrous; peduncles glabrous or hirsutulous in lines, not stipitate-glandular.

   3. Perennial herbs; stems hirsute in lines or throughout.  

   1. *S. bullatum*  

   3. Annual herbs; stems glabrous or axils strigillose.  

   3. *S. subulatum*


*Aster jalapensis* Fernald.

Perennial herbs 0.1-0.5 m; stems decumbent basally, sometimes purplish, few-branched distally, leafy only in distal half, and there often close-spaced, hirsute in lines or throughout, infrequently glabrous. Leaves 2-6(-17) × 0.3-1(-1.8) cm, sessile, linear-lanceolate to oblanceolate, secondary venation reticulate, surfaces usually glabrous, attenuate into petiolariform base then often slightly dilated, the base about as wide as or slightly wider than stem, margins subentire, sometimes setose or setulose, apex acuminate. Capitulescence corymbiform, few-capitulate, lateral branches often slightly over-topping central axis, leaves abruptly decrescent and grading into bracteoles distally; peduncles 2-6 cm, usually bracteolate, hirsutulous often in lines, not stipitate-glandular, bracteoles 3-6 mm, often loosely grading into phyllaries 1-nerved. Capitula 6-8 mm; involucre 5-7 mm diam., campanulate; phyllaries 3-6 × to c. 1 mm, the outer usually more than half as long as the inner, slightly graduated, 3-4-seriate, linear-lanceolate, with an oblanceolate chlorophyllous zone throughout or in distal 1/2, surface glabrous to sometimes sparsely strigillose distally or distal margins ciliate, margins narrowly scarious, apex erect, often green throughout to margins, acute to apiculate. Ray florets 15-26, 1(-2)-seriate; corolla white, tube 2-2.7 mm, limb 5-7 (uncoiled) × 1-1.5 mm, typically in 2-4 outward coils when pressed. Disk florets 15-20; corolla 5-5.5 mm, tube and
throat subequal, lobes c. 0.7 mm, triangular. Cypselae 2-2.6 mm, 5-nerved, sparsely strigillose, apex narrowed; pappus bristles 4-5 mm, stramineous. 2n = 16. Flowering Year-round. In soil on logs, more commonly epipetric, streamsides, near waterfalls, bosque húmedo tropical. Ch (Méndez Ton 5809, MO); C (cited by Martínez et al., 2001); B (Peña et al. 1065, MO); G (Tuerckheim II 1603, MO); H (Nelson 3962, MO). (200-)400-2000(-2200) m. (SE. México, Mesoamérica.)


Perennial herbs 0.5(-1.2) m; stems erect, sometimes maroon proximally, few-branched distally; herbage glabrous or nearly so and tending to become glaucous. Leaves petiolate or distal ones sessile, basal leaves much larger than distal cauline leaves; blade thickly chartaceous to subcarnose, venation obscure, margins entire to occasionally weakly serrate, apex acute to obtuse, mucronulate. Basal leaves (usually withered at anthesis) and proximal cauline leaves 3-19 × 1-4 cm, oblanceolate to spatulate, basally attenuate-tapered usually into a winged clasping petiole 2-7 cm. Distal cauline leaves 1-11 × 1-3 cm, sessile, lanceolate to oblanceolate, base auriculate-clasping and obviously much broader than stem. Capitulescence openly corymbiform-paniculate, axillary leaves greatly descrescent and bracteate on the stiff branches and peduncles; peduncles 0.5-3.5(-6) cm, bracteoles subclasping. Capitula c. 1 × c. 1 cm; involucre 4.5-7 mm, campanulate; phyllaries 3-6-seriate, regularly imbricate and appressed, lanceolate to oblanceolate, with a distal diamond-shaped chlorophyllous zone usually 1-2 mm, apex acute. Ray florets mostly 13-25; corolla usually blue or lavender, well-exserted from involucre, tube c. 2 mm, limb 7-13 × c. 2 mm, 4-nerved, minutely 3-notched at apex. Disk florets 30-35; corolla (4-)5-6 mm, tube slightly shorter than throat, lobes 0.6-0.9 mm, triangular; anthers stramineous. Cypselae 1.5-2.5 mm, brown, glabrous; pappus bristles 3.5-4.5(-6) mm, brownish to reddish. 2n = 48. Flowering Year-round. Gardens, roadsides. Y (Standley, 1930: 439 sub Aster laevis); G (Pruski 4481, MO); H (Molina 31736, MO); ES (Araniva y Villacorta RV-00021, MO); CR (Croat 46907, MO). 0-1500 m. Native to the Estados Unidos and Canadá; commonly cultivated and persisting or escaping in México, Mesoamérica, Colombia, Guayana Francesa, Ecuador, Bolivia, Argentina; Europa.)

Symphyotrichum laeve, here treated broadly and without infrataxa, is similar to S. novi-belgii but differs by its regularly imbricate and appressed (vs. loosely imbricate, sometimes reflexed) phyllaries with a diamond-shaped (vs. elongate) chlorophyllous zone usually 1-2 mm (vs. often


Annual tap-rooted sometimes subsucculent herbs 0.3-1.5(-2.5) m; stems green throughout or purplish proximally, usually single from base, sometimes diffuse and much-branched distally, glabrous or axils strigillose, rarely narrowly fistulose. Leaves sessile or proximal ones petiolate;
basal and proximal cauline leaves to 17 × 2 cm, all typically withered at anthesis; distal cauline leaves 2-12 × 0.2-1 cm, linear-lanceolate to linear, remote, secondary venation obscure or faint, surfaces glabrous, base attenuate, not dilated, not clasping, about as broad as e stem, margins entire to serrulate, without setae or sometimes short-setulose, apex acuminate. Capitulescence usually broadly corymbiform-paniculate, main branches often 10-30 cm, leafy, axis sometimes weakly deflected at nodes; peduncles 0.5-4 cm, 4-12-bracteolate, usually glabrous, not stipitate-glandular, bracteoles 2-4(-6) mm, grading into phyllaries, subulate. Capitula 5-6.5(-8) mm; involucre 4-6 mm diam., cylindrical to turbinate; phyllaries 2-6(-7) × 0.5-1 mm, strongly graduated, (3-)4-5-seriate, lanceolate-subulate, with a lanceolate to oblanceolate chlorophylous zone throughout or inner series chlorophylous only in distal 1/2 or 2/3, surface glabrous, margins scarious, apex acute to apiculate, sometimes incurved or purplish. Ray florets 16-40(-50+), 1-2-seriate; corolla usually white (infrequently pink or lavender), tube 2-4 mm, limb 1.5-3.5 × 0.2-0.6 mm, typically in 1-3 outward coils and sometimes appearing shorter than style branches when pressed. Disk florets 7-23; corolla 3.5-5 mm, lobes c. 0.5 mm, triangular. Cypselae 1.5-2.8 mm, 5(-6)-nerved, sparsely strigillose, apex narrowed; pappus bristles 3-4.5(-5.5) mm, free or sometimes weakly connate basally, white. 2n = 10, 20. Flowering Year-round. Boggy ground, disturbed areas, lake shores, marshy areas, muddy ditches, pastures, pinares, roadsides, saline areas, sandy areas, savannas, streamside ditches. T (Cowan 2411, MO); Ch (Pruski et al. 4209, MO); C (Alvarez et al. 10338, MO); QR (Tellez y Rico 3465, MO); B (Gentle 936, MO); G (Proctor 25092, MO); H (Nelson 5566, MO); N (Moreno 3313, MO); CR (Oersted 254, K). 5-2400 m. (Canadá, Estados Unidos, México, Mesoamérica, Colombia, Venezuela, Ecuador, Perú, Bolivia, Brasil, Uruguay, Paraguay, Chile, Argentina, Cuba, Jamaica, Hispinitola, Puerto Rico, Virgin Islands; introduced in Europa, África, Asia, Australia, New Zealand, Islas del Pacifico.)

Five varities of this widespread species were recognized by Sundberg (2004), whereas Nesom (2005) recognized five species within Symphyotrichum subulatum sensu Sundberg (2004). The proposed segregates Aster subulatus var. parviflorus and S. expansum were used for our plants by, respectively, Sundberg (2004) and Nesom (2005). Within Aster subulatus sensu Sundberg (2004) I recognized two species, S. subulatum and S. divaricatum. The application of the name Aster exilis Elliott is uncertain (Cronquist, 1980; Sundberg, 2004), although it has been misapplied (e.g., Clewell, 1975; Standley, 1938) to our species. Bentham (1853) treated this species in Costa Rica under the name Aster caricifolius Kunth.

Both the very similar S. divaricatum (Nutt.) G.L. Nesom and Antillean and U.S. Gulf-Coastal S. tenuifolium (L.) G.L. Nesom are similar to S. subulatum, but differ by their longer ray corolla limbs. Both should be looked for in coastal areas of the Yucatan Peninsula.
At low elevations, plants of *S. subulatum* are often stunted and sometimes resemble diffuse plants of (and are variously misidentified as) *Conyza canadensis* (which differs by long-setose leaves, phyllaries basally green, and flat fruits) and *Chloracantha spinosa* (which differs by 3-nerved phyllaries and sometimes thorny stems).


*Aster bimater* Standl. et Steyerm., *Virgulus bimater* (Standl. et Steyerm.) Reveal et Keener.

Erect slender perennial 0.2-0.45(-1) m; stems strongly ascending, brittle, moderately leafy distally, hirsute to sparsely strigillose, usually minutely stipitate-glandular distally; herbage with elongate eglandular trichomes, stipitate-glandular trichomes where present to c. 0.1 mm, minute and much shorter than the eglandular trichomes. Leaves 1-3 × 0.1-0.3 cm, sessile, linear-lanceolate to linear-ob lanceolate, obscurely 3-veined with indistinct pair of veins near margin, surfaces strigillose to hirsute, base obtuse to rounded, not clasping, about as broad as stem, margins entire, stiff-ciliate to antrorsely so, apex cuspidate. Capitulescence corymbiform, few-capitate, lateral branches often about as long as central axis; peduncles 2-11 cm, usually few-several-bracteolate, striate-sulcate, shortly stipitate-glandular and also often hirsutulous, bracteoles to 4 × to c. 1 mm, sometimes loosely grading into phyllaries. Capitula 8-12 mm; involucre 7-10 mm diam., campanulate; phyllaries 3-6 × to c. 1 mm, slightly graduated to infrequently subequal, 3-seriate, linear-ob lanceolate, shortly stipitate-glandular and also hirsutulous to strigillose, distal 1/2 chlorophyllous throughout and pubescent on both surfaces; outer phyllaries typically c. 2/3 as long as the inner, apex often obtuse and sometimes recurved; inner phyllaries sometimes tinged violet at the acute to acuminate apex. Ray florets 7-22, 1-seriate; corolla white, tube 2.5-3 mm, limb 5-10 × 1-2 mm, typically coiled when pressed. Disk florets 15-30; corolla 5-6 mm, tube shorter than limb, lobes 0.5-0.6 mm, triangular. Cypselae 2-2.5(-4) mm, late-maturing, 5-8-nerved, strigose to hirsutulous with terminal cells sometimes divergent, rarely stipitate-glandular; pappus bristles 4-6 mm, stramineous to brownish. 2n = 10. Flowering May-Jul. *Pine-oak forests*. Ch (Purpus 9071, F); G (King y Renner 7046, MO). 1400-2300 m. (E + SE México, Mesoamérica.)

Our Mesoamerican species was treated by Nash (1976) as *Aster moranensis* Kunth, which has only non-glandular vestiture and at its southeastern-most reaches only Oaxaca and Veracruz.

Erect shrubs to low prostrate cushion-like subshrubs; stems commonly irregularly angled; pubescence lanuginose or lanose with thin uniseriate trichomes, glandular with stalked or subsessile glandular trichomes or pilose with long uniseriate multisepitate trichomes, leaves commonly clustered apically. Leaves simple, alternate, sessile, linear to narrowly elliptic-lanceolate, basally somewhat clasping or amplexicaul, margins entire to somewhat dentate, commonly revolute, apically acute. Capitulescence terminal, of solitary(-2-3) capitula, or corymbiform to subglomerate and few-several-capitulate, capitula usually short-pedunculate. Capitula bisexual, disciform (seemingly pseudoradiate), many-flowered; involucre campanulate or hemispheric, rarely cylindrical; phyllaries subequal to unequal, 3-5-seriate, usually chartaceous, usually stramineous proximally and reddish distally, commonly glandular, lanuginose or pilose; receptacle alveolate. Marginal florets commonly 2-4-seriate, pistillate; corolla tubular-funnelform (pseudoradiate), setulose-papillose at tube-throat juncture, tube elongate, limb tubular-bulbous, directed outwards (somewhat radiating), apex unequally 3-5-dentate; style branches usually exserted. Disk florets +/- numerous, usually functionally staminate (seemingly bisexual in *W. triungulifolia*); corolla funnelform or tubular, 5-lobed, setulose-papillose at the tube-throat junction, commonly with throat and lobes purplish-red, lobes often externally glandular; anthers with appendages long-acuminate, thecae with rounded bases, sometimes sagittate; style branches ovate-acute, papillose almost until the point of bifurcation, ovary sterile (seemingly fertile in *W. triungulifolia*), cylindrical, 5-veined. Cypselae obovoid, compressed, 2-3-costate, sparsely pubescent or occasionally densely pubescent, eglandular; pappus of many bristles, bristles subequal, usually nearly as long as corolla, 1-seriate, stramineous, scabrid to barbellate. 6 spp. Costa Rica and Panama.

*Westoniella* is notable for its disciform (seemingly pseudoradiate) marginal floret corollas, which are funnelform or tubular, but with limbs directed outwards. *Westoniella barqueroana, W. chirripoensis,* and *W. kohkemperi* are endemic to the Chirripó Massif, and *W. lanuginosa* is endemic to Cerro Fabrega, Panamá. *Westoniella eriocephala* and *W. triungulifolia* are the only species that occur on both the Chirripó Massif and on and near Cerro Buenavista (Cerro de la Muerte).


1. Erect subshrubs 0.5-1.5 m; stems erect, simple to few-moderately branched; capitulescence subglomerate to corymbiform; cypselae usually sparsely short-setulose.
2. Leaves narrow-elliptic to lanceolate, margins 2-3 mucronate-toothed.

3. **W. eriocephala**

2. Leaves linear, margins entire.

3. Leaves 15-25 mm, adaxially glandular, otherwise glabrous to weakly arachnoid.

4. **W. kohkemperi**

3. Leaves 8-18 mm, adaxially glandular and slightly lanuginose (young leaves densely gray-lanuginose).

5. **W. lanuginosa**

1. Cushion-like plants to low subshrubs less than 0.26 m; stems densely branched; capitulescence usually monocephalous (or sometimes 2-capitulate); cypselae usually moderately to densely pilose.

4. Leaves 3-5 lobed, adaxially bullate, abaxially densely tomentose-lanate.

6. **W. triungulifolia**

4. Leaves entire, adaxially smooth, abaxially glandular and sparsely lanuginose at least proximally.

5. Leaves 4-8 mm; outer phyllaries glandular and strongly pilose to near apex; marginal florets with limbs narrow-bulbous.

1. **W. barqueroana**

5. Leaves 3.5-5 mm; phyllaries glandular, otherwise commonly glabrous or sometimes weakly lanuginose; marginal florets with swollen bulbous limbs.

2. **W. chirripoensis**

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Cushion-like perennial subshrubs to 0.1 m; stems prostrate to ascending, densely branched, leafy in distal 1/2, glabrous or weakly arachnoid. Leaves 4-8 × c. 1 mm, linear-lanceolate, chartaceous, adaxial surface smooth, arachnoid, abaxial surface glandular and sparsely lanuginose, midrib visible, margins entire, revolute, apex acute. Capitulescence usually monocephalous (or 2-capitulate), sessile or very short-pedunculate; peduncles (0-)3-4 mm, glandular and pilose with uniseriate multisepitate trichomes. Capitula c. 8 mm, surrounded by leaves; involucre 6.5-7 × 8-9 mm, hemispherical; phyllaries graduated, 3-4-seriate, linear-lanceolate, chartaceous; outer phyllaries 4-5 × c. 1 mm, glandular and strongly pilose to near apex with uniseriate multisepitate trichomes, apex glabrous; inner phyllaries c. 6 × 0.9-1 mm. Marginal florets c. 60+, 3-4-seriate; corolla 3.5-4 mm, tube cream-colored, glandular, pubescent, limb 0.8-1 mm, as long as the style, narrow-bulbous, weakly exserted from the involucre, violet. Disk florets
c. 35, functionally staminate; corolla 4-4.5 mm, funnelform, cream-colored, glandular at the middle, throat and lobes violet, gradually broadened, lobes erect, apically pubescent; ovary pubescent. Cypselae 1.8-2 mm, sparsely to moderately pilose; pappus bristles c. 4 mm. Flowering Sep, Dec-Jan. Páramo, low moist sites. CR (Pruski et al. 3921, MO). 3400-3800 m. (Endemica.)


  Cushion-like perennial subshrubs 0.06-0.08 m; stems prostrate to low-ascending, densely branched, glabrous or weakly arachnoid. Leaves commonly clustered apically, 3.5-5 × 0.8-0.9 mm, linear-lanceolate, chartaceous to carnose, adaxial surface smooth, mostly glabrous, sometimes glandular, abaxial surface glandular, sparsely lanuginose proximally, midrib visible from below, margins entire, revolute, apex acute, boat-shaped. Capitulescence monocephalous, capitula sessile or sub sessile, closely subtended by leaves. Capitula 5.5-6 mm, 65+-flowered; involucre 5-6.5 × 4-6 mm, turbinate-campanulate; phyllaries subequal, 3-4-seriate, linear-lanceolate, thinly chartaceous, glandular, otherwise commonly glabrous or sometimes weakly lanuginose; outer phyllaries 3.5-4 × 0.7-0.8 mm, purplish; inner phyllaries c. 5.5-5 × c. 0.7 mm. Marginal florets c. 40+, 2-3-seriate; corolla 4-4.5 mm, cream-colored, tube glandular, limb swollen bulbose, exserted; style exserted. Disk florets c. 25, functionally staminate; corolla 4-4.5 mm, glandular in the middle, at the base of the limb, tube c. 1.3 mm, cream-colored, throat and lobes gradually broadened, purple, lobes 0.4-0.5 mm, erect, glandular. Cypselae 1.5-2 mm, usually moderately pilose; pappus bristles c. 4 mm, commonly shorter than corolla, apex slightly clavate. Flowering Sep-Feb. Páramo, on rocks. CR (Pruski et al. 3924, MO). 3400-3800 m. (Endemica.)


  Erigeron adenophorus Greenm.

  Shrubs 0.5-1 (-1.5) m; stems erect, few-moderately branched, glabrous to loosely arachnoid, stipitate-glandular on older stems, with persistent proximal leaf bases, leafy distally. Leaves 15-30 (40) × 2-6 (10) mm, narrow elliptic to lanceolate, chartaceous, midrib visible from below, both surfaces pilose with uniseriate multisepctate trichomes and stipitate glandular trichomes, indument
denser abaxially, margins crenulate to serrate with 2-3 sharp mucronate teeth to 0.7 mm, flat or weakly revolute. Capitulescence subglomerate to corymbiform, few-15-capitulate, moderately exserted above distal most leaves, branches densely pilose, with uniseriate multiseptate trichomes; capitula pedunculate; peduncles 4-13 mm, strongly pilose. Capitula 8-9 mm; involucre 6-6.5 × c. 9 mm, campanulate; phyllaries subequal, weakly graduated, 3-4-seriate, lanceolate, chartaceous, green proximally, violet distally, strongly pilose with uniseriate multiseptate trichomes; outer phyllaries c. 4 × 0.6-1 mm; inner phyllaries c. 6 × 0.6-0.8 mm. Marginal florets c. 50-90, c. 3-seriate; corolla c. 4.5(-5) mm, cream-colored or apex weakly violet, tube glandular, especially near junction with limb, limb 1.2-1.5 mm, narrow bulbous, exserted; style branches shortly exserted from mouth of limb. Disk florets (18-)30-50, functionally staminate; corolla c. 4.5 mm, funnelform, glandular medially and thence again toward apex of lobes, tube cream-colored, throat and lobes gradually broadened, violet, lobes 0.6-0.8 mm, erect; ovary strongly 3-costate. Cypselae c. 2 mm, sparsely short-setulose; pappus bristles 4.5-5.5 mm. Flowering Sep-Apr. Páramo, rocky, and moist places. CR (Pruski et al. 3917, MO). 3100-3700 m. (Endemica.)

The type locality is near Cerro Buenavista (Cerro de la Muerte), but most recent collections are from Chirripó Massif. The type of *W. lanuginosa* states that it was is “also on Cerro Sakira,” but I presume this is in reference to similarly shrubby *W. eriocephala*.


Shrubs 0.5-1.5 m; stems erect, simple to weakly branched with leaves spread along the axis of the stem and packed together in short shoots, glabrous to loosely arachnoid, densely leafy distally. Leaves 15-25 × 0.6-1 mm, linear, chartaceous, adaxially glandular, otherwise glabrous to weakly arachnoid, abaxially lanuginose and glandular, base auriculate, margins entire, strongly revolute, nearly plicate, apex acute. Capitulescence densely pilose, terminal, subglomerate to corymbiform, few-15-capitulate, slightly to moderately exserted above distal most leaves, capitula pedunculate; peduncles 2-10 mm, strongly pilose with uniseriate multiseptate trichomes. Capitula 7-9 mm; involucre 5.5-7 × 8-9 mm, campanulate; phyllaries weakly graduated, c. 3-5-seriate, lanceolate, distally purple, strongly pilose with uniseriate multiseptate trichomes; outer phyllaries 2.5-3 × 0.7-0.8 mm, purple; inner phyllaries 5-6 × 0.5-0.7 mm. Marginal florets c. 115, c. 3-4-seriate; corolla c. 4.5(-5) mm, glandular near junction of tube and limb, purple at least apically, limb 1-1.2 mm, narrow bulbous, exserted from the involucre; style branches shortly exserted from mouth of limb. Disk florets usually 30-40, functionally staminate; corolla 4.5-5(-5.3) mm, funnelform, glandular in the middle and also at lobe apices, tube c. 1.6 mm, cream-
colored, throat and lobes gradually broadened, violet, lobes c. 0.6 mm, erect; ovary subglabrous or sparsely glandular apically. Cypselae 2-2.5 mm, strongly 3-costate, sparsely short-setulose; pappus bristles 5-6 mm. Flowering Sep, Dec-Feb. Páramo. CR (Pruski et al. 3927, MO). 3400-3800 m. (Endemica.)


Shrubs 1-1.5 m; stems erect, branched with clustered leaves along the axis of the stem, especially distally, glabrous to loosely arachnoid, glandular. Leaves 8-18 × c. 1 mm, linear, chartaceous, adaxially glandular and slightly lanuginosa (young leaves densely gray-lanuginosa), abaxially glandular, base subauriculate, margins entire, markedly revolute, apex apiculate. Capitulescence densely wooly, terminal, subglomerate to corymbiform, few-15-capitulate, closely subtended by leaves, capitula short-pedunculate; peduncles to c. 10 mm, strongly lanuginosa and pilose with uniseriate multisepitate trichomes. Capitula 6-7.5 mm; involucre 4-6.5 × 8-9 mm, campanulate; phyllaries subequal, 3-4-seriate, linear-lanceolate, pale or purple, especially apically, strongly pilose with uniseriate multisepitate trichomes. Marginal florets c. 90, 3-4-seriate; corolla usually 3.8-4.2 mm, distally reddish, glandular near junction of tube and limb, limb 1-1.2 mm, narrow bulbous, weakly exserted from the involucre; style branches not exserted from the limb. Disk florets c. 35, seemingly functionally staminate; corolla usually 4.5-5 mm, funnelform, glandular mediately and also at lobe apices, throat and lobes gradually broadened, violet, lobes 0.6-0.7 mm, erect. Cypselae 1.5-2 mm, 3-costate, sparsely short-setulose; pappus bristles 4.5-5 mm. Flowering Mar-Apr. P (Gómez et al. 22471, MO). 3100-3300 m. (Endemica.)


Cushion-like perennial tap-rooted low subshrubs to 0.25 m; stem prostrate to erect, densely branched, leafy throughout, tomentose-lanate. Leaves usually densely imbricate or occasionally spreading and loosely spaced in enlarged stems. Leaves usually 5-6.5 × 1.8-2.5 mm, small, obovate (3-5 lobed), coriaceous, adaxial surface strongly bullate, mostly arachnoid or becoming glabrous, abaxial surface densely tomentose-lanate, base oblong and then semi-amplexicaul, margins 1-2-lobed distally, lobes c. 1 mm, acute, unguiculate, strongly revolute, apex acute to unguiculate. Capitulescence usually monocephalous or 2-capitulate, usually surrounded by leaves, capitula sessile or sub sessile; peduncles (0-)1-4 mm, lanose. Capitula 7.5-8 mm; involucre
6-7 × c. 8 mm, cylindrical or turbinate; phyllaries subequal to unequal, weakly graduated, c. 4-seriate, lanceolate-acute, thinly chartaceous, glandular, green proximally, violet distally, outer phyllaries arachnoid-lanuginosa, inner phyllaries usually only glandular. Marginal florets c. 30+, c. 2-seriate; corolla 5-5.2 mm, white-purple, weakly glandular near junction of tube and limb, limb c. 2 mm, not exserted from the involucre. Disk florets 10-15, seemingly bisexual; corolla 4.5-6 mm, funnelform to campanulate, violet, glandular and sparsely long villous in the middle also on lobes, lobes c. 0.6 mm, erect. Cypselae 1.5-2 mm, those of marginal and disk florets similar, moderately long-pilose, apically glandular; pappus bristles 4-4.5 mm. Flowering Jul-Sep, Dec-Feb. Páramo. CR (Alfaro 3559, MO). 3100-3800 m. (Endemica.)

IV. Tribus Bahieae B.G. Baldwin

Bahiinae Rydb.

Por J.F. Pruski.

Annual or perennial herbs to infrequently shrubs; herbage without secretory cavities or latex, usually glandular. Leaves typically cauline, alternate or opposite, unlobed to pinnatisect or palmatisect, mostly petiolate. Capitulescence terminal, mostly open-cymose to open corymbiform-paniculate, less commonly monocephalous to rarely congested (only extra-Mesoamerican). Capitula radiate or discoid; involucre turbinate to hemispherical; phyllaries subimbricate to infrequently imbricate, subequal to infrequently graduated, 1-2(-4)-seriate, sometimes with scarious margins or apex, typically persistent; clinanthium flat or convex, epaleate. Ray florets (when present) 1-seriate, pistillate; corolla usually white or yellow, limb with nerves typically equally thin, adaxial surface more or less smooth. Disk florets bisexual (functionally stamineate in only Neothymopsis); corolla mostly shortly 5-lobed (rarely deeply lobed), symmetrically lobed to infrequently asymmetrically lobed, usually yellow or white to sometimes reddish or purplish, often glandular, throats without colored resin in ducts, lobes smooth or papillose within; anthers ecaudate, filaments glabrous, thecae usually pale-colored to sometimes purplish, not black, endothecium pattern polarized (radial only in Chamaechaenactis), endothecial cells quadrangular and in longitudinal rows, apical appendage usually ovate; style exappendiculate or when appendiculate the sterile appendage usually much shorter than stigmatic portions, base glabrous (papillose only in Chamaechaenactis), branches moderately flattened, with stigmatic surfaces 2-banded and not confluent apically, recurved at anthesis, apex acute to rounded, infrequently attenuate-cuspidate. Cypselae isomorphic, mostly obpyramidal to subterete, (obcompressed in monotypic Bartlettia) indistinctly to obviously 3-5-angled, carbonized, walls without raphids, usually striate, apex truncate; pappus typically of several persistent 1-seriate erose squamae or squamellae, base broad and thickened (Mesoamerica), with or without a
prominent thickened midrib, midrib sometimes continuing into aristate tip, cypselae rarely epappose. Aprox. 20 genera and 80 spp. Mostly warm regions of the Americas, some in the paleotropics. 5 gen. and 7 spp. in Mesoamerica.

Mesoamerican genera of tribe Bahieae, because of their Helianthoid features albeit with epaleate clinanthium s, have been placed traditionally into tribe Helenieae (e.g., Bentham y Hooker, 1873; Rydberg, 1914; Williams, 1976b; Turner y Powell, 1977; Karis y Ryding, 1994; Villarreal et al., 2008), within which Turner y Powell (1977) recognized about 70 genera. Karis y Ryding (1994), however, noted paraphyletic Helenieae s. lat. "will have to be split." Indeed, Bahieae was segregated from Helenieae by Baldwin et al. (2002), and is composed of taxa mostly with a pappus of squamellae with thickened midribs, while tribe Helenieae s. str. technically differ further by non-carbonized cypselae (Panero, 2007-BAH). Robinson (1981) and Karis y Ryding (1994) treated most of our genera among the c. 25 genera then placed by Robinson in Heliantheae subtribe Chaenactidinae.

More recently, Baldwin et al. (2002) placed Chaenactis DC. and two closely related genera in the newly described tribe Chaenactideae. Among Helenioid segregate tribes, the Bahieae are similar to Madieae, Perityleae, and especially to Chaenactideae (viz Robinson, 1981; Karis y Ryding, 1994), but of these three only Perityle is presently known in Mesoamerica. Although Chaenactideae has similarly carbonized cypselae, it differs from Bahieae by its typically alternate leaves and by its often basally connate pappus squamellae deciduous as a unit (Baldwin et al., 2002). This treatment is based on that of Pruski (2012-Helen).

Four of our discoid species are many-flowered and have leaves that are simple or lobed into broad segments. Reduction in flower number and dissection of the leaves into narrow segments, however, occurs in discoid Florestina pedata, which in gestalt confusingly resembles radiate Schkuhria pinnata. Both of our radiate species have leaves divided into linear segments.


1. Leaves sessile; phyllaries imbricate, graduated, unequal, 3-4-seriate.
2. *Espejoa*

1. At least proximal stem leaves petiolate; phyllaries subimbricate, subequal, 1-2-seriate.
2. Capitula usually short-radiate, 4-10-flowered; individual cypsela asymmetrically pubescent; leaves 1-2-pinnatifid or 1-2-pinnatisect into linear segments.

3. Minute herbs 1-2 cm; involucres campanulate to hemispherical; cypselae moderately 3-5-angled, abaxial (outer) faces glabrous and adaxial (inner) faces hispidulous, tapered to an elongate conspicuous pilose-hirsute base and carpopodium.

1. Achyropappus

3. Slender herbs 10-75(-150) cm; involucres turbinate-obconic; cypselae obviously and prominently 4-angled, faces glabrous (rarely strigillose) and angles strigillose to pilose-sericeous, shortly tapered to a small oblique-annular glabrous carpopodium.

5. Schkuhria

2. Capitula discoid, (4-)8-70-flowered; individual cypsela symmetrically pubescent; leaves usually simple or deeply lobed into broad segments (pedate-palmatisect into narrow segments only in *F. pedata*).

4. Leaves mostly opposite proximally and alternate distally, blade surfaces hirtellous; phyllaries finely striate or with weakly developed midribs; style branch apices attenuate-cuspidate; pappus symmetrically arranged, squamellae with prominent thickened midribs at least basally.

3. Florestina

4. Leaves nearly opposite throughout, blade surfaces canescent-tomentulose; phyllaries thick-carinate with midribs very prominent; style branch apices obtuse to truncate; pappus obviously asymmetrically arranged, squamellae evenly thin and without obvious midribs, adaxial (inner) cypselae faces with longer squamellae nearly reaching to the top of the corolla tubes, squamellae of the abaxial (outer) face much-reduced.

4. Loxothysanus

1. Achyropappus Kunth

Por J.F. Pruski.

Annual herbs 1-80 cm; stems slender, moderately leafy, hirsute with simple trichomes and stipitate glands. Leaves opposite, petiolate, chartaceous, 1-2-pinnatifid into linear segments. Capitulescence terminal, mostly open-cymose, (1-)2-5-capitulate; peduncles leafless. Capitula radiate, 8-35-flowered; involucre campanulate to hemispherical; phyllaries usually 5, subimbricate, subequal, 1-2-seriate, obovate, more or less planar, subherbaceous, margins narrowly scarious; receptacle flat. Ray florets 2-5; corolla yellow or white, tube stipitate-glandular, limb 0.6-8 mm, ovate to orbicular, abaxially glandular, apex emarginate. Disk florets
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6-30; corolla broadly campanulate, shortly 5-lobed, yellow, tube stipitate-glandular; anther thecae short-sagittate, apical appendage triangular-lanceolate, navicular, eglandular (vs. sometimes glandular in Bahia); style branch apex acute, minute papillose. Cypselae narrowly obpyramidal, moderately 3-5-angled (vs. 4-angled in Bahia), striate, individual cypselae asymmetrically pubescent with abaxial (outer) face glabrous and adaxial (inner) face sparsely to densely hispidulous, base tapered basally to an elongate conspicuous pilose-hirsute (trichomes ascending or erect) base and carpopodium that appears whitish; pappus symmetric, of 8-10 ovate to obovate stramineous squamellae much shorter than fruits and corollas, without a prominent midrib. $x = 10$. 3 spp. Mexico, Mesoamerica.

Blake (1937) and Williams (1976b) referred this species to Bahia and gave it as most closely to Bahia anthemoides (Kunth) A. Gray [= Schkuhria anthemoides (Kunth) Wedd. non (DC.) J.M. Coul.] , the generitype of Achyropappus. Although Ellison (1964) treated our species in Vasquezia Phil. (tribe Perityleae), Vasquezia differs most obviously by its epappose cypselae. Achyropappus is maintained here as marginally distinct from Bahia following Rydberg (1914), Baldwin et al. (2002), Panero (2007-BAH), and Turner (2012).


Vasquezia depauperata (S.F. Blake) Ellison.

Minute herbs 1-2 cm; stems densely hirsute. Leaves obovate in outline; blade 0.2-0.5 × c. 0.1 cm, 3-5-lobed, surfaces hispidulous and sparsely glandular-pilose, not punctate-glandular, pubescence denser abaxially, the lobes 0.3-0.7 mm, basal larger, directed forward, entire or sometimes again lobed, apex obtuse; petiole 0.3-0.5 cm, about as long as blade, narrowly winged to base and dilated at stem. Capitulescence about half of plant height, (1-)2-3-capitulate, not held much above leaves; peduncles 0.3-0.4 cm. Capitula 2.5-3 mm, short-radiate, 6-8-flowered; involucre c. 2.5 mm diam.; phyllaries c. 5, 2-2.5 mm, obovate, sparsely hirsute with simple and stipitate trichomes, apex broadly obtuse or rounded. Ray florets c. 2, basically included within involucre; corolla yellow, tube and limb more or less subequal, tube c. 0.6 mm, limb c. 0.6 mm, orbicular. Disk florets c. 6, ovary and tube included, the short limb more or less exerted; corolla c. 1.3 mm, tube and limb more or less subequal, lobes c. 0.4 mm, triangular; style branches c. 0.2 mm. Cypselae c. 2 mm, carpopodium 0.2-0.3 mm; pappus squamellae c. 0.2 mm. Flowering Sept.
Alpine meadows, rocky areas in open juniper woodlands. G (Skutch 1271, A). 3000-3700 m. (Endemic.)

2. Espejoa DC.

Por J.F. Pruski.

Annual herbs; stems erect or spreading, usually moderately branched; internodes about as long as leaves; herbage eglandular. Leaves opposite throughout, sessile, stiff-chartaceous or subsucculent, venation pinnate, surfaces subglabrous, margins entire, scabridulous-ciliolate. Capitulescence terminal or axillary, open-cymose, few-several-capitulate, moderately exserted from subtending leaves on leafless often elongate peduncles. Capitula discoid, 6-16-flowered; involucre turbinate-campanulate; phyllaries 8-12, imbricate, graduated, unequal, 3-4-seriate, broadly elliptic to orbicular, more or less planar, stiff-chartaceous but with margins narrowly scarious, several-striate; receptacle flat. Ray florets 0. Disk florets: corolla funnelform-campanulate, deeply 5-lobed, yellowish to tube yellowish green or lobes purplish, glabrous or lobes pubescent, tube stout-thickened, strongly dilated, lobes lanceolate, longer than throat, lobe with nerves marginal; anther apical appendage ovate; style branches short, apex acute to obtuse, sparsely papillose. Cypselae narrowly obpyramidal but usually somewhat compressed especially when immature, striate, 4-5-angled, brownish-black but surface often obscured by tan to white indumentum, dense-sericeous, base gradually tapered to very small sericeous oblique-annular carpopodium; pappus symmetric, of 12-16 subequal elongate squamellae, squamellae to about half as long as mature fruits and reaching to about base of corolla lobes, ovate-oblong, with a prominent thickened midrib, stramineous throughout or midrib brownish, margins broad-scarious-hyaline, overlapping, apex acuminate, somewhat erose to mucronate or aristate. $x = 9$. 1 sp. Mexico, Mesoamerica.


Jaumea mexicana (DC.) Benth. et Hook. f. ex Hemsl.

Herbs 20-75 cm; stems opposite to dichotomous-branched with central axis over-topped by lateral branches, evenly-leafy in distal half, subterete, pale-brown, glabrous or distal parts hispidulous in lines. Leaves: blade 2.5-7(-8) × 1-2.5(-3) cm, elliptic to oblong, sometimes internally black-dotted, secondary veins thin, usually indistinctly reticulate, base obtuse to
rounded, sometimes subclasping, apex acute to obtuse or sometimes rounded, mucronate. Capitulescence: peduncles 3-9(-12) cm, thin but stiffly ascending. Capitula 9-13 mm; involucre 6-10 mm diam.; phyllaries 3-11 × (3-)4-6 mm, green to inner ones usually purplish-tinted distally, sometimes internally black-dotted, apex obtuse to broadly rounded. Disk florets 6-16, slightly exserted; corolla 4-5 mm, lobes c. 2 mm; anthers pale yellowish; style branches c. 0.3 mm. Cypselae 6-8 mm; pappus squamellae 2-4 × c. 1 mm. 2n = 18. Flowering mostly Jul-Jan. 

Disturbed areas, fields, open forests, roadsides, savannas, thickets, wooded slopes. Ch (Breedlove 28307, MO); G (Standley 79432, F); H (Williams y Molina 10792, MO); ES (Calderón 1317, US); N (Seymour 1784, MO); CR (Opler 1522, MO). 0-1500 m. (Mexico, Mesoamerica.)


Por J.F. Pruski.

Erect annual to short-lived perennial herbs, tap-rooted to sometimes becoming fibrous-rooted; stems simple from the base, moderately leafy, typically branched distally, pith typically solid, internodes (ours) usually much longer than leaves; herbage mostly heterotrichous with patent stipitate-glandular and often antrorse non-glandular trichomes, infrequently glabrescent, stipitate-glandular trichomes often held above but usually about as long as the non-glandular trichomes. Leaves ours simple to lobed into broad segments (ours infrequently dissected into narrow segments), extra-Mesoamerican species mostly lobed to dissected, mostly opposite proximally and alternate distally, all or at least proximal stem leaves petiolate, evenly spread along length of stem; blade chartaceous, 3-5-plinerved from base, midblade secondaries of simple-leaves also strongly ascending, venation not prominent, surfaces (ours) hirtellous. Capitulescence open-corymbiform, generally few-several-capitulate, typically dichotomously branched, lateral branches often as long as central axis; peduncles mostly elongate, naked or indistinctly few-bracteolate. Capitula discoid, ours (4-)8-20-flowered; involucre campanulate to turbinate; phyllaries mostly 6-13, subimbricate, subequal, 1-2-seriate, oblong, broad, chartaceous but with margins scarious, finely striate or with weakly developed midrib, disk corollas somewhat exserted from top of involucre; receptacle flat. Ray florets 0. Disk florets: corolla typically funnelform, asymmetrically moderately-deep 5-lobed, cream-colored to violet, tube shorter than amphiolute limb, lobes somewhat unequal, slightly reflexed; anthers basally short-obtuse, apical appendage lanceolate-ovate, eglandular; style obviously appendiculate, branches each with 2-banded stigmatic surfaces, apex attenuate-cuspidate, often papillose. Cypselae long-obconic to oblong-
subpyramidal, slightly c. 4-angled, black, indistinctly c. 10-striate, individual cypselae symmetrically pubescent, tapered to a small oblique-annular glabrous carpopodium; pappus of 8-10 stramineous broad erose squamellae, often much shorter than the corolla, symmetrically arranged, monomorphic or sometimes dimorphic, subequal or unequal, with a prominent thickened midrib at least basally, distal margins broadly hyaline-scarious, apex truncate or tapered. Usually $x = 10$; infrequently $x = 11$ or 12. 8 spp. SW. United States, Mexico, Mesoamerica, 3 spp. in Flora Area.

By a chromosome base numbers of $x = 10-12$ Florestina resembles Palafoxia, which differs, however, by exappendiculate styles with acute to obtuse apices and by its sometimes heteromorphic cypselae. Although Florestina latifolia and F. platyphylla are distinguished by the pappus features of aristate vs. apically rounded squamellae, Schkuhria pinnata is defined as containing individuals with either or both squamellae forms.


1. Leaves mostly pedate-palmatisect, blades or segments linear-lanceolate or linear-oblanceolate; corollas typically cream-colored.  

2. F. pedata  
1. Leaves simple, blades deltate-cordiform or deltate-ovate to orbicular; some corollas reddish-purplish or violet or at least apically so.  

2. Pappus squamellae about 3/4 as long as corollas, elliptic-lanceolate, abruptly aristate-tapered apically.  

1. F. latifolia  
2. Pappus squamellae about 1/2 as long as corollas, obovate to suborbicular, broadly rounded to truncate apically.  

3. F. platyphylla  


Polypteris latifolia (DC.) Hemsl.  

Stout herbs 30-70(-100) cm; stem erect, brownish to purplish, densely hirsutulous; herbage hirsutulous with stipitate-glandular and non-glandular trichomes. Leaves simple, proximal ones petiolate and distal bracteoles ones subsessile; blade 2-5(-8) × 1-4(-6) cm, deltate-cordiform to orbicular, surfaces finely hirtellous, base broadly obtuse or truncate to subcordate, margins crenate-dentate, sometimes deeply or irregularly so, apex acute to obtuse or rounded; petiole 1-5 cm. Capitulescence typically few-several-capitulate; peduncles 1-9 cm, purplish, finely hirtellous. Capitula 8-11 mm; involucre 5-10 mm diam., broadly turbinate; phyllaries 7-10 × 2.5-6 mm,
oblanceolate to obovate, green to purplish apically, c. 9-nerved, finely hirtellous, apex obtuse to rounded. Disk florets 20-45; corolla 4.5-5 mm, narrowly funnelform, moderately asymmetrically lobed, marginal florets with corolla reddish-purplish throughout or at least apically so, central florets sometimes with corolla cream-colored or tinged with pink, tube c. 1.5 mm, lobes 1-1.5 mm, moderately unequal in length, shorter than throat, apex papillose; style branches c. 0.8 mm. Cypselae 3.5-5.5 mm, densely setose or the inner ones nearly glabrescent; pappus squamellae 3.5-6 mm, elongate, about 3/4 as long as the corolla, elliptic-lanceolate, usually monomorphic, apex aristate-tapered, when dimorphic with 4 longer ones abruptly tapered squamellae alternating with 4 shorter and less pointed squamellae. 2n =24. Flowering mostly May-Nov. Disturbed areas, brushy slopes, thorn woodlands, thickets, tropical deciduous forests, savannas, scrub-forests, bosque seco subtropical. Ch (Purpus 9111, NY); G (Strother, 1999: 50); H (Williams 16920, MO); N (Morley 741, MO). 75-1300 m. (Mexico, Mesoamerica.)

This common species was not cited as occurring in Guatemala by Turner (1963). Turner (1963) noted that this species is \( x =12 \), thus different cytogenetically from other known species of Florestina.


Achyropappus pedatus (Cav.) Less., Hymenopappus pedatus (Cav.) Cav. ex Lag.,
Hymenopappus pedatus (Cav.) Kunth.

Slender herbs 25-60 cm; stem erect, greenish or pale brown, costate, typically hirsutulous with stipitate-glandular trichomes, also substrigose with non-glandular trichomes. Leaves mostly 3-5-pedate-palmatisect into narrow segments, proximal leaves sometimes simple, petiolate; blade 2-5.5 × 1-3 cm, broadly-triangular to ovate in outline, segments or blade when simple linear-lanceolate or linear-oblancoate, surfaces sparsely to moderately substrigose-hirtellous with non-glandular trichomes, abaxial surface of midrib occasionally stipitate-glandular proximally, base narrowly cuneate, margins subentire or less commonly few-serrate, apex obtuse; petiole 0.8-1.6 cm. Capitulescence few-several-capitulate; peduncles 0.5-7 cm, filiform, brownish, hirsutulous with glandular trichomes, also typically densely substrigose with non-glandular trichomes. Capitula 5-7 mm; involucre 3-5 mm diam., turbinate to narrowly campanulate; phyllaries 4-6 × 1-3 mm, obovate, greenish or apex sometimes violet, (1-)3-5-nerved, strigillose with non-glandular trichomes, apex obtuse to rounded. Disk florets (4-)8-13; corolla 2-3.3 mm, broadly funnelform, moderately asymmetrically lobed, typically cream-colored, glabrous to stipitate-glandular or
lobes sometimes sessile-glandular, tube 0.7-1 mm, lobes 0.9-1.5 mm, moderately unequal in length, slightly longer than throat, lanceolate; style branches c. 0.5 mm. Cypselae 3-4.5 mm, typically moderately to densely setose, setae sometimes crisped; pappus squamellae 1-2.5 mm, about 1/2 as long as corolla, obovate to suborbicular, rounded to truncate apically, infrequently acute. 2n = 20, 22. Flowering Jul-Oct. Disturbed areas, thorn scrub, thickets, tropical deciduous forest, thickets. Ch (Breedlove 20110, MO); G (Molina y Molina 27813, MO). 500-1200(-?2000) m. (Mexico, Mesoamerica.)

This gestalt of this species is very similar to that of Schkuhria pinnata, but F. pedata differs in its stipitate-glandular indumentum and floral details.


Stout herbs 20-90 cm; stem erect, brownish, densely hirsutulous throughout with non-glandular trichomes, distal half also with stipitate-glandular trichomes. Leaves simple, petiolate, the majority alternate; blade (1-)2-5 × (0.3-)1.3-4.5 cm, deltate-ovate, surfaces finely substrigose-hirtellous with non-glandular trichomes, immature leaves occasionally also sparsely stipitate-glandular, base broadly obtuse to subcordate, margins crenate-dentate, sometimes deeply or irregularly so, apex obtuse; petiole (0.2-)0.5-2 cm. Capitulescence several-many-capitulate; peduncles 1-4.5 cm, brownish, finely hirtellous with glandular and non-glandular trichomes, the stipitate-glandular trichomes longer than the non-glandular ones. Capitula 6-9 mm; involucre 6-9 mm diam., broadly turbinate; phyllaries 4-7 × 3-4 mm, obovate, green to slightly purplish apically, c. 9-nerved, finely hirtellous medially and basally with glandular and non-glandular trichomes, apex obtuse to rounded. Disk florets 15-20; corolla 2.5-3 mm, narrowly funnelform, slightly asymmetrically lobed, violet at least apically, tube 0.7-0.8 mm, lobes 0.7-1.1 mm, slightly unequal in length, slightly shorter than throat, glabrous or lobes weakly papillose; style branches c. 0.7 mm. Cypselae 3-4 mm, setose; pappus squamellae 1.5-2 mm, about 1/2 as long as corolla, obovate to suborbicular, apex broadly rounded to truncate. Flowering Nov. Pine-oak forests. Ch (Breedlove 47086, CAS). 1600 m. (Mexico [Oaxaca], Mesoamerica.)

This species appears to be rare, being known from few collections, and one only (fide Strother, 1999) in Mesoamerica.

4. Loxothysanus B.L. Rob.
Por J.F. Pruski.

Perennial herbs or subshrubs, usually rupicolous; stems decumbent to spreading, usually variously curved or bent, opposite-branched, lateral branches not over-topping central axis, leafy distally; internodes usually much shorter than leaves; herbage resinous. Leaves simple to deeply 3(-5)-lobed into broad segments, nearly opposite throughout (distal-most sometimes alternate), long-petiolate, chartaceous, venation palmately 3-nerved from base, also with 1-3 prominent secondaries per side distally, openly reticulate, surfaces sometimes slightly discolorous, canescent-tomentulose with crisped trichomes, margins entire, few-crenate, to sometimes deeply 3-lobed, teeth or lobes with obtuse apex; petiole thin. Capitulescence terminal, open-corymbiform, few-several-capitulate, exserted from subtending leaves and sometimes branched above them, ultimate peduncles leafless. Capitula discoid, 35-70-flowered; involucre turbinate-campanulate to campanulate (turbinate in bud); phyllaries 9-13, subimbricate, subequal, 1-2-seriate, oblanceolate to oblong, navicular, stiff-chartaceous throughout, thick-carinate with midrib very prominent and protruding especially proximally, closely crisped villosulous and densely and finely glandular puberulent; receptacle flat or nearly so. Ray florets 0. Disk florets: corolla funnelform to campanulate, shortly to moderately 5-lobed, slightly asymmetrically so, white to pink, glandular-papillose especially proximally, tube slender, only slightly shorter than limb, slightly dilated, lobes triangular-lanceolate, slightly unequal especially in outer florets; anther thecae tan to purplish, short-sagittate, apical appendage ovate, often sparsely glandular; style branches with apex obtuse to truncate, papillose-tufted. Cypselae narrowly obpyramidal and 4angled to nearly clavate, black, surface cell pattern irregular, not forming striations, individual cypselae symmetrically pubescent (hirtellous) throughout, angles somewhat callose-thickened, base long-attenuate to a very small glabrous annular carpopodium; pappus obviously asymmetrically arranged, of 5-8 obviously unequal stramineous erose squamellae, much shorter than corollas and cypselae, when immature some appearing connate nearly into a ring basally, separating post-anthesis, squamellae evenly thin and without an obvious midrib, adaxial (inner) cypselae faces with longer squamellae nearly reaching to the top of the corolla tubes, squamellae of the abaxial (outer) face much-reduced. \(x = 15\). 2 spp. Mexico.

In describing *B. nepetifolia*, Gray (1861) commented that by virtue of its "extraordinary" pappus it could constitute a "new genus." Similarly, in the protologue of *Loxothysanus*, Robinson (1907) cited its "strongly asymmetrical pappus" as diagnostic.


*Bahia nepetifolia* A. Gray, *Loxothysanus filipes* B.L. Rob.

Herbs or subshrubs 0.3-1 m; stems tomentulose, brown. Leaves: blade 1.5-9 × 1-6 cm, variable in size and shape, ovate to deltate, sometimes lobed to near base into 1(-2) broad and irregular cuneate segments per side, surfaces usually slightly discolorous, adaxial surface greenish, moderately canescent-tomentulose, abaxial surface usually densely whitish canescent-tomentulose, base obtuse to truncate or occasionally subcordate, margins usually sinuate-crenate, apex acute; petiole (0.5-)1-4.5 cm. Capitulescence broadly rounded to flat-topped; peduncles 0.5-3 cm, tomentulose, bracteolate; bracteoles 2-5, 1-2 mm, linear, ascending. Capitula 7-9 mm; involucre 8-10 mm diam.; phyllaries 12-14, 5-7.5 × 1.5-2.5 mm, green, midrib 0.2-0.3 mm diam., apex acute. Disk florets 45-70, slightly exserted; corolla 2.8-3.2 mm, lobes 0.8-1.2 mm; style branches 0.6-1 mm. Cypselae 3-4 mm; pappus squamellae 0.5-1.5 mm. 2n = 30. Flowering Nov-Mar. Rocky areas. Ch (*Pruski et al. 4201, MO*). 400-1300 m. (Mexico, Mesoamerica.)

5. *Schkuhria* Roth, nom. cons.


Por J.F. Pruski.

Annual tap-rooted herbs 2-150+ cm, rarely perennial herbs; stems usually erect and single from base but dichotomously much-branched in capitulescence, sometimes basally branched and nearly prostrate, green or main axis or nodes only sometimes reddish, 5-6-angled, glabrous to more commonly strigillose to hispidulous with often bulbous-clavate trichomes, leafy with leaf segments usually narrower than stems; herbage usually punctate-glandular, ours without stipitate glands. Leaves 1-2-pinnatisect (ours) to rarely simple, opposite proximally becoming alternate distally, short-petiolate, chartaceous, surfaces sparsely puberulent and punctate-glandular, leaf segments 3-7+, linear, about as thin as petiole. Capitulescence mostly in open and leafy corymbiform-panicles with capitula solitary and terminal on branchlets; peduncles slender. Capitula radiate or discoid, several-many-flowered, involucre turbinate to campanulate, often pyriform in bud; phyllaries 4-8(-18) (sometimes subtended by 1-3 secondary calycular bracteoles), subimbricate, subequal, 1-2-seriate, oblong to obovate, concave but drying flat,
chartaceous-green with whitish or purplish scarious margins and apex, evenly pluristriate or midrib sometimes minutely carinate, punctate-glandular, apex obtuse to rounded; receptacle flat. Ray florets 0-3(-6); corolla pale yellow or white, usually inconspicuous, tube glandular-papilllose, limb ovate to cuneate, 2-3-lobed, lobes obtuse. Disk florets (3-)5-10(-40); corolla broadly tubular to narrowly funnelform, shortly (4-)5-lobed, yellow or sometimes reddish-tipped, tube broad, glandular-papilllose, limb not greatly ampliate, lobes deltate-triangular, papilllose within; anther thecae short-hastate, apical appendage ovate, sometimes glandular; style proximally thickened, branch apex short-acute, mamilllose-papilllose. Cypselae obpyramidal, obviously and prominently 4-angled, discolorous with faces mostly black and ribs (and apex) stramineous, faces of rays few-striatulate or sometimes c. 3-costate, faces of disks few-striatulate, individual cypselae asymmetrically pubescent with face glabrous (rarely strigillose) and angles strigillose to pilose-sericeous especially near base very nearly to carpopodium, shortly tapered to a small oblique-annular glabrous carpopodium; pappus symmetrically disposed, of 8 fusiform to orbicular squamellae, typically non-contiguous basally and overlapping distally, stramineous or sometimes tinted purplish, with a prominent midrib, midrib sometimes abaxially pilosulose, margins broad-scarious, when aristate the narrow apex arising directly from callose-thickened midrib, squamellae of the cypsela angles more commonly aristate than the intermediaries or sometimes all squamellae obtuse to rounded apically. $x = 10, 11, 12$. Approx. 5 spp. SW. United States, Mexico, Mesoamerica, South America; introduced to Europe, Africa.

The genus was revised by Heiser (1945), who recognized six species, but subsequently Turner (1995) and Strother (1999) reduced the number of species to five by treating the two most common species sensu Heiser as but a single species.


Slender herbs 10-75(-150) cm; stems erect, much branched distally, branches ascending at about 45°, puberulent to glabrate, narrowly fistulose. Leaves 1-3(-5) cm, elliptic to ovate in outline, mostly alternate (especially on incomplete herbarium specimens), 1-2-pinnatisect, surfaces punctate-glandular, otherwise puberulent to sometimes subglabrous, lobes to 1.5 cm × 0.1 cm, apex obtuse. Capitulescence diffuse; peduncles 0.5-2.5(-5) cm, leafless. Capitula 4.5-7 mm, 4-10-flowered, usually short-radiate; involucre 3.5-6 mm diam., turbinate-obconic; phyllaries 4-5, 4.5-6 × 1.5-3 mm, obovate, slightly carinate, other than for the glandular punctations and distal marginal cilia the surfaces typically glabrous, margins and distal 1/3-2/3 often purplish; calycular bracteoles 1-3 mm. Ray florets (0-)1, included within involucre to limb slightly exserted and slightly spreading; corolla tube c. 1 mm, limb 1-2.5(-3.5) × 1-1.5 mm, faintly 3-5-nerved. Disk florets (3-)5-7(-9); corolla 2-3 mm, tube c. 1 mm, constricted above base, lobes c. 0.5 mm; anthers 0.5-0.6 mm, pollen yellow; style branches c. 0.6 mm. Cypselae (2.5-)3-4.5 mm, often bicolored or tricolored with faces and angles (and sometimes trichomes) discolorous, angles densely pilose-sericeous (ours) to short-strigillose, trichomes (0.2-)0.5-1+ mm, white, stramineous angles and stramineous apex c. 0.2+ mm diam.; pappus squamellae (0.5-)1-3.7 × 0.5+ mm, subequal or unequal, shorter than to longer than disk corollas, included to slightly exserted from involucre, those of the cypsela angles often longer and more pointed than the intermediate-facial squamellae, apex rounded to aristate in various combinations, when aristate the proximally half of squamellae longitudinally concave. 2n = 20, 22. Flowering year-round, mostly Jul-Dec. Bosque enano, campo abierto, clearings, cultivated areas, disturbed areas, disturbed forests, dry hillsides, fields, lava flows, open areas, pastures, pine-oak forests, roadsides, rocky areas, savannas, thickets, volcanic slopes. Ch (Breedlove 28439, MO); G (Bernoulli 135, NY); H (Williams y Molina 10683, MO); ES (Calderon 962, NY); N (Seymour 6384, MO); CR (Spellman et al. 732, MO). 600-2000(-2400) m. (SW. United States, Mexico, Mesoamerica, Colombia, Venezuela, Ecuador, Peru, Bolivia, Brazil, Uruguay, Chile, Argentina; introduced to Europe, Africa, Australia.)
Heiser (1945) called most South American plants of our species *Schkuhria pinnata* var. *pinnata*, and these plants are mostly obtuse-squamulose. Turner (1995) further characterized the South American populations of *S. pinnata* as differing by usually longer ray corolla limbs and usually less pubescent cypselae. Heiser (1945) noted that most plants from Mexico and Mesoamerica are variously aristate-squamulose, and used the name *S. pinnata* var. *virgata* for those with 5 or more disk florets and having cypselae angles short pilose-sericeous. Heiser (1945) used the name *S. anthemoides* for material with 5 or fewer disk florets and with long pilose-sericeous cypselae angles.

Blake (1951) noted that *S. anthemoides* (DC.) J.M. Coult. is illegitimate and using Heiser's taxonomy Blake adopted the name *S. wislizeni* for much aristate-pappose material from United States south to Mesoamerica. McVaugh (1972) made the combination *S. pinnata* var. *guatemalensis*, which he used for material from Mexico and Mesoamerica. In his treatment of Compositae of Honduras, Clewell (1976) used the *S. virgata* for material Heiser had earlier treated under two species. Similarly, in his Flora of Guatemala treatment of Helenieae, Williams (1976b) used the name *S. virgata*. However, because McVaugh (1972) was not cited by either Clewell (1975) or Williams (1976), each apparently wrote their texts before McVaugh's paper was published. To this day, much material from Central American herbaria is distributed as "*S. virgata*".

Turner (1995) treated all material (including the types of *S. pinnata* var. *virgata*, *S. pinnata* var. *guatemalensis*, and *S. wislizeni*) from the United States, Mexico, and Central America as a single non-typical variety, for which he made the incorrect combination *Schkuhria pinnata* var. *wislizeni*. If all North American and Central American material is recognized as but one non-typical variety, the name *S. pinnata* var. *virgata* has priority by 40 years over Turner's var. *wislizeni*.

On the other hand, although the cypselae illustrated in the protologue appear short-villous, the supposed South American type has lanceolate pappus squamellae thereby closely resembling Mexican material. Indeed, it is possible that the type is from Mexican seed, in which case the name *S. pinnata* var. *virgata* would be replaced by the typical variety. However, because of the basically complete intergradation between admittedly noteworthy extremes in pappus form and cypselae angle pubescence, I provisionally treat the material from both continents as a single species as in McVaugh (1972) and Turner (1995), and without varietal recognition (as in Strother, 1999).
It should be noted, however, while *S. pinnata* contains forms with pappus squamellae either or both apically rounded or aristate, that these same pappus features are used elsewhere to distinguish *Florestina latifolia* from *F. platyphylla*.

**Bibliography for Bahieae**


V. Tribus *Calenduleae* Cass.

Por J.F. Pruski.

Herbs to small trees, sometimes spiny. Leaves simple to variously dissected, alternate (Mesoamerica) or rarely opposite; blade chartaceous (Mesoamerica), venation pinnate (Mesoamerica). Capitulescence monocephalous (Mesoamerica) to corymbiform; peduncles typically present, capitula rarely sessile. Capitula radiate; phyllaries subequal (Mesoamerica) or sometimes graduated, 1-4-seriate; receptacle epaleate. Ray florets pistillate or sterile; corolla limb usually well-developed, 3-denticulate. Disk florets bisexual or functionally staminate; corolla funnelform to narrowly campanulate, 5-lobed; anthers short-caudate, ecalcarate, endothecium cells thickenings polarized, apical appendage triangular-ovate; style branches short-bifid (Mesoamerica), +/- flattened, stigmatic surface 2-banded at least proximally. Cypselae not carbonized, dry (Mesoamerica) or rarely drupaceous, isomorphic to dimorphic or gradate-heteromorphic, straight to curved, terete to compressed, alate or exalate, smooth to tuberculate (Mesoamerica with ray cypselae obviously rugulose-tuberculate abaxially), epappose. 12 genera, aprox. 120 spp. native to the Old World, mostly South African to Mediterranean region, S. Europe, Asia Minor.

1. Ray florets 2-3+-seriate, corolla limbs yellow to orange; disk florets functionally staminate; ray cypselae curved, +/- subterete, setose, all rugulose-tuberculate abaxially, gradate-heteromorphic, outer ray cypselae gradually long-subrostrate apically. 1. *Calendula*

2. Dimorphotheca
1. **Calendula** L.

Por J.F. Pruski.

Herbs to subshrubs. Leaves simple, sessile; blade linear to obovate. Capitula many-flowered; involucre campanulate to hemispherical; phyllaries linear-lanceolate to lanceolate, 1-2-seriate, herbaceous, margins narrowly scarious at least proximally. Ray florets pistillate, 2-3+-seriate (ours); corolla limb linear to oblanceolate. Disk florets functionally staminate; style unbranched, distally swollen-conical and short-papillose, ovary sterile. Ray cypselae curved, +/- subterete (ours), all rugulose-tuberculate abaxially, gradate-heteromorphic; outer ray cypselae cymbiform to slightly arcuate, grading to inner series of ray cypselae distinctly lunate-incurved. \( x = 7, 8, 9 \).

Aprox. 15 spp. Mediterranean region (i.e., N. Africa, S. Europe, Asia Minor).


Annual or perennial herbs, 15-65(-90) cm; stems decumbent to erect, main stem long, branched throughout, several-costate; herbage stipitate-glandular and aromatic, gland-tip small, also sometimes loosely arachnoid-floccose. Leaves 3-17 × 1-3(-4.5) cm, oblanceolate to spatulate, distal cauline leaves clasping, margins subentire, apex acute to obtuse. Peduncle 2-8(-12) cm. Capitula 1-1.5 cm; involucre 1.5-2.5 cm diam.; phyllaries usually 20-35, 8-13 × 1.5-2, 2-seriate, apex gradually (less commonly abruptly) attenuate-caudate. Ray florets 25-60+; corolla limb 14-20 × 3-5 mm, about 2× as long as phyllaries, yellow to orange, 4-6+-nerved. Disk florets 30-100+; corolla (4)-5-6 mm, concolorous with or slightly lighter-colored that ray corollas, lobes c. 1.3 mm, lanceolate. Ray cypselae green maturing brownish, setose; outer ray cypselae 1.5-2(-2.5) cm, apex gradually long-subrostrate apically, grading in size and form into inner ray cypselae, these c. 1 cm. \( 2n = 28, 32 \). Flowering November. *Cultivated*. Ch (Breedlove, 1986: 43); G (*Pruski 4554b*, MO); H (Molina, 1975: 1120). 1500 m. (Native to Europe and Asia; cultivated in Estados Unidos, Mexico, Mesoamerica, Colombia, Ecuador, Peru, Bolivia, Brazil, Chile, Argentina; Asia, Australia, New Zealand, Pacific Islands.)

This species typically sets seed in cultivation and may persist for several years.

2. **Dimorphotheca** L.

*Acanthotheca* DC., *Blaxium* Cass., *Castalis* Cass., *Xenismia* DC.

Por J.F. Pruski.
Herbs to less commonly shrubs. Leaves simple to variously divided, sessile or petiolate; blade linear to oblong. Capitula many-flowered; involucre campanulate to hemispherical; phyllaries linear-lanceolate, 1-2-seriate, herbaceous, margins scarious. Ray florets pistillate (ours) or sterile, 1-seriate; corolla limb oblanceolate to oblong. Disk florets bisexual (ours) or functionally staminate. Cypselae +/- straight, dimorphic; ray cypselae suberete to triquetrous, ellipsoidal or subglobose, rugulose-tuberculate (ours) to smooth, sparsely short-stipitate-glandular distally (ours) to glabrous; disk cypselae compressed, round to elliptic or obovate in outline, glabrous, margins thickened, sometimes alate, surfaces smooth. $x = 9, 10$. Aprox. 19 spp. Africa.

**Bibliografía:** Standley, P.C. *Fieldiana, Bot.* 18: 1135-1571 (1938).


*Dimorphotheca annua* Less.

Annual herbs, 10-40 cm; main stem short, branched mostly proximally; herbage +/- densely hirsute with elongate non-glandular trichomes, usually also shortly stipitate-glandular, gland-tip small. Leaves 1.5-8 × 0.4-2.5 cm, basal leaves (when present at anthesis) much larger than cauline leaves, oblanceolate to oblong or basal leaves spatulate, simple, sessile, margins subentire to deeply few-dentate, apex acute to obtuse. Peduncle 3-10 cm. Capitula 0.8-1.2 cm, sometimes nutant; involucre 0.9-1.4 cm diam.; phyllaries c. 15, 7-12 × 2-2.5 mm, 2-seriate, apex gradually to abruptly attenuate-caudate. Ray florets 10-18; corolla limb 15-30 × 2-4 mm, about 2-3× as long as phyllaries, 4-nerved, adaxially white or ochroleucous, abaxially blue to purplish. Disk florets 30-50+; corolla 4-6 mm, yellow with purplish teeth. Cypselae light brownish; ray cypselae 4-5(-6) mm, obtuse at apex; disk cypselae 6-8 × 4-6 mm. $2n = 18, 20$. *Cultivated.* H (Molina, 1975: 113); ES (Standley y Calderón, 1941: 278 sub *D. annua*); CR (Standley, 1938: 1450 sub *D. annua*). Presumably mid-elevations (i.e. 500-2000 m). (Native to Africa; cultivated in Estados Unidos, Mesoamerica, ?Bolivia; Europe, Australia.)

Although at the time of this writing I have examined of this species no material from Mesoamerica, Standley (1938) describes the ray corolla limbs as white adaxially, leaving little doubt as to the identity of the material.

VI. Tribus *Cardueae* Cass.

Annual to perennial herbs, less commonly arborescent, rarely acaulescent, often spiny; stems simple or branched, often fistulose. Leaves basal and/or cauline, alternate, mostly pinnatifid, sometimes merely dentate or entire, mostly chartaceous or subcoriaceous, usually spiny. Capitulescence monocephalous or corymbiform, less commonly paniculate or globose-synecephalous. Capitula usually numerous-flowered (Mesoamerica) or rarely uniflorous, usually discoid or rarely marginal florets falsely pseudoradiate; phyllaries (1-)3-15-seriate, often spine-tipped; receptacle flat to subconic, epealeate, usually bristly-setose, cypsela insertion areoles flat or concave. Marginal pistillate or sterile florets usually 0, when present corolla pseudoradiate or actinomorphic. Disk florets typically discoid and bisexual; corolla mostly tubular to funnelform, actinomorphic, 5-lobed, mostly lavender to purplish or occasionally yellow; anthers often long-caudate, apex appendaged, filaments free or infrequently connate basally, often papillose, thecae with endothecial tissue polarized; pollen typically spheroidal (in Mesoamerica prolate in Centaurea and oblate-subprolate in Carthamus), usually subpsilate to microechinate; style trunk with a dense-papillose articulated annular ring distally just below bifurcation, glabrous proximal to this ring and usually papillose at least adaxially distal to it, branches with continuous stigmatic surfaces. Cypselae usually isomorphic, basifixed to obliquely or laterally attached to receptacle, oblong or obconic, compressed or prismatic, apically rounded to truncate, apical annulus typically manifest and lighter in color than cypsela body, topped by persistent style base, surface usually hard, glabrous to sometimes villous, smooth or less commonly rugulose or striate, carpododium small; pappus pluriseriate, commonly of elongate, scabrid to plumose, stramineous bristles, less commonly squamulose. Aprox. 83 genera and 2500 spp.; mostly in temperate regions of Old World. 5 gen and 15 spp. in Mesoamerica. The only Mesoamerican endemics are in Cirsium, where 4 of its 8 spp. are endemic to northern Mesoamerica.

The tribal names Cynareae (e.g., Dittrich, 1977; Dittrich et al., 1980; Jeffrey, 1968; Nash y Williams, 1976), and Cardueae (e.g., Bremer, 1994; Dillon, 1982; Garcia y Koch, 1995; Kubitzki, 2007) have both been used for this tribe (sens. lat.). but it appears that Cardueae is the earliest valid tribal name for the tribe as generally circumscribed.

The Cardueae are among the more early-divergent Asteraceae and are among the first herbaceous members of the family to have spread to the north temperate zones. Several genera of Cardueae (e.g., Centaurea, Cirsium, Saussurea) contain several hundred species, these mostly north temperate. Cynareae, by their sometimes short ovate style branches and caudate anthers,
closely resemble Mutisieae. s. lat. These two tribes are also similar by containing many species that quickly fruit.

Typical Cardueae have numerous-flowered capitula and spiny divided leaves, but subtribe Centaureinae differs by mostly unarmned entire leaves, often yellow corollas, and marginal florets often pseudoradiate. Subtribe Echinopsinae differs from typical Cardueae by their single-flowered glomerate capitula. Each Centaureae and Echinopseae are occasionally recognized, but each appears nested within Cardueae and are thus recognized here as subtribes.

The Cardueae are one of three Asteraceae tribes whose species are commonly spiny-leaved. The two other commonly spiny-leaved tribes are Barnadesieae (generally Andean shrubs characterized by bilabiate capitula and paired nodal thorns) and Lactuceae (mostly herbs with generally milky latex and ligulate capitula); but Cardueae differ by capitula typically discoid.

Nearly cosmopolitan weeds of Cardueae with non-plumose pappus that should be looked for in Mesoamerica include Arctium minus (Hill) Bernh., Carduus nutans L., and Onopordum acanthium L. Arctium is an unarmed herb with exalate stems unusual in its uncinate outer phyllaries. Carduus and Onopordum each have spiny leaves and winged stems, but Onopordum differs from many Cardueae by its non-bristly receptacle.


1. Plants unarmed; cypselae obliquely to laterally attached to receptacles; receptacles with cypsela insertion areoles concave.
   2. Phyllaries subequal or obgraduate, outer phyllaries leafy; capitula homogamous and discoid; pollen spheroidal.
      1. Carthamus
   2. Phyllaries unequal, outer phyllaries not leafy; capitula typically heterogamous, pseudoradiate or less commonly disciform, rarely homogamous and discoid; pollen prolate.
      2. Centaurea

1. Plants spiny; cypselae basifixied; receptacles with cypsela insertion areoles flat.
   3. Pappus bristles simple; anther filaments connate.
      5. Silybum
3. Pappus bristles plumose; anther filaments free.
   4. Leaves eglandular (Mesoamerica); receptacles +/- dry; phyllaries usually chartaceous or subcoriaceous.

3. Cirsium

4. Leaves glandular; receptacles carnose; phyllaries thick-coriaceous.  

4. Cynara

1. Carthamus L.

Por J.F. Pruski.

Unarmed (ours) or spiny, annual to rarely perennial herbs; stems usually erect, branched; herbage often glandular, otherwise glabrous to arachnoid-pubescent. Leaves basal and/or cauline, alternate, blade unlobed to pinnatifid or pinnatisect, dentate-spinulose to spiny. Capitulescence monocephalous or open-corymbiform. Capitula homogamous and discoid; involucre ovoid or ellipsoid; phyllaries many, imbricate, subequal or obgraduate; outer and mid-series phyllaries resembling distal-stem leaves in size, shape, and texture, stiff, margins pinnatifid to spinulose; inner phyllaries less stiff; receptacle flat to convex, naked or scaly, cypsela insertion areoles concave. Florets 15-60+, bisexual; corolla tubular-funnelform, yellow or orange to red or purplish, tube slender, nerves of throat and lobes dark, lobes linear-lanceolate; anther filaments free, Mostly papillose, tails short, apical appendage oblong; style branches connivent to near apex, papillose. Cypsela obliquely attached to receptacle, slightly dimorphic, ovoid to obovoid, c. 4-angled, glabrous, surface rugulose or subpsilate, base asymmetric, ovary wall calcium oxylate crystals of three kinds (druse, elliptical in outline, and rectangular in outline); pappus absent or double with many unequal pluriseriate smooth-margined persistent stiff scales. x = 10, 11, 12, 32. Aprox. 14-20 spp. Native to Europe, Mediterranean region, and Asia; cultivated and naturalized widely elsewhere.

Yellow-flowered Carthamus lanatus L. is sometimes weedy in the Neotropics and should be looked for in the Flora Area. Although C. lanatus has the technical features of Carthamus (i.e., a short pappus of scales and obliquely attached cypsela), it is by its spiny pinnatifid leaves and spiny outer phyllaries somewhat reminiscent of Silybum marianum.

Much pressed material of Centaurea benedicta has distal stem leaves (falsely) covering the involucre, thus superficially resembling, and often misdetermined as, Carthamus.


Unarmed tap-rooted annual herbs 0.3-0.7(-1.5) m; stems exalate, smooth, stramineous, pith +/- solid; herbage glabrous, eglandular. Leaves (2-)3-12 × (1-)1.7-4(-5) cm, cauline, sessile, not pinnatifolobed, lanceolate to elliptic, surfaces concolorous, base usually obtuse to semiamplexicaul, margins dentate-spinulose or rarely entire, teeth usually 1-2 mm, apex acute; distal stem leaves subequal in size to phyllaries, 3-5-subplinerved. Capitulescence leafy, of several nearly subsessile capitula at the ends of branches. Capitula 2.5-3.5 cm; involucre 1.9-2.6(-2.9) cm diam., leafy; phyllaries obgraduate, 4-5-seriate; outer c. 20 phyllaries 20-29 × 5-10 mm, longer than inner phyllaries, rhomboidal-lanceolate, green in distal c. 2/3, usually spreading, veins prominent, base constricted, margins thin-spinulose, apex attenuate, thick-spinose, terminal spine 2-3 mm; grading to inner phyllaries 20-22 × 4-5 mm, lanceolate, margins entire, apex mostly acuminate. Disk florets: corolla 20-30 mm, much longer than pappus scales, orange or bright yellow, tube 15-23 mm, throat c. 1 mm, much shorter than the lobes; anther filaments 1-2 mm, thecae orange or bright yellow. Cypselae 6-9 mm, white or stramineous; pappus absent or scales 2-7 mm, not exserted from involucre. 2n = 24. Flowering Mar-Apr. *Cultivated, naturalized in disturbed areas.*

T (*Calzada 2364, XAL*); ES (Mociño, 1993: 126); N (*Baker 144, MO*). 0-700 m. (Native to the Mediterranean region; cultivated and naturalized in Canadá, Estados Unidos, Mexico, Mesoamerica, Paraguay, Chile, Argentina; Europa, Africa, Asia, Australia.)

*Carthamus tinctorius* is widely cultivated for a dye (a substitute for saffron) extracted from corollas and for oil extracted from its cypselae. It is often grown in very extensive monocultures, and may quickly naturalize wherever grown. The locality given by Mociño (1993) was Servatoropoli, which McVaugh (1977: 177, 182) noted was the Latin equivalent of San Salvador.

2. **Centaurea** L., type cons.


Por J.F. Pruski.

Annual to perennial herbs, unarmed throughout or infrequently leaves or phyllaries spinose; stems simple or branched, mostly exalate. Leaves basal and/or cauline, alternate, mostly sessile or subsessile at least distally, blade entire to 2-pinnatisect, often glandular. Capitulescence monocephalous to corymbiform-paniculate. Capitula typically heterogamous, pseudoradiate or
less commonly disciform, rarely homogamous and discoid; involucre cylindrical to globose; phyllaries many, imbricate, unequal, often distally lacerate or pectinate to spinose, apex narrowly scarious or sometimes with an obvious appendage; receptacle flat, bristly, bristles often longer than pappus, cypsela insertion areoles concave. Florets 15-400; when capitula heterogamous the marginal florets sterile or infrequently with staminodia; corolla violet to pinkish, less commonly yellow or white, tube slender, often bent at throat. Marginal florets: corolla usually large and pseudoradiate, sometimes small and actinomorphic, limb typically radiating outwards, lobes unequal. Disk florets bisexual; corolla funnelform, actinomorphic; anther filaments free, smooth or finely papillose, thecae caudate, apical appendage usually oblong; style branches short. 

Cypselae obliquely to laterally attached to receptacle, surface smooth to infrequently striate or rarely prominent-costate, glabrous to sometimes pilose, trichomes uniseriate or biseriate (twin-hairs), base asymmetric; pappus absent or more commonly with many unequal 2+-seriate persistent or readily deciduous scales or bristles. $x = 7, 8, 9, 10, 11, 12, 13$. 250-650 spp. Mostly native to Eurasia and the Mediterranean region, few spp. native to the Americas; several species are weedy and cosmopolitan.

*Centaurea* is treated here in the broad traditional sense with *Cnicus* and *Plectocephalus* in synonymy, although *Plectocephalus* has been suggested (Hind, 1996) as distinct. Although the generitype of synonymous *Cnicus* (*C. benedicta*) is reminiscent of *Carthamus*, the involucre of *C. benedicta* is not leafy nor do its outer phyllaries resemble its distal leaves, but rather the resemblance between these taxa is superficial due to specimens of *C. benedicta* having the distal stem leaves (falsely) covering the capitula simply as an artifact of being pressed.

Nearly cosmopolitan weedy *Centaurea calcitrapa* L., *C. melitensis* L., and *C. solstitialis* L. are each known from Mexico and South America, and should be looked for in the geographically intermediate Flora Area. *Centaurea melitensis* and *C. solstitialis* both have yellow corollas, winged stems, and entire-margined cauline leaves, but *C. solstitialis* differs by its prominently long-spined phyllaries. *Centaurea calcitrapa* L. is characterized by exalate stems, pinnatifid cauline leaves, prominently long-spined phyllaries, and purplish corollas, but differs from Flora Area species by its epappose cypselae.


1. Leaves with surfaces slightly discolored, eglandular, distal cauline leaves linear; involucres 1.1-1.6 × 0.9-1.5 cm; phyllaries not obviously appended; marginal florets with corolla limbs cuneate; cypselae strigose-villous.  

3. *C. cyanus*
1. Leaves with surfaces concolorous, glandular, oblanceolate or oblong to lanceolate; involucres
2-4 × (1-)2-5 cm; at least the inner phyllaries with obvious appendages; marginal florets with
corollas filiform; cypselae glabrous.

2. Leaves spiny; capitula subsessile; discoid or disciform; corollas yellow; phyllaries spinulose
to spinose apically or the inner phyllaries with stout pectinate-spinose appendages; cypselae 6-
10 mm, prominently c. 20-costate.   2. C. benedicta

2. Leaves non-spinose; capitula pedunculate, filiform-pseudoradiate; some corollas lavender to
pink; phyllaries with obvious apical appendages, appendages pectinate but never spinose;
cypselae 3.5-5.5 mm, obscurely striate.

3. Mid-series phyllaries with appendages usually with 3-7(-8) pairs of well-spaced teeth,
appendages whitish to stramineous.   1. C. americana

3. Mid-series phyllaries with appendages with 8-12+ pairs of usually closely spaced teeth,
appendages brown.   4. C. rothrockii

States, Nuttall s.n. (PH, as microfiche!). Illu.: Steyermark, Fl. Missouri 1627, t. 383, f. 9
(1963). N.v.: Cardo, ES.

Centaurea mexicana DC., Centaurea nuttallii Spreng., Plectocephalus americanus (Nutt.) D.
Don.

Much like Centaurea rothrockii, annual herbs 0.5-2 m. Leaves 5-20 cm, oblanceolate to
lanceolate, non-spinose, surfaces concolorous, punctate-glandular, also hirtellous. Capitula
pedunculate, filiform-pseudoradiate; involure 2-3.5 × 2-5 cm; phyllaries with obvious apical
appendage, appendage pectinate but never spinose; mid-series phyllaries with appendage usually
with 3-7(-8) pairs of well-spaced teeth, appendage whitish to stramineous, teeth ciliolate to
ciliate. Marginal florets 25-50+: corolla filiform, pseudoradiate, lavender to pink throughout or
tube sometimes yellowish. Disk florets: corolla yellowish or cream-colored. Cypselae 3.5-5.5
mm, gray-brown, obscurely striate, glabrous; pappus bristles 6-10+ mm. 2n = 26. Cultivated as
an ornamental, often naturalized in disturbed areas. H (Molina, 1975: 112); ES (Standley et
Calderón, 1941: 349). 700-1000 m. (native to United States and Mexico; Mesoamerica; Europe.)

Although I have not seen pertinent vouchers, the report of this species in Central America is
not questioned. As noted by Greenman (1904), Centaurea americana and C. rothrockii appear to
be each others closest relative, but only C. americana is known to be widely naturalized well
outside of its native range.

Spiny-leaved annual tap-rooted herbs 0.2-0.7 m; stems exalate, branched from base or throughout, prostrate to erect, reddish, few-costate, pilose-villous, patent trichomes mostly 2-4+ mm. Leaves 4-25 × 1-5 cm, basal and cauline, spiny, proximal leaves winged-petiolate, distal leaves sessile and mostly semiamplexicaul, runcinate or pinnatifoliated to sometimes distal-most merely spinose-dentate, lanceolate to oblong in outline, reticulate, midrib often darkened, secondary veins often whitish abaxially, surfaces concolorous, glandular, also sparsely pilose-villous and/or arachnoid-pubescent, margins usually with 3-5 pairs of well-spaced lobes, lobes of mid-stem leaves cut about 1/2 to midrib, lobes 5-20 × 3-8 mm, triangular to elliptic, lobes and sinuses spinulose to spinose, spinules and spines usually 1-2 mm, rachis usually 1+ cm diam., apex acute. Capitulescence leafy, of few to several nearly subsessile capitula at ends of branches. Capitula disciform or infrequently discoid; involucre 3-4 × (1-)2-3.5 cm, ovoid to globose, closely subtended by several unlobed spreading leaves; phyllaries with body mostly 10-20 × 3-7 mm, ovate to lanceolate, weakly graduate, 4-5-seriate, thin-chartaceous, mostly glabrous, appressed with spreading apex or appendage, apex spinulose to spinose or the inner 10-15+ phyllaries with an obvious stout pectinate-spinose yellowish to purplish appendage, terminal spine 3-10+ mm, lateral spinules to 4+ mm; receptacle with bristles about as long as pappus outer series bristles. Marginal florets few, inconspicuous, about as long as the disk florets, sterile; corolla actinomorphic, filiform, cream-colored to pale yellow, 2-4-lobed. Disk florets many; corolla 19-24 mm, (3-)5-lobed, yellow to pale yellow, tube about 2× as long as limb, lobes often without obvious nerves; anthers often darkened. Cypselae 6-10 × to c. 3 mm, obovoid, brown-nitidous, prominently c. 20-costate, glabrous, basal scar to 2+ mm, obovate, stramineous, apex with a stiff dentate crown c. 0.5 mm; pappus 2-seriate, outer series 9-12 mm, of c. 10 smooth or scabridulous awn-like bristles sometimes slightly exserted from involucre, inner series 2-4 mm, of scabridulous bristles. 2n = 22. *Cultivated and occasionally naturalized.* G (Morton 1981: 920). C. 1000 m. (native to the Mediterranean region; cultivated and naturalized in Canadá, Estados Unidos, ?Mexico, Mesoamerica, Venezuela, Ecuador, Brazil, Uruguay, Chile, Argentina; Europa, Africa, Asia.)

In the Flora Area *Centaurea benedicta* is widely grown as a medicinal herb at least in Guatemala, where it is sold by herb vendors.


Unarmed tap-rooted annual herbs 0.2-0.8 m; stems usually 1, erect, exalate, striate, branched distally, often arachnoid-floccose when immature. Leaves 3-11 × 0.2-0.8 cm, graminoid or basal leaves lyrate-pinnatifid, oblanceolate to distal cauline leaves linear, surfaces slightly discolorous, eglandular, green adaxially, gray and sparsely arachnoid-floccose abaxially, base sometimes slightly decurrent, margins entire or basal leaves sometimes with 1-3 pairs of linear-lanceolate lobes to 1 cm, apex acute. Capitulescence open-corymbiform, rounded or flat-topped, capitula several, pedunculate; peduncles mostly 5-10 cm. Capitula pseudoradiate, 25-35-flowered; involucre 1.1-1.6 × 0.9-1.5 cm, campanulate becoming broadly turbinate post-fruit; phyllaries graduate, 4-7-seriate, appressed, green proximally, 3-7-striate, glabrous or sometimes sparsely arachnoid-floccose, regularly pectinate-lacerate distally, teeth c. 1 mm, triangular-lanceolate, the scarious apex c. 1 mm, not obviously appended, white to darkened, not spinose; outer phyllaries 2-5 × 1.3-2.5 mm, triangular; inner phyllaries 11-16 × c. 3 mm, lanceolate; receptacle with smooth-margined bristles to 5+ mm. Marginal florets usually 7-12, sterile; corolla 20-25 mm, pseudoradiate, usually blue, limb cuneate, slightly ascending to exserted laterally, lobes usually 4-6 mm, usually < 1/2 of limb length, triangular-lanceolate. Disk florets: corolla 10-15 mm, usually blue, throat 2-3 mm, lobes usually 3-5 mm, nerves submarginal; anthers blue to blackish, appendage c. 2 mm, often outwardly arcuate; style trunk annular ring 0.2.-0.3 mm, subterminal, branches c. 0.5 mm, spreading. Cypselae 3-5 mm, ellipsoidal, whitish, strigose-villous, basal scar to 1+ mm; pappus 1.5-5 mm, not exserted from involucre, of many unequal persistent scabridulous bristles. 2n = 24. Flowering Apr-June. *Cultivated as garden ornamental, weedy in corn fields.* Ch (Santiz 753, CAS); H (*Cámbar 169*, TEFH); ES (Standley et Calderón, 1941: 370). 1500-2400 m. (native to Europa; widely cultivated and naturalized in Canadá, Estados Unidos, Mexico, Mesoamerica, Ecuador, Chile, Argentina; Africa, Asia, Australia, New Zealand, Pacific Islands.)


*Plectocephalus rothrockii* (Greenm.) D.J.N. Hind.

Unarmed tap-rooted annual or biennial herbs 0.3-1.5 m; stems usually 1, erect, exalate, sulcate-striate, few-branched, glandular, otherwise hirtellous distally. Leaves 3-10 × 0.7-1.5(-2)
cm, oblanceolate to lanceolate, non-spinose, surfaces concolorous, punctate-glandular, adaxial surface hirtellous, adaxial surface sparsely arachnoid-floccose and also often hirtellous, base subamplexicaul, margins entire or sometimes denticulate, hispidulous, apex acute to attenuate; distal leaves becoming bracteate. Capitulescence monocephalous, 1-5 per plant, stems evenly bracteate-leafy to near capitula, capitula pedunculate; peduncles mostly 2-10 cm, dilated and fistulous distally, glandular and arachnoid-floccose. Capitula 3-5+ cm, pseudoradiate, 50-100+-flowered; involucre 2-3.5 × 2-5 cm, hemispherical; phyllaries usually 2-3 mm diam., 8-10-seriate, appressed, green proximally but with an obvious apical appendage, 7+-striate, appendage 3-10 × 4-7 mm, triangular, pectinate but never spinose, mid-series phyllaries with appendage with 8-12+ pairs of usually closely spaced linear-lanceolate teeth, teeth 2-4+ mm, ciliate, appendage erect or spreading, brown, often puberulent; outer phyllaries ovate, floccose-tomentose, evenly grading to the inner phyllaries, inner phyllaries oblong and usually glabrous; receptacle with smooth-margined bristles to 10+ mm. Marginal florets 25-50+, sterile; corolla 35-70 mm, filiform-pseudoradiate, spreading laterally or drooping, lavender to pink throughout or tube sometimes yellowish, lobes usually 5, 15-30 mm, linear, nerves submarginal. Disk florets 50+; corolla 20-31 mm, yellowish or cream-colored, tube 8-15 mm, throat and lobes subequal, lobes 6-8 mm; anthers 5-7 mm; style branches c. 0.5 mm. Cypselae 3.5-5.5 mm, ellipsoidal to obovoid, dark brown, obscurely striate, glabrous; pappus (2-)5-8+ mm, not exserted from involucre, of many unequal deciduous barbinate bristles, outer cypselae sometimes epappose. Flowering (in Oaxaca) Jun-Oct. Disturbed areas, meadows, Pine-oak forests. Ch (expected). 2000-2300 m. (United States, Mexico S to Tehuantepec, Oaxaca; expected in adjacent SW Chiapas.)

Greenman (1904) mentioned that his observations on Centaurea americana and C. rothrockii were based upon specimens in GH, Hind (1996) cited the Greenman holotype as F, but neither potential type has been seen by me.

3. Cirsium Mill.

Por J.F. Pruski.

Annual to perennial mostly stout herbs to c. 4 m, rarely acaulescent, spiny; stems usually 1 from base, erect, simple or distally branched, commonly striate, occasionally winged, often fistulose. Leaves basal (rosulate, often deliquescent) and cauline, alternate, mostly sessile and subamplexicaul, mostly pinnatifid to pinnatifid, venation pinnate, surfaces glabrous to arachnoid-tomentose, usually eglandular (ours) or sometimes glandular, glands capitate or punctate, margins and lobes spiny, spines simple, usually stramineous. Capitulescence

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monocephalous or corymbiform to less commonly paniculate. Capitula discoid; involucre commonly cylindrical or urceolate to hemispherical or globose; phyllaries many, mostly elliptic-lanceolate to linear-lanceolate, imbricate, subequal or more commonly graduated, pluriseriate, usually chartaceous or subcoriaceous, typically proximally stramineous or green, often distally colored (often violet); outer and mid-series phyllaries often spine-tipped, base appressed, distally spreading or sometimes recurved to erect; inner series mostly erect or ascending, apex often spineless; receptacle flat to convex, +/- dry, epaleate but usually bristly-setose, setae often to c. 10 mm, margins entire, cypsela insertion areoles flat. Disk florets 25-200+, typically bisexual; corolla elongate tubular-funnelform, 5-lobed, often distal end bent outward, mostly violet or purplish to infrequently yellow or cream-colored, glabrous (ours) or lightly glandular, tube elongate, slender; anthers stramineous to violet, commonly long-caudate, filaments free, papillose or occasionally not so; style generally with a minute annulus (ring of sweeping papillae) on trunk just below bifurcation, branches short, appressed for much of their length, the free apex often obtuse, often slightly spreading. Cypselae basifixed, smooth, not ribbed, glabrous, apically truncate, ovary wall calcium oxylate crystals often large and elongate; pappus commonly of many 3-5-seriate subequal elongate plumose stramineous to brownish bristles or sometimes setiform squamellae, basally connate and mostly deciduous as a ring, sometimes persistent, outer bristles sometimes slightly shorter than and basally broader than the inner ones. $x = 17$. Aprox. 250-300 spp. Nearly cosmopolitan with most species temperate Eurasian, about 75 spp. occurring in North America, aprox. 35 spp. in the Neotropics, many spp. often aggressively weedy.

*Cirsium* is characterized by plumose pappus bristles, the feature traditionally used to separate it (perhaps artificially so) from the otherwise similar *Carduus*, which has a scabrid to barbellate pappus. The common names for the genus are "cardo" and "cardo santo" (Spanish) and thistle (English). Petrak (1910, 1911) revised the Central American species of the genus and Petrak (1917) gave a detailed treatment of *C. horridulum*. A very useful overview of the Cynareae and *Cirsium* was given by Scott (1990).

The endothecial tissue and ovary wall crystal types are those reported by Dormer (1961, 1962). Ownbey et al. (1975[1976]) published the chromosome number counts used herein, drawing special attention to aneuploidy found in our suite of species. Gerald Ownbey was the acknowledged authority of *Cirsium*, and species circumscriptions here are basically based on his herbarium annotations.

The report by Mociño (1993: 126) of *Carduus nutans* L. cultivated in Chiapas is presumably in reference to a species of *Cirsium*, and McVaugh (2000) cites as *Cirsium* Sessé and Mociño material from Mexico that was originally determined as *Carduus nutans*. *Cirsium cernuum* Lag.
has been occasionally misapplied to Flora Area species, but proves instead to be an earlier name for the Mexican taxon formerly called *C. nivale* Kunth.

Phyllary colors and corolla colors given below in the key and species treatments basically refers distal portions, as the bases are often pale in color. As a matter of convenience, stem pubescence as given below basically refers to that distally, i.e., as that typically represented on most herbarium specimens, and older proximal portions of stems are often glabrate, albeit often not stated herein.


1. Stems winged from at least mid-stem decurrent leaf margins.
   2. Leaf adaxial surfaces prickly.
   8. *C. vulgare*
   2. Leaf adaxial surfaces never prickly.
      3. Involucres densely arachnoid-lanate proximally; outer phyllaries rigid-spined, spines 5-15 mm.
      5. *C. radians* [pro parte]
      3. Involucre glabrous or loosely arachnoid-pubescent; outer phyllaries moderate-spinose, spines 2-8 mm.
      4. Leaf surfaces +/- discolorous, lobes narrowly to broadly triangular, spines typically much less than 1/4 as long as lobes; phyllaries not drying blackish-brown; corollas 24-33 mm; not drying dark purple, lobes erect or slightly spreading.
      3. *C. mexicanum*
      4. Leaf surfaces +/- concolorous, lobes triangular-lanceolate to lanceolate, spines usually about 1/2 length of lobe; phyllaries sometimes drying blackish-brown; corollas; corollas mostly 17-22 mm; usually drying dark purple, lobes flexuous to coiling-recurved.
      4. *C. nigriceps* [pro parte]

1. Stems exalate.
   5. Involucres closely subtended by few-many erect, pectinate-spinose bracteate leaves forming false or secondary involucres.
   6. Plants caulescent 0.5-2 m; several outer phyllaries pectinate-spinose, phyllaries finely scabridulous; receptacles with setae mostly 4-9 mm; corollas usually 30-45 mm; pappus
bristles noticeably shorter than corollas, stramineous.

2. C. horridulum

6. Plants subacaulcent or nearly so; outer phyllaries mostly not pectinate-spinose, inner
phyllaries mostly glabrous; receptacles with setae 1-2 mm; corollas 22-29 mm; pappus
bristles about as long as corollas, fuscous. 6. C. skutchii

5. Involucres not closely subtended by leafy false or secondary involucres.

7. Corolla lobes much longer than the short throat, anther filaments visible, exserted from
corolla throats.

8. Outer phyllaries appressed and erect, margins entire or rarely pectinate-spinulose;
corollas 24-28 mm. 1. C. consociatum

8. Outer phyllaries commonly reflexed, margins pectinate-spinose; corollas 30-60 mm.

7. C. subcoriaceum

7. Corolla lobes and throat subequal, anthers filaments included within throats.

9. Leaf surfaces +/- concolorous; involucres glabrous or loosely arachnoid-pubescent;
phyllaries sometimes drying blackish-brown, outer phyllaries moderate-spinose, spines
2-8 mm. 4. C. nigriceps [pro parte]

9. Leaf surfaces discolorous; involucres densely arachnoid-lanate proximally; phyllaries
not drying blackish-brown, outer phyllaries rigid-spinose, spines 5-15 mm.

5. C. radians [pro parte]

1211 (GH!). Illust.: none found. N.v.: none.

Like Cirsium radians, perennial herbs (0.1-)0.2-0.6(-1.5) m; stems few-branched distally,
exalate, arachnoid-pubescent. Leaves mostly 10-50 × 4-10 cm, deeply pinnatifid to near midrib,
lanceolate to oblanceolate in outline, sessile or with winged petiolar bases, spiny, mostly cauline
at anthesis, surfaces discolorous, adaxial thinly arachnoid-pubescent to glabrate, abaxial surface
gray-tomentose, margins not decurrent onto stem, 4-15 lobed, lobes mostly 1-5 × 0.5-1.5 cm,
broadly triangular or proximal few reduced to spines, 2-3-furcate, lobes and lobules spinose,
lobes and sinuses otherwise unarmed, spines 5-10 mm, usually about 1/3 to 1/4 length of lobe,
rachis 0.5-1 cm diam., apex very long-attenuate. Capitulescence open corymbiform, few-
capitulate, capitula sessile to short-pedunculate, subnutant; peduncles 0-2 cm, arachnoid-
tomentose. Capitula 3.5-4.5 cm; involucre 3.5-4.5 × 4-8 cm, campanulate to subhemispherical,
not closely subtended by leafy false or secondary involucre, arachnoid-pubescent; phyllaries 15-
45 × 1-3 mm, linear-lanceolate, 5-6-seriate, appressed and erect, straight, stiff, maroon to
purplish, arachnoid-pubescent, margins entire; outer series of phyllaries gradually moderate-spinose, spine 2-4 mm, yellow-stramineous; inner series of phyllaries long-attenuate, not spinose; receptacle with setae 4+ mm. Disk florets: corolla 24-28 mm, whitish to lavender, tube 10-12 mm, lobes much longer than the short throat, throat c. 3 mm, lobes 11-13 mm, ascending-erect; anthers 6.5-7 mm, filaments visible, exserted from corolla throat, papillose, appendage 1-1.5 mm, apex acuminate; style branches c. 2.5 mm above annulus. Cypselae c. 5 mm, brown; pappus bristles c. 25 mm, stramineous. Flowering Sep. Alpine meadows. G (Skutch 1211, GH). 3300-3700 m. (Endemic.)

*Cirsium consociatum* is known to me from only the type, although Nash (1976f) seems to have seen additional material.


Biennial caulescent herbs 0.2-1.5(-2) m, sometimes forming giant basal rosettes to 1.2 m diam.; stems 1-10 cm diam., stout, mostly simple-stemmed below capitulescence, exalate, sometimes distally purplish, arachnoid-tomentose to glabrate. Leaves basal (rosulate) and cauline, proximal leaves usually present at anthesis though typically not represented in herbarium specimens, basal and distal leaves sometimes remarkably dimorphic in size with rosulate leaves sometimes giant, sessile throughout or proximal leaves winged petioliform to base; blade mostly 7-60 × 1.5-15 cm, unlobed or spiny-dentate to more commonly pinnatifid (distal leaves often pinnatifid to deeply so), narrowly lanceolate or oblanceolate to oblong-elliptic in outline, midrib broad and pale-colored, surfaces generally green and concolorous or margins often purplish, adaxial surface glabrous to sometimes sparsely villous, abaxial surface glabrous to sometimes arachnoid-tomentose, margins commonly with 6-15 pairs of well- to closely-spaced spiny lobes, lobes mostly 1-3.5 cm, deltate to narrowly lanceolate, spines unequal in size, 2-40
mm, individual lobes often with 1-3 spines much larger than the rest, rachis mostly 0.5-2 cm
diam., apex acute to attenuate. Capitulescence monocephalous to tightly corymbiform, 1-5(-15)-
capitulate mostly in distal c. 20 cm of stem, lateral branches not overtopping central axis,
infrequently several-capitulate with somewhat open branching, usually short-pedunculate with
peduncle of lateral capitula mostly much shorter than capitulum; peduncles (0-)1-6 cm, generally
arachnoid-tomentose. Capitula 3-6 cm; involucre (2.5-)3-5.5 × (2-)3-8 cm, cylindrically quickly
becoming campanulate, prominently subtended by few to many 1-3-seriate appressed lanceolate
pectinate-spinose bracteate leaves forming a false or secondary involucre slightly shorter than to
longer than true involucre; phyllaries 5-9-seriate, appressed, often purplish margined,
infrequently loosely arachnoid-pubescent, finely scabridulous; the outer phyllaries 10-15 × 2-3
mm, deltoid to lanceolate, margins distally pectinate-spinose, apex attenuate terminating in stiff
spine; grading to inner phyllaries (25-)30-55 × c. 2 mm, linear-lanceolate, margins entire, apex
long-attenuate, softly spinulose; receptacle with setae mostly 4-9 mm, setae about as long as to
longer than cypselae. Disk florets: corolla usually 30-45 mm, lavender to cream-colored,
infrequently yellow or reddish, tube 19-29 mm, very slender, throat 6-8 mm, lobes 5-8 mm,
ascending or slightly flexuous; anthers 5-7 mm, tail c. 1.5 mm, apical appendage c. 1 mm, long-
apiculate; style exserted to c. 5 mm from anther cylinder, branches to c. 4 mm, apical 0.5-1 mm
free. Cypselae 4-5(-6) mm, light brown; pappus bristles 25-38 mm, noticeably shorter than
corolla, stramineous. 2n = 32, 33, 34, 35. Flowering Jan, Mar, May, Jul, Oct-Nov. Disturbed
areas, roadsides, marshes, inundated areas, pastures, thickets, pine-oak forest. Ch (Ownbey y
Muggli 3990, NY); Y (Garcia y Koch, 1995: 28); C (Chan 1981, NO); QR (Villaseñor, 1989: 40);
B (Balick et al, 2000: 149); G (Türckheim II 2148, GH); H (Nelson Sutherland, 2008: 157). 0-
2400 m. (E + SE Estados Unidos, México, Mesoamerica, Bahamas.)

Petrak (1911) if not the first was among the first to identify at least some tropical Mexican
material as formerly USA-endemic C. horridulum [viz Cirsium horridulum subsp. chrismarii
(Klatt) Petr.], but Ownbey et al. (1975[1976]) used the names C. horridulum and C. vittatum for
material from Mexico. Indeed as circumscribed here, C. horridulum is variable in amount of
indumentum of leaves and phyllaries, in leaf lobing, and corolla color, features occasionally used
to recognized infraspecies within C. horridulum. However, no taxonomically significant
morphologies or geographic correlations were seen by me and thus no infrataxa are recognized
here.

Only minor variation was seen in receptacular setae length among populations of C.
horridulum, and setae length proves useful taxonomically in distinguishing C. horridulum from
C. skutchii. The yellow corollas occasionally found in C. horridulum are rare within Cirsium.
*Cirsium horridulum* is further diagnosed by its caulescent habit, capitula false or secondarily involucrate, and scabridulous phyllaries.


N.v.: ch'ishwash, Ch; cardo santo, omil, Y; cardo, cardo santo, omil, omil, C; omil, cardo, cardo santo, omil, QR; alcachofa de monte, cardo santo, cardo santo macho, suctzún, G; cardo, cardo santo, cardo santo, punzaquedito, H; cardo-santo, alcachofa de monte, ES; cardo, CR.

*Cnicus costaricensis* Pol., *Cirsium mexicanum* var. *bracteatum* Petr., *Cnicus mexicanus* (DC.) Hemsl.

Frequent perennial herbs (0.3-)0.7-3 m; stems distally branched, winged at least from decurrent mid-stem leaf margins, lightly arachnoid-pubescent, wings short or long-tapered to c. 4(-6) cm, commonly spiny. Leaves (2.5-)4-40(-45) × 2-16(-24) cm, mostly cauline at anthesis, pinnatifid-runcinate to elliptic in outline, usually cut about 1/2-2/3 to midrib, rarely non-lobed, surfaces +/- discolorous, adaxial surface weakly arachnoid to glabrate, never prickly, abaxial surface laxly to appressed arachnoid-tomentose, grayish-white, at least mid-stem leaf margins decurrent onto stem as wings, margins usually with 2-6 pairs of lobes, lobes mostly 1-3(-7) × 0.5-2(-4) cm, narrowly to broadly triangular, irregularly-spinose, spines 1-10 mm and typically much less than 1/4 as long as lobes; proximal leaves commonly decurrent on the stem, petiolate or petiolariform, petiole to c. 5 cm; distal cauline leaves sessile, often only inconspicuously decurrent, basal auricles strongly and densely spiny, spines to c. 15 mm. Capitulescence openly to tightly corymbiform, 3-6(-11)-capitulate, short-pedunculate, remotely leafy; peduncles (0.1-)1-2 cm, arachnoid-tomentose. Capitula 2.8-3.8 cm; involucre 2.5-3(-3.5) × 2-4 cm, cylindrical quickly becoming campanulate, not closely subtended by leafy false or secondary involucre, glabrous or loosely arachnoid-pubescent; phyllaries 8-30(-35) × 1-3 mm, lanceolate to linear-lanceolate, 8-10-seriate, not drying blackish-brown, margins entire, glabrous or outer ones loosely arachnoid-pubescent; the outer phyllaries 1-3-nerved, brownish, apex moderate-spinose, spine 2-8 mm, often slightly spreading; inner phyllaries 3-5-nerved, stramineous with apex brownish or purplish, apex long-attenuate, not spinose, ascending-flexuous. Disk florets: corolla 24-33 mm, pink to lavender or sometimes whitish, not drying dark purple, tube 15-20 mm, throat 5-7 mm, lobes 4-6 mm, erect or slightly spreading; anthers 4.5-5.5 mm, appendage 1-1.5 mm, apex acute; style slightly exserted, branches 2-3 mm, apical c. 0.3 mm free, slightly reflexed. Cypselae 3-5 mm, brown, lustrous; pappus bristles 23-30 mm, stramineous. 2n = 22. Flowering Year-round.

*Disturbed and waste areas, fields, pastures, trails, roadsides, forest edges, secondary growth,*
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upland forests, volcano slopes. T (Garcia y Koch, 1995: 32); Ch (Pruski et al. 4193, MO); Y (Gaumer et al. 23590, MO); C (Lundell 1202, NY); QR (Davidse et al. 20078, MO); B (Gentle 1062, NY); G (Greenman y Greenman 5856, MO); H (Molina y Molina 24467, MO); ES (Calderón 775, NY); N (Molina 20578, NY); CR (Lent 2404, MO); P (Hammel 3029, MO). 10-2300 m. (México, Mesoamerica, Cuba, Hispaniola, Puerto Rico.)


Perennial herbs 1-2 m; stems several-branched distally, winged or more commonly exalate, arachnoid-pubescent. Leaves mostly 10-25 × 3.5-6 cm, deeply pinnatifid to near midrib, lanceolate in outline, sessile, very spiny, mostly cauline at anthesis, venation often noticeable, surfaces +/- concolorous, adaxial surface villosulous to glabrulate, never prickly, abaxial surface midrib often arachnoid-tomentose or sparsely so, surface otherwise glabrous or sometimes sparsely arachnoid-tomentose, margins usually not decurrent onto stem, mostly 6-15 lobed, lobes mostly 1.5-3 × 0.2-1 cm, triangular-lanceolate to lanceolate, irregularly spinose, each lobe usually stoutly 2-5-spinose from strong secondary veins, lobes and sinuses also spinulose-serrulate, spines mostly 7-11 mm, rigid, stramineous, usually about 1/2 length of lobe, spinules mostly 1-3 mm, rachis mostly 0.5-0.8 cm diam., apex long-attenuate. Capitulescence of several leafy branches, branch apex tightly corymbiform and mostly 3-7-capitulate, capitula subsessile to short-pedunculate; peduncles 0.5-1.5 cm, arachnoid-tomentose. Capitula mostly 2-3 cm; involucre mostly 1.7-2.5 × 1.5-2 cm, campanulate, not closely subtended by leafy false or secondary involucre, but the spreading distal cauline leaves sometimes pressed and falsely overlaying involucre, glabrous or loosely arachnoid-pubescent; phyllaries mostly 10-25 × 1-2 mm, linear-lanceolate, 5-7-seriate, appressed and erect, margins entire; outer phyllaries sometimes loosely arachnoid-pubescent, mid-zone usually drying blackish-brown, apex gradually moderate-spinose, spine 2-4 mm, stramineous; inner phyllaries glabrous, mid-zone and apex usually drying blackish-brown, apex attenuate, not spinose. Disk florets: corolla mostly 17-22 mm, whitish to purplish, usually drying dark purple, tube 9-12 mm, basal ribs often prominent, lobes and throat subequal, throat c. 5 mm, lobes 3-5 mm, flexuous to coiling-recurved; anthers 6-7 mm, stramineous, filaments included within corolla throat, appendage c. 1 mm, apex acute; style branch apical 0.2-1 mm free. Cypselae 3-3.7 mm, brown; pappus bristles c. 15 mm, sordid, apex sometimes weakly swollen. Flowering May-Aug. 2n = 36. Montane forests, hillsides, alpine meadows. Ch (Matuda 4599, MO); G (Steyermark 50157, F). 3000-3700 m. (Endemic.)

This species was described as exalate, but stems wings may be seen on some specimens.

*Cirsium guatemalense* S.F. Blake, *Cnicus radians* (Benth.) Hemsl.

Biennial or perennial herbs 0.5-2 m; stems few-branched distally, exalate or infrequently winged, loosely arachnoid-pubescent. Leaves 7-33 × 2.5-13 cm, deeply pinnatifid to near midrib or proximal leaves pinnatilobed, lanceolate or oblong to proximal leaves sometimes elliptic in outline, sessile, usually very stoutly spiny, mostly cauline at anthesis, surfaces discolorous, adaxial surface loosely arachnoid-pubescent to glabrate, never prickly, abaxial surface usually grayish-white arachnoid-tomentose to sometimes loosely so with veins subglabrous, margins usually not decurrent onto stem, infrequently decurrent 0.5-3 cm, 4-12 lobed, lobes mostly 1-3(-5) × 0.2-1.5(-2.5) cm, triangular-lanceolate to linear-lanceolate, spines subequal to sometimes strongly unequal, each lobe 1-2(-4) usually stoutly spinose to less commonly moderately spinose, lobes and sinuses otherwise few-spinulose to smooth, spines mostly 5-25 mm, usually rigid, stramineous, spines usually 1/2-2/3 of lobe length to less commonly moderately spinose with spines less than half of lobe length, spinules mostly 1.5-4 mm, rachis mostly 0.2-0.6(-3.5) cm diam., apex often long-attenuate. Capitulescence open-corymbiform or rarely monocephalous, mostly few-capitulate, capitula subsessile to pedunculate; peduncles 0.5-4(-10) cm, usually loosely arachnoid-pubescent. Capitula mostly 2.5-4 cm; involucre mostly 2-3 × 3-5 cm, campanulate to narrowly so, not closely subtended by leafy false or secondary involucre, densely arachnoid-lanate proximally; phyllaries mostly 12-30 × 1-2 mm, linear-lanceolate, 6-7-seriate, appressed and erect or sometimes outer series spreading but then straight and not reflexed (though often pressed as though recurved), rigid-subcoriaceous, not drying blackish-brown, 1-nerved, densely arachnoid-lanate and brownish proximally, margins usually entire or an outer phyllary or two rarely pectinate-spinulose; outer few series of phyllaries attenuate and gradually rigid-spined, apex glabrous, spines 5-15 mm, stramineous; inner phyllaries moderate-spined to spinulose, less commonly flexuous and non-spined. Disk florets: corolla 19-28 mm, pink to lavender, not drying dark purple, tube 10-14, lobes and throat subequal, throat 4-6 mm, lobes 5-8 mm, ascending to erect; anthers c. 7 mm, stramineous, filaments included within corolla throat, appendage c. 1 mm, apex acute; style branch apical c. 0.2 mm free. Cypselae to c. 4.5 mm, brown, with a distinct annular stramineous rim to c. 0.4 mm; pappus bristles to c. 20 mm, sordid, reaching to proximal part of corolla lobes, apex sometimes swollen. Flowering Jun-Jan. 2n = 34. *Pastures, hillsides, open pine-oak forests, roadsides, volcano slopes*. Ch (*Breedlove 29407*, MO); G (*Ownbey y Muggli 3980*, NY); ?H (Nelson Sutherland, 2008: 157-158). 2400-3500 m. (Endemic.)
Cirsium guatemalense is treated here as a synonym of *C. radians*, following Nash (1976f) and annotations by G. Ownbey (en sched.). *Cirsium guatemalense*, however, was described by Blake (1937) as winged-stemmed (and with corolla throat and lobes subequal). The report by Nelson Sutherland (2008) of this species in Honduras was not verified herein and is possibly based on a misdetermination.


Polygamodioecious subacaulescent perennial herbs 0.06-0.18 m [i.e., 6-18 cm], rhizomes short, 1-3 cm diam.; stems exalate, central stem 0.02-0.14 m [i.e., 2-14 cm], erect, very leafy, sometimes procumbent less leafy lateral stems also present. Leaves 15-30+, 5-20(-35) × 2-6 cm, mostly basal and rosulate, winged-petiolar, rosette densely leafy, stems with a few smaller leaves, pinnatifid to near midrib, narrowly ob lanceolate in outline, surfaces concolorous or infrequently discolorous, adaxial surface glabrous, abaxial surface infrequently arachnoid-tomentose between the spines to more commonly glabrate, lobes usually 8-13 per side, mostly 1-3 × 0.4-0.8 cm (including terminal spine), lanceolate to triangular-lanceolate, the proximal few lobes often manifest only as a spine, all lobes with a long-spinose apex and also basal-laterally usually prominently few-spinose, terminal spine 7-14 mm, usually about 1/2 length of entire lobes (about as long as leafy part of lobes), stramineous, lobes 1-2 cm apart on rachis, about subequal to sinuses to lobes about 2× as wide as sinuses, rachis mostly (0.3-)0.5-1 cm diam.; petiolar base of basal leaves to 7 cm. Capitulescence subsessile to short-pedunculate, 1-5(-9)-capitulate, capitula solitary terminating rhizome or short branches; peduncles mostly 0-4 cm, bracteate-leaved. Capitula 3-4.5 cm, mostly bisexual or some seemingly only pistillate; involucre 2.5-3.5 × 2-4 cm, campanulate, closely subtended by a few erect, pectinate-spinose bracteate leaves forming a false or secondary involucre about as long as the involucre; phyllaries 15-35 × 1.5-4 mm, triangular-lanceolate to lanceolate, 5-7-seriate, appressed throughout, greenish-brown for most of their lengths, mostly glabrous, margins entire or outer few phyllaries infrequently indistinctly pectinate, apex spinose, spine 3-5 mm, stramineous, inner phyllaries mostly glabrous, margins sometimes ciliolate distally, apex spinose to merely spinulose; receptacle densely short-setose, setae 1-2 mm, setae much shorter than cypselae. Disk florets: corolla 22-29 mm, lavender to whitish, tube 15-20 mm, throat c. 4 mm, lobes 3-5 mm, erect to flexuous; anthers 4.5-5.5 mm, filaments (2-)3-4 mm, glabrous, tails c. 0.5 mm, about as long as collar appendage c. 1 mm, apex acuminate; style branches c. 0.5 mm, lanceolate. Cypselae 3.8-5 mm, subcompressed, brown, lustrous; pappus bristles 22-28 mm, about as long as corolla, fuscous. 2n = 34. Flowering Mar,
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Jul-Sep. Alpine meadows, open Juniperus forest. G (Ownbey y Muggli 3962, NY). 3200-3700 m. (Endemic.)

This species appears to be endemic to the plateau of the Sierra de los Cuchumatanes. Blake (1937) described the species as dioecious and the holotype as pistillate. Although, it appears that the holotype instead is simply of a plant in fruit and most collections have bisexual capitula, it nevertheless seems best in deference to Blake to provisionally characterize the species polygamodioecious, a sexual condition known, for example, in temperate *C. arvense* (L.) Scop.


Frequent perennial herbs (0.5-)1-3(-4) m; stems few-several-branched distally, exalate, loosely arachnoid-tomentose. Leaves mostly 10-60(-80) × 2-35(-45) cm (bracteate leaves of peduncles often much reduced), deeply pinnatifid c. 4/5+ midrib or distal leaves merely pinnatilobed, broadly lanceolate to oblong in outline, mostly cauline at anthesis, surfaces discolorous, adaxial surface loosely arachnoid-tomentose becoming glabrate, abaxially arachnoid-tomentose, grayish-white, base of proximal leaves sometimes gradually attenuate, not decurrent on the stem, margins usually with 4-9 pairs of lobes, lobes mostly 1.5-15 × 0.5-4 cm, triangular to lanceolate or oblong, spinose-dentate to rarely becoming secondarily lobed, spines of individual lobes subequal, spines 4-12(-20) mm, usually very much smaller than lobes, rachis mostly 0.8-3.5 cm diam., apex acuminate; proximal leaves commonly narrowly winged petiolate, midrib often broad and pale-colored; distal leaves sessile. Capitulescence monoecephalous or openly corymbiform on distal third of main stem, 1-7(-13)-capitulate, short-long-pedunculate, remotely bracteate-leafy; peduncles 1-5(-20) cm, usually not longer than capitulum, usually erect or less commonly capitula slightly nutant, loosely arachnoid-tomentose. Capitula 3.5-6(-10) cm; involucre 3.5-5.5(-8) × (3-)4.5-7(-10) cm, globose-ovoid, not closely subtended by a leafy false or secondary involucre; phyllaries usually 100-200+, mostly 2-4(-5) mm diam., 10-15-seriate, midrib not prominent; outer phyllaries 15-25 mm, triangular-lanceolate to lanceolate, green at least in distal 1/2, usually densely arachnoid-tomentose proximally, margins pectinate-spinose, apices stiffly
spinose, at maturity outer several series commonly strongly reflexed or bent outward at mid-point; quickly grading to innermost phyllaries 35-60(-80) mm, lanceolate to linear-lanceolate, erect, stramineous throughout or distal 1/2 orangish or reddish, never finely scabridulous to rarely slightly papillose-scabridulous distally, usually glabrate, margins entire or subentire, apex attenuate, sometimes flexuous or sublacerate-serrulate; receptacle with setae 4-8+ mm. Disk florets: corolla 30-60 mm, violet or cream-colored to orangish-red or sometimes yellow, tube 15-28 mm, limb deeply 5-lobed to near base, lobes much longer than the short throat, throat 1-2 mm, very short, lobes 14-30 mm, linear, erect or slightly spreading; anthers c. 13 mm, filaments obviously papillose, clearly visible, exserted from corolla throat, appendage c. 3 mm, apex obtuse; style branches 1.5-3 mm, apical c. 0.3(-0.8) mm free. Cypselae 4.5-6.5(-8) mm, dark brown, lustrous; pappus bristles 20-40 mm, stramineous to sordid. $2n = 34, 36$. Flowering Year-round. Disturbed weedy areas and roadsides, fields, pastures, low secondary forest, open forests, selva mediana alterada, cloud forests, montane forests, pine-oak forests, secondary forests, thickets, subparamos, volcano slopes. Ch (Matuda 2847, NY); QR (Cabrera y Cabrera 3520 bis, MO); G (Pruski y Ortiz 4289, MO); H (Clewell 3807, NY); ES (Villacorta y Reyna de Aguilar 722, MO); N (Araquistain y Sandino 1403, MO); CR (Pruski et al. 3848, MO); P (Allen 1588, MO). (10-)900-3500 m. (México, Mesoamerica.)

I follow García López y Koch (1995) by recognizing as *Cirsium subcoriaceum* by its very long corolla lobes and reflexed pectinate-spinose outer phyllaries. In these features *C. subcoriaceum* is similar to *C. conspicuum* (G. Don) Sch. Bip. [and the possibly synonymous *C. anartiolepis* Petr.], but *C. conspicuum* appears to differ by narrower capitula with outer phyllaries more finely pectinate and without arachnoid tomentum, by inner phyllaries more consistently reddish, and by corolla throats and tubes subequal. Both *C. conspicuum* and *C. anartiolepis* should be looked for in the Flora Area. The TEX web cite lists Soule y Prather s.n. [“3102” fide Tom Wendt, pers. comm., IV-2011] from Chiapas as *C. anartiolepis*, but this specimen has not been seen by me and the determination is not verified here.

The sole collection know from Quintana Roo is found well outside of the normal elevational range of this species.

It is perhaps not coincidental that *C. subcoriaceum* and *C. horridulum*, the two Flora Area species with most obviously pectinate-spinose outer phyllaries, are the two species with the largest capitula. *Cirsium horridulum* is characterized its involucre closely subtended by a false or secondary involucre of pectinate-spinose bracteate leaves, and its erect finely scabridulous phyllaries, whereas *C. subcoriaceus* differs by its less spiny leaves, by lacking a secondary involucre, and by outer few series of phyllaries, these usually strongly reflexed.


Taprooted biennial herbs 0.5-1.5(-2) m; stems distally branched, winged, lightly arachnoid-pubescent, distal stem wings as long as internodes, spiny, the side that is a continuation of adaxial leaf surface prickly. Leaves 5-30(-40) × 1.5-11 cm, pinnatifid-runcinate to 2-pinnatifid to near midrib, oblanceolate to obovate in outline, mostly cauline at anthesis, slightly discolorous or concolorous, adaxial surface stiff prickly, abaxial surface laxly arachnoid-tomentose to glabrate, grayish-white or green, margins decurrent onto stem as wings, lobes 0.5-5 × 0.4-1 cm, usually lanceolate, each secondarily and prominently 2-3-lobed, gradually terminating in spines to c. 4 mm, margins otherwise entire to softly short-spineose with spinules less than 1 mm, rachis mostly 0.5-0.8 cm diam., apex long-attenuate or less commonly acute; proximal leaves winged-petiolariform, margins with up to c. 6 pairs of closely spaced lobes; distal leaves sessile, basal auricles c. 3-lobed, margins 2-4-lobed. Capitulescence corymbiform, few-many-capitulate, subsessile to short-pedunculate; peduncles (0-)1-2(-6) cm, arachnoid-tomentose. Capitula 3.5-4.5 cm; involucre 3-4 × 2-4 cm, hemispheric to campanulate, not closely subtended by leafy false or secondary involucre; phyllaries 5-40 × 1-1.8 mm, linear-lanceolate to inner series sometimes linear, strongly imbricate, 7-12-seriate, appressed with apex spreading to reflexed, green with stramineous tips, 1-costate, loosely arachnoid-pubescent, margins entire, apex spine-tipped, spine 2+ mm. Disk florets: corolla 26-35 mm, lavender, tube 17-21 mm, throat 4-6 mm, lobes 5-8 mm, flexuous to spreading; anthers c. 5 mm, appendage 1-1.5 mm, apex acute; style branch apical c. 0.5 mm free. Cypselae 3-5 mm, brown; pappus bristles 20-30 mm. 2n = 68. Flowering Aug. *Open forests, volcano slopes.* G (Holm et al. 1997: 207). 2000-3200 m. (native to Europa; naturalized in Canadá, Estados Unidos, México, Mesoamerica, Ecuador, Perú, Bolivia, Brasil, Uruguay, Chile, Argentina; introduced to Africa, Asia, Australia, New Zealand.)

4. Cynara L.

*Arcyna* Wiklund

Por J.F. Pruski.
Spiny annuals or perennial herbs; stems erect, simple or branched; herbage often arachnoid-tomentose. Leaves basal (rosulate) and cauline, alternate; blade 1-2(-3)-pinnatilobed, spineless to stoutly spinose, surfaces mostly pubescent, sometimes glandular; proximal leaves petiolate and distal leaves sessile. Capitulescence monocephalous or open-corymbiform. Capitula to 15 cm diam., large, discoid; involucr e hemispheric or ovoid; phyllaries many, imbricate, strongly graduated, 5-8+-seriate, thick-coriaceous, green, margins entire; receptacle concave to convex, carnose, densely long-bristly, bristles flattened, cypsela insertion areoles flat. Florets many to numerous, bisexual; corolla elongate tubular-funnelform, white to purple, tube filiform, limb abruptly narrow-ampliate, lobes linear-lanceolate; anther filaments free, finely papillose distally, otherwise glabrous, thecae stiff, endothecium polarized, tails fimbriate, apical appendage oblong; style branches connivent to near apex. Cypselae basifixed, narrowly obovoid, sometimes subcompressed, c. 4-angled, glabrous, apex truncate; pappus of many bristles, 3-7-seriate, connate basally and deciduous as a ring (ours), mostly plumose. $x = 17$. Aprox. 8-11 spp. Mediterranean region and W. Asia, 1 sp. subcosmopolitan.


*Cynara cardunculus* var. *scolymus* (L.) Fiori, *Cynara scolymus* L.

Tap-rooted annual or biennial herbs 0.5-1.6(-2.4) m; stems stout, striate, glabrescent to densely arachnoid, sometimes winged from decurrent distal leaves. Leaves mostly 20-80 × 10-30 cm, +/- elliptic-lanceolate to oblong in outline, surfaces glandular, adaxially green, glabrous or loosely arachnoid, abaxial surface white to griseous-tomentose, margins with 5+ well-spaced primary segments per side, primary segments usually 2-13 × 0.5-3.5 cm, entire to toothed, teeth unarmed or spinose, spines 5-30 mm, often clustered basally. Capitulescence 1-4-capitulate. Capitula 3-7(-12) × 3-9(-12) cm, globose; involucre ovoid; phyllaries 60-100, glabrous, apices often spreading laterally at anthesis; outer phyllaries 10-20 × c. 5 mm, triangular, apex acuminate; mid-series phyllaries usually stout-spinose, spines usually to 5+ mm; grading to the inner phyllaries 30-60 × 10-20 mm, apex usually acute to obtuse, aristate or mucronate. Disk florets 80-200+; corolla 35-62 mm, white to more commonly purplish, tube 25-44 mm, lobes longer than throat; style exserted to c. 13 mm from anther cylinder. Cypselae 4-8 mm; pappus bristles c. 50(-100), 20-40 mm, outer series broad-based. $2n = 34$. Flowering May-Dec. Commonly cultivated
and (in Guatemala, fide Morton, 1981) available "in all the herb markets". G (Morton 1981: 923); P (Ivan Valdespino, pers. comm, III-2011). 1500-2200 m. (Native to the Mediterranean region; cultivated and occasionally escaping in Estados Unidos, Mexico, Mesoamerica, Colombia, Venezuela, Ecuador, Peru, Brazil, Uruguay, Paraguay, Chile, Argentina, Greater Antilles; Europa, Africa, Asia, Australia, New Zealand.)

Much of this species, grown for the edible receptacles of its budding capitula (artichoke) or sometimes for edible leaf rachises (cardoon), traditionally has been called *Cynara scolymus*. However, Wiklund (1992) reduced *C. scolymus* to synonymy of *C. cardunculus*, stating that the morphological differences were basically due to human selection. Although Wiklund (1992) recognized infraspecies, here the species is recognized in the broad sense with no infraspecies. The species is perhaps not grown between Guatemala and Panama, and Barry Hammel (pers. comm., III-2011) says that he has never seen it sold in Costa Rican markets.

5. *Silybum* Vaill.
*Mariana Hill*

Por J.F. Pruski.

Spiny taprooted annual or biennial herbs; stems erect, mostly simple, exalate; herbage glabrous to pubescent. Leaves basal (rosulate) and cauline, alternate; blade spinose to 1-pinnatifoliied, leaves sessile or the basal leaves petiolate, surfaces eglandular, glabrous or glabescent, white-veined, otherwise green to variegated. Capitulescence monocephalous. Capitula large, discoid; involucre globose or ovoid; phyllaries many, imbricate. strongly graduated, 4-6-seriate, stiff, the outer and mid-series phyllary margins dentate-spinose, apex abruptly long-spinose, inner phyllaries entire and merely narrowed apically, not spinose; receptacle flat, densely setulose, cypsela insertion areoles flat. Florets 25-100+, bisexual; corolla elongate tubular-funnelform, purple, tube filiform, limb abruptly narrow-ampliate, lobes linear-lanceolate; anther filaments connate into a glabrous or papilllose short tube, tails short-caudate, slightly exserted outside of filament tube, anther appendages oblong; style branches connivent to near the slightly swollen apex. Cypselae basifixed, ovoid, subcompressed, glabrous, ovary wall calcium oxylate crystals distinctly elongate; pappus bristles pluriseriate, stramineous to pale brown, scabrid, connate basally and deciduous as a ring, outer series broad-based. \( x = 17 \). 2-3 spp. Mediterranean region and W Asia, 1 sp. subcosmopolitan.


*Mariana mariana* (L.) Hill.

Herbs 0.8-1.5(-2.5) m; stems glabrous or slightly arachnoid-pubescent, fistulose. Leaves mostly (5)8-50 × (3-)6-20 cm, lanceolate to ovate, surfaces concolorous, base at least on distal leaves (as represented on herbarium specimens) clasping and auriculate, spines 2-13 mm, tan to yellowish; mid-stem leaves margins with 3-5 closely spaced coarse triangular plurispinose lobes usually cut less than 1/2 to midrib; quickly grading to distal leaves, these distinctly larger than phyllaries, with spinose unlobed margins. Capitulescence with few capitula per plant; peduncles usually 10-20 cm, ebracteate or sometimes few-bracteate with the bracts basically being clusters of 5-10 spines without much of a "blade" per say. Capitula (3-)4-6 × 3-5 cm; phyllaries 30-50 × 8-12 mm, ovate-lanceolate, green, glabrous, outer and mid-series phyllaries abruptly bent and directed outward near mid-phyllary, the pungent apex 20-30 mm, inner phyllaries erect. Disk florets: corolla 30-35 mm, much longer than the pappus bristles, tube 18-25 mm, throat 2-3 mm, much shorter than the lobes; anther filament tube c. 2 mm. Cypselae 6-8 mm, brown with stramineous annular rim; pappus bristles 15-20 mm. 2n = 34. *Cultivated as a medicinal, easily naturalized in disturbed areas*. Ch (Márquez et al. 1999: 31). 700-2500 m. (Native to Mediterranean region; cultivated and naturalized in Canadá, Estados Unidos, Mexico, Mesoamerica, Colombia, Venezuela, Ecuador, Peru, Brazil, Uruguay, Chile, Argentina; Europa, Africa, Asia, Australia, New Zealand.)

This species is similar in the gestalt of the involucres to *Carthamus lanatus* L., which in addition to the generic distinctions, differs by phyllaries and distal-stem leaves subequal, by smaller subsessile capitula, and by yellow corollas.

VII. Tribus **Cichorieae** Lam. et DC.

*Lactuceae* Cass.

Descripción de la tribu y clave generalica por J.F. Pruski.

Annual to perennial herbs, or rarely shrubs to trees, often tap-rooted; stems rarely winged; herbage with milky latex. Leaves basal and/or cauline, simple to pinnatifolobed or pinnatifid, alternate, typically chartaceous, venation pinnate or infrequently parallel (*Tragopogon*).
Capitulescence terminal or infrequently lateral, monocephalous to paniculate, usually open, very rarely sessile in rosette. Capitula homogamous and ligulate, usually ecalyculate; phyllaries imbricate(subimbricate), graduated to sometimes subequal, (1-)3-5+-seriate, at least the inner appressed, usually +/- chartaceous with scarious-hyaline margins and/or apex, often basally indurate in fruit, typically persistent and reflexed post fruit; receptacle flat to convex, typically eapeate. Florets ligulate, bisexual; corolla often open and closing diurnally (more notably so that in many other Asteraceae), usually yellow, tube or tube-throat juncture often pubescent with stiff or crisped trichomes, limb +/- oblong, apex truncate, 5-dentate; anthers 5, well-exserted, pale or concolorous with corollas, infrequently brownish or blackish, base caudate (calcarate, fertile), anthers with endothecial tissue with mostly transitional (see Dormer, 1962) thickenings; apically appendaged, appendage usually ovate to deltate; pollen mostly echinolophate; style exappendiculate, trunk papillose distally, branches typically slender and elongate, stigmatic surface continuous from base to near apex, apex rounded to acute. Cypselae usually isomorphic within capitulum, less commonly outer cypselae shorter or different in shape or surface features, infrequently winged, usually brownish, typically glabrous or sparsely pubescent, carpopodium smooth-annulate or infrequently weakly eannulate by decurrent cypsela body costae; pappus usually of many elongate capillary bristles, less commonly of broad-based capillary bristles, scales, squamellae, or awns, bristles scabrid or sometimes plumose, 1-few-seriate, subequal or less commonly a few outer bristles sometimes shorter and smoother, typically persistent. x = 3, 4, 5, 6, 7, 8, 9 (pleiosomorphically x = 9). Aprox. 90 genera and 1700(-3900) spp. All continents except Antarctica, mostly north-temperate.

Although Cichorieae are the most readily identifiable tribe of Asteraceae, there is no consensus on number of subtribes or their delineation. Stebbins (1953) noted that traditional subtribal schemes were often based upon pappus and receptacle features (as featured in the subtribal key by Lack, 2007), but Stebbins (1953) emphasized the taxonomic value of style branch shape. The name Lactuceae has often been used (e.g., Bremer, 1994; Calderón de Rzedowski, 1997; D'Arcy y Tomb, 1975; Vuilleumier, 1973) for the tribe, but (for example) Bentham y Hooker (1873), Standley (1938), Stebbins (1953), and Nash (1976h) correctly used the tribal name Cichorieae. Mesoamerican genera are placed by Lack (2007) in eight different subtribes, discussion of which is beyond the scope of this flora.

The varying numbers of species recognized within Cichorieae (1700-3900) is basically because the there is no consensus on how to treat the aprox. 2200 apomictic microspecies described in Hieracium and Taraxacum. In general, microspecies are not recognized by
taxonomists working in the Americas, presumably in part because most American species are sexually reproducing (Vuilleumier, 1973).

The cypselae of *Launaea* and *Pinaropappus* have been described elsewhere variously as rostrate or erostrate, but here I describe our species as "tapered-subrostrate," and indeed they are neither abrupt-rostrate as in our species of *Lactuca*, nor long-rostrate as in *Taraxacum*. Similarly, *Youngia* typically differs from *Crepis* by compressed (vs. subterete) cypselae, but our sole species of *Youngia* has what I term "subcompressed" cypselae that are not nearly as strongly compressed as other genera (e.g., *Lactuca*) of the tribe.

Mociño's (1993) *Guatimalensis Prima Flora* serves as the source vouchering the reports of *Cichorium endivia* and *Sonchus arvensis* in modern-day Guatemala (see McVaugh, 1977 for locality attributions). However, Mociño's (1993) mention of three species of non-tropical *Scorzonera* L. in Guatemala is presumably erroneous. Of these names Sessé and Mociño herbarium #2766 (MA) originally determined as *Scorzonera picroides* L. is a species of *Pinaropappus*, but McVaugh (2000) said that Sessé et Mociño's usage of *S. angustifolia* L. and *S. graminifolia* L. (at least as treated by them in their Mexican floras) were not traced. Given that species of *Scorzonera* typically have relatively few large capitula and a pappus of plumose bristles, and considering the distribution of similar taxa known in Mesoamerica coupled with use of the epithets "angustifolia" and "graminifolia," it seems possible that *S. angustifolia* and *S. graminifolia* sensu Mociño (1993) were in reference to native American material of *Hypochaeris* and/or *Tragopogon*, or if cultivated then perhaps to narrow-leaved *Scorzonera hispanica* L. For example, the report by Polakowsky (1875) of yellow-flowered and widely grown *Scorzonera hispanica* L. cultivated in Costa Rica is likely correct as this species was known to be cultivated in the Americas in the 1800s, but this species is not expected to become naturalized. Illegitimate Costa Rican *Crepis heterophylla* Klatt (1895) [non (Asian) Klatt (1894)] was treated as unknown by Standley (1938), and similarly is unplaced here.

*Helminthotheca echioides* (L.) Holub and *Lapsana communis* L. are leafy-stemmed herbs native to Europa, occasional weedy in the Neotropics, and should be looked for in montane regions of Mesoamerica. *Helminthotheca echioides* is characterized by apically 2-4-furcate uncinate trichomes, yellow-flowered spiny-bracteate capitula, and fusiform rostrate cypselae topped by plumose pappus bristles. *Lapsana communis* is characterized by its small (5-10 mm) yellow-flowered capitula with c. 8 subequal phyllaries and epappose ellipsoidal costate cypselae. Additionally, *Leontodon* L. and *Lygodesmia* D. Don should be looked for in Mesoamerica.

This tribal treatment draws upon several Asteraceae floras (e.g., Cronquist, 1980; D'Arcy y Tomb, 1975; McVaugh, 1984; Nash, 1976h; Standley, 1938; Villaseñor, 1989), but important
references specific to Cichorieae used here include Calderón de Rzedowski (1997), Lack (2007), and Vuilleumier (1973).


1. Pappus typically of squamellae much shorter than cypselae; corollas usually blue or violet.

1. **Cichorium**

1. Pappus of elongate bristles; corollas (at least adaxially) yellow or bluish to reddish (including the intermediate shades of pink, lavender, violet, purple, etc.).

2. Most pappus bristles plumose; at least the inner cypselae long-rostrate (outer cypselae erostrate in *H. glabra*).

3. Corollas yellow; receptacle paleate; phyllaries graduated, 3-4-seriate; scapose herbs; leaf blades oblanceolate, venation pinnate; outer cypselae long-rostrate or erostrate.

4. **Hypocharpis**

3. Corollas violet to purple; receptacle epauleate; phyllaries subequal, 1(-2)-seriate; leafy-stemmed herbs; leaves graminoid, venation parallel; cypselae long-rostrate.

10. **Tragopogon**

2. Pappus bristles scabrid; cypselae rostrate to erostrate.
4. Corollas usually pink, lavender, bluish, or pink-purple.
5. Receptacles epaleate; cypselae obviously compressed, abrupt-rostrate; pappus bristles white or stramineous; corollas subequal; leafy-stemmed herbs.

**5. Lactuca** (*p.p.; Lactuca graminifolia*)

5. Receptacles paleate; cypselae subterete, subrostrate; pappus bristles brownish; inner florets with corolla much shorter than that of outer florets; subscapose herbs.

**7. Pinaropappus**

4. Corollas usually yellow.
6. Cypselae abrupt-rostrate or long-rostrate.

7. Leafy-stemmed herbs; capitulescences paniculate; capitula ecalyculate; phyllaries graduated; corollas subequal; cypselae abrupt-rostrate, more or less smooth.

**5. Lactuca** (*p.p.; L. sativa*)

7. Scapose herbs; capitulescences monocephalous; capitula calyculate; phyllaries subequal; corollas usually unequal; cypselae long-rostrate, rugose or spinulose-muricate distally.

**9. Taraxacum**

6. Cypselae erostrate or subrostrate.
8. Cypselae compressed.
8. Cypselae subterete or subcompressed.
9. Capitula ecalyculate; phyllaries graduated.

10. Leaves entire to toothed; herbage variously pubescent, rarely glabrous; perennial herbs with thick or fibrous roots from rhizomes or caudices.

**3. Hieracium**

10. Leaves typically runcinate-pinnatifolobed; herbage typically glabrous; annual or biennial, usually tap-rooted herbs.

**6. Launaea**

9 Capitula calyculate; phyllaries subequal.
11. Involucres 3-6 mm diam.; phyllaries 8-16, 5-8 mm, black-stipitate glandular; corollas 8-12 mm; anthers yellow; cypselae subterete, costae subequally thickened.

**2. Crepis**

11. Involucres 1.5-3 mm diam.; phyllaries 6-8, 4-6 mm, glabrous; corollas 4.5-7 mm; anthers green-black; cypselae subcompressed, costae slightly unequally thickened.

**11. Youngia**

**1. Cichorium L.**

*Acanthophyton* Less., *Cichorium* sect. *Acanthophyton* (Less.) DC.
Annual to perennial, erect tap-rooted herbs; stems usually 1(-2) per caudex, leafy, usually branched, distal leaves usually bracteate. Leaves basal and cauline, simple to pinnatifid(-bipinnatifid), basal ones usually winged-petiolate, distal cauline ones bracteate, sessile, usually amplexicaul. Capitulescence elongate, well-exserted from subtending leaves, spike-like, often compound with axis interrupted by stout elongate lateral branches or 1-capitulate peduncles diverging at c. 45°; peduncles dimorphic, most 0-2 mm, some elongate to 20+ cm. Capitula: involucre cylindrical or subcampanulate; phyllaries (10)13, slightly graduated, 2-seriate, stiff-chartaceous; outer phyllaries 5, elliptic-lanceolate to obovate, green with cartilaginous base drying tan, distal 1/2 often reflexed; inner phyllaries (5)8, lanceolate, appressed with apex often spreading, green or margins sometimes narrowly scarious; receptacle flat, epaleate (ours). Ligulate florets (5-)8-24, all florets with corollas subequal and exserted; corolla blue or violet often photographing bluish (ours), infrequently white to pink, limb exserted laterally or ascending at c. 45°; style branches elongate (ours). Cypselae isomorphic, cylindrical or obovoid, erostrate, subterete, 3-5-angled-striate, surfaces smooth and glabrous, apex truncate; pappus typically of squamellae much shorter than cypselae, squamellae several whitish erose, infrequently 1-few aristate-tipped and half or more as long as cypselae. $x = 9$. 6 spp. Eurasia and N. Africa, 2 widely cultivated, 1 widely naturalized and weedy elsewhere.

Although most floras give *Cichorium endivia* as differing from *C. intybus* by inner florets with aristate squamellae, the squamellae are late in elongating and alone cannot be used in distinguishing the species. Likewise, flower color is not fully reliable in distinguishing species, in part because color is not always true in photographs. Our species of *Cichorium* are most often cultivated as salad greens and picked pre-flower; their showy blue or violet flowers are often merely lagniappe. D'Arcy y Tomb (1975) said *C. endivia* and *C. intybus* "are probably grown from time to time" in upland regions of Panama.

Naturally to Linnaeus *C. endivia* applied to *endive*, and following tradition Kiers (2000) applied the common name *chicory* to *C. intybus*. "Reversed" applications of the common and scientific names include *Belgium endive* being a cultivar of *C. intybus* (see Vuilleumier, 1973), whereas conversely Vuilleumier (1973) noted that in France curly-leaved forms of *C. endivia* are known as *chicorée*.

1. Capitulescence bracts ovate, crisped to serrulate-margin; outer phyllaries ≥ 3/4 as long as inner phyllaries; lateral peduncles 3-6 mm diam. at apex; in fruit pappus squamellae of inner florets sometimes 1-2 mm and aristate-tipped; annuals or biennials; leaves similar in shape.

1. C. endivia

1. Capitulescence bracts lanceolate, entire-margin; outer phyllaries c. 1/2 as long as inner phyllaries; lateral peduncles 2-3 mm diam. at apex; pappus squamellae usually < 1 mm, rarely aristate-tipped; perennials; leaves dimorphic.

2. C. intybus


   Cichorium crispum Mill., C. endivia var. crispum (Mill.) Lam., C. endivia var. latifolium Lam., C. endivia var. sativa DC., C. intybus β endivia (L.) C.B. Clarke.

   Much like C. intybus, annual or biennial herbs, 1-1.5 m; stems sometimes clavate distally. Leaves (basal and cauline) similar in shape, either runcinate-pinnatifid(-bipinnatifid) or obovate and unlobed, surfaces glabrous; basal leaves usually 25-40 × 10-18 cm, grading in size to mid-stem leaves. Capitulescence with capitula solitary or in sessile axillary clusters of 4-6, clusters subtended by an ovate, crisped to serrulate-margin bract; lateral peduncles 4-20 cm, 3-6 mm diam. at apex. Capitula: outer phyllaries 7-10(-15) × 2-5(-10) mm, ≥ 3/4 as long as inner phyllaries; inner phyllaries 8-12 × 1-3 mm. Ligulate florets 15-20; corolla usually violet (but photographing bluish-violet), tube 2-3 mm, limb 10-19 × 2-4.5 mm. Cypselae 2-2.8 mm; pappus squamellae 0.4-0.9 mm, in fruit squamellae of inner florets sometimes 1-2 mm and aristate-tipped. 2n = 18. Cultivated. G (Mociño, 1993: 126); ES (Standley y Calderón, 1941: 277); CR (expected); P (expected). Elev. unknown, presumably montane. (Native to Eurasia; introduced in Canadá, Estados Unidos, Mexico, Mesoamerica, Brazil, Chile, Argentina; N. Africa, Australia, Islas del Pacífico.)

   Although Cichorium endivia is usually harvested before flowering, it should nevertheless be looked for in Mesoamerica as a garden escape. The citation by Nash (1976h) of the common name "escarola" for C. intybus, is presumably instead in reference to material that I would identify as of C. endivia. Popular cultivars include escarole (with obovate unlobed leaves, as in
synonymous C. endivia var. latifolium) and runcinate-pinnatifid-leaved curled endive (as in synonymous C. endivia var. crispum).

I follow Kiers (2000) and recognize C. endivia without infrataxa. Cichorium endivia subsp. *divaricatum* (Schousb.) P.D. Sell, recognized by Cullen et al. (2000), proves to be a synonym of C. pumilum Jacq.


Perennial herbs, 0.3-0.8(-1.2) m, caudex and tap-root very stout, stems sometimes 1-few-branched proximally, glabrate to hirsute, trichomes often broad-based. Leaves dimorphic, surfaces usually glabrous, sometimes veins or margins hispid; basal and proximal cauline leaves (6-)10-25(-30) × 1.5-4(-7), typically runcinate-pinnatifid, patent or oblongate in outline, base elongate(4-6 cm)-petioliform and attenuate, lobes 3-6-jugate, lobe apices often pointed, proximal lobes well-spaced, mid-leaf lobes c. as broad as sinus, terminal lobe usually the longest; mid-stem and distal cauline leaves few, usually 3-10 cm, lanceolate or oblong, remote, base sessile and subamplexicaul, margins usually entire or remotely denticulate. Capitulescence in distal 3/4 of plant, capitula single or in sessile axillary clusters of 2-4(-8), clusters subtended by a lanceolate entire-margined bract; lateral peduncles 3-6(-13) cm, 2-3 mm diam. at apex, 1-capitulate. Capitula 2.5-3.5 cm diam. (when capitula open and measured across from corolla apex to corolla apex), usually broader than tall; involucre 8-12(-16) × 3.5-5 mm; phyllaries glabrous to sparsely hirsute with stipitate-glandular or eglandular trichomes c. 1(-2) mm; outer phyllaries 4-6(-8) × 2-4 mm, c. 1/2 as long as inner phyllaries; inner phyllaries 8-12(-15) × 2-3(-4) mm.

Ligulate florets 14-24; corolla usually blue, tube 1.5-3 mm, limb 11.5-19 × 3-5 mm, abaxial surface often papillose distally; anther thecae c. 3.5 mm; style branches 1.5-2 mm. Cypselae 2-2.5(-3) mm; pappus squamellae 0.2-0.4 mm, those of inner florets often longer than that of outer florets, usually < 1 mm, rarely aristate-tipped. 2n = 18. Disturbed areas, gardens. G (Nash, 1976h: 441); H (Molina, 1975: 112); ES (Standley y Calderón, 1941: 277); P (expected). Elev. unknown, presumably montane. (Native to Eurasia and N. Africa; introduced in Canadá, Estados
Unidos, Mexico, Mesoamerica, Venezuela, Bolivia, Brazil, Chile, Argentina; Australia, Islas del Pacífico.)

_Cichorium intybus_ is occasionally cultivated (as an ornamental, a cool-season salad green, or as an additive to coffee) and sometimes escapes. Nash (1976h) mentioned that its cut flowers are "sometimes sold in Guatemalan markets, especially those of Quetzaltenango." Nash (1976h) cited the common name of "escarola" for _C. intybus_, a common name that appears to be applied correctly only to material that I would identify as _C. endivia_.

Cullen et al. (2000) listed "_Cichorium intybus_ subsp. _sativum_ (Bishoff) Janchen" as the cultivated chicory, but I am unable to otherwise trace this name.

2. _Crepis_ L.

Por J.F. Pruski.

Annual, biennial, or perennial, taprooted or less commonly rhizomatous, rosulate, caulescent, herbs or rarely subshrubs with woody caudices; herbage glabrous or more commonly pubescent with stipitate-glandular and non-glandular trichomes; stems erect to decumbent, 1-several, simple to much-branched. Leaves basal and/or cauline, simple to pinnatifid; petiole (when present) usually winged; basal leaves typically spatulate to oblanceolate or lanceolate, often lyrate or runcinate; cauline leaves generally present. Capitulescence commonly corymbiform or paniculate. Capitula calyculate (ours) or ecalyculate; involucres cylindrical to campanulate or sometimes hemispherical, sometimes becoming turbinate in fruit; phyllaries subequal, lanceolate; receptacle epeate. Ligulate florets with corollas slightly unequal to obviously unequal; corolla yellow (ours) or orange to rarely white or reddish, tube usually shorter than limb; anthers yellow (ours); style branches elongate. Cypselae isomorphic (ours) or occasionally dimorphic, fusiform to oblongoid, erostate (ours) or less commonly inner ones rostrate, suberete (ours), black to white, 4-35-costate, costae (subequally thickened) continuing onto weakly exannulate carpopodium (ours); pappus of numerous, white to tawny, elongate scabrid capillary bristles. _x_ = 3, 4, 5, 6, 7, 8. Aprox. 200 spp. Mostly in temperate, Europa and Asia, a few also naturalized or native to North America, Africa, Australia; several are nearly cosmopolitan weeds.

The genus was revised by Babcock (1947), who listed full generic synonymy. Only the most common or homotypic generic synonyms are given above. Babcock's (1947), revision is noteworthy for being among the first to utilize cytogenetic characters. The species of the Old World are mostly diploid, whereas many weedy species are polyploids. Published descriptions of the genus vary as to whether the capitula are said to be calyculate or ecalyculate and the
phyllaries uniseriate or 2-few-seriate. These distinctions in *Crepis* (as well as in *Taraxacum*) are somewhat arbitrary, but I describe our species as having calyculate capitula with uniseriate phyllaries because the outermost bracteoles are eximbricate and very much smaller and thinner than the subequal subimbricate phyllaries (proper), albeit not greatly differing texturally or in pubescence.

Babcock (1947) referred with doubt Mexican and Bolivia *C. heterophylla* Klatt to *Hieracium*, but did not mention heterotypic *C. heterophylla* Klatt named from Costa Rican material (mid-elevational *Pittier 6994*) by Klatt (1895). Standley (1938) could not place Costa Rican *C. heterophylla* Klatt with certainty and neither can I, but the name is an illegitimate later homonym and cannot be used.


*Crepis cooperi* A. Gray, *Crepis virens* L.

Annual or monocarpic biennial herbs, 20-60(-90) cm; stems (1-)several, mostly sparsely leafy, usually erect, simple or often 1-few-branched, hispid basally quickly grading to hirtellous distally rarely glabrate. Leaves: midrib often 3-striate to +/- mid-blade, surfaces glabrous or more commonly midrib conspicuous hispid, sometimes heterotrichous also with crisped-appressed trichomes laterally; basal and proximal stem leaves few to several, typically petiolate, blade 5-15(-20) × 1-3(-4.5) cm, spatulate to oblanceolate or sometimes lanceolate, runcinate or lyrate, base long-attenuate, margins pinnately lobed to sharply few-dentate, lobes few, unequal, directed outward, triangular, leaf and lobe apices acute or sometimes obtuse, often mucronate, proximal leaves somewhat abruptly reduced into distal stem leaves; distal leaves few, 2-4 × 0.1-0.4 cm, bracteate, sessile, auriculate and clasping, hastate-trifid or subentire. Capitulescence typically flat or slightly rounded, corymbiform, 10-15(-30)-capitulate; peduncles 1-4.5 cm, sparsely stipitate-glandular. Capitula calyculate; involucres 3-6 mm diam., cylindrical to turbinate; phyllaries 8-16, 5-8 mm, black-stipitate glandular and typically heterotrichous also with crisped-appressed trichomes, apices acute; calycular bracteoles 8, linear, 2-4 mm long and c. 1/3 as long as involucre, sparsely black-stipitate glandular. Ligulate florets 20-60, corollas obviously unequal;
corolla 8-12 mm, usually yellow throughout, tube 2-3 mm, limb 6-9 mm (sometimes reddish abaxially); anthers c. 3 mm, yellow; style branches 1-2 mm. Cypselae 1.5-2.5 mm, more or less broad-fusiform, typically light-brownish, 10-costate, costae mostly smooth (sometimes scabridulous distally); pappus bristles 3-4 mm, white, not or only slightly exserted from involucre, sometimes caducous. 2n = 6. Flowering Feb, Apr, Jun, Sep. Pastures, roadsides, volcanic craters. CR (Pruski et al. 3843, MO). 2300-3400 m. (native to Europa; naturalized in Canadá, Estados Unidos, México [Veracruz], Mesoamerica, Ecuador, Brazil, Chile, Argentina; Australia, Islas del Pacífico.)

Although a widespread weed of European original and cited for Costa Rica by Standley (1938), Crepis capillaris was only recently reported (Rzedowski y Calderón de Rzedowski, 2005) from Mexico. Crepis capillaris (fide Babcock, 1947) is one of only three species of Crepis with 2n = 6. The similar C. tectorum, also naturalized in the Americas, differs by having phyllaries strigillose ventrally, a setose receptacle, and dark brown cypselae and should be looked for in Flora Area.

3. Hieracium L.

Chlorocrepis Griseb., Pilosella Hill, Stenotheca Monnier

Por J.H. Beaman y J.F. Pruski.

Perennial herbs with thick or fibrous roots from rhizomes or caudices; stem pubescence often longer than stem diam.; herbage variously hirsute, setose, pilose, lanate, villous, stipitate-glandular, and/or floccose (minutely tomentose) with stellate trichomes, rarely glabrous. Leaves basal and/or cauline, sessile or petiolate, usually chartaceous to sometimes subcoriaceous, margins entire to toothed, infrequently (ours never) pinnatifolobed to pinnatifid. Capitulescences cymose to paniculate, few-many capitulate, occasionally monocephalous. Capitula ecalyculate; involucre narrowly campanulate to hemispheric, rarely turbinate; phyllaries imbricate, graduated, 2-several seriate, linear-lanceolate, attenuate, herbaceous, sometimes inconspicuously so, all reflexed port-fruit; receptacle epyaleate, flat to slightly concave or convex. Florets few-many, corollas +/- unequal; corolla usually yellow or rarely white (orange or pinkish in some extra Flora Area spp.); anther appendages usually acute to triangular, rarely rounded; style branches 1-1.9 mm, relatively short. Cypselae subterete, cylindrical, erostrate, often dark reddish brown, mostly 10-ribbed, narrowed basally, infrequently narrowed distally; pappus of many elongate white to sordid, persistent, elongate scabrid capillary bristles. Aprox. 200(-1000+) spp.; aprox. 110 spp. in the Americas, aprox. 72 spp. native to the neotropics.
The number of species accepted in the genus varies from about 100 (the low end given by Lack, 2007) to 1000+ as treated by some Old World authors (e.g., Juxip, 2002). Zahn (1921-1923) monographed *Hieracium* and recognized 756 species, but with *H. pilosella* L. containing 624 subspecies. Tutin et al (1976) recognized 260 species groups in Europe. Juxip (2002) inflated the number of species, in large part by elevating most of Zahn's subspecies to the species rank, accepting a total of 785 species in the former Soviet Union.

The stems and peduncles of Mesoamerican species of *Hieracium* are typically heterotrichous, often with a low, matted, floccose layer of crisped trichomes, above which may occur scattered short several-celled stipitate-glands and/or long-pilose indument, but indumentum traits may vary greatly. The capitula are ecalyculate, but Barkley et al. (2006) called the outer phyllaries calycular bracts.

The present treatment is adopted from Beaman (1990), in which 18 species were recognized in Mexico and Central America, five of 11 Mesoamerican taxa recognized being described after Zahn's monograph. The number of species (19) recognized in Mexico and Central America by Robinson y Greenman (1904) is roughly congruent with the number in Beaman (1990). Nash (1976h) recognized 10 species in Guatemala, and of the species recognized in Central America by Beaman (1990) only *H. sphagnicola* does not occur in Guatemala. The report by Hemsley (1881: 260) of South American *Hieracium lagopus* D. Don in Costa Rica is presumably based on material of either *H. abscissum* or *H. irasuense*.


1. Corolla limbs with at least lateral teeth usually 1.5-4 mm.
   2. Corollas white; capitulescence monocephalous or with mostly abortive lateral buds; **Guatemala**.
   
   2. H. clivorum
   
   2. Corollas yellow; capitulescence 3-6-capitulate; Costa Rica and Panama.

11. H. sphagnicola

1. Corolla limbs with teeth 0.3-1 mm.
   3. Phyllaries usually densely long-pilose (sparsely to densely long-pilose in *H. mexicanum*); capitula mostly relatively large (usually relatively small in *H. mexicanum*), involucres mostly ≥ 15 mm diam. [10-12(-15) mm diam. in *H. mexicanum*]; capitulescence 1-10-capitulate.
4. Basal leaves broadly oblanceolate, oblong, or obovate, chartaceous, rather densely long-pilose; peduncles flexuous.  

7. H. mexicanum [p.p.]

4. Basal leaves linear to narrowly lanceolate or oblanceolate, relatively thick-chartaceous.

5. Leaves broadest in distal half well below apex, distinctly but often remotely toothed, apex acute or acuminate.  

5. H. guatemalense

5. Leaves broadest just below apex, subentire or inconspicuously toothed, acute or obtuse.  

10. H. skutchii

3. Phyllaries sparsely to moderately long-pilose, short-pilose, sparsely floccose basally, stipitate-glandular, or glabrate (rarely densely hirsute in H. fendleri subsp. ostreophyllum); capitula usually relatively small (mid-sized in H. schultzii), involucres mostly < 14 mm diam. (12-17 mm diam. in H. schultzii); capitulescence often numerous-capitulate.

6. Leaves basal or nearly all basal, cauline leaves when present usually abruptly reduced distally.

7. Broadest leaves mostly oblanceolate, blades more than 4 times as long as broad, mostly greenish or whitish abaxially.  


7. Broadest leaves mostly obovate, ovate, spatulate, blades < 4 times as long as broad, frequently reddish to purplish abaxially.

8. Most leaves rounded; capitulescences strict.

3. H. fendleri subsp. ostreophyllum

8. Most or all leaves acute; capitulescences flexuous.

7. H. mexicanum [p.p.]

6. Leaves cauline, or basal and cauline, cauline leaves gradually reduced distally.

9. Stem bases and usually abaxial surface of basal leaves densely lanate.

8. H. pringlei

9. Stem bases and basal leaves sparsely to densely long-pilose, stem sometimes also floccose basally.

10. Cypselae conspicuously tapered distally.  

9. H. gronovii

10. Cypselae usually not tapered distally (sometimes slightly tapered in the distal 1/3 in H. irasuense).

11. Stems densely long-pilose and sparsely to fairly densely floccose basally (rarely not floccose basally).  


11. Stems sparsely to densely long-pilose basally (never floccose or rarely slightly floccose basally).
12. Capitula relatively small, involucres 6-9 × 8-11 mm, narrowly campanulate; phyllaries not long-pilose; capitulescence branches relatively flexuous.  

1. **H. abscissum**

12. Capitula mid-sized, involucres 10-12 × 12-17 mm, campanulate; phyllaries often long-pilose especially apically; capitulescence branches usually rather strict.  

9. **H. schultzii**


Single-few stemmed perennial herbs, 25-90 cm, from a short or elongate, usually thickened caudex with numerous fibrous roots; stems usually strongly striate, sparsely to densely long-pilose (never or rarely slightly floccose) basally, often becoming glabrate toward mid-stem, usually sparsely to densely floccose and sparsely to moderately stipitate-glandular distally, sometimes also stipitate-glandular proximally. Leaves basal and cauline; basal leaves usually few, 4-23 × 0.8-3 cm, oblanceolate, tapered to a winged petiolar base, margins inconspicuously toothed, apex acute or rounded, surfaces moderately long-pilose; cauline leaves few to numerous, 3-15 × 0.7-2 cm, gradually reduced distally, generally becoming bract-like and linear at mid-stem, base tapered to a winged petiole or distal ones sometimes with base clasping, apex acute or rounded, surfaces sparsely to moderately long-pilose and frequently also with short glandular trichomes. Capitulescence mostly narrowly cylindrical-thyrsoid, numerous-capitulate; peduncles 0.2-2.2 cm, sordid-floccose and/or stipitate-glandular. Capitula relatively small; involucres 6-9 × 8-11 mm, narrowly campanulate; phyllaries 14-18, dark greenish basally, becoming lighter apically and marginally, usually sparsely sordid-floccose near base and sparsely to rather densely stipitate-glandular, becoming less densely so distally, not long-pilose. Ligulate florets 20-24+; corolla yellow, tube c. 4 mm, limb c. 5 × 1-1.5 mm, shallowly toothed, teeth c. 0.3 mm. Cypselae 2.2-3 mm, not tapered distally, tapered basally; pappus bristles 4-5 mm, tawny or less commonly...
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white. 2n = 18. Flowering Year-round. *Oak forests, pine forests, pine-oak forests, disturbed areas, rocky montane areas, rarely in bogs.* Ch (Breedlove 26845, MO); G (King 7143, MO); H (Williams y Molina 14687, F); N (Rueda et al. 12923, MO); CR (Standley 42872, MO); P (Davidson 871, MO). 900-3400 m. (United States [Arizona, New Mexico], Mexico, Mesoamerica.)

Specimens of *H. abscissum* from Honduras and south typically have a more open capitulescence with larger capitula as compared to Mexican and Guatemalan populations. Additionally, these southern populations sometimes show a very slight amount of floccose pubescence abaxially on proximal leaves and proximal stem portions, and as such appear similar to *H. irasuense*.


Scapose perennial herbs with short, thick, horizontal rhizomes; scape 15-30 cm, sparsely long-pilose proximally, becoming glabrate near mid-scape and progressively more densely floccose distally toward capitulum. Leaves basically basally, scape 1-3-bracteate; basal leaves several to many, 3.5-6.5 × 0.8-1 cm, ob lanceolate, thick-chartaceous to subcoriaceous, tapered to a short or sometimes elongate petiolar base, margins usually with 3 or 4 pairs of teeth, apex broadly acute or sometimes very short-acuminate, dark green and glabrous adaxially, abaxially pale green, with a few long trichomes scattered along midvein and margin; scape bracts < 8 mm, filiform to linear. Capitulescence monocephalous or sometimes with abortive lateral buds. Capitula relatively small; scape moderately floccose and sparsely stipitate-glandular mostly near involucre; involucre c. 10 × 10-15 mm, campanulate; phyllaries 14-18, attenuate, greenish black, densely whitish subapressed stipitate-glandular. Ligulate florets with corolla 8-10 mm, white, limb with at least lateral teeth usually 2-3+ mm, abaxial surface pubescent proximally. Mature cypselae not seen; pappus bristles c. 5 mm, slightly tawny. Flowering Aug. Bluffs. G (Steyermark 50065, F). c. 2400 m. (Endemic.)

*Hieracium clivorum* is similar to *H. skutchii*, but differs in having wider leaves, densely stipitate-glandular (vs. densely long-pilose with non-glandular trichomes) phyllaries, and white (vs. yellow) corollas.

Phyllaries sparsely setose with non glandular trichomes to moderately pilose with long-stipitate-glandular trichomes. Ligulate florets 15-30+. Cypselae 3-6.5 mm. (W. United States, Mexico, Mesoamerica.)

The typical subspecies, which differs from our subspecies by eglandular phyllaries and longer cypselae, occurs in the United States south to central Mexico. Barkley et al. (2006) describe the species with corollas pale yellow to ochraceous and the cypselae as always tapered distally.

Hieracium fendleri var. ostreophyllum (Standl. et Steyer.) B.L. Turner.

Herbaceous perennial with 1 to few scape-like stems, 15-75 cm, occasionally reproducing from stoloniferous offshoots; caudex short, thick, bearing numerous +/- thick fibrous roots, the summit often tufted with long, amber trichomes; stems moderately long-pilose basally, becoming more sparsely so distally, trichomes 3-8 mm. Leaves mostly basal, cauline leaves when present abruptly and greatly reduced in size; basal leaves 2-6, 3-10 × 1.5-4.5 cm, spatulate, blade < 4 times as long as broad, base short-petiolute to subsessile, margins usually inconspicuously toothed, rarely lacerate-runcinate along the proximal half, apex rounded or rarely broadly acute, adaxially green, usually reddish to purplish abaxially, moderately or occasionally sparsely long-pilose on surfaces with trichomes 3-5.5 mm; cauline leaves 0(1-3), < c. 4 cm, linear-lanceolate or less commonly linear-oblancoate. Capitulescence rather strictly paniculate, generally ≤ 10-capitulate, strict; branches and peduncles moderately long-pilose with non-glandular trichomes and also stipitate-glandular, occasionally also sparsely to moderately densely floccose. Capitula relatively small; involucre 9-13.5 × 8-11 mm, narrowly campanulate; phyllaries 15-24, blackish along the midnerve, lighter toward the margin, moderately pilose with long-stipitate-glandular trichomes, the outer series short-triangular, the inner series more or less abruptly longer, narrowly lanceolate. Ligulate florets with corolla yellow, tube 5-8 mm, glabrous to sparsely pilose, limb 5-6.5 × 1.5-1.7 mm, teeth c. 0.5 mm. Cypselae 3-4 mm, tapered basally, truncate or slightly tapered is the distal 1/4; pappus bristles 5.5-9 mm, whitish to tawny. Flowering Aug, Dec-Feb. Grassy areas, pine forests, pine-oak forests. Ch (Breedlove 27067, MO); G (Standley 62633, F). 1000-2700 m. (Mexico [Durango, Jalisco], Mesoamerica.)

Breedlove 27067 was determined by Beaman (1990) as Hieracium gronoviei. The more northern-centered H. fendleri subsp. fendleri of the United States and Mexico differs from our
subspecies by its involucre pubescence being of non-glandular (vs. stipitate-glandular) trichomes and by its cypselae 4-6.5 (vs. 3-4) mm. By often fairly pubescent leaves with apices often rounded, \textit{H. fendleri} is similar to \textit{H. pringlei}, but differs from it by stems moderately long-pilose (vs. lanate) basally, leaves always basal (vs. basal and cauline), and usually reddish or purplish (vs. greenish or occasionally grayish) abaxial leaf surfaces.


Short-lived, 1-few-stemmed perennial herbs, caudex short with numerous fibrous roots; stems 35-80 cm, densely long-pilose basally, becoming sparsely so to glabrate distally, also floccose basally. Leaves cauline or basal and cauline; basal leaves few or sometimes ephemeral, 3-10(-15) × 1-2.3(-4.3) cm, oblanceolate to oblong, base short-petiolate, margins inconspicuously toothed, apex obtuse or rounded, surfaces greenish, moderately long-pilose; cauline leaves 3-9, 5-8 × 1-2.5 cm, oblanceolate, gradually reduced distally, mostly on the proximal 1/2 of the stem, base tapered, occasionally somewhat clasping, margins subentire, apex obtuse or acute, surfaces sparsely to moderately long-pilose. Capitulescence an open to cylindrical corymbiform-panicle, 10-50-capitulate, main axis elongate, capitula single or grouped on lateral branches; branches and peduncles moderately to densely stipitate-glandular and sparsely to moderately appressed-floccose. Capitula relatively small; involucre c. 10 × c. 9 mm, narrowly campanulate; phyllaries 12-16, often red-brown proximally and yellow-green distally, apex sometimes red-brown, sparsely floccose basally, sparsely to rather densely glandular, glabrate to glabrous apically. Ligulate florets 12-20+; corolla yellow, usually glabrous, tube 3.5-4 mm, limb c. 4.5 × 1-1.4 mm, teeth c. 0.3 mm. Cypselae 3.2-3.5+ mm, conspicuously tapered distally, slightly expanded at apex; pappus bristles c. 6 mm, tawny. 2n =18. Flowering Year-round except Feb. \textit{Principally in pine forests.} Ch (Breedlove 48170, CAS); B (Lundell 6660, MICH); G (Steyermark 29722, F); H (Davidse et al. 35435, MO); N (Standley 10098, F); P (Busch 1, US). 500-2000 m. (Canada, E. United States, Mexico [Nueva Leon, Oaxaca], Mesoamerica, Hispaniola.)

The citation in D'Arcy y Tomb (1975) and Beaman (1990) of LINN 954-16 as the type of \textit{H. gronovii} has been overturned because that specimen is \textit{H. venosum}. 

*Hieracium culmenicola* Standl. et Steyerm.

Perennial herbs, 18-45 cm, typically from a densely caespitose base; stems simple or few-branched distally, densely pilose(-lanate) proximally, trichomes brownish, becoming floccose medially and distally, sometimes long-pilose near capitulecence. Leaves basal and cauline; basal leaves 5-10 × 0.5-0.8 cm, linear-lanceolate to linear-oblanceolate, broadest in distal half well below apex, relatively thick-chartaceous, margins distinctly but often remotely toothed, apex acute or acuminate, adaxial surface green, glabrate, abaxial surface lighter green, sparsely floccose, minutely stipitate-glandular, appearing glabrous except near the lanate base; cauline leaves 0-4, similar to the basal leaves. Capitulecence monocephalous or loosely corymbiform, 1-4-capitulate; peduncles densely long-pilose, sometimes also stipitate-glandular with 3-4 mm stramineous trichomes. Capitula relatively large; involucre 9-12 × 15-20 mm, broadly campanulate; phyllaries 20-28, c. 3-seriate, densely long-pilose, trichomes base blackish and whitish distally, imparting a blackish appearance to phyllaries. Ligulate florets with corolla yellow, pilose, tube c. 5 mm, limb 8-9 × ≤c. 2.7 mm, teeth c. 1 mm. Cypselae 2-3 mm (only immature cypselae seen); pappus bristles c. 5 mm, tawny. Flowering Jan. Cliffs on volcanoes, grassy slopes, cloud forest. G (Steyermark 34815, F). (?2000-)3000-3900 m. (Endemic.)


Short-lived perennial with 1-several stems, 25-80 cm; caudex short with numerous fibrous roots, the crown tufted, pilose; stems sometimes subscapose, densely long-pilose and sparsely to fairly densely floccose basally (rarely not floccose, as in type of *H. maxonii*), becoming mostly floccose distally and long-stipitate-glandular, these glandular trichomes black-based with a yellowish apex. Leaves mostly basal or basal and proximal-cauline, similar, broadest leaves mostly oblanceolate, blade more than 4 times as long as broad, mostly greenish or whitish abaxially; basal leaves 3-18 × 1-2 cm, oblanceolate, mostly short-petiolate, margins conspicuously toothed, teeth c. 1 cm apart, apex mostly acute, surfaces densely long-pilose, also abaxially inconspicuously floccose; cauline leaves 1-6, 6-15(-30) × 0.5-2.7 cm, lanceolate or oblanceolate, usually present only in proximal 1/3 of stem, gradually reduced, generally sessile,
apex mostly acute, surfaces moderately long-pilose; also usually sparsely floccose.
Capitulescence mostly openly corymbiform and usually flattish, rather few-capitulate; branches and peduncles rather densely grayish, brownish, or stramineous-floccose (and rather densely stipitate-glandular with glands black-based and yellowish apically). Capitula relatively small; involucre 8-10 × 9-12 mm, campanulate; phyllaries 15-18, blackish along the center and yellowish green at the margins, rather densely stipitate-glandular with glands black-based and yellowish apically, also sparsely floccose, infrequently long-pilose. Ligulate florets with corolla glabrous to sparsely pilose, tube 3-5 mm, limb 4-6 × 1.3-1.5 mm, teeth 0.3-0.5 mm. Cypselae 2.8-3.5 mm, sometimes slightly tapered in the distal 1/3; pappus bristles 5-6 mm, tawny. 2n = 18.
Flowering Year-round except Apr. Conifer forest, damp thickets, meadows, oak forests, pine-oak forests, potreros roadsides, rocky alpine areas, volcano slopes. Ch (Matuda 806, MO); G (Steyermark 32767, F); H (Standley 11950, F); ES (Molina y Molina 12167, F); CR (Pruski et al. 3841, MO); P (Woodson et al. 1045, MO). 1500-4000 m. (Endemic.)


Short-lived, usually single(-several)-stemmed, perennial herbs, 10-40 cm; caudex short, thick, mostly descending; stems moderately long-pilose and sparsely to moderately floccose basally, becoming more densely floccose distally and particularly in the capitulescence, frequently also becoming sparsely to moderately long-setose distally, also occasionally stipitate-glandular.
Leaves mostly basal; basal leaves 3-10 × 1.5-3 cm, blade < 4 times as long as broad, mostly ovate or obovate, occasionally broadly lanceolate or oblanceolate, chartaceous, short-petiolate, margins inconspicuously toothed, apex acute or less commonly obtuse-rounded, adaxial surface green, moderately long-pilose to glabrate, abaxial surface light green or reddish, moderately to densely long-pilose, also very inconspicuously or sparsely floccose; cauline leaves 0(1-3), restricted to the proximal 1/3 of the stem, linear to narrowly lanceolate or oblanceolate, tapered to a short-petiolate base, apex acute, surfaces long-pilose, abaxial surface also sparsely to moderately floccose. Capitulescence congested-thyrsoïd or paniculaté, 3-10-capitulate, nodding, flexuous;
peduncles 0.5-2 cm, floccose and sparsely to moderately long-pilose with black-based trichomes, sometimes also sparsely to moderately short-stipitate-glandular. Capitula usually relatively small; involucre 8-10 × 10-12(-15) mm, campanulate; phyllaries 18-24, greenish, darker near the center and toward the base, sparsely to densely long-pilose, sparsely to moderately stipitate-glandular, and floccose, especially basally, the inner series gradually longer. Ligulate florets with corolla yellow, glabrous to sparsely pilose, tube 3-3.5 mm, limb 3.5-4 × 1.2-1.5 mm, teeth c. 0.3 mm. Cypselae 1.8-2.5 mm, tapered at the base; pappus bristles 5-6 mm, white to slightly tawny. 2n =18. Flowering Aug. Alpine meadows. c. 4100 m. G (Beaman 3160, MSC). (Mexico, Mesoamerica.)

Robinson y Greenman (1904) provisionally placed Hieracium lagopus D. Don (publ. May, 1830) into synonymy of H. mexicanum (publ. April, 1830), whereas here I follow Zahn (1921-1923) and Beaman (1990), who excluded it from synonymy and considered H. lagopus D. Don to be a distinct South American species.


Short-lived, mostly single-stemmed, perennial herbs, 20-60 cm; caudex short or to 2 cm long with numerous fibrous roots; stems usually densely lanate basally, becoming glabrate to sparsely floccose or long-pilose distally. Leaves basal and/or cauline; basal leaves few-several, (4-)8-10(-25) × 2-4 cm, broadly obovate to narrowly lanceolate, often absent at flowering time, base mostly short-petiolate, occasionally petioles to 6 cm, margins subentire to occasionally dentate, apex mostly rounded but occasionally acute or acuminate, adaxial surface greenish, lanate, abaxial surface greenish or occasionally grayish, usually densely lanate; cauline leaves 1-5, 2-12 × 0.7-3 cm, lanceolate or oblanceolate, becoming linear distally, usually tapered to a sessile base, apex obtuse or acute, the proximal ones sparsely to densely lanate or villous on both surfaces, the distal ones often sparsely villous to glabrate. Capitulescence corymbiform, 4-12(-20)-capitulate; branches and peduncles moderately to densely stipitate-glandular with black or yellowish trichomes, also generally sparsely floccose to occasionally floccose. Capitula relatively small; involucre 7-9 × 8-10 mm, narrowly campanulate; phyllaries c. 18-24, greenish-black basally and
along the middle, lighter greenish near the margins, sometimes purplish-tipped, long-stipitate-glandular basally or less commonly throughout, base also slightly floccose. Ligulate florets 12-15+; corolla yellow, pilose, tube 3-3.5 mm, limb 3-4 × 1 mm, teeth 0.3 mm. Cypselae 2-3.4 mm; pappus bristles 5 mm, white. 2n = 18. Flowering Aug, Dec-Jan. Oak forests, pine forests, pine-oak forests. Ch (Ghiesbreght 573, GH); G (Standley 82355, F). 1500-2800 m. (United States [Arizona, New Mexico], Mexico, Mesoamerica.)

The name *H. stuposum* Fr. was used by Nash (1976h) for this taxon, but that name was considered by Beaman (1990) as an illegitimate later homonym of *H. stupposum* Rchb.


Perennial herbs, single-stemmed or infrequently several-stemmed, 10-70 cm; caudex usually short, thick; stem moderately to densely long-pilose (never floccose) basally, sometimes also glandular-stipitate basally, the pilose indumentum usually extending proximally to the capitulescence, distal portion of stem sparsely to rather densely floccose, also with sparsely to densely short- to long-stipitate-glandular with blackish bases and yellowish apices. Leaves basal and/or cauline, similar; basal leaves (0-)1-several, 3-10 × 1-3 cm, oblanceolate to lanceolate or oblanceolate to lanceolate or oblong, attenuate to petiolar base, margins subentire to conspicuously toothed, apex mostly acute or acuminate, occasionally rounded, surfaces greenish, sparsely to moderately long-pilose; cauline leaves few to many, 2-15(-17) × 0.5-3.5 cm, gradually reduced distally, becoming narrower distally, mostly appressed to the stem, the proximal ones gradually tapered basally, the distal ones sessile and clasping the stem, apex acute to acuminate, infrequently slightly rounded, surfaces somewhat crisped, moderately to rather densely long-pilose. Capitulescence cymose, 3-many-capitulate, branches usually rather strict or the capitula occasionally nodding; peduncles 0.5-4 cm, moderately to densely stipitate-glandular, also sparsely to densely floccose. Capitula mid-sized; involucre 10-12 × 12-17 mm, campanulate; phyllaries moderately to densely stipitate-glandular and moderately sordid-floccose especially basally, also often long-pilose especially
apically, base and midrib blackish green, becoming lighter apically and marginally; outer phyllaries c. 8; inner phyllaries 20-30, distinctly +/- twice as long as outer ones. Ligulate florets 25-40+; corolla yellow, glabrous to sparsely pilose, tube 3.5-4.5 mm, limb 3-4(-4.8) × c. 1 mm, teeth 0.3-0.5 mm. Cypselae 2-4.3 mm, not tapered distally, tapered at the base; pappus bristles c. 4-6 mm, mostly tawny, rarely white. Flowering Apr-Aug. Pine forests, grasslands. G (Steyermark 48123, F). 1800-3200 m. (United States [Texas], Mexico, Mesoamerica.)

Zahn (1921-1923) placed H. schultzii in synonymy with H. abscissum, but Nash (1976h) and Beaman (1990) treated them as distinct.


Single-stemmed, scapose perennial herbs, 10-35 cm; rhizomes long, slender, producing tufts of basal leaves; stem simple or few-branched, glabrate or sparsely villous proximally, gradually becoming distally sordid-floccose and moderately setose. Leaves basal and sometimes cauline, relatively thick-chartaceous; basal leaves 3-8(-9) × 0.5-1.4 cm, narrowly oblanceolate, broadest just below apex, subcoriaceous, tapered to a short-petiolate base, margins subentire or inconspicuously toothed, apex acute or obtuse, adaxial surface dark green, sparsely villous, abaxial surface light green, glabrate to sparsely long-pilose near the margins or sometimes over the surface; cauline leaves much reduced, the proximal ones linear, the distal ones linear-acicular, sparsely glabrate to pilose. Capitulescence monocephalous or loosely corymbiform, 1-5-capitulate; peduncles 10-15 cm. Capitula relatively large; involucre 12-16 × 15-22 mm, broadly campanulate to hemispherical; phyllaries 30-50, green-black along the center, lighter near the margins, densely long-pilose with black-based trichomes, lighter distally, the inner series of phyllaries gradually longer. Ligulate florets with corolla yellow, densely long-pilose, tube 5-6 mm, limb 5-11 × 2-2.7 mm, teeth 0.8-1 mm. Cypselae 2.2-3 mm, basally tapered; pappus bristles 4-5 mm, slightly tawny. Flowering Feb-Mar, Jul-Sep. Limestone slopes and cliffs, Coniferous forests. G (Véliz et al. 2M.7923, MO). (2400-)3000-3700 m. (Endemic.)


Hieracium standleyi S.F. Blake.

Single-several stemmed perennial herbs, 18-60 cm, from slender underground rhizomes with numerous slender fibrous roots; stem moderately long-pilose basally, glabrate to sparsely pilose in the proximal half, distally becoming progressively more sordid-floccose and stipitate-
glandular, the distal portion with narrowly acicular bracts. Leaves mostly basal or basal and proximal-cauline, similar; basal leaves 3-12(-27) × 1.5-3 cm, narrowly to somewhat broadly oblanceolate, thin-chartaceous, base attenuate-tapering to a petiole to 3(-4) cm, margins inconspicuously toothed, apex rounded (-obtuse), surfaces sparsely to moderately long-pilose, rarely glabrate; cauline leaves when present similar to the basal but progressively reduced and narrowed distally. Capitulescence openly corymbiform, 3-6-capitulate; peduncles 1.5-8 cm, moderately sordid-floccose, sometimes also sparsely long-pilose, becoming densely floccose and moderately to densely stipitate-glandular near the capitula. Capitula relatively small; involucre 8-11 × c. 12 mm, campanulate; principal phyllaries 10-20, grayish-green, outer ones moderately stipitate-glandular and long-pilose basally, becoming sparsely stipitate-glandular distally, the inner series gradually longer, glabrate. Ligulate florets c. 23; corolla yellow, moderately pilose, tube 3.5-6 mm, limb 9-10 × c. 2.5 mm, irregularly deeply toothed, with at least lateral teeth usually 1.5-4 mm, usually one or both lateral teeth much longer than the central three. Cypselae c. 3 mm, nearly cylindrical, slightly tapered near the apex and abruptly tapered at the base; pappus bristles 4-5 mm, tawny. Flowering Jul-Dec. Paramos, sphagnum bogs. CR (Chacón 527, MO); P (Antonio 1564, MO). 1200-3300 m. (Endemic.)

4. Hypochaeris L.

*Achyrophorus* Adans.

Por J.F. Pruski.

Annual or more commonly perennial, taprooted herbs, rosulate and scapose (ours) or less frequently leafy-stemmed; stems or scapes 1-15, erect, simple to branched; herbage with trichome apex entire, not bifurcate. Leaves simple to pinnatisect, our spp. with base narrowly winged-petiolariform; blade oblanceolate (ours), venation pinnate, base often slightly dilated, surfaces glabrous to hirsute. Capitulescence often scapose, monocephalous to corymbiform or paniculate; peduncles minutely few-bracteolate (ours). Capitula: involucre cylindrical to hemispherical, enlarging in fruit; phyllaries graduated, 3-4-seriate, margins scarious to broadly so; receptacle paleate; paleae at anthesis about as long as florets, apex flagelliform (ours), deciduous. Ligulate florets 20-100+, subequal or unequal, well-exserted to only slightly so, ovary sometimes with rostrum elongating while corolla attached; corolla (at least adaxially) yellow (ours) to orange or less commonly white, trichomes of tube-throat juncture sometimes longer than tube diam. (ours), limb sometimes pale abaxially; style branches relatively short. Cypselae isomorphic or less commonly dimorphic, commonly fusiform (outer cypselae sometimes ellipsoid or narrowly
obconic) commonly long-rostrate (outer cypselae sometimes erostrate), subterete, 10-15-costate (ours), costae typically spinulose-muricate, otherwise glabrous, rostrum filiform, tan; pappus of 20-60+ stramineous elongate capillary bristles, most subequal and plumose (sometimes biseriate with a few outer bristles shorter and scabrid), most exserted in fruit from involucre, plumose bristle lateral pinnulae single-celled. $x = 4, 5, 6[7]$. Aprox. 60 spp. Native to Americas, N. Africa, Asia, and S. Europa; aprox. 50 spp. in temperate South America, 4 of these in North America, including 2 in Mesoamerica.

By its usually long-rostrate cypselae and typically plumose pappus bristles, *Hypochaeris* is similar among Flora Area taxa to *Tragopogon*, which differs clearly by its graminoid leaves, subequal phyllaries, and epaleate receptacles. *Leontodon hirtum* L. and *L. saxatilis* Lam. [syn. *L. taraxacoides* (Vill.) Mérat 1831, non Hoppe et Hornsch. 1821] occur in tropical America and are similar to *Hypochaeris* in *gestalt*, unequal graduated phyllaries, and paleate receptacles. *Leontodon* is distinguished by its apically bifurcate trichomes, and although the genus has yet to be found in Mesoamerica, it may be expected there. Only homotypic synonymy is given for our two basically rosulate species of *Hypochaeris* and no names are known to have been based upon Flora Area material.

The two leafy-stemmed non-Flora Area species that Cronquist (1980) listed for the southeastern United States [i.e., *H. chillensis* (Kunth) Britton and *H. microcephala* var. *albiflora* (Kuntze) Cabrera] have a uniseriate pappus with all bristles plumose and should be looked for in Flora Area.

The generic name is often misspelled as the orthographic variant "*Hypochoeris*" (e.g., Cronquist, 1980; D'Arcy, 1975; Nash, 1976h; Vuilleumier, 1973).


1. Cypselae dimorphic, the outer ones erostrate, truncate apically, the inner ones long-rostrate; leaves usually glabrous; at anthesis corollas usually slightly exserted from involucre; corollas of outer florets 5-8 mm, limbs and tubes +/- subequal.

1. **H. glabra**

1. Cypselae +/- isomorphic, long-rostrate; leaf usually hirsute throughout; at anthesis corollas at least of outer florets well-exserted from involucre; corollas of outer florets 15-20 mm, limbs c. 2× as long as tubes.

2. **H. radicata**

*Hypochaeris radicata* subsp. *glabra* (L.) Mateo et Figuerola.

Annual or perennial scapose herbs, 15-55 cm, leaves rosulate or infrequently 1-several cauline to rarely mid-stems secondarily (teratologically) rosulate; scapes 1-several per rosette, simple or few-branched distally, usually glabrous. Leaves 1.5-12 × 0.5-2.5 cm, base attenuate, margins coarsely dentate to lyrate-pinnatifoliated, apex of lobes often pointed, apex acute to obtuse, surface usually glabrous, sometimes either hispid-hirsute on veins or margins hispid-ciliate. Capitulescence corymbiform, few-capitulate. Capitula 8-20 mm; involucre at anthesis 7-9 × 3.5-6 mm expanding in fruit to 11-15(-17) × 12-20 mm, narrowly turbinate immediately pre-anthesis, narrowly to broadly cylindrical at anthesis, campanulate in fruit; phyllaries 18-20, 3.5-15 × 1.2-3 mm, triangular to lanceolate, often reddish apically, glabrous or outer puberulent distally, transverse impression of outer erosurate cypselæ apex often manifest (in pressed material) on phyllaries; paleæ 8-15 mm. Ligulate florets 20-40, inner and outer florets at anthesis +/- subequal; corolla (of inner and outer florets) 5-8 mm, at anthesis usually slightly exserted from involucre, yellow, limb to c. 5 mm, limb and tube +/- subequal. Cypselæ dimorphic; outer cypselæ 3-4(-5) mm, obconic, erosurate, truncate apically, quickly grading to the inner cypselæ; inner cypselæ 5.5-8.5(-10) mm, fusiform, long-rostrate, body 2.5-3.5 mm, rostrum 3-5 mm; pappus bristles 30-40+, most bristles 7-13 mm and 2n = 8, 10 (?12). Flowering Feb-Dec. *Fields, open forests, roadsides, volcano slopes.* G (*Pruski y Ortiz 4260*, MO). 1800-3100 m. (Native to Europa and Asia; naturalized in Canadá, Estados Unidos, Mexico, Mesoamérica, Ecuador, Brazil, Uruguay, Paraguay, Chile, Argentina, Jamaica; Australia, Islas del Pacífico.)

*Hypochaeris glabra* (the generitype) is distinguished from *H. radicata* by usually glabrous leaves and by erosurate outer cypselæ. *Hypochaeris glabra* appears to flower rapidly, and is most commonly seen in various stages of fruit.


Perennial scapose herbs, leaves rosulate or infrequently 1-2 cauline, caudex (12-)25-60 cm, thick; scapes 1-8(-15) per rosette, 2-4-branched distally, usually glabrous. Leaves 4-22(-25) × 0.5-3.5 cm, attenuate to subpetiolar base, margins crenate to more commonly lyrate-pinnatifoliated, apex of lobes often obtuse to rounded, sinuses mostly rounded, apex acute to obtuse, surfaces
usually hirsute throughout or cauline leaves (when present) sparsely so, trichomes c. 1 mm.
Capitulescence corymbiform, 2-9-capitulate. Capitula 18-25(-30) mm; involucre (7-)10-15(-18) ×
(3.5-)10-15 mm, broadly cylindrical to globose immediately pre-anthesis, our material broadly
cylindrical to more commonly campanulate (or in extra-Flora Area material often cylindrical) at
anthesis, campanulate in fruit; phyllaries 20-28, 3-15(-18) × 1.5-2.5 mm, triangular to lanceolate,
glabrous or several outer ones with costa bulbous-hispid or serrate; paleae 12-18 mm. Ligulate
florets 50-70+; corolla yellow, corolla of outer florets 15-20 mm (corolla of inner florets shorter),
well-exserted, tube 5-6 mm, trichomes at tube-limb juncture to 1+ mm, sometimes longer than
tube is broad, limb 10-14 × 2.5-4 mm, c. 2× as long as tube, (sometimes greenish-brown
abaxially). Cypselae (6-)9-16 mm, +/- isomorphic, fusiform, long-rostrate, bodies 3-6 mm,
rostrum (3-)6-10 mm; pappus bristles 30-40+, most bristles 8-12 mm (at anthesis only about as
long as corolla tube) and plumose, but technically biseriate with outer bristles shorter and scabrid.
2n = 8. Flowering Jan-Nov. Open fields, meadows, páramo, pastures, pine-oak forests, roadsides,
streamsides, volcano slopes. G (Nash, 1976: 449); CR (Pruski et al. 3855, MO); P (White y White
92, MO). 1100-3500 m. (Native to Europa; naturalized in Canadá, Estados Unidos, Mesoamérica,
Colombia, Venezuela, Ecuador, Bolivia, Brazil, Uruguay, Paraguay, Chile, Argentina, Jamaica;
Asia, Australia, Islas del Pacífico.)

The flowers of Hypochaeris radicata appear to have a long duration, and the species is not
often seen with mature fruits. In the flora area H. radicata is generally larger-capitulate than
United States material, and is only common at high elevations in Costa Rica. In Panama H.
radicata remains known from the single collection cited by D'Arcy y Tomb (1975).

5. Lactuca L.

**Mulgedium** Cass.

Por J.F. Pruski.

Annual or more commonly perennial taprooted leafy-stemmed herbs; stems usually single and
erect, usually strict proximally and branched distally only in the capitulescence, sometimes
fistulose. Leaves basal and/or cauline, simple to runcinate-pinnatisect, sessile or petiolate; blade
entire to dentate, infrequently spinulose-margined, the cauline ones often auriculate-amplexicaul.
Capitulescence corymbiform-paniculate (ours), often pyramidal, capitula typically many, usually
branching at 45-90° angles; peduncles bracteolate (ours); bracteoles often loosely grading into
outer phyllaries. Capitula ecalyculate (ours); involucre cylindrical or sometimes subcampanulate;
phyllaries 5-13+, graduated, 3-5-seriate, triangular to lanceolate, margins sometimes narrow-
scarious, inner series usually subequal; receptacle epealeate. Ligulate florets 6-50+, corollas subequal, moderately exserted; corolla yellow to bluish or pink-purple (rarely white); style branches short, much shorter than anthers. Cypselae oblong to fusiform in outline, abrupt-rostrate with rostrum well-distinguished from body (ours), less commonly gradually rostrate, obviously compressed or sometimes subcompressed, body tan to reddish brown or blackish, faces 1-9-costate-striate, costae and faces more or less smooth (ours), usually glabrous or less commonly distally setulose, rostrum often tan, often discolorous with body, costae diminishing above carpododium, carpododium smooth-annular; pappus of 40-120+ subequal, white or stramineous, elongate scabrid capillary bristles, sometimes several outer bristles much smaller than the inner bristles, sometimes caducous. $x = 9[6, 8]$. 90-100 spp. Temperate zones of both hemispheres.

*Lactuca* and *Mulgedium* were treat as distinct in Barkley et al. (2006), but here I follow the synonym of Lack (2007), who treated *Mulgedium* in synonymy of *Lactuca*. Two species occurring in Mexico which should be looked for in the Yucatán Peninsula and Chiapas are *L. serriola* L., a near-cosmopolitan drought tolerant weed, and *L. ludoviciana* (Nutt.) Riddell. Also, *L. floridana* (L.) Gaertn. (syn. *L. villosa* Jacq.) and Jamaican endemic *L. jamaicensis* Griseb. should be looked for in Caribbean-coastal Mesoamerica.


1. Cypselae obviously compressed, thick-margined, bodies blackish, faces 1-3-striate, margins very much more prominent than the striations; corollas usually bluish or pink-purple; phyllaries usually reflexed post fruit; native.  **1. L. graminifolia**

1. Cypselae subcompressed and thin-margined, exalate, bodies stramineous, faces 5-9-striate, margins not more prominent than the striations; corollas yellow; phyllaries usually erect post fruit; cultivated.  **2. L. sativa**


Native biennial to perennial, glabrous or subglabrous, proximal 1/3-1/2 leafy-stemmed herbs, 0.6-1(-1.3) m. Leaves basal and proximal-cauline, evenly reducing in size distally, simple to few-pinnatifid, sessile or pinnatifid ones often long-winged-petiolariform; blade (5-)10-25(-33) cm, blade or rachis 0.3-1.5(-4) cm wide, linear-lanceolate to linear-oblanceolate, base narrow-cuneate to long-attenuate or sometimes simple cauline leaves auriculate (auricles to c. 0.5 cm), margins
not spinulose, entire or few-lobed, lobes 2-4-jugate, 2-4 × 0.5-1 cm, remote, narrowly lanceolate to less commonly triangular, terminal lobe 5-12 cm, linear-lanceolate, lobes or blade apex obtuse or acute, glabrous or abaxial surface (especially midrib) sparsely hispid with trichomes 2-3 mm. Capitulescence in distal 1/3 of stem, corymbiform-paniculate, usually rounded-pyramidal with lateral branches usually ascending at c. 45° and shorter than main axis, infrequently nearly flat-topped; peduncles 1-5 cm, bracteolate. Capitula 9-13 mm at anthesis, 14-17 mm in fruit; involucre 4-8 mm diam., cylindrical to subcampanulate; phyllaries 12-15 × 1.5-2 mm, sometimes purplish-tipped, usually reflexed post fruit. Ligulate florets 15-24; corolla c. 8 mm, usually bluish or pink-purple (fading to stramineous), limb c. 5 mm; style branches c. 0.3 mm. Cypselae elliptic in outline, obviously compressed, subalate, thick-margined, body 4-6 × 1.5-2.3 mm, blackish, each face 1-3-striate, margins very much more prominent than the striations, rostrum 1.5-3(-4) mm, 1/3-1/2 as long as body, short-filiform; pappus bristles 7-9 mm. 2n = 34. Flowering year-round. *Dry forests, pine forest, pine-oak forests, roadsides, thickets.* Ch (Breedlove 15041, MICH); G (King y Renner 7118, MO). 1000-2500 m. (United States, Mexico, Mesoamerica, Hispaniola.)

McVaugh (1972) referred Mexican plants that are pink-purple-flowered, flat-fruited, and abrupt-rostrate to *Lactuca graminifolia*, within which he proposed two new varieties, including *L. graminifolia* var. *arizonica* McVaugh, which resembles *L. ludoviciana*. Calderón de Rzedowski (1997) recognized *L. graminifolia* without varities, mentioning variation that "transgrede los límites of these varieties." Indeed, the difference between basal and cauline leaf shapes cited by McVaugh (1972) as distinguishing varieties seem no more variable than leaf shape differences within other American species, each of which is recognized (e.g. Barkley et al., 2006) without infrataxa. Moreover, some plants from Florida have hispid indumentum on leaf midribs abaxially, which perhaps further disassembles McVaugh's varieties. Thus, I follow Calderón de Rzedowski (1997) and treat *L. graminifolia* var. *mexicana* McVaugh in synonymy of *L. graminifolia*, recognized here without infrataxa.

McVaugh (1972) commented on the difficulties in separating *L. graminifolia* from *L. hirsuta* Muhl. ex Nutt. and *L. ludoviciana*. Similarly Correll y Johnston (1970) mentioned that *L. canadensis* is similar to *L. graminifolia*, but both the usually yellow-flowered *L. canadensis*, as well as bluish-flowered gradually-short-rostrate *L. floridana* (L.) Gaertn., differ by their smaller capitula at anthesis with a shorter (10-12 mm) involucre. *Lactuca hirsuta* is similar to *L. graminifolia*, but differs by typically being hairy, leafy-stemmed, and yellow-flowered. *Lactuca hirsuta* does not occur in Mexico, nor does it have nomenclatural priority over *L. graminifolia*.  


Lactuca ludoviciana and L. brachyrrhyncha Greenm. are the only similar flat-fruited abrupt-rostrate species occurring in Mexico that resemble L. graminifolia. Cronquist (1980) mentioned that L. ludoviciana is similar to L. graminifolia by its “tendency for the leaves to be basally disposed,” but it differs from L. graminifolia by usually spinulose-margined leaves and 20-56-flowered capitula. Lactuca brachyrrhyncha Greenm. differs most significantly from L. graminifolia by its abrupt-short (c. 1 mm) rostrum, and although know to me from only an isotype in MO, L. brachyrrhyncha seems best at present maintained as distinct.


Cultivated annual or sometimes biennial herbs, 0.3-1 m; herbage +/- glabrous. Leaves basal and cauline, evenly diminishing in size to c. mid-stem, abruptly bracteate distally, sessile, blade green or infrequently reddish, ovate or orbicular, entire or runcinate-pinnatifid, margins entire or denticulate; basal rosette typically densely leafy, columnar to globose; basal and proximal stem leaves 5-35 cm, margins entire or sometimes crisped-margined; bracteate leaves 0.5-1.5 cm, cordiform, base auriculate. Capitulescence corymbiform-paniculate, cylindrical to rounded, often with lateral branches ascending at 45+°, nearly as long as main axis; peduncles short, somewhat obscured by bracteoles; bracteoles 1-several, to 3+ mm, cordiform auriculate-based, sometimes papillose-glandular. Capitula 9-14 mm; involucre 3-4 mm diam., cylindrical; phyllaries 7-10 mm, usually erect post fruit, sometimes papillose-glandular. Ligulate florets 7-20(-30); corolla yellow, limb sometimes violet-streaked abaxially. Cypselae fusiform or oblong in outline, subcompressed, thin-margined, body 3-4.5 × 1-1.4 mm, somewhat plump, usually stramineous, each face 5-9-striate, margins not more prominent than striations, rostrum 3-6 mm, +/- as long as bodies, filiform; pappus bristles 3.5-4 mm. 2n = 18, 36. Flowering Dec-Feb, Aug-Sep. Cultivated, disturbed areas. T (Cowan, 1983: 26); Ch (Breedlove, 1986: 50); Y (Ucan y Flores 3528, MO); B (Balick et al., 2000: 154); G (Nash, 1976h: 450); H (Molina, 1975: 115); ES (Standley y Calderón, 1941: 282); N (Grijalva 3542, MO); CR (Standley, 1938: 1488); P (Mori y Bolten 7250, MO). 100-2000 m. (Native to Asia; cultivated in Canadá, Estados Unidos, Mexico, Mesoamerica, Colombia, Venezuela, Ecuador, Peru, Bolivia, Brazil, Paraguay, Chile, Argentina, Jamaica, Hispaniola, Puerto Rico; Europa, Africa, Australia, New Zealand, Islas del Pacífico.)

Lactuca sativa is unknown except in cultivation, and is presumably derived from a Middle Eastern Asian species near L. serriola (Vuilleumier, 1973). Although the species is grown widely
in Mesoamerica, no synonymous names are known to be based upon Mesoamerica material, and thus synonymy is not given.

6. **Launaea** Cass.


Por J.F. Pruski.

Annual to perennial herbs to woody based subshrubs or spiny shrubs, usually tap-rooted; stems usually erect, solitary or few from base, branched distally; herbage typically glabrous (ours). Leaves rosulate or proximal-cauline, simple to pinnatifid, sessile or petiolate; blade usually oblanceolate, chartaceous to stiffly so or subcarnose, margins toothed or spinulose to lobed, rarely subentire. Capitulescence spicate to thyrsoid-paniculate; peduncles rarely glandular. Capitula ecalyculate; involucre at anthesis cylindrical to less frequently subcampanulate; phyllaries 18-25, strongly graduated, 3-5-seriate, margins scarious; inner series of phyllaries usually 5 or 8, subequal; receptacle epealeate. Ligulate florets 7-40(-100+), corollas subequal (ours); corolla yellow (ours) to sometimes violet, limb slightly shorter to usually longer than tube; anthers 2-4 mm; style branches yellow, sweeping papillae concolorous or blackened. Cypselae +/- isomorphic, cylindrical or short-fusiform, shortly tapered-subrostrate (ours), but ranging from short-rostrate to erositate, subterete, 4-5-costate, often striate between costae, commonly transversely rugulose-muricate, glabrous or outer ones sometimes papillose, carpopodium exannulate, irregularly-costate, costae prominent; pappus of 60-100+ subequal whitish elongate scabrid capillary bristles, sometimes a few outer bristles smaller and coarse, sometimes caducous. 

\[ x = 9 \] [6, 7, 8]. 54 spp. Mostly native to Asia or N. Africa, 1 pantropical and weedy.

*Launaea* was revised by Kilian (1997), who recognized 54 species. The most important generic features stressed by Kilian (1997) that distinguish *Launaea* from vegetativly similar *Lactuca* are the subcompressed to subterete (vs. usually obviously compressed) cypselae and weakly exannulate and irregularly-costate (vs. smooth-annular) carpopodia. Among flora area species, the rugulose-muricate cypselae in *Launaea* (vs. the more or less smooth cypsela costae and faces in *Lactuca*) are noteworthy. The "heterocarpy" within individual capitula mention by Kilian (1997) is minor (e.g., cypselae 4-costate vs. 5-costate and cypselae apex tapering slightly different) compared to that of other Compositae genera, and I describe the cypselae in *Launaea* as +/- isomorphic.


Annual or biennial herbs, 0.3-1(-1.5) m; stems leafy in proximal 1/3, glabrous or very rarely stipitate-glandular. Leaves (5-)10-20(-28) × 1.5-6(-11) cm, typically runcinate-pinnatisect, rosulate or cauline, chartaceous, marginal lobes to c. 3(-4) cm, shallow to deep, triangular, lobe margins irregularly spinulose and serrulate, lobe apices acute to acuminate, blade apex obtuse to rounded, surfaces glabrous; basal and proximal-cauline leaves oblong to ovate, base long-attenuate, winged-petioliform; distal cauline leaves (when present) sessile, subauriculate. Capitulescence typically paniculate-racemose, leafless, few-several-branched, infrequently somewhat compacted and corymbiform, branches to 30+ cm, ascending, often nearly as long as central axis, capitula few, usually remote, lateral; peduncles 2-5 mm; bracteoles few-several, 1-2 mm, triangular-ovate, moderately imbricate distally. Capitula 12-15 mm; involucre 10-12 × 2.5-4(-5) mm, narrow-urceolate in bud becoming at anthesis narrowly cylindrical; phyllaries 2-12 × 1-2 mm, glabrous or nearly so; outer phyllaries triangular-ovate, scarios margins as broad as central green portion, quickly grading to inner ones, inner phyllaries 8, 2-3 × longer than the outer ones, linear-lanceolate. Ligulate florets 12-24(-35); corolla 11-13 mm, short-exserted from involucre, pale yellow, tube 6-8 mm, limb c. 5 mm. Cypselae 3-5 (including the narrowed apex) × 0.6-0.7 mm, cylindrical-subfusiform, grayish-green, glabrous, narrowly sulcate, narrowed apex 0.5-1 mm, base only slightly tapered; pappus bristles 6-9 mm, the outer sometimes slightly broad-based. 2n = 18. Flowering Nov-Dec, Mar, Jun-Aug. *Disturbed areas, grass lands, open deciduous forests, roadsides, sandy streams, strand vegetation.* Ch (Breedlove 30369, MO); Y (Gaumer 877, MO); C (Martinez 29410, MEXU); QR (Cabrera y Cabrera 15418, MO); B (Lundell 4822, NY); G (Steyermark 31532, GH); N (Bentham, 1853: 113 sub *Brachyramphus intybaceus*); CR (Hemsley, 1881: 262 sub *Lactuca intybacea*). 0-600(-1300) m. (Native to Africa and Asia; naturalized in Estados Unidos, Mexico, Mesoamerica, Colombia, Venezuela, Peru, Cuba, Jamaica, Hispaniola, Puerto Rico, Virgin Islands, Lesser Antilles, Trinidad and Tobago.)
The name *Lactuca intybacea* is usually attributed to Jacquin's *Icones* 1(4), fascicles 1-4 having been reviewed on 19 Aug 1784, and the *Icones* is thereby given priority over the same name (quickly repeated and) attributed to Jacquin by Linnaeus (edited by Murray), *Syst. Veg. ed. 14*: 713 May-Jun 1784.

*Launaea intybacea* was treated by each Nash (1976h) and Villaseñor (1989) as *Lactuca*, and the pale yellow flowers described therein as "white." Millspaugh y Chase (1904), however, had earlier correctly noted the flower color as yellow. D'Arcy y Tomb (1975) said *L. intybacea* "is to be expected" in Panama. Full synonymy, including names not used for American material, was given by Kilian (1997).

7. **Pinaropappus** Less.

Por J.F. Pruski.

Glabrous perennial scapose or subscapose (ours), often rosulate herbs, infrequently low caespitose woody subshrub, taprooted, often spreading-rhizomatous from woody taproot; stems 1-several, erect, simple or sometimes branched, sometimes sparsely leafy, angled distally. Leaves basal and cauline, simple or few-pinnatifid, sessile or narrowly petiolariform, cauline leaves (when present) narrow, entire or nearly so, sometimes bracteate; blade chartaceous to sometimes subcoriaceous or subcarnose, venation indistinct. Capitulescence monocephalous and usually long-pedunculate, less commonly corymbiform; peduncles sometimes bracteate. Capitula ecalyculate; involucre 3-20 mm diam., turbinate to campanulate; phyllaries 18-40, at least the outer series well-graduated, 3-5-seriate, ovate to lanceolate, chartaceous, green proximally, margins narrowly scarious, distally usually scarious, purplish, apex obtuse to acuminate; receptacle paleate; paleae deciduous. Ligulate florets (10-)20-60, corollas unequal, that of outer florets moderately exserted, inner florets with corolla much shorter than that of outer florets; corolla (at least the limb) usually pink to lavender (extra Flora Area populations infrequently white); style branches elongate. Cypselae tardily developing, suberete, cylindrical to fusiform, gradually tapered-subrostrate, c. 5-costate and 5-10-striate (each costa having a pair of lateral striations), glabrous or setulose, carpopodium subannulate to exannulate, irregularly-costate, costae +/- prominent; pappus of 15-60, subequal or unequal with several outer ones shorter, brownish elongate scabrid capillary bristles. $x = 8, 9$. 6-10 spp. S.W. Estados Unidos, Mexico, Mesoamerica.

Shinners (1951) recognized five species of *Pinaropappus*, and described a new variety of the most common species, *P. roseus* Less. Shinners (1951) stated that the new variety (i.e., *P. roseus*)
var. *foliosus* Shinners) was "the only new name found necessary for a revision of the small genus *Pinaropappus*," a revision that was never published. McVaugh (1972) provided a synopsis of *Pinaropappus* and recognized six species. In recent years Billie Turner has described an additional four species, of which I have seen little material.

Although the similar and variable *P. roseus* and *P. spathulatus* are treated below as distinct, it seems likely that only a single species (i.e., *P. spathulatus*, if indeed it is distinct from *P. roseus*) occurs in Mesoamerica.

Descriptions of the cypselae range from that of Correll y Johnston (1970), who said that "a true beak not present" to that of Bremer (1994), who said the cypsela apex is "attenuate into a beak." The cypselae apex in *Pinaropappus* is never abruptly rostrate, and I describe the cypselae apex in *Pinaropappus* as gradually tapered-subrostrate, basically as did McVaugh (1984).


1. At least basal leaves commonly remotely few-runcinate-pinnatifolobed; capitula 15-25 mm; involucres 10-20 mm; outer phyllaries spatulate to ovate; paleae lanceolate.

1. **P. roseus**

1. Leaf margins entire or remotely few-dentate distally, capitula (9-)13-18 mm; involucres 8-12(-14) mm; outer phyllaries lanceolate to elliptic, paleae linear-lanceolate.

2. **P. spathulatus**


Much like *P. spathulatus*, perennials herbs, (10-)20-30(-65) cm; stems few-many from caudex, erect, sparingly branched below mid-stem, 3-5-angled. Leaves typically basal and proximal cauline, or at anthesis 6-10 cauline leaves reaching distal 3/4 of stem, simple distally but at least basal ones commonly remotely few-runcinate-pinnatifolobed; blade 4-12 × (0.2-)0.5-3 cm, narrowly oblanceolate in outline, mid- and distal-cauline often reduced to linear or minute bracts. Capitulecence of few-many, few-capitulate, few-branched scapes, bracts 0.5-2.5 cm, grading very gradually into 1-few bracteoles 2-5 mm; peduncles 10-20(-40) cm, slender. Capitula 15-25 mm; involucre 10-20 × 12-20 mm., campanulate; phyllaries 30-40, 2-20 × 1.5-3 mm, apices dark
brown, obtuse to acute; outer phyllaries spatulate to ovate; paleae 12-20 × 1-1.5 mm, lanceolate. Ligulate florets (20-)45-60; corolla (12-)15-22 mm, pale pink (extra Flora Area populations infrequently white); anthers 4-6 mm. Cypselae 5-8 mm; pappus bristles 7-11 mm. 2n = 18. Habitat unknown. ?Ch (Matuda, 1950: 597; Shinners, 1951: 48). Elevation unknown. (Estados Unidos [W. Louisiana to Arizona], Mexico, ?Mesoamerica.)

Pinaropappus roseus is provisionally treated as Mesoamerican based on the reports by Shinners (1951), who cited no voucher, and Matuda (1950), who vouchered his report of P. roseus in Chiapas by Matuda 4624. Although I have not seen Matuda 4624, I have examined Matuda 5809 from Chiapas which was originally determined and distributed as P. roseus. However, Matuda 5809 (MO) proves instead to be P. spathulatus. Similarly, Sessé and Mociño herbarium #2766 (MA, microfiche BT-13 255.A6!) from Mexican originally determined as Scorzonera picroides L. proves instead to be P. roseus, raising the possibility that Mociño's (1993) citation of S. picroides in Guatemala is perhaps based upon material of P. spathulatus. Because Hemsley (1881) and McVaugh (1972), for example, cited P. roseus as occurring only from Oaxaca northward into Texas, and because of my changed determination of Matuda 5809, I suggest that the report of P. roseus in Chiapas by Matuda (1950) based upon Matuda 4624 (n.v.) and Shinners (1951) may be in error. The report by Smith (1895) of P. roseus in Guatemala is erroneous and based upon material I determine as P. spathulatus.

Pinaropappus roseus differs from P. spathulatus basically by its basal leaves often pinnatifid, by larger capitula, by proportionally shorter, spatulate to ovate outer phyllaries, and by proportionally shorter darkened zones on the phyllary apices. Several varieties have been recognized for this species, but because I have not seen Matuda 4624 cited by Matuda (1950), I treat P. roseus here without infrataxa and without making judgment on possible taxonomic status of the varieties.


Pinaropappus caespitosus Brandegee, Pinaropappus spathulatus var. chiapensis McVaugh.

Subscapose herbs from elongate divaricate-branched rhizomes; stems few-many, (5-)20-30 cm, simple to few-branched, leafy basally or proximally, rarely few-leaved to mid-stem, distally few-bracteate, subhexagonal. Leaves 5-20+ per tuft, spreading, simple, cauline ones (when present) remote; blade 2-14 × 0.1-0.6(-1.5) cm, linear to linear-oblong to ovate or basal ones narrow-oblong-oblong to spatulate, chartaceous, base long-attenuate, sometimes petiolate, margins
entire or remotely few-dentate distally, dentations (when present) 1-2 per margin, 1-2 mm. Capitulescence of few-many monocephalous and simple to tricephalous and 1-2-branched (at about mid-stem) scapes, scapes naked to bracteate and bracteolate, bracts 1-3 cm, linear to subulate, subtending branches, grading gradually or abruptly into 1-few bracteoles 2-10 mm; peduncles 12-30 cm, slender. Capitula (9-)13-18 mm; involucre 8-12(-14) × 6-10 mm, campanulate; phyllaries 3-12(-14) × (1-)1.5-2.5(-3) mm, 4-5-seriate, apex often minutely ciliolate; outer phyllaries lanceolate to elliptic, scarious purple-brown area in a c.1.5 mm arch, apex obtuse; the two+/- innermost series lanceolate to linear-lanceolate, subequal, scarious distal purple-brown zone 3-4 mm, c. 1/4 phyllary length, apex narrowly acute to filiform; paleae 10-14 × 0.5-1.1 mm, linear-lanceolate, apex purplish. Ligulate florets 34-60, 3-4+-seriate, corollas unequal, lavender (pale bluish) to pink (tube sometimes yellowish), those of outer florets exserted 3-6 mm from involucre at c. 45°; corolla of outer florets 10-12(-15) mm, tube 3-4.5 mm; anthers c. 4 mm, yellowish; style pale-colored, branches to c. 2.5 mm. Cypselae 4-7.5 mm, the slender apex shorter than the body slender; pappus bristles 4.5-7 mm, slightly longer than the cypselae. 2n = 18. Flowering Jan-Nov. *Juniperus* forest, meadows, pine-oak forests, rock crevices. Ch (King 2804, NY); G (Pruski y Ortiz 4263, MO). 1000-3700 m. (Mexico [Puebla and Veracruz], Mesoamerica.)

Shinners (1951) treated *Pinaropappus caespitosus* and *P. spathulatus* as conspecific and occurring from Puebla and Veracruz into Guatemala. The few known populations of *P. spathulatus* from near Pico Orizaba (including the types of *P. caespitosus* and *P. spathulatus*) usually consist of small individuals, but by critical features match *P. spathulatus* as circumscribed by Shinners (1951). The phyllary width differences (middle phyllaries 1-1.5 mm in populations from Puebla and Veracruz vs. 1.5-2.5 mm in populations in Chiapas and Guatemala) used by McVaugh (1972) as varietal differences were not taken by Nash (1976h) as significant, and she placed *P. spathulatus* var. *chiapensis* in synonymy of *P. spathulatus*. The corolla color variation (presumably due to small differences in alleles) of the species (i.e., pink to lavender or pale bluish) may be found within an individual population (viz *Pruski y Ortiz* 4263).

8. **Sonchus** L.

Por J.F. Pruski.

Annual or perennial taprooted, herbs to rarely small caulirosulate trees, often glandular-pubescent; stems erect, few-branched, often stipitate-glandular, fistulose. Leaves simple to pinnatifid, base winged-petioliform or stem leaves sessile, cauline or sometimes all basal,
chartaceous (ours), base sheathing or clasping the stem, often auricled, sometimes spinulose to
spinose, blade spinose-dentate to deeply pinnatifid-incised, teeth callose-tipped, margins often
slightly revolute, surfaces eglandular (ours), proximal and midstem leaves generally pinnatifid,
distal stem leaves mostly simple, ovate-lanceolate. Capitulescence corymbiform to paniculate,
occasionally monocephalous; peduncles glabrous to pilose. Capitula: involucres umbonate in bud
and swollen around receptacular disk, urceolate at anthesis, campanulate in fruit; phyllaries
moderately graduated with c. 2 inner series subequal (ours), 2-several-seriate, triangular to
lanceolate, green throughout or margins narrowly scarious; receptacle epaneate, flat to concave,
sometimes fistulous. Ligulate florets with corollas unequal; corolla yellow (at least adaxially) or
sometimes tinted purplish abaxially, slightly to well-exserted, usually sparsely pubescent
abaxially, tube as long as or slightly longer than limb; style branches moderately short. Cypselae
ovate to oblong, erose, compressed, stramineous or brownish, faces 3-8-costate, smooth or
transversely rugulose-muricate, glabrous, base and apex slightly narrowed but never attenuate,
carpopodium annular or subannular, costae typically terminating immediately above
carpopodium; pappus of numerous persistent white elongate scabrid capillary bristles, most
narrow throughout but some slightly dilated basally, usually reaching to near phyllary apices. $x =
introduced into the New World, 2 Flora Area spp. are also pantropical weeds.

Boulos (1960, 1972) placed our species in Sonchus subgen. Sonchus, which contains several
cosmopolitan (vs. African endemic) species that Boulos diagnosed partly by herbaceous (vs.
woody) habit. Sonchus subgen. Sonchus was revised by Boulos (1973), where complete
synonymy is given. Each of our species of S. subgen. Sonchus, however, are treated by Boulos
(1960, 1972) as belonging to different sections. The only heterotypic synonyms given below are
those known to be based upon material from the Americas. Boulos (1972) following the
suggestion of Bentham y Hooker (1873) cited Trachodes D. Don in synonymy of Sonchus, but
here Trachodes is referred instead to synonymy of Launaea, which it matches by few-flowered
cylindrical capitula and apically narrowed cypselae.

1. Cypsela faces 3(-5)-costate, otherwise smooth, costae well-spaced; pappus bristles +/- caducous; leaf margins spinose to aculeate, spines or prickles usually 1-3(-7) mm.

2. **S. asper**

1. Cypsela faces at maturity ≥ (4-)5-costate, transverse-rugulose at maturity on and between costae, costae closely spaced; pappus bristles +/- persistent; leaf margins usually spinulose, teeth 1-2(-3) mm.

2. Perennial herbaceous possible waif; stems narrow-fistulose; corollas 18-26 mm, outer florets usually with corollas +/- well-exserted.

1. **S. arvensis**

2. Common naturalized annual or biennial herbs; stems broad-fistulose; corollas 9-14 mm, usually slightly exserted.

3. **S. oleraceus**


**Hieracium arvense** (L.) Scop.

Perennial herbaceous possible waif, 0.3-1(-1.5) m usually rhizomatous; stems erect, simple proximally, glabrous to near capitulescence, narrow-fistulose. Leaves 6-35 × 1.5-15 cm, mostly basal and proximal-cauline, smaller and remote distally, pinnatifid to stem leaves pinnatifolobed or unlobed, lanceolate to oblom in outline, lobes 2-5-jugate, lanceolate to triangular, lobes typically narrower than sinuses, lobe margins usually spinulose, teeth 1-2 mm, terminal lobe usually largest, lobe and blade apices acute to obtuse, surfaces glabrous. Capitulescence held well above larger cauline leaves, corymbiform-paniculate, somewhat flat-topped, with lateral branches often over-topping central axis; peduncles 1.5-7 cm, sometimes either stipitate-glandular or sessile-glandular. Capitula 15-30 × 30-50 mm (when capitula open and including corollas fully spread); involucre 10-15+ × 8-10 mm, drum-shaped to campanulate; phyllaries 38-50, 6-15 × 1.5-2 mm, c. 3-seriate; outer phyllaries sparsely or dense villous to tomentulose basally; mid-series and inner phyllaries glabrous to infrequently stipitate-glandular. Ligulate florets 150-235, corolla 18-26 mm, outer florets usually with corolla well-exserted, yellow, tube and limb +/- subequal or tube longer than limb, limb 9-12 × c. 2 mm. Cypselae 2.5-4 × 1-1.5 mm, narrowly oblom in outline, moderately compressed, faces (4-)5+-costate, transverse-rugulose-muricate at maturity on and between costae, costae +/- equally thick, closely spaced; pappus bristles 8-15 mm, +/- persistent. 

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(Native to Europa; naturalized in Canada, Estados Unidos, Mesoamerica, Chile, Argentina; Africa, Asia, Australia, New Zealand, Islas del Pacifico.)

*Sonchus arvensis* is known to me in Mesoamerica only from literature reports of Mociño (1993) and Holm et al. (1997), both post-dating Nash (1976h), who did not treat it for Guatemala. Were this striking species to be even occasional in its occurrence in Mesoamerica, it would presumably have been recollected within the two centuries since Mociño visited Central America, so *S. arvensis* seems to be at best a rare waif in Mesoamerica.

*Sonchus arvensis* tends to be more frequent in temperate (vs. Gulf Coastal) North America, and thereby would presumably be found in montane zones of Flora Area, although not reported by Mociño (1993) as montane. Several varieties have been recognized (e.g., Boulos 1972, 1973), but I have not seen Flora Area vouchers and treat it in the broad sense without making judgment on possible taxonomic status of the varities, or their (one-time) occurrence in Flora Area.


*Sonchus carolinianus* Walter.

Common naturalized annual herbs, 0.1-1(-2) m; stems erect, simple to few-branched, sometimes angled basally, broad-fistulose, glaucous-glabrous to sometimes stipitate-glandular distally; stipitate glands of stems and phyllaries 0.6-1.2 mm. Leaves 4-25(-30) × 1.5-8 cm, mostly cauline when flowering, distal leaves often unlobed, most larger leaves shallowly to deeply pinnately-lobed, obovate or spatulate in outline, base auriculate, auricles rounded, not dilated or sometimes slightly dilated, auricles and margins spinose to aculeate, spines or prickles usually 1-3(-7) mm, lobes 2-5 per side, typically triangular to linear-lanceolate, lobe apex spinose to stiffly prickled, lobes typically as wide as or narrower than sinuses, terminal lobe indistinct to slightly pronounced, usually not much larger than lateral lobes, often lanceolate, apex narrowly acuminate to long-attenuate and spinose to stiffly prickled, surfaces glabrous or subglabrous to when young infrequently arachnoid-floccose. Capitulescence corymbiform or subumbelliform; peduncles 0.5-5 cm, glabrous or in bud often loosely white-tomentose. Capitula usually 10-16(-20) mm; involucre 10-14 × (6-)10-20 mm; phyllaries 35-45, 2-14 × 0.8-2 mm, 3-4-seriate, glabrous to infrequently stiffly stipitate-glandular. Ligulate florets usually 100+; corolla 10-13 mm, slightly exserted, tube usually longer than limb, limb 4-5 × c. 1 mm, usually yellow throughout (or outer series sometimes whitish-violet abaxially); anthers yellow with black apex. Cypselae 2-3 × 1-1.3
mm, elliptic or obovate in outline, strongly compressed, faces 3(-5)-costate, otherwise smooth, costae equally thin, well-spaced, lateral margins thinly winged, margins sometimes hispidulous; pappus bristles 6-9 mm, +/- caducous. 2n =18. Flowering Jul-Oct, Dec-Feb, Apr. Disturbed areas, campo abierto, orillo de camino, wet areas. Ch (Santiz R. 580, MO); N (Moreno 2020, MO); CR (Haber 10208, MO); P (D'Arcy y D'Arcy 6527, MO). 100-2400 m. (Native to temperate Eurasia, but now nearly a cosmopolitan weed; naturalized in Canadá, Estados Unidos, Mexico, Mesoamerica, Colombia, Venezuela, Guyana, Ecuador, Peru, Bolivia, Brazil, Uruguay, Paraguay, Chile, Argentina, Jamaica, Hispaniola, Puerto Rico, Lesser Antilles; Africa, Australia, New Zealand, Islas del Pacífico.)

The lectotypification proposed by Boulos (1973) was based on non-original material (LINN-949.8) and was superseded by the selection by Boulos in Jarvis y Turland (1998). Although Sonchus asper is generally more temperate, S. oleraceus instead occurs in the more temperate Flora Area zones.


Sonchus gracilis Phil., Sonchus rivularis Phil.

Common naturalized annual or biennial herbs, 0.2-1(-1.3) m; stems erect, simple to few-branched, striate to tall plants angled basally, broad-fistulose, glaucous-glabrous to distally stipitate-glandular; stipitate glands of herbage usually 1-2 mm. Leaves 4-25 × 1.3-8 cm, mostly cauline when flowering, distal leaves often unlobed, most larger leaves runcinate to lyrate pinnatifid-pinnatisect, obovate to oblanceolate in outline, base auriculate, auricles rounded to sagittate, slightly dilated to sometimes very dilated, auricles and margins usually spinulose, teeth to c. 1(-3) mm, lobes (when present) 1-4 per side, usually 1-5 cm, usually lanceolate to ovate, often wider than sinuses, terminal lobe usually distinct and much larger than lateral lobes, typically broadly triangular, lobe base truncate to hastate, apex usually acute to rounded, surfaces glabrous or glaucous. Capitulescence corymbiform or subumbelliform; peduncles 1-6 cm, glabrous or stiffly stipitate-glandular to white-tomentose apically. Capitula usually 12-17 mm; involucre 8-13 × 7-20 mm; phyllaries 25-35, 3-13 × 0.5-2.5 mm, c. 4-seriate, basally sometimes white-tomentose, all phyllaries otherwise glabrous to often stiffly stipitate-glandular. Ligulate florets usually 80+; corolla 9-14 mm, usually slightly exserted, tube and limb +/- subequal,
yellow, limb to c. 6(-7) × c. 1.5 mm. Cypselae 2.5-3.5 × 0.8-1 mm, narrowly oblong in outline, moderately compressed, lateral margins thickened but not winged, faces at maturity ≥ 5-costate, transverse-rugulose-muricate at maturity on and between costae, costae unequally thick, closely-spaced, occasionally sulci more defined than costae, margins and costae typically hispidulous; pappus bristles 5-8 mm, +/- persistent. 2n = 32. Flowering Year-round. Cultivated areas, disturbed areas, campo abierto, open rocky hillssides, orillo de camino, páramo, thickets, volcano slopes, wet areas. T (Peréz et al., 2005: 85); Ch (Pruski et al. 4247, MO); Y (Gaumer 310, F); C (Alvarez 268, MO); QR (Souza 11190, MO); B (Dwyer 10475, MO); G (Pruski y Ortiz 4270, MO); H (Nichols 2047, MO); ES (Villacorta y Lara 2534, MO); N (Moreno 2993, MO); CR (Pruski et al. 3849, MO); P (Averett et al. 1063, MO). 0-3400 m. (Native to Eurasia, but now a cosmopolitan weed; naturalized in Canadá, Estados Unidos, Mexico, Mesoamerica, Colombia, Venezuela, Ecuador, Peru, Bolivia, Brazil, Uruguay, Paraguay, Chile, Argentina, Cuba, Jamaica, Hispaniola, Puerto Rico, Virgin Islands, Lesser Antilles, Trinidad and Tobago; Africa, Australia, New Zealand, Islas del Pacífico.)

Although Calderón de Rzedowski (1997) did not cite Sonchus oleraceus for Tabasco, the report by Peréz et al. (2005) seems reasonable because S. oleraceus is by far the more common of our species. High elevational plants on volcanic slopes tend to be more-branchered and more frequently stipitate-glandular than lower elevational plants.

The supernumerary cypselae costae are often late in developing, and often not fully manifest on maturing rugulose-muricate ovary surfaces. This cosmopolitan weed is occasionally misdetermined as Erechtites hieraciifolius (Senecioneae).


Taraxacum sect. Mexicana A.J. Richards

Por J.F. Pruski.

Small, rosulate, scapose, taprooted perennial herbs (sexual or apomictic). Leaves basal, several to many, simple to pinnatifid, sessile or petiolate; blade usually runcinate or lyrate pinnatifid, oblanceolate to obovate, chartaceous, base cuneate to attenuate, margins dentate or lobed to rarely entire, apex acuminate to rounded, surfaces glabrous or pubescent. Capitulescence monocephalous; scapes 1-many per plant, simple, fistulose, usually ebracteate, glabrous to distally pubescent. Capitula basically calyculate, phyllaries and calycular bracteoles typically dimorphic; involucre cylindrical to campanulate; phyllaries proper subequal, 1(-2)-seriate, erect, base connate, green with margins at least of inner series scarious; calycular bracts or bracteoles 5-
30, usually 2-3-seriate, appressed in bud to spreading (ours) or reflexed at anthesis; receptacle epaneate. Ligulate florets 15-150, corollas usually unequal with outer series with longer corolla limbs; corolla yellow (ours) to purplish; style branches elongate (ours). Cypselae fusiform, long-rostrate, subterete, body narrowly obovoid, 4-5-angled, 4-12-costate, stramineous to reddish, rugose or spinulose-muricate distally, usually setulose; pappus of 50+, white to stramineous, elongate scabrid capillary bristles. $x = 8. 60(-2000)$ spp. Mostly native to the Old World, but many now cosmopolitan; c. 25 species in the Americas.

*Taraxacum officinale* is by far the most common species of *Taraxacum* in the Neotropics, although red-fruited material (presumably referable to largely North American *T. erythrospermum* Andr.) has been seen from the West Indies. The phyllaries of *Taraxacum* are sometimes described as in 2 unequal series (e.g., Vuilleumier, 1973), but I describe the capitula as basically calyculate because at anthesis the calycular bracts are often spreading and +/- eximbricate, whereas the phyllaries proper appressed and subequal.


Herbs 3-25(-35) cm. Leaves usually 5-20+, 5-25 × 1.5-4 cm; petiole narrowly winged distally; blade runcinate-pinnatifid, oblanceolate to obovate in outline, base typically attenuate onto petiole, lobes triangular, usually 2-6 per side, at least the distal ones subopposite, gradually reduced proximally, terminal lobe ovate or hastate, often the longest, margins and sinuses sometimes dentate, apex acute or obtuse, surfaces glabrous to sparsely villous, trichomes crisped or subappressed. Capitulescence with erect capitula; scapes 1-6(-16), erect or ascending, usually longer than the leaves but some of the highest elevational plants sometimes with scapes as short as leaves, glabrous to proximal part or distal part sometimes sparsely villous. Capitula 1.5-3 cm; involucre 0.8-1.7(-2.5) cm diam., campanulate, phyllaries and calyculus ecorniculate; phyllaries proper 13-20(-25), 10-17 × 1.5-3.5 mm, +/- lanceolate, mostly green to ferruginous apically, margins scarious, glabrous, apex acute to obtuse; calycular bracts 12-20(-30), 5-10 × (1-)1.5-2.5(-
3) mm, graduated, ovate to lanceolate or sometimes deltoid, often to c. 1/2+ as long as phyllaries, thin, thinly scarious or sometimes whitish marginally, glabrous or margins subpapillose, typically soon recurved to reflexed, apex acute. Ligulate florets c. 100+; corolla 10-20 × 1-1.5 mm, yellow, tube shorter than limb, limb of outer florets spreading-slightly exserted, often longitudinally brown-streaked abaxially; anthers and styles concolorous with corolla limb adaxial surface; style branches c. 1.5 mm. Cypselae 7-14 mm, tan-brownish or rostrum stramineous, body 2.5-3.5 mm, rostellum 0.5-0.8 mm, rostrum filiform, subequal with body at anthesis, 2-3 × longer than body in fruit; pappus bristles 4-6(-8) mm, held within involucre at anthesis, but rostrum elongating in fruit thus exserting pappus. 2n = 24(32, 40, 44, 48). Flowering Year-round, with peak from May-Jan.

Alpine meadows, disturbed areas, pine-oak forests, robledales, urban areas, volcano slopes. Ch (Matuda 4544, NY); G (Contreras 5244, MO); H (Caballero 121, MO); ES (Renderos et al. MR-00330, MO); CR (Taylor y Taylor 4434, NY); P (D'Arcy y D'Arcy 6459, MO). (900-)1400-3500 m. (native to Europa, but now nearly cosmopolitan; naturalized in Canadá, Estados Unidos, Mexico, Mesoamerica, Colombia, Venezuela, Ecuador, Peru, Bolivia, Brazil, Uruguay, Paraguay, Chile, Argentina, Cuba, Jamaica, Hispaniola, Puerto Rico; Africa, Asia, Australia, New Zealand, Islas del Pacífico.)

The treatment of _Taraxacum_ in Tutin et al. (1976) mentioned 100+ segregate species in the "_T. officinale_ group" of _T. sect. Taraxacum_. However, I follow (for example) Standley (1938), Nash (1976h), and Calderón de Rzedowski (1999) by also defining _T. officinale_ as a variable polymorphic and widespread weedy species, the neotropical populations of which tend to have fewer and broader phyllaries and calycular bracts, albeit these differences insignificant. _Taraxacum officinale_ as defined here encompasses much of the variation noted for "_T. officinale_ group" in Tutin et al. (1976) and most of the supposed diagnostic variation (e.g., that of rostellum shape and length, calycular bract shape, texture, and curvature) in _T. sect. Mexicana_ in the Neotropics cited in Richards (1976).

Study throughout Mesoamerica and even within duplicates of single collections (e.g., _Taylor y Taylor 4434_) shows leaf lobe dentation, scape length, calycular bract length, rostrum length, and cypselae body length varies continuously, and cannot be not used here as distinguishing species. The slight differences observed among American material of _T. officinale_ are insignificant taxonomically and are not comparable in magnitude to variation seen in most pantropical Compositae. Most clear synonyms, however, are not listed in formal synonymy here.

_Taraxacum officinale_ has been collected mostly in montane areas in the Neotropics, but as low as 900 meters elevations in Honduras (the "200" meter elevation of _Molina 10117_ cited by
Richards, 1976, is a typographical error for "2000"), yet to date does not appear to have been collected in the Lesser Antilles, Virgin Islands, or in the Guianas.

Fernald (1933) placed *T. officinale* in synonymy of the earlier *T. palustre* (Lyons) Symons. Richards (1972) and Tutin et al. (1976), however, treated the two as taxonomically distinct species belonging to different sections of *Taraxacum*. For many years generic and specific authorship of *T. officinale* was often cited as "Weber ex Wiggins" or as "Weber," but the title page of the paper containing the protologue credits only Wiggers.

10. **Tragopogon L.**

Por J.F. Pruski.

Biennial to perennial taprooted leafy-stemmed herbs; stems 1(-few). Leaves basal and cauline, appressed to ascending, simple, sessile; blade graminoid, chartaceous, venation parallel, base dilated and amplexicaul, margins entire. Capitulescence monocephalous; peduncles elongate, stout. Capitula: involucre cylindrical to campanulate, ecalyculate; phyllaries (5-8-13, green throughout, subequal, 1(-2)-seriate; receptacle epialeate. Ligulate florets 30-200, corollas unequal, shorter than phyllaries; corolla violet to purple (ours) or more frequently yellow. Cypselae subterete, fusiform, long-rostrate (ours) or outer cypsela sometimes short-rostrate, body 5-10-costate, costae often muricate, rostrum about as long as or longer than body and about as long as pappus; pappus of 12-20, elongate mostly plumose (outer ones sometimes scabrid) capillary bristles. $x = 6$. 100-150 spp. Most native to temperate zones of the Old World, but aprox. 5 spp. in the Americas, 2 polyploids having formed in the Americas; Europa, Africa, Asia; introduced in Australia, Islas del Pacifico.

Our species matches the protologue by having eight phyllaries longer than the florets. The two other species most frequently found in the Americas, *Tragopogon dubius* Scop. and *T. pratensis* L., differ from *T. porrifolius* by their yellow corollas. Two species of the similar *Lygodesmia* D. Don (characterized by scabrid pappus bristles and few-flowered capitula) occur in Mexico and should be looked for in Flora Area.

I believe Mociño's (1993) usage of *Scorzonera graminifolia* L. is possibly in reference to material of our graminoid-leaved *Tragopogon*, in which case it would represent the only reference known to me of the genus in Guatemala.


Subglabrous biennial herbs, 0.4-1 m; stem erect, simple or few-branched from base, unbranched distally, proximal internodes much shorter than leaves, grading to distal-most internodes nearly as long as leaves. Leaves 6-28 × 0.5-1.5 cm, linear-lanceolate, midrib not obviously much thicker than laterals, apex acuminate, straight and not recurved, surfaces glabrous. Capitulescence of 1-few-capitula per plant; peduncles 10-25 cm, gradually dilated and fistulose distally. Capitula 3.5-6 cm; involucre usually 1.5-3 cm diam. (spreading to 12 cm diam. in fruit), narrowly obconic in bud, campanulate at anthesis, distal 3/4 at anthesis abruptly spreading (outwardly geniculate) and widely separated for most of their length; corolla of outer florets exserted past receptacular disk, but not longer than the phyllaries; phyllaries 8(-13), 3-4 cm at anthesis, 5-9 mm wide at base quickly narrowing to c. 1 mm wide apically, typically continuing to elongate in fruit, lanceolate, flat or sometimes with central longitudinal angle, apex acuminate to attenuate, glabrous or sometimes slightly arachnoid. Ligulate florets 50-100+, outer florets shorter than phyllaries but with corolla much longer than that of inner florets; corolla violet to purple, corolla of outer florets 20-27 mm, anther thecae typically concolorous with corollas, filaments pale; style branches or at least attached pollen yellow. Cypselae usually 25-40 mm, body usually 10-16 mm, rostrum filiform, usually c. 2 × as long as body, ampliate and arachnoid distally near pappus; pappus bristles 20-25 mm, tawny, lateral pinnulae often 2+ mm. 2n = 12. Flowering May. *Disturbed dry slopes*. Ch (Breedlove, 1986: 56); ?G (Mociño, 1993: 125 ?sub *Scorzonera graminifolia*). c. 2700 m. (Native to Europa; cultivated or naturalized in Canadá, Estados Unidos, Mexico, Mesoamerica, Uruguay, Chile, Argentina; Asia, Australia, New Zealand, Islas del Pacífico.)

Although this widespread and well-known species was known in the literature a century before *Species Plantarum* of Linnaeus was published (Linnaeus cited references of Burser, Bauhin, Morison, and Daléchamps), it appears to be very infrequent in Mesoamerica. *Tragopogon porrifolius* is expected to occur only in montane areas of Mesoamerica.

11. **Youngia** Cass.

Por J.F. Pruski.

Annual to perennial taprooted herbs, usually ≤ 1 m, often rosulate; stems erect or infrequently tufted, usually alternate-branched distally, glabrous to pubescent. Leaves simple to more
commonly lobed, petiolate; blade usually lyrate, chartaceous, base often subclasping, margins entire to denticulate. Capitulescence corymbiform to racemose or paniculate, 4-150-capitulate; peduncles slender, usually ebracteate. Capitula usually small, calyculate (ours) or ecalyculate, phyllaries and calycular bracteoles strongly dimorphic; involucre urceolate or cylindrical to campanulate; phyllaries usually 8, subequal, 1-2(-4)-seriate, margins usually scarious, phyllaries sometimes appended; calycular bracteoles 3-5, delate to ovate; receptacle epeate. Ligulate florets 5-30, all florets in ours with corollas subequal and exserted; corolla usually yellow (or sometimes abaxially purplish); anthers green-black (ours); style branches short (ours). Cypselae subcompressed (ours) or compressed, +/- fusiform in outline, typically erostrate (ours), slightly unequally 10-15-costate, costae slightly unequally thickened, lateral costae or those on angles slightly thicker than other costae, costae usually setulose (ours); pappus persistent or caducous, of 30-60 usually white, elongate scabrid capillary bristles, bases usually free. x = 5, 6, 8. Aprox. 30 spp. Native to Asia; 1 or 2 spp. introduced into the Americas; Europa, Africa, Australia, New Zealand, Islas del Pacifico.

Youngia was treated in synonymy of Crepis by Bentham y Hooker (1873). Although described in the protologue as most closely related to Mycelis Cass., Youngia was basically reconstituted from Crepis by Babcock y Stebbins (1937). Youngia differs from Mycelis by typically erostrate cypselae and from Crepis by subcompressed cypselae with slightly unequally thickened costae.


Chondrilla japonica (L.) Lam., Crepis formosana Hayata, Crepis japonica (L.) Benth., Youngia formosana (Hayata) H. Harra, Youngia japonica subsp. formosana (Hayata) Kitam., Youngia japonica var. formosana (Hayata) H.L. Li., Youngia lyrata Cass.

Annual or biennial herbs, (8-)20-50 cm; stems slender, 1-6 from base, each few-branched distally, glabrous, fistulose. Leaves usually 4-15, basal or occasionally 1-2 cauline leaves +/- similar to the basal ones; petiole 0.5-5(-7) cm, usually unwinged; blade (2-)4-20 × (1-)1.5-5 cm, simple and margins merely undulate to runcinate or very much more commonly lyrate-pinnatifid, oblanceolate to spatulate or ovate in outline, secondary veins moderately distinct, lateral lobes
usually 3-7 per side and often subopposite, gradually reduced proximally, terminal lobe the
largest, lobe margins subentire to undulate or sometimes few-denticulate, apices rounded to acute,
surfaces glabrous to puberulent, trichomes often crisped. Capitulescence usually paniculate, main
axis branched at mid-stem to distally, branches few, the proximal 3-20 cm, the distal-most
branchlet usually < 1 cm, branches glabrous to puberulent; peduncles 2-10(-15) mm, glabrous.
Capitula 4.5-6.5 mm, calyculate; involucre 1.5-3 mm diam., urceolate in bud, cylindrical at
anthesis, campanulate in fruit; phyllaries proper 6-8, 4-6 × 1-1.3 mm, lanceolate, green to
purplish apically, glabrous, margins white-membranous, apex acute to obtuse; calycular
bracteoles 4-5, c. 0.5 mm, broadly ovate to deltoid, glabrous, apex acute. Ligulate florets (10-)17-
25; corolla 4.5-7 mm, yellow to pale yellow, limb exserted at c. 45°; anthers black; style yellow,
trunk apex exserted. Cypselae 1.5-2.5 mm, elliptic-fusiform in outline, erostrate, abruptly
narrowed apically; pappus bristles 30+, 2.5-3.5 mm, reaching to near top of involucre. 2n = 16.
Flowering Year-round. Cafetales, campo abierto, disturbed areas, garden weed, orillo de
camino, urban areas. G (Pruski et al. 4476, MO); H (Clewlow 3837, MO); ES (Berendsohn 236,
MO); N (Coronado et al. 790, MO); CR (Jiménez et al. 1371, MO); P (Galdames et al. 2990,
MO). 75-2200(-3000) m. (Native to Asia; naturalized in S.E. Estados Unidos, Mexico,
Mesoamerica, Colombia, Venezuela, Guyana, Brazil, Paraguay, Cuba, Jamaica, Hispaniola,
Puerto Rico, Virgin Islands, Lesser Antilles, Trinidad and Tobago; Africa, Australia, New
Zealand, Islas del Pacífico.)

This delicate but weedy species is spreading actively in the Neotropics, and for example
although now known in Costa Rica or Guatemala, it was not listed by, respectively, Standley
(1938) or Nash (1976h). Complete heterotypic synonymy is given Babcock y Stebbins (1937) sub
Youngia japonica subsp. genuina. The species is recognized here without infrataxa. Although my
synonymy is incomplete, caulescent-leaved Y. japonica subsp. longiflora Babc. et Stebbins and Y.
japonica subsp. elstonii (Hochr.) Babc. et Stebbins are excluded intentionally and are perhaps
best recognized at species level. Material examined from the mid-Atlantic Estados Unidos (e.g.,
Hill 16754, MO) and referred to Y. japonica in Barkley et al. (2006) is apparently specifically
distinct. Thus in the Estados Unidos, Y. japonica remains known only from the southeast.

VIII. Tribus Coreopsideae Lindl.

Bidentideae Godr., Bidentidinae Griseb., Coreopsidaceae Link, Coreopsidinae Dumort, Coreopsidodinae
C. Jeffrey

Por J.F. Pruski.
Annual or perennial herbs to shrubs or infrequently vines or trees, when vining rarely climbing by means of twisting petioles, roots typically not tuberous; stems rarely deflected at distal nodes; herbage without secretory cavities or latex, glabrous to pubescent with uniseriate trichomes; corollas with anthochlors (a flavanoid group). Leaves typically cauline or occasionally basal, often opposite and pinnatifid, sometimes alternate and/or unlobed. Capitulescence terminal, monoecephalous to laxly cymose or corymbiform, not or rarely congested. Capitula radiate or sometimes discoid; involucre usually double with a distinct outer series of phyllaries differing from inner translucent chartaceous series in texture and color; phyllaries usually biseriate (1-6-seriate) and dimorphic, individual series of phyllaries usually 5, 8, 13, etc., rarely phyllaries pluriseriate and graduate, usually free to near base or rarely connate for about half of their lengths; outer phyllaries typically herbaceous and green, in Mesoamerica similar to each other; inner phyllaries usually thin-chartaceous with scarious margins, typically prominently brownish-orange-striate; clinanthium usually flat to convex(-conical), typically paleate (Mesoamerica paleate); paleae flat and not conduplicate, typically deciduous. Ray florets (when present) 1-seriate, sterile or sometimes pistillate; corolla variously colored, limb typically with two thicker nerves, adaxial surface papillose, apex mostly 3-lobed; ovary sterile or sometimes fertile and forming fruits. Disk florets bisexual or sometimes functionally staminate; corolla shortly 4(-5)-lobed, usually yellowish, glabrous to pubescent but pubescence rarely restricted to a ring at base of throats, lobes often setulose; anthers ecaudate, black or brown, infrequently yellowish, filaments typically glabrous, endothecial pattern polarized (radial only in *Dahlia*), endothecial cells mostly quadrangular or oblong, appendages usually deltate-ovate, often with a proximal central colored resin duct, usually eglandular (Mesoamerica) or rarely glandular; ovary usually fertile and forming fruits, style appendiculate, obviously branched or rarely basically undivided or weakly bifid only at very apex, branches somewhat flattened, with stigmatic surfaces typically 2-banded, appendage pointed, finely papillose. Cypselae usually isomorphic (infrequently dimorphic or heteromorphic), rays typically obcompressed and triquetrous, disk often obcompressed, rays and/or disks sometimes alate, all rays and disks sometimes columnar, black to brown, usually carbonized, or rarely pericarp ornamented with unidentified dark secretions (in Mesoamerica in *Coreopsis mutica*), surfaces smooth or infrequently striate, apex truncate or emarginate to tapered and rostrate, carpododium often inconspicuous and annular; pappus typically of 1-8(-15) smooth or retrorsely(-antrorsely) barbellate often unequal awns, infrequently absent, rarely of 3-6 squamellae. 24-30 gen., aprox. 550 spp. Mostly Americas; 8(-11) gen., aprox. 42 spp. in Mesoamerica.

Coreopsideae were long-placed in Heliantheae (as subtribe Coreopsidinae; e.g., Bentham y Hooker, 1873: 197; Sherff y Alexander, 1955; Stuessy, 1977; Robinson, 1981; Karis y Ryding, 1994), but were treated at the tribal level by Turner y Powell (1977), Ryding y Bremer (1992), Panero (2007), and Turner (2010). The present treatment uses as its foundation the landmark works of Nash (1976d), Sherff (1932,
1936, 1937), Sherff y Alexander (1955), and Turner (2010). Although, it has long been known that as traditional circumscribed *Bidens* and *Coreopsis* and are not monophyletic (e.g., Tadesse et al., 1995; Kimball y Crawford, 2004; Tadesse y Crawford, 2014), needed names for Mesoamerican genera to be segregated are not yet published, and the present treatment for the moment basically defaults to the generic circumscriptions of Sherff y Alexander (1955), Nash (1976d), Karis y Ryding (1994), Panero (2007), and Turner (2010).

*Bidens, Cosmos,* and *Coreopsis* form the core Coreopsidinae, and among Mesoamerican genera Panero (2007-406) placed only *Chrysanthellum* in subtribe Chrysanthellinae. However, figure 5 in Tadesse y Crawford (2014) indicated that *Heterosperma* could be treated in an expanded Chrysanthellinae. *Dahlia, Goldmanella,* and *Hidalgoa* were placed by Panero (2007-406) in subtribe Coreopsidinae, but appear instead to be early divergent clades in tribe Coreopsideae (Tadesse y Crawford (2014) and are here removed from Coreopsidinae. Indeed, *Goldmanella* has been noted previously as anomalous in each Coreopsidinae and Coreopsideae (Robinson, 1981; Ryding y Bremer, 1992).


1. Phyllaries all scarious, c. 4-seriate, obviously graduated, not dimorphic and more or less similar to each other in shape and texture; stems sometimes deflected at distal nodes.  
   **6. Goldmanella**

1. Phyllaries usually biseriate and dimorphic, outer phyllaries typically herbaceous and green, inner phyllaries usually thin-chartaceous with scarious margins.

   2. Small herbs with stems prostrate, to 30 cm; leaves alternate or clustered in basal rosette

   2. Chrysanthellum

   2. Mostly erect herbs to shrubs taller than 30 cm; leaves mostly opposite throughout.

   3. Vining perennial herbs to lianas climbing by means of twisting petioles; disk florets functionally staminate, style basically undivided or weakly bifid only at very apex; pappus absent.

   **8. Hidalgoa**
3. Annual or perennial herbs to shrubs or vines, when vining not climbing by means of twisting petioles; disk florets bisexual, styles obviously branched; pappus present or absent.

4. Cypselae markedly heteromorphic in shape; ray florets pistillate; ray cypselae broad-ovate in outline.

7. Heterosperma

4. Cypselae usually monomorphic or graduated monomorphic, when moderately heteromorphic the ray florets sterile and not forming cypselae.

5. Disk florets with filaments pilose-hirsute.

4. Cosmos

5. Disk florets with filaments glabrous.

6. Capitula large, 40-150 mm across the expanded rays; cypselae with pappus usually absent.

5. Dahlia

6. Capitula small to mid-sized; cypselae with pappus usually of 2-4 awns.

7. Cypselae usually linear but sometimes cuneate or obspatulate, exalate, faces ribbed or sulcate; pappus awns usually retrorsely barbed, rarely smooth or antrorsely barbed.

1. Bidens

7. Cypselae oblong to orbicular, typically broadly winged, faces smooth; pappus awns smooth or antrorsely barbed.

3. Coreopsis

1. Bidens L.


Por J.F. Pruski.

Annual or perennial herbs, less commonly shrubs or scandent vines, extremely rarely dwarf herbs to 0.06 m, terrestrial or rarely aquatic, often simple-stemmed proximally and branched only distally, when vining not climbing by means of twisting petioles, roots not tuberous; stems usually leafy, erect or less commonly decumbent or scandent, subterete or angulate to hexagonal or tetragonal, striate or multisulcate, commonly glabrous or subglabrous to sometimes pilose, pith solid, roots not tuberous. Leaves opposite to sometimes alternate distally or rarely whorled, generally petiolate or infrequently sessile, leaf lobing and pubescence often very variable within individual species; blade undivided or more commonly 3-7-partite to variously 1-3-pinnatifid or 1-3-pinnatisect, often triangular or ovate in outline or undivided ones lanceolate to ovate, usually chartaceous, pinnativeined, surfaces glabrous or puberulent to densely pilose or rarely tomentose, generally eglandular; leaf segments often ovate or lanceolate, petiolulate or less commonly sessile, margins entire to commonly serrate and ciliate, often deeply lobed yet again; petiole frequently narrowly winged, base sometimes narrowly connate across the node. Capitulescence terminal
on main axis or on branches or branchlets from the distal nodes, capitula single to open-cymose or corymbiform-paniculate, typically long-pedunculate. Capitula small to mid-sized, seldom more than 30-50 mm across the extended rays, mostly radiate, sometimes discoid, 5-150+ flowered; involucre mostly campanulate or hemispheric to sometimes cylindrical, double i.e., of 2 dissimilar (in size, shape, and/or texture) series of phyllaries; phyllaries free or sometimes very base connate, subequal within an individual series, rarely strongly imbricate, margins entire, persistent and reflexed in old fruit; outer series of phyllaries mostly 3, 5, 8, or 13 etc., minute to foliose, generally smaller than to subequal with inner outer series, sometimes obglandulat, linear to spatulate or infrequently ovate, herbaceous, green, 1-few-nerved, sometimes indistinctly so, appressed to more commonly ultimately spreading or reflexed, glabrous to pubescent; inner series of phyllaries wider than outer phyllaries, appressed, membranous, commonly yellowish and brownish pluristriate, surfaces usually glabrous, margins usually hyaline; clinanthium flat to convex, paleate; paleae usually resembling but narrower than the inner phyllaries, often linear-lanceolate, subplanar, usually stramineous or yellowish and yellowish to dark striate, typically deciduous leaving exposed pale-colored clinanthium that post fruit often is dome-shaped. Ray florets (0-) 5-13+, sterile or rarely styliferous, uniseriate, often strongly exerted from involucre; corolla usually yellowish, sometimes white (and then main veins sometimes pinkish abaxially) or rarely purplish or rosaceous, rarely discolorous-spotted at base of limb, often pressing paler abaxially, glabrous, limb usually broad, often well-exserted from involucre, apex rounded to subtruncate, usually 3-denticate. Disk florets 5-60(-150+), generally bisexual; corolla generally funnelform, typically actinomorphic, usually yellow or yellow-orange at least distally, veins sometimes reddish, glabrous or puberulent, tubes typically much shorter than throats, shortly 4-5-lobed, lobes deltate to sometimes triangular-lanceolate; anthers usually brown to black or occasionally yellow, the apical appendage ovate-lanceolate, basally short-sagittate, filaments glabrous; style branches flattened, appendiculate, distally long-papillose, appendages deltate or lanceolate to subulate, stigmatic lines paired or with stigmatic surface entire proximally. Cypselae usually linear but sometimes cuneate or obspatulate, usually graduated isomorphic in shape and size with the central cypselae the longest and least obcompressed, sometimes outer few obviously dimorphic in size, shape, and/or vestiture, quadrangular or sometimes subterete to slightly obcompressed, much less commonly obviously and broadly obcompressed with convex outer face, exalate or rarely coryk-marginated, typically erostrate or rarely with flat rostrum, usually blackish of greenish-brown, carbonized to papillate-carbonized, rarely not carbonized, erect and straight or the outer ones sometimes subfalcately curved supernally, very rarely fully recurved and nearly once-coiled, variously angled or ribbed but often faces 3-4 and bisulcate longitudinally, when cypselae obcompressed faces sometimes pluristriate, surfaces eglandular, glabrous or antrorsely pubescent, vestiture usually similar and sparse, or outer cypselae moderately to densely hirsutulous with the inner cypselae obviously
less pubescent; apex often gradually narrowed in distal 1/3 of fruit, sometimes slightly dilated apically or
even obviously truncate, infrequently obviously rostrate; pappus of 2-4(0-7) awns, awns much shorter
than the cypselae and generally not reaching the base of the corolla lobes, rarely longer than the corolla,
usually retrorsely barbed, rarely smooth or antrorsely barbed. erect or strongly spreading, stout, persistent.

x = 13. Cosmopolitan, aprox. 150-240 species, mainly warmer regions of the New World.

Species of Bidens are often common and weedy. Individuals may vary from having non-divided leaves
to being pinnatifid and from glabrous to tomentose, and these characters may not always be used to
distinguished species. Although a few species may have either discoid or radiate capitula, capitular
features and ray corolla color appear to be generally dependable taxonomically. In top-snatch herbarium
specimens of tropical herbs it is not at all always apparent, which plants are annuals and which are
perennials. Thus for example, although B. bicolor is keyed as an annual and B. aurea keyed as a
perennial, sometimes weighing features not used in keys, such as capitula size, phyllary color upon
drying, etc. help in specimen identifications.

The present treatment basically follows that of Sherff (1937) and Sherff y Alexander (1955), but
perhaps most notable instead follows Ballard (1986), Funk and Pruski (1996), and Pruski (1997) in
recognizing B. alba as distinct from B. pilosa. Roseman (1990) and Melchert (2010a) provided detailed
treatments including recognition of several segregates, for what is treated here as a (overly?) broadly
circumscribed B. reptans. It is well known that Bidens is not monophyletic (e.g., Tadesse et al., 1995), and
Mesoamerican Delucia and other possible segregates may deserve generic recognition.


1. Dwarf herbs.
2. Leaves sessile, not divided; subaquatic herbs.
3. Ray corollas purplish to rosaceous.
4. Cypselae with rostrum obviously flattened rostrum, pappus awns antrorsely barbellate.
5. Cypselae margins corky; inner phyllaries lanceolate.

11. B. nana
10. B. laevis
17. B. rostrata
5. B. blakei
12. B. oerstediana
4. Cypselae erostrate or when rostrate the rostrum subterete or quadrangular, pappus awns smooth or retrorsely barbellate.

6. Cypselae dimorphic in vestiture with outer cypselae moderately to densely hirsutulous; at least some cypselae subfalcately curved supernally, pappus awns usually 4.

7. Pappus with one awns erect, the other awns refracted away nearly in same plane.

16. B. riparia

8. B. cynapiifolia

6. Cypselae more or less similar in vestiture or similarly glabrous, all usually more or less straight-erect, sometimes curved in B. chiapensis but then 2(-4)-awned; pappus awns usually 2-3.

8. Annual herbs.

9. Cypselae moderately dimorphic in color, size, and shape with outer cypselae reddish narrow-cuneate, short and often obscured by phyllaries. 4. B. bigelovii

9. Cypselae graduated isomorphic or less commonly weakly dimorphic, all usually elongate, linear, and black.

10. Capitula radiate.

11. Ray corollas typically white throughout. 1. B. alba

11. Ray corollas 2-toned, yellow with dark red spot near base of limb. 3. B. bicolor

10. Capitula discoid to obscurely radiate.

12. Disk florets (20-)35-75. 1 4. B. pilosa

12. Disk florets usually 6-12. 19. B. tenera

8. Perennial herbs to shrubs or vines.

13. Climbing shrubs or vines.

14. Capitula radiate, moderately large, 4-6 cm across the expanded rays; ray florets usually 8, corolla limb 18-25(-30) mm. 9. B. holwayi

14. Capitula radiate or sometimes discoid, usually small, when radiate 1.5-3(-5) cm across the expanded rays; ray florets (0-)3-7(-8), corolla limb 7-25 mm. 15. B. reptans

13. Perennial herbs to subshrubs.

15. Ray florets styliferous; cypselae never carbonized; outer phyllaries subfoliaceous. 13. B. ostruthioides

15. Rays not styliferous or capitula discoid; cypselae carbonized; leaves chartaceous; outer phyllaries not foliar.
16. Outer phyllaries typically much longer than the inner; capitula radiate or discoid.  
\textbf{6. B. chiapensis}

16. Outer phyllaries shorter than to subequal to inner phyllaries; capitula radiate.

17. Ray corollas white.  
18. Capitula 5-12 mm, 3-4.5 cm across the expanded rays.  
\textbf{7. B. chrysanthemifolia}

18 Capitula 4-5 mm, 1-1.5 cm across the expanded rays.  
\textbf{18. B. steyermarkii}

17. Ray corollas usually yellow.  
19. Outer phyllaries dark-streaked, herbs usually in wet habitats.  
\textbf{2. B. aurea}

19. Outer phyllaries not dark-streaked, herbs usually in only slightly humid or in upland habitats.  
\textbf{20. B. triplinervia}


Annual typically diffuse herbs 0.5-1.5 m; stems decumbent to erect, moderately branched, tetragonal, glabrous to sparsely villous, especially villous at the nodes. Leaves (3-)6-17 x (5-)6-13 cm, pinnately 3-5-foliolate or rarely simple, petiolate; blade (when leaf simple) or segments 3-6 × 1-3.7 cm, lanceolate or elliptic-ovate to oblong, chartaceous to rarely coriaceous, surfaces glabrous to sparsely pilose, base
attenuate to cordate or truncate, margins serrate, apex acute to acuminate; petiole to 3 cm. Capitulescence open-cymose, 6-18-capitulate; peduncles 1-7 mm, glabrous to sparsely villous. Capitula radiate, (1.6-)2.2-4.6 cm across the expanded rays, n fruit becoming hemispherical to nearly rounded; involucre campanulate, generally not broadening greatly in fruit; outer phyllaries 7-13(6-16), 2-4(1.5-5) x 0.4-1.3 mm, commonly spatulate to linear-lanceolate, spreading to reflexed, proximally sparsely to moderately hispid, margins sometimes ciliate; inner phyllaries (6-)8-10, (2-)3-7 mm, ovate; receptacle dome-shaped post anthesis. Ray florets 5-8, conspicuous, sterile; corolla limb mostly 5-16(4-18) x 3-9(-12), elliptic-ovate to nearly orbicular, typically white throughout, sometimes ochroleucous or sometimes even pinkish tinted but never 2-toned, 6-10-striate, striae sometimes ochroleucous or sometimes even pinkish tinted but never 2-toned, 6-10-striate, striae sometimes purplish, apex often subtruncate. Disk florets 20-65; corolla 3-5(-6) mm, yellow. Cypselae 4-10(-14) mm, fusiform, obcompressed-quadrangulate, elongate, linear, and black, all more or less similar in vestiture, all usually more or less straight-erect, each of the 3-4 faces 2-grooved, glabrous to distally tuberculate-strigose; pappus awns 2(0-3), 1-2(-3) mm, retrorsely barbellate. 2n = 48. Flowering year-round. Coastal dunes, cultivated fields, disturbed areas, ditches, fields, gardens, mountain slopes, open areas, riversides, roadsides, thickets, volcano slopes, wet areas. T (Pruski et al. 4234, MO); Ch (Pruski et al. 4226, MO); Y (Gaumer 632, MO); C (Martínez S. et al. 29549, MO); QR (King y Garvey 11609, MO); B (Whitefoord 9028, MO); G (Pruski y MacVean 4496, MO); H (Yuncker 4751, MO); ES (Croat 42177, MO); CR (Pruski et al. 3824, MO); P (Churchill y Churchill 6144, MO). 0-700(-3500) m. (Southern United States, Mexico, Mesoamerica, Colombia, Venezuela, Ecuador, Guyana, French Guiana, Peru, Bolivia, Brazil, Paraguay, Chile, Argentina, Cuba, Jamaica, Hispaniola, Puerto Rico, Virgin Islands, Lesser Antilles, Trinidad and Tobago; Africa, Asia, Pacific Islands.)

White-rayed *Bidens alba* is segregated yet again from *B. pilosa*, and although I am unsure whether white flowered plants from Louisiana are conspecific with those from southern South America and Pacific Islands. Nevertheless, they are treated here, perhaps simplistically, as conspecific. Sherff (1937) recognized this species at infraspecific ranks within *Bidens pilosa*, mostly as *B. pilosa* var. *radiata* and perhaps *B. pilosa* var. *bimucronata* fo. *odorata* is the same. Ballard (1986), Melchert (1976, 2010a), Funk y Pruski (1996), and Pruski (1997) on the other hand recognized *B. alba* as distinct from *B. pilosa*. Strother (1999) and Strother y Weedon (in Barkley et al. 2005) recognized only *B. pilosa*, and treated *B. alba* and *B. odorata* in synonymy of *B. pilosa*. Indeed, in July 2014 in Tocache Peru, other than by the white ray character, I could not readily distinguish *B. alba* from *B. pilosa*. Most material called *B. odorata* by Ballard (1986) and Melchert (1976, 2010a) appears to be an higher elevational form with bipinnate leaves and linear-lanceolate outer phyllaries and is not formally treated in synonymy here, whereas typical *B. alba* as envisioned here is basically low-elevational, where it often has tripartite leaves and
spatulate outer phyllaries. I am unsure of the identity of high elevational plants often called *B. odorata*, and they are loosely placed here basically as a matter of convenience.


Perennial herbs usually in wet habitats, 0.5-1(0.2-1.5) m; stems arising singly along length of elongate rhizomes, typically stiffly erect, branched distally, angular-sulcate, green to purplish, glabrous or inconspicuously puberulent. Leaves 3-12 × 1-4 cm, extremely heterophyllous but ours typically bipinnatisect with narrowly linear segments or sometimes simple, deltate in outline or when simple then lanceolate, chartaceous, glabrous or puberulent, bases truncate to more commonly cuneate, petiolate; primary segments 3-5, 3-12 × 0.3-2.5 cm, linear-lanceolate to lanceolate; when 2-pinnatisect the ultimate segments 0.5-3 × 0.1-0.2 cm, linear margins entire or serrate; petiole 2-4 cm. Capitulescence open-cymose, each branch 2-5-capitulate, the plants sometimes pluricephalous; peduncles mostly 4-16 cm. Capitula radiate, 2.5-4 cm across the expanded rays; involucre 4–6 × 5–10 mm, campanulate to hemispherical; phyllaries nearly subequal; outer phyllaries 5-13, 3-6 x 0.5-1 mm, linear, often reflexing, green or sometimes yellowish-green but not foliar, 1-3 darker nerves often visible, base usually pilose-villosulous, sometimes glabrous in the middle, margins sometimes ciliate, apex occasionally hirsutulous; inner phyllaries 8-11, 4-5(-6) x (1.2-)2-2.5 mm, lance-ovate, dark in elongate-triangular mid-zone usually to c. 1.5 mm diam. at base with the elsewhere (in other species) usually distinct striations so close together so as to coalesce, sometimes striations individually distinct only lateral-distally, midzone often pilose, margins hyaline-yellow, to c. 0.4 mm diam, apex long-acuminate, sometimes topped by a tuft of papillae; paleae often drying with elongate blackish midzone. Ray florets 5-6(-8), sterile, not styliferous; corolla usually yellow or drying ochroleucous, infrequently white, limb 15-25 x 8-15 mm, oblong to obovate, 12-21-nerved, apex 3-denticulate. Disk florets 15-60; corolla 3.8-5.5 mm, yellowish. Cypselae 4-6(-7.5) mm, weakly dimorphic, dark brown to blackish, carbonized, all usually more or less straight-erect, faces 2-grooved, all more or less similarly glabrous or sparsely strigillose, sometimes tuberculate, not ciliate, apices truncate and not at all attenuated; outer cypselae narrow-cuneate, obcompressed; inner
cypselae linear, unequally quadrangular; pappus awns 2(1-4), 1.5-3 mm, erect to spreading, retrorsely barbed. 2n = 24, 46. Flowering May, Jul, Sep-Jan. **Cultivated fields, montane forests, Pinus-Quercus forests, roadside ditches, steep slopes, streamsides and other moist habitats.** Ch (Cruden 1548, MO); G (Molina R. y Molina 26583, MO). 1300-3000 m. (SW Estados Unidos, Mexico, Mesoamerica.)

*Bidens aurea* is usually diagnosed by its dark-streaked outer phyllaries and centrally darkened inner phyllaries. It is often misdetermined as extra-Mesoamerican *Bidens schaffneri* (A. Gray) Sherff, which differs by its exaristate cypselae. *Bidens aurea, B. bicolor, and B. bigelovii* are very similar by weakly dimorphic cypselae.


Annual herbs 0.2-1.2(-2) m; stems erect to ascending, sometimes laxly spreading, terete, sometimes reddish, glabrous or sparsely hirsute. Leaves 6-20, typically 3(-5)-partite with ovate to ovate-lanceolate segments or rarely 2-pinnatifid, chartaceous, surfaces usually sparsely to densely puberulent, rarely glabrous, petiolate; primary segments 2-6.5(1-7.5) x 1-3.5 cm, lanceolate to ovate, bases truncate to cuneate, margins coarsely serrate; petiole 3.5-6.5 cm. Capitulescence open-cymose; peduncles 3-8(-18) cm. Capitula radiate, (3.5-) 4-6 cm across the expanded rays; involucre campanulate to hemispherical; phyllaries subequal or obgraduate; outer phyllaries (5-)8, (4-)5-10 x 0.5-1.5(-2) mm, linear to narrowly oblong, erect to reflexed, herbaceous, 1-3 darker nerves often visible, base usually pilose-villosulous, typically completely glabrous distally; inner phyllaries usually 8, 4-8 mm, lanceolate, the elongate-triangular mid-zone drying blackish, always puberulent to pubescent; paleae drying blackish distally. Ray florets 5-6, sterile; corolla 2-toned, yellow with dark red spot near base of limb, limb 15-30 x to c. 18 mm, obovate, 12-17-nerved. Disk florets 30-50; corolla 3.5-6 mm, yellowish. Cypselae weakly dimorphic, all more or less similar in vestiture, all usually more or less straight-erect; outer cypselae 3-5 mm, oblong, pale to reddish, sometimes epappose; inner cypselae 5-12 mm, linear, quadrangular, black, setulose distally; pappus awns 2(0-3), 1.5-3 mm, retrorsely barbed. 2n = 24. Flowering Oct-Jan(-June). **Cornfields, grassy areas, high plateaus, montane forests, open hillsides, Pinus-Quercus forests, roadsides, rocky slopes, streamsides.** Ch (*Breedlove* 41369, MO); G (Pruski et al. 4554, MO). (300-)1700-3200 m. (Mexico, Mesoamerica.)

Annual herbs 0.2-1 m; stems erect, quadrangular, sparsely pilose. Leaves 2-13 cm, usually 3-5-partite but varying from 1-3-pinnatifid, petiolate; segments lanceolate to lance-ovate, surfaces glabrous to sparsely pilose, margins uniformly and coarsely serrate-dentate; petiole 0.5-2.5 cm. Capitulescence open-cymose, 5-13+-capitulate; peduncles 2-10 cm. Capitula radiate or discoid, very rarely bilabiate; involucre at anthesis < 5 mm diam.; outer phyllaries 5-11, 2-4.5 x 0.3-0.8 mm, lanceolate to narrow-spatulate, base often tan-indurate, hispid-pilose, margins often ciliate; inner phyllaries 7-9, 2.5-5 x 1-1.7 mm, lanceolate, glabrous to midzone pilose-hirsute, margins hyaline, but the sometimes broadly hyaline margins typically soon withering. Ray florets 0-5+, sterile or sometimes pistillate, sometimes with staminodia; corolla 1.5-4+ mm, 5+0 or sometimes bilabiate, white or pale yellow, sometimes red-spotted at base. Disk florets 12-20(-30); corolla 1.5-3+ mm, yellow. Cypsela moderately dimorphic in color, size, and shape, sometimes weakly so, outer cypsela usually moderately differing from inner ones, but often shorter than and obscured by outer phyllaries, thereby often overlooked, all more or less similar in vestiture, all usually more or less straight-erect; outer cypsela 1-4, 5-7 mm, narrow-cuneate or clavate, obcompressed, reddish-brown, truncate, papillose-hispidulous and very scabrous, 0- or 2-awned; inner cypsela 8-13 mm, linear-fusiform, quadrangular, black, glabrous proximally, distally erect-hispid, 2-3-awned, distally gradually narrowed but black to near apex and thus not technically nor clearly rostrate; pappus awns (0 or) 2-3, all of individual fruits similarly erect or spreading, that of rays (when fertile) 0.3-1.5 mm, that of disks 1.5-3 mm, retrorsely barbellate. 2n = 24, 48. Flowering Aug-Feb. Disturbed areas, hills, roadsides. Ch (Melchert, 2010a: 22); ?Y (Carnevali et al., 2010: 89; CICY web site cites Puch 1106); G (Smith 2350, US); P (Ebinger 697, MO). (?0-)1500-1600 m, (United States, Mexico, Mesoamerica.)

The outer fruits of *Bidens bigelovii* are often overlooked and the material of this taxon is often mistaken for the pantropical *B. pilosa*, or as in Strother (1999) considered synonymous with it. Although Melchert (2010a) listed *B. duranginensis* in synonymy, I cannot find shortish reddish outer fruits on the MO isotype and this name is listed here only as a questionable synonym. Discoid plants of *B. bigelovii* also resemble the usually 3-awned *B. tenera*, which similarly is often mistaken for *B. pilosa*. The great variation of characters exhibited in *B. bigelovii* of having capitula either radiate or discoid (or rarely even bilabiate), ray florets either non-styliferous or styliferous and sterile or seemingly partly fertile, and ray corollas either yellow or white, to sometimes even basally blotched, are not at all taxonomist-friendly.

The report of this normally mid-elevational variety at low elevations in the Yucatan was not verified by me, and the report by Carnevali et al. (2010) is possibly erroneous. Melchert (1976, 2010a) recognized *B. bigelovii* var. *angustiloba*, a less-dissected leaf form which is not treated here as distinct. The cited
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material from Panama was annotated (as var. *angustiloba*) by the acknowledged specialist, Robert Ballard (en schedula).


*Bidens alata* Melchert, *Cosmos steyermarkii* Sherff.

Slender annual herbs 0.3-0.5+ m, few-branched in capitulescence in distal half of plant; stems erect, simple proximally, suberete or obscurely tetragonal, glabrous to sparsely hirsutulous. Leaves 3-5 x to 3 cm, bipinnatisect or apical few simple and filiform, chartaceous, petiolar; blade (when leaf simple) or segments 0.5-2.5 × c. 0.1 cm, ovate in outline, surfaces glabrous to minutely hispidulous; segments 3-7, filiform, apical segment often the longest, lateral segments in 1-2 pairs, widely spreading, margins entire; petiole 0.5-1.5 cm. Capitulescence open-cymose, 2-7-capitulate; peduncles 7-18 cm, glabrous or finely tomentulose. Capitula c. 9 mm at anthesis, radiate; involucre campanulate; phyllaries strongly biseriate; outer phyllaries 7-8, 3.5-6 mm, about half to 2/3 as long as the inner, oblong or narrow-spatulate but never broad-spatulate, widely spaced, 1-nerved, midvein broad and dark, margins ciliolate, apex rounded; inner phyllaries 4-10 × 1.8-2.4 mm, lanceolate, mostly dark with the elsewhere (in other species) usually distinct striations very close together and not individually distinct, margins c. 0.3 mm diam., hyaline-yellow. Ray florets 5-12, sterile; corolla limb 10-15 × 3-4, oblong, golden-yellow, c. 11-striate. Disk florets 14-20; corolla 4.5-5 mm, narrow-funnelform, tube shorter than throat, yellow, lobes 0.8-1.3, triangular to lanceolate. Cypselae 14-26 × 2.6-3.4 mm, much longer than the paleae, obspatulate in outline, strongly obcompressed, obviously rostrate, body black, surfaces glabrous or abaxial face of outermost cypselae with pubescent midzone, margins to c. 0.4 mm, corky, stramineous-brownish, continuous or sometimes interrupted basally, margins scabrous-hispidulous throughout, trichomes 0.1-0.2 mm, rostrum elongate, flattened, tan-brown, not corky margined; pappus awns 2, 1.5-2.7 mm, antrorsely barbellate. Flowering Nov-Jan. *Dry rocky slopes.* G (*Steyermark 31341*, F). 1200-1500 m. (Endemic.)

The two collections of *Bidens blakei* known to me have corky margined cypselae, but otherwise morphologically closely approximate Nicaraguan-centered *B. oerstediana*. Although treated as distinct by Melchert (1976), I treat *Cosmos steyermarkii* and its homotypic synonym *Bidens alata* under the earlier *Bidens blakei*, as it seems likely that further collections from Guatemala will bridge the size and pubescence differences found in the respective types.


Scrambling subshrubs to 1.5 m; stems subterete, glabrous. Leaves tripartite, chartaceous, petiolate; segments 2-9 x 1.2-3.5 cm, lanceolate to ovate or rhombic, chartaceous, surfaces subglabrous to pubescent, margins sharp-serrate, often ciliolate, apex acuminate to attenuate; petiole 1-3 cm. Capitulescence terminal, 1-3-capitulate; peduncles 4-15(-20) cm. Capitula radiate or discoid, 2-3 cm across the expanded rays; involucre turbinate to campanulate or hemispherical; phyllaries obgraduate; outer phyllaries 8-16, (6-)9-15 x 0.8-2 mm, typically much longer than the inner phyllaries, but sometimes subequal to inner, linear, ascending to spreading or reflexed, herbaceous but not foliar, usually glabrous but often ciliolate; inner phyllaries c. 13, 6-11 mm, lanceolate, yellowish but reddish pluristriate. Ray florets 0 or 8(-13), sterile, not styliferous; corolla pale yellow fading to ochroleucous, limb 8-15 x c. 5 mm, lance-ovate, 7-nerved. Disk florets 30-50; corolla 7-9 mm, yellow, lobes c. 1 mm. Cypselae 8-13 mm, linear, tetragonal, carbonized, all more or less similar in vestiture or similarly glabrous or subglabrous, more or less straight-erect or sometimes curved apically, each of the 3-4 faces 2-grooved, black or sometimes paler distally, all glabrous or all hirtellous, apex gradually narrowed; pappus awns 2(-4), 3-5(-6) mm, erect, retrorsely barbellate. 2n = 24. Flowering (Jun +) Sep-Jan. *Deciduous forests, forest edges, montane forests, Quercus forests, Pinus-Quercus forests, ravines, roadside banks, secondary upland forests, swampy meadow, thickets, volcano slopes, wooded slopes.* Ch (Ghiesbreght 551, MO); G (Steyermark 50947, F); H (Molina R. y Williams 20277, F). 800-3400 m. (Mexico, Mesoamerica.)

The types of *Bidens arbuscula* Ant. Molina and *B. demissa* Sherff have discoid capitula, but the more common phase of the species has radiate capitula. It seems, however, that the radiate plants have glabrous fruits while the discoid plants have pubescent fruits, a distinction which if consistently holding up suggests that *B. demissa* Sherff (with *B. arbuscula* as a synonym) should be resurrected.


Perennial herbs to 1 m; stems procumbent to somewhat ascending, rooting at the proximal nodes. Leaves 3-9 x 1.5-4 cm. ovate to lanceolate, simple or tripartite, petiolate; blade sometimes nearly
secondarily lobed yet again, chartaceous, base decurrent, surfaces glabrous to puberulent or pilosulose, margins sharply and deeply crenate-serrate, apex acute. Capitulescence terminal, capitula single or sometimes in threes at the ends of leafy branches; peduncles 5-23 cm. Capitula 5-12 mm, radiate, 3-4.5 cm across the expanded rays; involucre campanulate; outer phyllaries 8-12, 4-6 x c. 1(-2) mm, shorter than to subequal with the inner phyllaries, linear to narrowly spatulate, not foliar, nerves sometimes dark, margins ciliate; inner phyllaries lanceolate, margins pilose-villous to sometimes glabrous, apex obtuse. Ray florets 5-8, sterile, not styliferous; corolla white, limb 10-20 x 5-10 mm, apex often nearly truncated. Disk florets c. 25+; corolla 4-6(-7) mm, yellow. Cypselae 2.5-7 mm, slightly dimorphic, carbonized, all usually more or less straight-erect, all usually glabrous; pappus awns 2(0 or 3), 1-2.5 mm, retrorsely barbellate. 2n = 24. Flowering mostly Jul to Feb. Grassy areas, meadows, montane forests, Pinus-Quercus forests, roadsides, rocky areas. Ch (Melchert, 2010a: 25); G (Velez et al. MV10633, MO); ES (Melchert, 1976: 202); N (Atwood y Neill 280, MO). (900-)2000-3500 m. (Mexico, Mesoamerica.)

Bidens chrysanthemifolia is not at all very distinct from the later regional endemic B. steyermarkii. Strother (1999) placed Bidens chrysanthemifolia in synonymy of yellow-rayed B. triplinervia, which it closely resembles in gestalt and pubescent inner phyllaries. Material from Costa Rica sometimes determined as B. chrysanthemifolia seems best referred to B. triplinervia,


Bidens bipinnata L. var. cynapiifolia (Kunth) M. Gómez.

Slender annual herbs 0.3-1.5(-3) m, erect; stems mostly single, hexagonal, sparsely to moderately branched, glabrous to puberulent, villous at the nodes. Leaves 4-15 cm x 2.5-6 cm, deltate-ovate to elliptic in outline, usually 2-pinnatifid and deeply and irregularly serrate or lobed, sometimes becoming alternate distally, chartaceous, petiolate; lobes 1-4(-6) x 0.3-1(-2.5) cm, ovate, moderately broad, the few primary lobes spreading, surfaces eglandular, abaxial surface pilose on veins, base acuminate to cuneate, margins often ciliate, apex acuminate to acute, rachis to 2.5(-5) cm, often winged toward terminal lobe or leaflet; petiole 1.5-3.5(-6) cm, sparsely puberulent to subglabrous, often winged to near base. Capitulescence terminal, open-cymose, capitula few to several; peduncles (3-)8-15 cm. Capitula 4-6 mm, inconspicuous radiate, hemispherical to nearly globose in fruit; involucre 5-8 mm diam., campanulate, becoming broadly expanded in fruit, the base setose; phyllaries ca. 20 biseriate, in 2 dissimilar series, nearly subequal or slightly obgraduated, greatly spreading in fruit; outer phyllaries 8-12, 3.6-6 mm, linear-lanceolate, base often pilose, margins not ciliate; inner phyllaries 8-9, 4-5.4 mm, lanceolate to ovate. Ray florets 3-5(-7), sterile; corolla not well-exserted from involucre, pale yellow, limb apex entire or notched. Disk florets
usually 20-30; corolla 2.3-3 mm, pale yellow to yellowish-orange. Cypselae dimorphic, tetragonal, not obviously compressed, very slightly tapered distally and not obviously rostrate, brownish-black, not tuberculate, faces 2-grooved at least in inner cypselae, at least some cypselae subfalcately curved supernally; outer 2-4 cypselae 5-9 mm, broadly linear, subfalcately curved, moderately hirsutulous, often quickly falling; inner cypselae 11-15(-17) mm, c. 3 times as long as involucre, linear-elongate, subfalcately curved or very innermost straight, glabrous; pappus awns 4(3-6), (1.5-)2-3.5 mm, all similarly erect, retrorsely barbellate. 2n = 48. Flowering Oct-Mar. Disturbed areas, roadsides, savannas, wet areas. Y (Gaumer 940, NY); C (Carnevali 2010: 89); N (Atwood 4336, MO); CR (Ramirez 100, MO); P (Tyson y Blum 2610, MO). 0-100 m. (Mexico, Mesoamerica, Colombia, Venezuela, Guyanas, Ecuador, Peru, Bolivia, Brazil, Paraguay, Cuba, Jamaica, Hispaniola, Puerto Rico, Virgin Islands, Lesser Antilles, Trinidad and Tobago; Asia, Pacific Islands.)

Sherff (1937) and D'Arcy (1976) treated Bidens cynapiifolia as a variety of the similar temperate B. bipinnata L., which differs by quadrangular stems and isomorphic cypselae.


Climbing shrubs or scandent vines to 5+ m in tall forests; stems angulate distally. Leaves 8-15(-18) cm, pinnatifid with 3-5 segments or rarely simple, terminal segment the longest, petiolate; leaf segments 4-12+ x 2.5-4 cm, lanceolate to ovate, chartaceous, surfaces glabrous to abaxially pilose-hispid especially along veins, base cuneate to rounded, margins sharp-serrate, teeth often 1-2 mm, apex attenuate. Capitulescence corymbiform, exserted from subtending leaves; peduncles 1-5 cm. Capitula 10-15 mm, radiate, moderately large and showy, 4-6 cm across the expanded rays, to 22 cm in fruit; involucre 12-16 mm at anthesis, cylindrical to broadly campanulate; outer phyllaries 5-11, 6-9(-14) x 1.8-2.5 mm, linear-lanceolate to oblanceolate or spatulate, darkly 3-5-straight, usually ciliolate, glabrous to pubescent or rarely even canescent, usually at least with margins ciliate; inner phyllaries 5-8, 7-8 mm, lance-ovate, glabrous to sparsely pubescent or rarely even canescent, margins ciliolate, apex attenuate. Ray florets usually 8, sterile; corolla limb 18-25(-30) x 5-9 mm, yellow to pale yellow, 7-9-nerved. Disk florets 40-60; corolla 5.5-6.5 mm, pale yellow, lobes c. 1 mm. Cypselae 12-15(-18) mm, linear, obcompressed, all more or less similar in vestiture, all usually more or less straight-erect, obviously densely tuberculate-ciliate, trichomes often 0.5+ mm; pappus awns 2(-4), 4-8+ mm, retrorsely barbellate. 2n = 96. Flowering Nov-Jan. Forest edges, montane forests, stream banks, thickets, volcano slopes. Ch (Breedlove 29435, MO); G (Williams 23105, NY), 1500-3500 m. (Endemic.)
I am unsure of the identity of Bidens holwayi var. colombiana Sherff, and neither recognize it nor treat it in synonymy of B. holwayi, which I recognized without infrataxa as in Nash (1976) and Strother (1999).


Perennial subaquatic herbs 0.2-0.8(-1.2) m, sometimes rooting at proximal nodes; stems erect or ascending, often much-branched, subterete, often purplish, glabrous or nodes pubescent. Leaves (3-)5-20 x (0.5-)0.7-3.5 cm, elliptic-lanceolate, simple and not divided, sessile, chartaceous to sometimes subcorose, indistinctly trinerved form stem but basically appearing pinnately veined, surfaces glabrous, base narrow-cuneate, margins usually coarsely serrate, apex acuminate. Capitulescence open-cymose, of single capitula or more commonly c. 3-capitulate, erect at anthesis but sometimes nutant in fruit peduncles 2.5-7 cm. Capitula 12-20 mm, quite large, 4-7 cm across the expanded rays, radiate; involucre to 15 x 20 mm, hemispherical; outer phyllaries 5-7, 10-12 x 2-5 mm, mostly oblanccolate, foliaceous, usually spreading to reflexed, glabrous throughout or base sometimes hispidulous, apex rounded, often orange; inner phyllaries 8-11, 6.5-10 x 5-7 mm, ovate or obovate, dark-pluristriate, the yellow-hyaline margins to c. 1 mm diam.; paleae apex often orange. Ray florets 7-8, sterile; corolla limb 15-30 x 10-15 mm, oblong, yellow, 10+-nerved, apex 2-3-denticulate. Disk florets 60-100+; corolla 4-6 mm, campanulate, yellow, tube as long as or longer than limb, lobes 0.5-1 mm. Cypselae 6-9 mm, narrow-cuneate, graded monomorphic, obviously obcompressed, exalate, margins and the often well-developed medial rib of each of the two faces retrorsely scabrid-ciliate, faces sometimes equally pluristriate, surfaces sometimes tuberculate, margins broadly stramineous, apex broad and more or less flat; pappus awns 2-3(-4), 3-5 mm, stiffly erect, broad-based, retrorsely barbellate. Flowering Nov-Jan. Meadows, marshes, lake shores, streamside, wet pastures. Ch (Breedlove 37144, CAS). Aprox. 2200 m. (Estados Unidos, Mexico, Mesoamerica, Ecuador, Peru, Brazil, Paraguay, Chile, Argentina; Pacific Islands.)

Dwarf annual herbs 0.03-0.06 m, few-branched from near base; stems filiform, erect to prostrate, glabrous to pilosulose. Leaves 0.5-1.2 x 0.5-1 cm, ovate in outline, pinnatifid to bipinnatifid, chartaceous; lobes 3-5(-9), 0.1-0.4 cm, narrowly ob lanceolate to spatulate, glabrous, margins entire; lateral lobes forward-directed to spreading, lateral and terminal lobe sometimes secondarily lobed; ultimate lobules 0.05-0.1 cm diam., usually from midpoint of primary lobe. Capitulecence with branchlets open-cymose or with capitula single, usually not well-exserted from leaves, sometimes capitula effectively sessile and immediately subtended by trilobed herbaceous bracts as long as or longer than involucre, plants paucicephalous; peduncles 0-0.7 cm, glabrous. Capitula 4-7 mm, discoid; involucre 3-5 x c. 2 mm, narrowly campanulate; phyllaries biseriate, subequal; outer phyllaries 2-4, 2.5-5 x c. 0.5 mm, very narrowly spatulate, thinly herbaceous, often ciliolate; inner phyllaries 4-5, 3-5 x c. 1 mm, ovate. Ray florets 0. Disk florets 3-9; corolla 1.7-2.4 mm, funnelform-campanulate, 4(-5)-lobed, yellow, minutely sparse-glandular. Cypselae 2.5-4.5 mm, plump-linear, subquadrangular, monomorphic, erose and only slightly narrowed distally, setulose distally, apex broad; pappus awns usually 2, 0.5-1 mm, retrorsely barbellate. Flowering Oct-Nov. Rocky meadows, volcano slopes. G (Smith 846, F). 3100-3600 m.

(Endemic.)


Diffuse seemingly annual herbs 0.2-2 m; stems erect to spreading, much-branched, often reddish, glabrous. Leaves 3-12 cm, deltate to ovate in outline, deeply 1-2-pinnatifid, often flaccid, chartaceous, petiolate; lateral segments 2-3-paired, linear to rhomboidal, widely spaced, spreading, each often divided yet again into 1-2 x c. 0.05 cm diam. often linear segments or broader and strongly irregularly lobed or deeply few-toothed, surfaces subglabrous; petiole 0.5-4 cm. Capitulecence open-cymose, plants pluricephalous; peduncles to 12(-15) cm. Capitula 7-10 mm at anthesis, radiate, hemispherical to nearly globose in fruit; involucre campanulate; phyllaries biseriate, in 2 dissimilar series; outer phyllaries 8(-11), 4-6 x to 1.3-3.2 mm, oblong to broad-spatulate, herbaceous, erect to recurved, midvein dark, margins often ciliate, apex obtuse to rounded; inner phyllaries 5-8 mm, lance-ovate. Ray florets 8(-10), sterile; corolla limb to 20 x 5-6 mm, yellow, apex obtuse. Disk florets 25-40; corolla 6-7 mm, narrow-funnelform, yellow, lobes 0.8-1.3 mm, margins papillose. Cypselae to 25 mm, obspatulate in outline, strongly obcompressed, body brown to black, gradually narrowed distally into a tan-brown flattened rostrum c. 5 mm, margins not corky, merely thin stramineous-margined to infrequently sometimes tuberculate with a few tubercules nearly coalescing into a semi-corky margin, surfaces often scabrous-hispidulous with appressed trichomes 0.1-0.2 mm, margins of body and rostrum scabridulous-hirsutulous with stout
antrorse trichomes usually 0.2-0.3 mm; pappus awns 2, 2-2.7 mm, erect, antrorsely barbellate. Flowering (May +) Oct-Dec. Pacific slope dry flats and hillsides, ocean beaches, pinares, rocky savannas, rocky slopes, volcanic soils. N (Neill 2900, MO). 0-400 m (Endemic.)


Bidens costaricensis Benth., Bidens guatemalensis Klatt, Bidens ostruthioides var. costaricensis (Benth.) Sherff, Bidens ostruthioides var. matritensis Sherff.

Perennial herbs or subshrubs; stems several from woody caudex, mostly sprawling to 1(-2) m, sometimes ascending, subterete, striate, glabrous or sparsely pubescent. Leaves 3-9 cm, triangular in outline, 3-5-partite to 2-pinnatifid, petiolate; primary segments 1-5 x 1-4 cm, rhombic-ovate, stiff-chartaceous or subcoriaceous, surfaces glabrous throughout or main veins of adaxial surface puberulent, base acuminate to cuneate, margins deeply and irregularly few dentate-serrate or lobed, serrations or lobes forward-directed, sometimes ciliolate, apex acute, mucronate; petiole to 4 cm, usually narrowly winged to base and forming a nodal ridge, often sparse-pilose. Capitulescence terminal, capitula mostly single; peduncles 5-20 cm, sometimes 1-2 bracteate. Capitula radiate, 4-6 cm across the expanded rays; involucres narrow-campanulate, sometimes obgraduate; phyllaries biseriate, in 2 dissimilar series, usually glabrous throughout; outer phyllaries 5(-7), 5-17 x 2-10 mm, lanceolate to ovate, broad Coreopsis-like and subfoliaceous, herbaceous and obviously contrasting in texture and color to inner phyllaries, bases slightly noncontiguous to clearly overlapping, 3-5-nerved, apex acute; inner phyllaries 5-8, 7-10 x 2.5-4.5 mm, ovate, orange-yellow, not drying black. Ray florets 5(-8), styliferous; corolla well-exserted from involucre, yellow, limb 14-25 mm, broadly obovate, apex 3-denticulate; style 4-5 mm, well-exserted, ovary fertile. Disk florets 20-40+; corolla 5-6 mm, pale yellow to yellowish-orange. Cypselae 4-12 mm, oblong to broadly linear, obcompressed or inner ones narrow-obcompressed to subquadrangular, reddish-brown and never carbonized, all more or less similar in vestiture, all usually more or less straight-erect, each of the 2-3 faces (3-)8-striate, all similarly glabrous, apex more or less flat and not at all attenuated or rostrate; pappus awns 2-3, 3.5-5 mm, erect, retrorsely barbellate. 2n = (24?), 46. Flowering year round. Disturbed forests, grassy hillsides, montane forests, paramo, Pinus-Quercus forests, roadside banks, rocky slopes, subparamo, wet thickets. Ch (Ghiesbrecht 555, MO); G (Pruski y Ortiz 4274, MO); ES (Berendsohn et al. 1989: 290-2); CR (Pruski et al. 3952, MO); P (White 48, MO). 1100-3600 m. (Mexico, Mesoamerica.)

Bidens ostruthioides, the generitype of Delucia DC., by its foliaceous outer phyllaries, fertile pistillate ray florets, likely base chromosome number of x = 23 is anomalous in Bidens, suggesting that at one point
synonymous Delucia may be resurrected from synonymy. Although the sole Panama voucher (White 48) is depauperate, its identification is here confirmed, but all other Panamanian vouchers determined as B. ostruthioides by D'Arcy (en schedula MO) prove instead to be B. triplinervia.


Branched annual herbs 0.3-1(1.8) m; stems erect, quadrangular, glabrous to sparsely pilose. Leaves 3-15 × 1.5-10 cm, commonly trifoliate but sometimes ternately divided but ranging from simple to 1-pinnately compound, petiolate; blade 2.5-10 × 1-8 cm, ovate; leaflets 1-6 cm, lanceolate to ovate, surfaces sparsely pilose, eglandular, margins coarsely serrate, apex acuminate to narrowly acute; rachis (when leaf divided) ca. 1(2) cm, often winged toward terminal leaflet; petioles 0.5-2(-3) cm, often sparsely pilose. Capitulescences terminal, cymose, plants with few to several(+) capitula; peduncles 2-7 cm, commonly pilose. Capitula discoid or infrequently inconspicuously radiate or disciform, (20-)35-75-flowered; involucre 4-15 mm diam., hemispherical, commonly basally pilose at junction with peduncle; phyllaries subequal, glabrous to puberulent; outer phyllaries 7-10, 4-6(3-8) mm, commonly ob lanceolate, herbeaceous or only apically so, glabrous or more commonly ciliate; inner phyllaries generally 5-6 mm, lanceolate, glabrous or rarely puberulent, scarios, striate, margins commonly broadly hyaline; receptacle flat to sometimes strongly convex or dome-shaped when past fruit, paleae linear-lanceolate. Ray flowers (0-)few, sometimes pistillate; corolla 2-3 mm, minute, pale yellow drying ochroleucous, limb apically notched. Disk florets 35-75; corolla (2-)3-4 mm, yellow, strongly brownish-red-nerved, lobes c. 0.5 mm, generally papillose. Cypselae 8-16(-20) mm, less than 2 times as long as involucre, linear, monomorphic, obcompressed-quadrangulate, all more or less similar in vestiture, all usually more or less straight-erect, dark brown to black, each of the 3-4 faces 2-grooved, glabrous below, tuberculate-strigose above; pappus awns 3(2-5), 2-3(-4) mm, retrorsely barbed, 2n = 72. Flowering year-round. *Clearings, cultivated fields, disturbed areas, ditches, fields, forest borders, gardens, montane forest, mountain slopes, open areas,*
riversides, roadsides, thickets, weedy ground, wet areas. T (Villaseñor, 1989); Ch (Croat 40366, MO); B (Gentle 8863, MO); G (Deam 241, MO); H (Molina R. 33957, MO); ES (Calderón 863, MO); N (Baker 2204, MO); CR (Pruski y Sancho 3801, MO); P (Greenman y Greenman 5257, MO). 0-2500 m. (Mexico, Mesoamerica, Colombia, Venezuela, Guyanas, Ecuador, Peru, Bolivia, Brazil, Uruguay, Paraguay, Chile, Argentina, Cuba, Jamaica, Hispaniola, Puerto Rico, Virgin Islands, Lesser Antilles, Trinidad and Tobago; Africa, Asia, Australia, Pacific Islands.)

*Bidens pilosa* is an extremely variable pantropical annual square-stemmed weed that is commonly found solely with discoid capitula; it is less commonly inconspicuously radiate. Only partial synonymy is give above. Much literature for *B. pilosa* instead actually refers to two or more species, and no distributions within them should be followed without care. Sherff (1937) treated *B. pilosa* as containing six varieties, but only for inconspicuously radiate plants does a single non-typical infrataxon, called *Bidens pilosa* var. *minor* (Blume) Sherff, sometimes seems convenient to use. *Bidens alba* was treated in synonymy by Sherff (1937), but was recognized as distinct by Melchert (1976, 2010a). I believe plants from Campeche, Quintana Roo, Yucatan called *B. pilosa* by Carnevali et al. 2010 are all referable to *B. alba*.


Perennial scrambling to climbing herbs to shrub like vines 2-8+ m; stems sparsely to moderately branched, spreading laterally to ascending, subterete, pluristriate, subglabrous or distal new growth pilose-pubescent, nodes sometimes prominent with enlarged leaf bases, pith solid or fistulose. Leaves 4-15 x 3.5-15 cm, typically triangular in outline and trifoliate, but sometimes either simple or infrequently 5-7-partite and overall shape varying from lanceolate to ovate, terminal segment often the longest, lateral segments mostly widely spreading, petiolate; leaf segments mostly 3-10+ x 2-4(-5.5) cm, lanceolate to ovate, chartaceous, pinnately veined, surfaces glabrous to densely short-pilose throughout, when pubescent the abaxial surface the more densely so, base obtuse to rounded, margins serrate, apex acuminate to attenuate; petiole 1-4(-5.5) cm, glabrous to puberulent. Capitulescence corymbiform to paniculate, usually pluricapitulate, held above subtending leaves; peduncles 1-5(-11) cm, glabrous to pubescent. Capitula 7-13 mm at anthesis, radiate or sometimes discoid, usually small, when radiate 1.5-3(-5) cm across the expanded rays, to 22 cm in fruit; involucre mostly 8-10 mm diam., campanulate; phyllaries biseriate, unequal; outer phyllaries 4-8, 1-6 x 0.5-1 mm, linear to linear-spatulate, slightly spreading to reflexed, 3-straight, usually ciliolate, glabrous to tomentulose; inner phyllaries 8-10, 5.5-10 x c. 1.5 mm, lanceolate, apiculate, puberulent. Ray florets (0-)3-7(-8), sterile; corolla limb 7-25 mm, oblong, yellow, 7-12-nerved, apex 3-denticulate. Disk florets 15-30+; corolla 4-9 mm, cylindrical-funnelform, yellow. Cypselae 6-12 mm, fusiform, obcompressed, all more or less similar in vestiture, usually more or less straight-erect, margins tuberculate long-ciliate, cilia in groups of 2-5 per tubercule; pappus awns 2, 3-3.5 mm, erect soon spreading sometimes nearly horizontally so, smooth to retrorsely barbed. 2n = 24, 48, 72. Flowering year round. Disturbed areas, forest edges, hedgerows, open to closed forests, roadside slopes, shrubby hillsides, stream banks, thickets. T (Croat 47880, MO); Ch (Pruski y Ortiz 4230, MO); Y (Gaumer 23510, MO); C (Lundell 1365, MO); QR (Hernandez et al. 300, MO); QR (Gaumer 2084, MO); B (Balick et al. 3159, NY); G (Pruski y MacVean 4487, MO); H (Williams y Molina R. 11530, MO); ES (Sidwell et al. 802, MO); N (Baker 2214, MO); CR (Wussow y Pruski 119, LSU); P (Maurice 862, MO). 0-2600 m. (Mexico, Mesoamerica, Colombia, Venezuela, Ecuador, Peru, Bolivia, Brazil, Paraguay, Argentina, Cuba, Jamaica, Hispaniola, Puerto Rico, Virgin Islands, Lesser Antilles, Trinidad and Tobago.)

Bidens reptans in this floristic treatment is circumscribed broadly and the species is unusually variable in having either radiate or discoid capitula, glabrous to densely pilose outer phyllaries, occurring from near sea-level to 2600+ meters in elevation, and containing diploid to (auto?) hexaploid populations. Additionally, as noted under the name B. squarrosa by Sherff (1937), plants of this vining species have leaves exhibiting sun-shade differences on single individuals by varying from simple to 5-partite (the B. mexicana and B. urbanii forms) and glabrous to densely pilose. As such, it is among the more variable species of Bidens, and includes many of the high-vining neotropical species of Bidens in synonymy, but
with similar but larger-capitulate *B. holwayi* provisionally treated as distinct. Treated here within *B. reptans*, however, is *Bidens boquetiensis* Roseman, which in capitulum size nearly approaches *B. holwayi* and also resembles South American *B. rubifolia*. It seems possible that both *B. boquetiensis* and *B. holwayi* could ultimately fall into synonymy of *B. rubifolia*.

Alternate, more detailed and narrower views of the species under names treated in synonymy here were given by Roseman (1990), who proposed two new Mesoamerican species, and recognized *B. antiquensis* with three varieties and *B. squarrosa* with six varieties, and by Melchert (2010a).


*Bidens refracta* Brandegee, *Bidens riparia* var. *refracta* (Brandegee) O.E. Schulz.

Annual herbs 0.5-1.5 m, stems erect, quadrangular, striate, sparsely pubescent. Leaves 2-12(-16) x to 9 cm, triangular in outline, usually tripartite to sometimes 2-pinnatifid, thin-chartaceous, petiolate; lobes 2-8(-12) cm, lance-ovate to ovate or rhomboidal, the terminal segment the longest, adaxial surface subglabrous to sparsely scabridulous, abaxial surface often sparsely pilosulose especially on veins, base cuneate to rounded, margins evenly sharp-serrate, apex acuminate; petiole 1-4+ cm. Capitulescence open-cymose, capitula few; peduncles 4-10 cm. Capitula 6-7 mm at anthesis, inconspicuous radiate, quickly maturing to fruit or at least typically collected only in fruit; involucre 5-7 mm diam., turbinate to campanulate, phyllaries obgraduate, sometimes strongly so; outer phyllaries 7-13, 5-10(-20) x c. 0.8 mm, linear-lanceolate, erect or in fruit widely reflexed, base often pilose or setose, margins not usually ciliate; inner phyllaries 8-12, 4-6 x c. 1 mm, oblong-lanceolate. Ray florets (?0-)5, sterile; corolla not well-exserted from involucre, pale yellow (drying ochroleucous), limb 4-6.5 x 1-2.5 mm, dark-striate, apex acute to obtuse, weakly denticulate. Disk florets 12-25+; corolla 2.8-4 mm, yellow. Cypselae dimorphic, tetragonal, not obviously compressed, gradually tapered distally but not obviously rostrate, faces 2-grooved, greenish-brown or outer ones darker, at least some cypselae subfalcately curved supernally; outer 6-9 cypselae 7-11 mm, usually about ½ as long as inner cypselae, broadly linear, apex sometimes outwardly directed, densely hirsutulous; inner cypselae 12-20 mm, linear-subfusiform, straight or slightly outwardly curved, glabrous or setulose distally; pappus awns 4(-5), 2-4.5 mm, one erect, the other refracted nearly in same plane, retrorsely barbellate. 2n = 24. Flowering year round. *Disturbed areas, ravines, rocky slopes roadsides, seashores, shrubby slopes, thickets*. Ch (Matuda 18695, MO); Y (Ucan 4261, MO); C (Lundell 899, MO); QR (CICY website cites Vargas 180, CICY); G (Molina R. y Molina 25137, MO); H (Nelson et al. 6045, MO); ES (Villacorta 2231, MO); N (Nichols 1276, NY); CR (Janzen 106062996, MO); P (Blum 1963, MO). 0-900 m. (Mexico, Mesoamerica, Colombia, Venezuela, Guyana, Ecuador, Peru, Brazil.)

Slender simple-stemmed annual herbs 0.2-0.6 m, few-branched in capitulescence in distal third of plant; stems erect, quadrangular, glabrous. Leaves 1.5-6(-9.5) x 0.1-0.3 cm, filiform, simple, strongly ascending, chartaceous, surfaces glabrous or abaxial surface setulose, margins entire, sometime revolute. Capitulescence open-cymose, 2-4-capitulate; peduncles 5-10 cm, glabrous. Capitula radiate; involucre 5-6 x 2-3 mm, cylindrical to turbinate; phyllaries strongly biseriate, all greenish with brownish to greenish-black striations; outer phyllaries 2, 1-2.5 mm, subulate to narrowly triangular; inner phyllaries 5, 4-6 mm, oblong to oblanceolate, apex rounded, sometimes pinkish. Ray florets (2-)5, inconspicuous, weakly exserted, sterile; corolla tube 1.5-2.5 mm, relatively elongate, limb 2.3-4 x. 1.5-2.3 mm, obovate to cuneate, purplish to rosaceous, 5-nerved, teeth c. 0.5 mm. Disk florets 13-15; corolla 3.3-4.5 mm, ochroleucous with dark veins, often with an apical rosaceous spot on reach lobe Cypselae 15-19 mm, narrowly spatulate, subfusiform, longer than the paleae, moderately obcompressed, exalate, gradually attenuate-rostrate, body few-strike and black, scabrous-hispidulous on rostrum and at least distally on body, margins not corky, distal margins of body and margins of rostrum scabridulous-hispidulous but not obviously more pubescent than distal surfaces of body and rostrum, rostrum elongate, flattened, not striate and texturally differing from body, tan-brown; pappus awns 2, 1.5-4 mm, antrorsely barbed. 2n = 24. Flowering Oct-Nov. *Grassy areas, Pinus-Quercus forests, rocky slopes.* Ch (*Breedlove y Strother 46528*, MO); G (Nash, 1976: 210). 900-1200 m. (Mexico, Mesoamerica.)


Perennial herbs c. 35 cm; stems several from base, slender, mostly sprawling to procumbent, subquadrangular, minutely sulcate, glabrous or puberulent. Leaves 3-5.5 cm, triangular-ovate in outline, 1-2-pinnatifide, petiolate; blade chartaceous, lateral segments 1-2 pairs, sometimes secondarily few-lobed, terminal segment linear-oblong, thin-chartaceous, surfaces sparsely hispidulous, apex attenuate, sharp-apiculate. Capitulescence terminal, capitula mostly single; peduncles 5-10 cm, sparsely hispidulous distally. Capitula 4-5 mm, radiate, 1-1.5 cm across the expanded rays; involucre campanulate; phyllaries whitish hispidulous; outer phyllaries 10-12, 4-4.5 mm, subequal to inner phyllaries, linear, not foliar. apex indurate-apiculate; inner phyllaries 5-8, to c. 4 mm, lanceolate. Ray florets c. 5, sterile, not styliferous; corolla white, limb to 13 x 8 mm, oblong or obovate, apex 2-3-denticulate. Disk florets c. 30; corolla c. 3 mm, yellowish. Cypselae 3-4.5 mm, linear-clavate, carbonized, somewhat 4-sided, dark reddish, all usually
more or less straight-erect, all more or less similarly glabrous or very sparsely setulose, epappose.

_Bidens steyermarkii_ is not at all very distinct from _B. chrysanthemifolia_, which in turn was treated in synonymy of _B. triplinervia_ by Strother (1999).


?_Bidens ekmanii_ var. _paucidentata_ O.E. Schulz ex Urb., ?_Bidens tenera_ var. _paucidentata_ (O.E. Schulz ex Urb.) Sherff, ?_Bidens tenera_ var. _tetracera_ Sherff.

Slender annual herbs 0.2-0.5 m, erect; stems single from base, quadrangular, sometimes few-branched but then only in capitulescence, glabrous or subglabrous. Leaves 3-12 x 2-6 cm, ovate when simple or deltate in outline when divided, unlobed to bipinnatifid, thin-chartaceous, petiolate; blade surfaces subglabrous or sparsely setose, base (when leaf undivided) rounded, margins sharp-serrate, ciliate, apex acute to acuminate; when 3-5-partite lateral segments 1-2.5 x 1-1.5 cm, ovate, sessile, the terminal segment often as long as undivided leaf blade; petiole 1.5-3.5(-6) cm. Capitulescence terminal, open-cymose and few-capitulate or capitula single; peduncles 6-10 cm, mostly held above leaves. Capitula discoid, 3.5-6 mm and inconspicuous at anthesis, apparently quickly turning from flower to fruit or at least typically collected in fruit, with the fruits well exserted from involucre; involucre 3-6 mm diam.; outer phyllaries c. 4, 3-4 mm, linear to linear-spatulate, basally setose, apex obtuse but mucronulate; inner phyllaries few, 5-6 mm. Ray florets 0. Disk florets usually 6-12; corolla c. 2.5 mm, yellow. Cypselae 12-18 mm, 2-3x as long as involucre, linear-elongate, slightly obcompressed or subquadrangular, all usually more or less straight-erect, monomorphic, pluricostate-sulcate, black, all similarly glabrous in vestiture, ; pappus awns 3(-4), 2-3 mm, ascending to erect. Flowering Nov. _Openings in forests, rocky areas_. CR (Grayum 9165, MO). 0-700 m. (Mesoamerica, Colombia, Venezuela, French Guiana, Bolivia, Brazil, Argentina, Cuba.)


_Bidens affinis_ Klotzsch et Otto, _Bidens artemisiifolia_ Poepp., _Bidens attenuata_ Sherff, _Bidens canescens_ Bertol., _Bidens consolidifolia_ Turcz., _Bidens crithmifolia_ Kunth, _Bidens delphinifolia_ Kunth, _Bidens glaberrima_ DC., ?_Bidens geraniifolia_ Brandegee, _Bidens grandiflora_ var. _breviloba_ Kuntze, _Bidens grandiflora_ var. _humilis_ (Kunth) Kuntze, _Bidens hirtella_ Kunth, _Bidens humilis_ Kunth, _Bidens
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Perennial herbs 0.3-0.7(-1) m, usually in only slightly humid or in upland habitats; stems several from central caudex, ascending to decumbent, few-many-branched, sometimes rooting at proximal nodes, subterete to somewhat angulate, glabrous to pilose in lines or canescent. Leaves 1-6+ cm, ovate to triangular in outline, vary variable in shape, 2-3-pinnatifid, rarely simple or infrequently tripartite, petiolate; blade chartaceous, ultimate segments linear-lanceolate to ovate, surfaces subglabrous to densely canescent or white-pilose, apex acute to obtuse, mucronate; petiole usually narrowly winged to base and forming a nodal ridge, often sparse-pilose. Capitulescence terminal, capitula usually single at the ends of leafy branches; peduncles 4-15+ cm, slender. Capitula c. 5 mm, radiate, 3-5 cm across the expanded rays; involucre broadly campanulate to hemispherical; outer phyllaries 8-13, 3-7 mm, shorter than to subequal with the inner phyllaries, linear to narrowly spatulate, appressed to reflexed, herbaceous but not foliar and only moderately contrasting in texture and color to inner phyllaries, not dark-streaked, sometimes both series drying black and then often not at all obviously contrasting in either texture or color, widely spaced at base to sometimes contiguous, glabrous or sometimes pilose-villous, margins ciliate, apex obtuse; inner phyllaries 8-12, 5.5-8 x 1.5-2 mm, lanceolate, glabrous to more commonly pilose-villous, apex obtuse or rounded, puberulent. Ray florets 5-6(-10), sterile, not styliferous; corolla yellow, limb 15-25(-35) x 8-15 mm, usually ovate, well-exserted from involucre, 15-17-nerved, apex minutely 2-3-denticulate. Disk florets 30-55; corolla 4-5.5 mm, yellow to yellowish-orange, lobes c. 0.7 mm, margins papilllose. Cypselae slightly dimorphic, carbonized, all usually more or less straight-erect, all more or less similarly glabrous to sparsely setulose; outer cypselae 3-5 mm, clavate-oblong, obcompressed, reddish-brown; inner cypselae 6-11 mm, linear, subquadrangular, black, each of the 3-4 faces 2-grooved; pappus awns (0)2-3(-4), 1-3 mm, erect, retrorse barbellate. 2n = 24, 48, 72. Flowering mostly June to Mar. Grassy areas, meadows, montane forests, paramos, Pinus-Quercus forests, rocky areas, subparamo, volcano craters and slopes. 2n = 24. Ch (Ghiesbrecht 533. MO); G (Velasquez s.n., BOLO as microfiche); H (House 1204, MO); ES (Berendsohn et al. 1989: 290-2); CR (Pruski et al. 3911, MO); P (Davidse y D'Arcy 10250, MO). 1600-3600 m. (Mexico, Mesoamerica, Colombia, Venezuela, Ecuador, Peru, Bolivia, Chile, Argentina.)

Melchert (2010a) placed *Bidens geraniifolia* in synonymy of *B. triplinervia*, however, Strother (1999) suggested once-collected *Bidens geraniifolia* instead may be synonymous with *B. chiapensis*. Although *B. geraniifolia* is known from only imperfect material appearing to have elongate outer phyllaries and glabrous inner phyllaries as in *B. chiapensis*, by its bipinnatifid leaves it more closely matches *B.*
triplinervia where it is listed as a provisional synonym. Additionally, Strother (1999) placed B. chrysanthemifolia in synonymy of yellow-rayed B. triplinervia, which it closely resembles in gestalt and pubescent inner phyllaries. If B. chrysanthemifolia were to be enveloped in synonymy of the widespread and well-known B. triplinervia, it should be noted that very suspect B. steyermarkii should in turn also subsumed with it.


Adenospermum Hook. et Arn.

Por J.F. Pruski.

Small annual or short-lived perennial herbs, less commonly with woody caudex, glabrous or nearly so, with quickly-deciduous corollas and often collected solely in fruit; stems subterete, striate, prostrate but never rooting at the nodes to erect. Leaves alternate or clustered in basal rosette by shortening of proximal internodes, simple to 2-3-pinnatisect, veins dark green with areoles drying yellow green. Capitulescence monocephalous and long-pedunculate to more commonly loosely corymbiform and few-capitulate from lateral braches in the distal nodes; peduncle slender, naked or few-bracteolate. Capitula inconspicuously radiate, many-flowered; involucre sometimes narrow-calyculate, neither ray nor disk corollas usually well-exserted; phyllaries yellowish with several reddish veins, imbricate, subequal, 1-2(-3)-seriate, margins scarious, when ray florets 3-seriate the inner-most phyllaries narrowed and resembling paleae; receptacle flat, paleate; paleae narrow, about as long as or shorter than involucre, flat, yellowish or brownish, margins thinly scarious. Ray florets pistillate, 1-3-seriate; corolla tube typically very short, limb mostly yellow, darkly 2-9-nerved, apex bidentate or rarely deeply bifid; style well-exserted. Disk florets bisexual (or rarely some functionally staminate); corolla 4-5-lobed, sometimes those of inner florets twice as large as others, mostly yellow, tube shorter than throat, lobes sometimes 3-nerved; anthers brownish, small, mostly included, basally obtuse, appendage acute, filaments glabrous, collar elongate; style typically obviously branched, branches linear-lanceolate, stigmatic surfaces proximal, smooth, sterile apical appendages penicellate to clavate, long-papillose, longer than stigmatic surfaces, in functionally staminate florets branches typically becoming well-exserted, without proximal stigmatic surfaces, and papillose along entire length, ovaries of some functionally staminate florets sometimes slightly flattened, linear-stipitate, apex obtuse to truncate, slightly longer than phyllaries. Cypselae not exserted from involucre, sometimes dimorphic, often 4-sided, outer cylindrical-clavate of sometimes circinate, inner sometimes flattened; carpododium small, non-sculptured; pappus absent or disks sometimes with a minutely bicorniculate annulus. x = 8. 11 spp, mostly neotropical, but with one species in Paleotropics.
Chrysanthellum has C-4 photosynthesis and associated Kranz anatomy. C-4 photosynthetic pathway presence in Chrysanthellum, as well as in the distantly related Flaveria and Pectis, suggests that in each group the pathway is derived independently as it has multiple times in Angiosperms (E. Kellogg, pers. comm.).

Chrysanthellum pilzii Strother occurs on coastal sand dunes along the central and eastern coasts of Oaxaca and should be looked for in southwestern Chiapas. It is a long-pedunculate plant with pinnatisect leaves and is similar to C. perennas, but differs by leaf lobes 3-7 (not 1-3) mm wide. A synopsis was provided by Turner (1988). The bracteoles here termed calyculus are loosely organized, occur distally on the peduncle, and thus do not appear to be an outer series of phyllaries as in related genera Bidens, Cosmos, and Coreopsis.


1. Plants subscapose; ray corolla limbs 6-9-nerved; ray cypselae circinate.

4. C. perennans

1. Plants with leaf stems; ray corolla limbs 2-3(-5)-nerved; ray cypselae cylindrical-clavate.

2. Disk florets functionally staminate, ovaries sterile, sometimes elongated and exserted from involucre; ray corolla limbs 5-8 mm; leaves simple; cypselae monomorphic, cylindrical-clavate; 15-200 m elevation.

3. C. integrifolium

2. Disk florets bisexual, forming fruit not exserted from involucre; ray corolla limbs 1.1-4(-5) mm; leaves simple to pinnatisect; at least some disk; cypselae dimorphic, at least some flattened; 500-1200(-1400) m elevation.

3. Leaves simple to once pinnatifid, lobes ≥ 3 mm diam.; capitulecence monocephalous; phyllaries 4-5 mm; capitula ≥ 4 mm; ray corolla limb 2-4(-5) mm.

1. C. americanum

3. Leaves 2(-3)pinnatisect, lobes ≤ 2 mm diam.; capitulecence loosely corymbiform; phyllaries 2.5-3.5 mm; capitula ≤ 3.5 mm; ray corolla limb c. 1.1(-2) mm.

2. C. indicum


Bidens apiifolia L., Chrysanthellum procumbens Rich., Chrysanthellum swartzii Cass., Collaea procumbens Spreng., Verbesina mutica L.

Decumbent to ascending glabrous herbs; stems 8-20 cm, few-several-branched. Leaves 2-6 × 0.4-2 cm, oblanceolate when simple to elliptic-ovate in outline when pinnatifid, mostly cauline, simple
proximally to once pinnatifid, base petiolariform, margins serrate to few pinnately lobed, lobes to $12 \times 4$ mm, apex acute to obtuse. Capitulescence monocephalous or less commonly loosely corymbiform and 3-5-capitulate; peduncles 3-7 cm, very slightly fistulose at very apex. Capitula 4-5 mm; involucre 6-9 mm diam., hemispherical, typically bracteolate, bracteoles 3-6, 1-2 mm, linear-lanceolate; phyllaries 10-12, 4-5 x 1.5-2.5(-3) mm, elliptic-ovate; paleae 3-4 mm, linear. Ray florets 13-34; corolla 2-4(-5) mm, yellow fading to white, limb 0.5-1.2 mm diam., linear-oblongate, 2(-5)-nerved. Disk florets 20-30, at least some bisexual and forming fruit; corolla 1.5-2.7 mm, funnelform, (4-)5-lobed, yellow fading to white, tube 0.3-0.6 mm, lobes 0.3-0.4 mm, deltate. Cypselae dimorphic; ray cypselae 2-3(-4) mm, cylindrical-clavate, pale, few-several-costate, costae sometimes corky; disk cypselae 2.3-3.5 x c. 1 mm, obcompressed, oblong in outline, pale to black, margins thickened, ciliate. *Disturbed areas, fields, hillsides, Pinus-Quercus forests.* Ch (Breedlove 2007: MO); G (Nash, 1976: 225); H (Clewel 1975: 165); ES (Rohweder 3481, MO); CR (Turner 1988: 428). 500-1200(-1400) m. (Mesoamérica, Cuba, Jamaica, Hispaniola.)

I have seen Mesoamerican material of this species only from Chiapas and El Salvador. It is not immediately apparent if the voucher-less citations for Guatemala and Honduras by Nash (1976) and Turner (1988), and for Honduras by Clewell (1975) are based on literature, on specimens of this species (s. str.), or material once referred to *C. americanum* var. *integrifolium* [now treated as *C. integrifolium*]. Occasional reports of this species in both South America and the Old World are based on material now referred to *C. indicum*.


Petioles sometimes sparsely ciliate. Capitula 2-5(-6) mm. Ray florets 5-34. Ray cypselae 2-4(-5) mm; disk cypselae 2.3-5(-6) mm, margins narrowly to broadly cartilaginous. (México, Mesoamérica, Perú, Bolivia, Brazil, Uruguay?, Argentina; Africa, Asia.)

Turner (1988) recognized three subspecies and four varieties of *C. indicum*. Here I recognized only subspecies, including the following in the flora, and indeed these three subspecies are allopatric.

*Chrysanthellum indicum* var. *mexicanum* (Greenm.) B.L. Turner, *Coreopsis diffusa* M.E. Jones.

Decumbent to erect annual herbs 5-30 cm, glabrous or nearly so; stems simple to more often several-branched proximally. Leaves 1-5(-9) cm, obovate in outline, 2(-3)-pinnatisect, all cauline or some sometimes clustered basally, long-petiolate with the petiole of proximal leaves often half or more of leaf length, segments 1-5 × 1-2 mm wide, linear to oblong, apex usually acute. Capitulescence loosely corymbiform with (1-)3-5 capitula in the distal nodes with the lateral branches often overtopping main axis; peduncles 1-2.5(-4) mm. Capitula 2.5-3.5 mm; involucre 3-4 mm wide becoming 4-7 mm wide when laterally spread in fruit, campanulate, typically subtended by 1-2(-3) linear bracteoles; phyllaries 8-13, 2.5-3.5 × 1-2 mm, elliptic-ovate to obovate; paleae 2-2.5 mm, filiform to linear. Ray florets 8-13; corolla c. 1.1(-2) mm, yellow or golden yellow, drying white, limb 0.3-0.5 mm diam., linear-oblancoeleate, 2-nerved. Disk florets 10-25, all commonly bisexual and forming fruit; corolla c. 1 mm, yellow, 4-5-lobed, lobes c. 0.2 mm, triangular. Cypsela dimorphic; ray cypsela 2.3-3.5 mm, pale brown, cylindrical-clavate, few-costate, glabrous; disk cypsela 2.3-3 × c. 1 mm, obcompressed, oblong in outline, dark brown with narrow tan ciliate margins, weakly striate. 2n = 16. Deciduous forests, disturbed areas, *Pinus-Quercus forests, wet areas*. Ch (*Purpus 9116*, MO); G (*Nash, 1976*: 225; Turner 1988: 435); N (*Moreno 21991*, MO). 900-1100 m. (C. + S. México, Mesoamérica.)

*Nash (1976)* cited the species as occurring to 2000 meters elevation, but I have seen Mesoamerican material from no higher than 1100 meters.


*Chrysanthellum americanum* var. *integrifolium* (Steetz) Alexander.

Glabrous or subglabrous annual sometimes succulent herbs 5-30 cm, at first rosulate; stems initially erect and soon prostrate, simple to few-branched. Leaves 1.5-7(-11) × 0.5-1.5(-2.5) cm, oblong-lanceolate to cuneate-spatulate, basal and more typically mostly cauline, simple or very rarely with a few proximal lobe-like teeth to 5 mm deep, base long-attenuate petiolariiform, distal margins serrate, apex obtuse to rounded. Capitulescence monolephalous at the end of each branch; peduncle 5-15 cm, occasionally 1-2-bracteolate, sometimes sparsely puberulent apically where broadened and fistulose. Capitula 5-8 mm; involucre (5-)8-12 mm diam., campanulate, typically bracteolate. Bracteoles 3-6, (1-)2-3.5 × sometimes to 0.8 mm diam., triangular to linear-lanceolate; phyllaries c. 13, 5-6 × 1.5-3 mm, elliptic-ovate; paleae c.
3.5 mm, linear. Ray florets 21-24(-55), 2-3-seriate; corolla 5-8 mm, yellow, tube c. 1 mm, limb 1-1.5 mm diam., linear-ob lanceolate, 2-3-nerved. Disk florets 25-35, functionally staminate; corolla 3.5-4 mm, funnelform to narrowly campanulate, (4-)5-lobed, yellow, tube c. 1 mm, lobes c. 0.4 mm, deltate; style long-bifid, branches penicellate to clavate, without stigmatic surface, ovary sterile, sometimes linear-stipitate, sometimes exserted from involucre. Cypselae 3-4 mm, cylindrical-clavate, broadly 8-10-costate, dark brown. Disturbed area, bushy slopes, lawns, savannas, wet areas. Ch (Clarke 470, MO); H (Davidse y Pilz 31658, MO); ES (cited by Turner, 1988); N (Moreno 9849, MO); CR (Heithaus 276, MO); P (Nee 6811, MO). 15-200 m. (S. México, Mesoamérica.)

The ovaries when linear-stipitate are similar in appearance to the linear paleae but are less flattened, without scarious margins, and are obtuse to truncate apically.


Erect subscapose glabrous annual or short-lived perennial herbs with 1-4 rosettes per root crown, each producing a single capitulum on an elongate peduncle. Leaves 2-7 × 1.5-3 cm, pinnatisect with 3-5(-7) lobes, long-petiolate, basal or congested proximally, lobes 3-20 × 1-3 mm, linear-lanceolate, the distal progressively reduced, apex acute. Capitulescence scapose, monocephalous, 1-4 per plant; peduncle 7-15(-20) cm. Capitula c. 6 mm; involucre 6-9 mm diam., turbinate, bracteolate, bracteoles 3-5, 1-1.5 mm, ciliate, apex acuminate; phyllaries 8-10, 3.5-5.5 × 2-3 mm, elliptic-lanceolate; paleae c. 2.5 mm, linear. Ray florets c. 13; corolla 6-8 mm, golden yellow, limb c. 2 mm diam., narrowly ob lanceolate, 6-9-nerved, deeply bifid. Disk florets 20-30, functionally staminate; corolla 2.8-3 mm, funnelform, golden yellow, 5-lobed, tube c. 0.8 mm, lobes c. 0.5 mm, deltate. Cypselae 2-4 mm, circinate, abaxial face echinate. Sandy roadsides. Ch (expect). 100-900 m. (México [Oaxaca].)

This species is known from only a handful of collections and has yet to be collected in Chiapas. It might reasonably be expected in the Flora Area, however, as the type locality in Oaxaca is within 50 kms of the border with Chiapas, where similar habitats are also found.

3. Coreopsis L.

Por J.F. Pruski.

Annual or perennial moderate-sized herbs to sometimes shrubs or rarely small trees; stems usually erect, glabrous or variously pubescent, leafy or sometimes leaves basal, pith solid, roots not tuberous. Leaves simple to pinnatifid, opposite or less commonly alternate, petiolate or sessile; blade surfaces eglandular, glabrous or variously pubescent. Capitulescence of single capitula or laxly corymbiform to paniculate;
peduncles 0.5-15+ cm. Capitula radiate, small to mid-sized, seldom more than 50(-80) mm across the extended rays; involucre cylindrical to hemispherical; phyllaries usually biseriate and dimorphic, very shortly connate at very base; outer phyllaries usually 5-8(-13+), usually shorter than to much shorter than the inner phyllaries, typically herbaceous and green, often weakly 2-seriate, usually glabrous throughout or infrequently margins ciliate or extreme bases pubescent, distinct, spreading to reflexed; inner phyllaries linear to oblong or ovate, usually larger than outer phyllaries, chartaceous-membranous with scarious margins, brown to yellowish or reddish, striate; clinanthium flat to convex, paleate; paleae linear or subulate to sometimes ovate, flat or slightly concave, membranous, typically glabrous, deciduous, rarely falling with and adnate to inner phyllaries, apex acuminate to obtuse. Ray florets 8(5-13, or more in double cultivars), usually sterile or styliferous and sterile, rarely fertile (sectt. Electra and Anathysana), typically 1-seriate (cultivars often 2+-seriate); corolla usually yellow or yellow-orange, sometimes with medial or proximal red blotch, limb oblong to obovate-cuneate, exserted, adaxially papillose, apex entire to 3-4-toothed. Disk florets 8-50+, bisexual, the outer or occasionally all modified and appearing ray-like in cultivated plants; corolla narrow-funnelform or sometimes campanulate, shortly 4-5-lobed, yellow or lobes rarely brown or purplish, tube subequal to or shorter than throat, throat narrowly funnelform, resin ducts single or paired, lobes triangular; anther thecae and appendage usually blackish or in the type section usually pale, appendage eglandular, base rounded to short-sagittate, filaments glabrous; style obviously branched, base not nodular, branches linear to oblong, often dilated, usually appendiculate, sometimes caudate-tipped, infrequently nearly truncate, long-papillose. Cypselae oblong to ovate or orbicular, basically monomorphic, strongly obcompressed, typically broadly alate, erostrate, body black, smooth or weak striate and not papillate-carbonized, faces glabrous to villous, wings membranous to cory, entire to incised, sometimes ciliolate, flat to incurved; pappus awns, bristles, or squamellae (0-)2, stout, smooth or antrorsely barbed, never retrorsely barbed. \( n = \) mostly 12, 13, 14. Approx. 100 spp. Mostly Americas.

This treatment is based largely on the works of Sherff (1936) and Sherff y Alexander (1955). *Coreopsis pinnatisecta* S.F. Blake occurs in Oaxaca and should be looked for in adjacent Chiapas. Similarly, *C. petrophila* A. Gray & S. Watson, *C. petrophiloides* B.L. Rob. & Greenm., and *C. rhyacophila* Greenm. should each be looked for in Chiapas albeit each occurs slightly west of Oaxaca. I was not able to verify the report of *Coreopsis pubescens* Elliott (n.v. hoja de poeta) by Calderón y Standley (1941: 371) in El Salvador. *Coreopsis pubescens* is a typically simple-leaved perennial herb with caudate-attenuate tipped paleae, sterile ray florets with corolla limbs yellow throughout, disk floret style branches with attenuate-cuspidate appendages, pale anthers, and broadly wings cypselae, thus resembling *C. lanceolata* (both species belong to sect. *Coreopsis*, with *C. lanceolata* being the generitype), from which it differs by distally stems leafy nearly throughout. It seems possible that the
plants called *C. lanceolata* by Standley (1938) and *C. pubescens* by Calderón y Standley (1941) are referable to a single taxon or perhaps that *C. pubescens* has fallen out of favor in Mesoamerican gardens. *Coreopsis tinctoria* belongs to sect. *Calliopsis* (Sherff y Alexander, 1955), which is still retained in sterile-rayed *Coreopsis* s. str. More recently, however, members of sect. *Electra* (including *C. mutica*) and sect. *Leptosyne*, which are fertile-rayed, have been excluded from *Coreopsis* by Tadesse and Crawford (2014). Sectional keys in *Coreopsis* were provided by Tadesse y Crawford (1995) and Tadesse y Crawford (2014). The cytotaxonomy of sect. *Electra* and especially of *C. mutica* was studied by Crawford (1970, 1982).


1. Shrubs; rays florets fertile.
2. Perennial herb; leaves typically not divided; ray corolla limbs yellow throughout; disk corollas 5-lobed; anther thecae and appendages pale; style branch appendages attenuate-cuspidate; cypselae broadly membranous-alate, pappus aristae 1-2.

1. *C. lanceolata*

2. Annual herbs; leaves 1-2-pinnatisect; ray corolla limbs bicolored, yellow distally with large reddish-brown blotch proximally; disk corollas 4-lobed; anther thecae and appendages black; style branch apices convex or nearly truncate, not obviously appended; cypselae exalate or narrowly winged, typically epappose.

3. *C. mutica*


Perennial herbs 0.1-0.5+ m; stems several-many from short caudex, not stoloniferous, subhexagonal-costate, glabrous to long-villous especially proximally, leaves basal and proximal-cauline, remote distally, erect to spreading. Leaves mostly 3-14+ x 0.5-1.9 cm, spatulate or lanceolate, typically not divided or rarely with 1-2 lateral lobes, long-petiolate or distal ones subsessile; petiole (0.1-)1–5+ cm. Capitulescence 1-few-capitulate; peduncles 8-30+ cm, usually as long as or longer than leafy part of plant, ebracteate. Capitula moderately large; involucre hemispherical; outer phyllaries mostly 5-10 x 3-4 mm, triangular, green but not at all strongly striate, glabrous, contiguous at base, margins narrow-
scarious, often fimbrillate distally, spreading laterally; inner phyllaries 8-12 mm, broader than the outer ones, ovate, yellow-green, pluristriate, glabrous, appressed proximally and distal end spreading laterally usually below an associated ray; paleae not very similar to inner phyllaries, caudate-attenuate tipped. Ray florets sterile; corolla limb 15-30 mm, obovate-cuneate, yellow throughout, apex irregularly 4(3-5)-dentate, central lobes held above lower-set lateral lobes. Disk florets: corolla 5-7 mm, 5-lobed, throat with paired resin ducts; anther thecae and appendage pale; style branch appendage attenuate-cuspidate.

Cypselae 2.5-4 mm, ovate to orbicular, incurved, body black, wings broad, about half as broad as body, thin, stramineous, entire; pappus squamellae 1-2, 0.3-0.8 mm. 2n = 26. Cultivated and sometimes escaping. 1000-1500 m. G (expect); ES (Standley y Calderón, 1941: 370); CR (Standley, 1938: 1447). (Canada, Estados Unidos; widely cultivated elsewhere and sometimes escaping.)

2. **Coreopsis mutica** DC., *Prodr.* 5: 571 (1836). Holotype: Mexico, Puebla, *Keerl s.n.* (BR, photo MO!).


Subshrubs to small trees 1-5 m. Leaf blade simple to trifoliate, chartaceous to subcoriaceous or subcarnose, margins entire to serrate. Capitulescence of single capitula to corymbiform-paniculate Capitula 20-50 mm across the extended rays. Ray florets 5-12, fertile. Disk florets 10-20; corolla 5-6 mm. 2n = 56, 84, 108. 10 vars. (Mexico, Mesoamerica.)


**Electra mutica** var. **microcephala** (D.J. Crawford) Tadesse et D.J. Crawford.

Shrubs 1-4 m; stems subterete, glabrous to densely pilose or villous. Leaves simple, petiolate or distal ones subsessile; blade 4-12(-16) x 1-6 cm, ovate to lanceolate, unlobed, stiff-chartaceous, usually with about 10 closely and evenly spaced secondary veins at about 45° to the prominent midrib, adaxial surface glabrous or nearly so, abaxial surface glabrous to villosulous, base cuneate to attenuate with short basal acumen, margins serrate, apex acute to attenuate; petiole 1-3 cm, narrowly margined distally. Capitulescence usually 6-30+-capitulate, corymbiform-paniculate or sometimes cymose, bracteate within, bracts 0.4-1.5+ cm; peduncles 1-5+ cm. Capitula 6-12 mm, 20-25 mm across the extended rays, moderately showy; involucre campanulate; phyllaries nearly subequal, with the outer series narrower than the inner, glabrous or pubescent at very base; outer phyllaries (3-)5, 5-12 x 1-1.5 mm, oblanceolate to oblong or spatulate, usually 3-nerved, not contiguous at base, apex often mucronulate; inner phyllaries 5-
8, 8-12 mm, elliptic or oblong to ovate, stramineous or pale green to purplish; paleae more or less similar to inner phyllaries, apex obtuse. Ray florets 5, pistillate; corolla tube sometimes papillose, limb 11-20 x 5-7 mm, broadly oblong, yellow. Disk florets 10-20; corolla 5-6 mm, tube sometimes papillose, throat with single resin ducts or at least resin ducts not obviously paired; anther thecae black, appendage tan; style branches caudate-appendiculate. Cypselae 5-8 x 2-43 mm, orbicular grading to inner oblong in outline, black with pale brownish wings, glabrous, wings less than half as wide as body, apex often emarginate; pappus awns 0-2, when present only on inner florets. 2n = 56. Flowering mostly Sep-Jan. Montane forests, Pinus-Quercus forests, roadside banks, stream sides, thickets, wooded slopes. Ch (Cronquist 9675, MO); G (Turckheim II 2043, MO); H (Molina R. y Molina 24564, MO); ES (Sidwell et al. 852, MO). 800-2400 m. (Mexico, Mesoamerica.)

Tadesse and Crawford (2014) recognized *Coreopsis mutica* as generically distinct from *Coreopsis*. The nomenclaturally correct name is unpublished and cannot be used here, but is in press at the time of this writing and in a month or two will be inserted into a revised version of the present text.


*Calliopsis tinctoria* (Nutt.) DC., *Diplosastera tinctoria* (Nutt.) Tausch.

Annual tap-rooted herbs 0.3-0.9+ m; stems single but branched distally, costate, sparsely leafy throughout; herbage glabrous. Leaves mostly 4-10 cm, 1-2-pinnatisect, ultimate segments 5-10+, 0.1-0.3(-0.5) cm diam., linear. Capitulescence open, corymbiform-paniculate, several-capitulate; peduncles mostly 2-5 cm. Capitula mid-sized, 5-10 mm diam. across the disk; outer phyllaries 1.5-2.5 mm, deltax, 3-5-striate, subimbricate at base, pale-greenish, margins broadly scarious, glabrous, loosely ascending; inner phyllaries 4-9 mm, lance-ovate, yellowish or often reddish-tinged, pluristriate, glabrous, appressed; paleae not very similar to inner phyllaries, gradually attenuate-tipped. Ray florets sterile; corolla limb 11-17 mm, obovate-cuneate, bicolored, yellow distally with large reddish-brown blotch proximally, apex irregularly 3(-4)-dentate. Disk florets: corolla 2.5-3 mm, 4-lobed, throat with single resin ducts or at least resin ducts not obviously paired, limb often reddish-tinged distally; anther thecae and appendage black; style branch apex convex or nearly truncate, not obviously appended, long-papillose in semicircle above stigmatic lines. Cypselae 1.5-3 mm, oblong, exalate or narrowly winged, typically epappose, sometimes minutely coroniform or squamellose. 2n = 26. *Cultivated and sometimes escaping*. 1700-1800 m. G (expect); ES (Standley y Calderón, 1941: 371); CR (Standley, 1938: 1447). 1000-2000 m. (Canada, Estados Unidos; widely cultivated elsewhere and sometimes escaping.)

4. *Cosmos* Cav.
Por J.F. Pruski.

Annual or perennial herbs to sometimes subshrubs, roots sometimes tuberous; stems erect or ascending, branched throughout or simple-stemmed and few-branched distally only near the capitulecence, striate, sometimes pressing angulate, subglabrous to sometimes pilose or sometimes hispid, pith solid. Leaves mostly cauline, opposite, commonly 1-3-pinnatifid to sometimes simple, often narrowly winged-subpetiolar to base, chartaceous or subcoriaceous, venation usually pinnate, when lobed the lobes opposite or subopposite, surfaces usually glabrous, sometimes puberulent or scabridulous to pilose-hispid, ultimate margins usually entire. Capitulecence terminal, of a few long-pedunculate capitula to sometimes openly corymbiform-paniculate. Capitula radiate (infrequently discoid), globose in bud subtended by spreading outer series of phyllaries, at anthesis often saucer-shaped with ray corolla limbs often spreading laterally (often concave and upturned) with disk corollas often exserted as a cylinder or dome held well above the spreading ray corollas; outer phyllaries usually spreading laterally, inner involucre turbinate to crateriform; phyllaries mostly 2-seriate and dimorphic, the 2 series often unequal, mostly glabrous, persistent; outer series of phyllaries 5-8, often herbaceous and green; inner series of phyllaries wider than outer phyllaries, chartaceous-membranous, often yellowish, striate, striations sometimes yellowish or reddish, margins usually scarious; clinanthium flat, paleate; paleae linear and planar to linear-lanceolate and somewhat concave proximally, usually gradually transitional from inner phyllaries, deciduous, striate to sometimes very obviously so, apex obviously long-caudate. Ray florets usually (0-)5-8(-16 in cultivated plants), sterile; corolla yellowish, orangish, rosaceous, or purplish to sometimes white, limb oblong to cuneate, commonly well-exserted, nerves supernumerary, usually 10+, apex often truncate and entire to sharply lobed. Disk florets 10-80+, bisexual; corolla tubular-funnelform, shortly (4-)5-lobed, typically yellow or orange at least distally, tube-throat juncture or lobes sometimes setulose, tubes shorter than throat, lobes deltate or triangular, papillose within; anther thecae usually blackish, appendage broadly ovate, filaments pilose-hirsute; style obviously branched, appendiculate, branches somewhat flattened, apex deltate-aristate with the obvious appendage, spreading-papillose, stigmatic surface usually obviously 2-banded. Cypselae monomorphic, fusiform, not flattened, typically exalate, erect or often curved outward when mature, tapered distally, often obviously so and often obviously rostrate with suberete rostrum, body quadrangular in cross-section (peripheral cypselae sometimes indistinctly obcompressed), glabrous throughout or commonly only the angles of body pubescent, faces longitudinally grooved, carpopodium annular; pappus (0-)1-5(-8)-awned, much shorter than the cypselae, awns retrorsely barbed, erect to reflexed, usually persistent. $x = 12, 17. 25-36$ spp. Mostly Mexico to Andean South America; widely introduced in temperate America and the Old World, sometimes persisting.
Two of our annual native Mexican species (\textit{C. bipinnatus} and \textit{C. sulphureus}) are commonly cultivated, and mostly adventive in the United States, Mesoamerica, South America, West Indies, and the Old World (Melchert, 2010b; Sherff, 1932, 1955). Orange-rayed material of \textit{C. sulphureus} is often misidentified as similar-leaved but pink-flowered \textit{C. caudatus}. \textit{Cosmos caudatus} is our most common species, occurs in all 12 political units in Mesoamerica, and although occasionally cultivated in Mesoamerica appears to be native throughout Mesoamerica and most of the neotropics (Melchert, 1990, 2010b; Sherff, 1932, 1955). Common names below are mostly from the literature, and at least some given for \textit{C. caudatus} (\textit{cambray} in El Salvador and \textit{flor de muerto} in Costa Rica) and \textit{C. sulphureus} (\textit{flor de muerto} in El Salvador and \textit{cambray} in Costa Rica) appear to be erroneous.


1. Leaves deeply pinnatisect, lobes linear or filiform and uniform in width.
2. Simple-stemmed annual herbs branching only distally near the capitulescence; ray florets generally 8; phyllaries nearly subequal to very obgraduate, outer series nearly as long as to much longer than inner series; paleae obviously long-caudate apically; cypselae rostrate.
   \hspace{1cm} \textbf{1. C. bipinnatus}
3. Pluri-stemmed perennial herbs to subshrubs; ray florets 5(-6); phyllaries unequal, graduated, outer series half as long as to 2/3 as long as inner series; paleae gradually narrowed apically; cypselae gradually narrowed distally but not obviously rostrate.
   \hspace{1cm} \textbf{3. C. crithmifolius}
4. Ray corollas orange to orangish-yellow or rarely yellow, limbs well exserted from involucre; phyllaries usually unequal at anthesis; outer phyllaries 3-5-nerved, glabrous throughout or margins sometimes scabrous-ciliate.
   \hspace{1cm} \textbf{5. C. sulphureus}

1. Leaves unlobed or pinnately 3-5-lobed to more commonly pinnatifid, ultimate lobes linear-lanceolate to oblong or oblong- lanceolate, broadest near middle or at least obviously narrowed apically and not uniform in width.
3. Subscapose to proximally leafy-stemmed perennial herbs; leaves unlobed or pinnately 3-5-lobed; phyllaries conspicuously dark-nerved, some nerves interrupted. cypselae gradually narrowed distally but not obviously rostrate.
   \hspace{1cm} \textbf{4. C. diversifolius}
3. Simple-stemmed annual herbs; leaves pinnatifid; phyllaries never conspicuously dark-nerved, nerves never interrupted; cypselae obviously rostrate.
4. Ray corollas pink to nearly white, limbs usually only moderately exserted from involucre; phyllaries typically nearly subequal; outer phyllaries usually 3-nerved, margins often scabrous-ciliate.
   \hspace{1cm} \textbf{2. C. caudatus}


Simple-stemmed annual herbs 0.5-2 m, from tap-root, few-branched distally; stems subterete, glabrous to hirtellous. Leaves 3-11 cm, deeply 2(-3)-pinnatisect, ultimate lobes mostly 0.5-3 × 0.05-0.2 cm, uniform in width, linear or filiform, usually surfaces glabrous and margins scabridulous, apex indurate. Capitulescence paucicapitulate, diffuse; peduncles 10-20(-30) cm. Capitula 8-15 mm at anthesis, at anthesis 5-7(-8) cm across the expanded rays, mature fruits not obviously exserted, usually very showy; inner involucre 7-12 mm, campanulate; phyllaries usually nearly subequal to very obgraduate, not conspicuously dark-nerved, outer series nearly as long as to much longer than inner series; outer phyllaries 8-11, 6-14(-17) × 1-3 mm, commonly ovate to pyriform, sometimes lanceolate, bases nearly contiguous, moderately 5-7-nerved, nerves continuous, margins often ciliolate, apex usually often caudate to subulate; inner phyllaries c. 8, 8-13 × 3-5 mm, ovate, apex obtuse to rounded; paleae obviously long-caudate apically. Ray florets generally 8; corolla pink or purplish to nearly white, limb 15-30(-45) x 8-20(-30) mm, obovate, well-exserted from involucre, sometimes slightly overlapping proximally to broadly overlapping, apex rounded to subtruncate, undulate-lobed. Disk florets 30-60+; corolla 5-7 mm, tube c. 1 mm, lobes c. 1.5 mm. Cypselae (including rostrum) 5-18 mm, outer ones shortest, inner cypselae with rostrum obvious, glabrous to tan-tuberculate or rostrum hispidulous; pappus awns 0-3, 1-1.5(-3) mm, ascending to erect. 2n = 24. Flowering Aug-Dec. *Cultivated in gardens but then often escaping, disturbed sites, matorral xerófilo, bosque de Quercus, roadsides.* Ch (Ventura y Lopez 4221, MO); G (Palacios s.n., MO); H (Nelson, 2008, 160); ES (Standley et Calderón, 1941: 278); CR (Strother, 1999: 41). 1500-2300 m. (Mexico, Mesoamérica; commonly cultivated and escaping in southern United States, Colombia, Venezuela, Guyana, Peru, Bolivia, Brazil, Argentina, Greater Antilles, Lesser Antilles; Africa, Asia, Australia, Pacific Islands.)

*Cosmos bipinnatus* is probably native to Mexico, and cultivated and/ or adventive elsewhere.

**Bidens artemisiifolia** var. *caudatus* (Kunth) Kuntze, **Bidens artemisiifolia** var. *ruber* Kuntze, **Bidens artemisiifolia** var. *rubra* Kuntze, **Bidens berteriana** Spreng., **Bidens caudata** (Kunth) Sch. Bip., **Cosmos pacificus** var. *chiapensis* Melchert.

Simple-stemmed annual herbs to 1.5(-3) m, from tap-root, branching only in distal half in the capitulescence; stems subterete, sparsely pilose-hirsute to glabrous. Leaves 8-27 × 2.5-12 cm, broadly triangular to ovate in outline, (1-)2-3-pinnatifid, primary segments 7-11, at least the larger ones usually again lobed ultimate lobes mostly 1.5-4 × 0.3-0.8 cm, oblong- lanceolate, broadest near middle or at least obviously narrowed apically and not uniform in width, venation reticulate, surfaces glabrous or sometimes puberulent on veins, rarely soft-velvety between veins, margins usually scabridulous, apex narrowly acute to attenuate. Capitulescence to 50+ × 50+ cm, diffuse, each ultimate branchlet 1-few capitula; peduncles usually 7-15(-20) cm. Capitula usually 8-12 mm at anthesis, at anthesis 2.5-3 cm across the expanded rays, usually only moderately showy, to 35 mm in mature fruit, quickly setting fruit or at least most often collected with fruit well-exserted; inner involucre 7-11 mm, campanulate; phyllaries typically nearly subequal, never conspicuously dark-nerved, nerves never interrupted; outer phyllaries c. 8, 6-11(-20) × 1-2 mm, linear-lanceolate to lanceolate or oblanceolate, usually 3-nerved, lateral nerves faint, base not noticeably broader than the middle, non-contiguous basally, margins often scabrous-ciliate but surfaces otherwise glabrous, apex acuminate to attenuate; inner phyllaries c. 8, 8-11 × 2-3 mm, oblong, often rosaceous, apex acute to obtuse, sometimes slightly dilated and fimbriate. Ray florets generally 8; corolla pink (then sometimes paler proximally) to nearly white, limb 10-15(-18) × 3-4 mm, oblong to obovate, usually only moderately exserted from involucre, usually overlapping only proximally, commonly 3-lobed apically, lobes sometimes to c. 2 mm. Disk florets usually 12-30+; corolla 5.5-7.5 mm, tube c. 1.5 mm, lobes 1-1.8 mm. Cypselae (including rostrum) 15-30(-35) mm, curved, obviously rostrate, rostrum about as long as body, hispidulous distally; pappus awns (0)2-3(-5), well-exserted from involucre when mature, longer two awns 2-4.5 mm, usually widely divergent to reflexed, a third reduced awn to c. 0.5 mm often present. 2n = (?24 or) 48. Flowering year-round. **Clearings, cultivated areas, disturbed areas, grasslands, pastures, roadsides, semideciduous forests, thickets.**

T (Cowan 3174, MO); Ch (Breedlove 20185, NY); Y (Gaumer 2505, F); C (Ramirez 58, MO); QR (Gaumer 2075, US); B (Arvigo et al. 139, NY); G (Heyde y Lux 3793, NY); H (Molina R. y Molina 31842, MO); ES (Calderón 1242, US); N (Kral 69285, MO); CR (Skutch 2409, MO); P (Fendler 173, MO). 0-1500 m. (Southern United States, Mexico, Mesoamerica, Colombia, Venezuela, Guyanas, Ecuador, Peru, Bolivia, Brazil, Cuba, Jamaica, Hispaniola, Puerto Rico, Virgin Islands, Lesser Antilles, Trinidad and Tobago; occasionally cultivated and adventive in Asia and Pacific Islands.)

**Cosmos caudatus** var. is basically a tetraploid species. Although Melchert (1990, 2010b) reported **Cosmos pacificus** var. *chiapensis* as being a diploid, it is treated here in synonymy of otherwise tetraploid
C. caudatus as in Strother (1999). *Cosmos caudatus* var. *exaristatus* Sherff proves to be consistently diploid, however, and is treated here as *C. pacificus* Melchert as in Melchert (1990, 2010b). The common name given in Carnevali et al. (2010) is presumably in reference to another taxon.


Many-stemmed subglabrous perennial herbs or subshrubs to 1 m, caudex woody; stems sometimes 4-6-angled, sometimes sparsely and minutely scabridulous. Leaves 5-15 cm, deeply pinnatisect with 3-7 lobes or distal most leaves unlobed, subcoriaceous, lobes 3-10 × 0.1-0.3(-0.5) cm, linear or filiform, uniform in width, at about 45° to the prominent midrib, evenly and widely spaced along midrib, closely 3-veined form stem and proximal portion of midrib closely bordered by a pair of thin veins, but lobes 1-veined with secondary venation indistinct, glabrous throughout or margins and midrib sometimes minutely scabridulous, apex sharp-tipped. Capitulescence 1-7-capitulate; peduncles 4-13(-20) cm, not scapiform. Capitula 10-18 mm, at anthesis 3-5 cm across the expanded rays and moderately showy; inner involucre 7-12(-14) mm, turbinate to narrowly campanulate; phyllaries unequal, graduated with outer series half as long as to 2/3 as long as inner series, slightly brown-nerved, nerves continuous and never obviously interrupted, glabrous throughout or apex of inner series puberulent; outer phyllaries 7-8(-12), 3-6(-9) mm, lanceolate, 3-5-nerved, apex acuminate, indurate; inner phyllaries 5-8, 7-12(-14) × 2-4 mm, broadly oblong, apex acute to obtuse; paleae apex gradually narrowed. Ray florets 5(-6); corolla pink to purple, limb 15-30 × 15-18 mm, broadly cuneate-obovate, usually not overlapping, conspicuously sulcate or nerved, nerves setulose abaxially, apex sharply 3-denticulate. Disk florets 15-30; corolla 7.5-10 mm, tube 2-2.5 mm, lobes 1-1.8 mm, long-papillose within. Cypselae 9-17 mm, very gradually narrowed distally but not obviously rostrate, minutely hispidulous; pappus awns 3-5(-6), 2-5.5 mm, very unequal. Flowering mostly (May-)Jul-Dec. *Bosque abierto, campo abierto, matorral xerófilo, montane slopes, pinares, Pinus-Quercus forests.* Ch (Purpus 9093, NY); G (Steyermark 32741, F); H (Williams y Molina R. 10111, MO); N (Kral 69455, MO); P (D’Arcy y D’Arcy 6461, MO). (600-)900-2200(-2800) m (Mexico, Mesoamerica.)

**Bidens diversifolia** (Otto ex Knowles & Westc.) Sch. Bip., **Bidens reptans** (Benth.) Sch. Bip., **Cosmos reptans** Benth.

Subscapose to proximally leafy-stemmed perennial herbs 0.3-0.8 m, 1-6-stemmed from base, roots fascicled and tuberous; stems subterete, glabrous to loosely pilose. Leaves 4-15 cm, unlobed to pinnately 3-5-lobed, often polymorphic on individual plants, some leaves sometimes also bipinnately lobed on same plant, chartaceous, when simple mostly to 5 × 3.5 cm and spatulate, when lobed the primary lobes 1-7 × 0.5-5 cm, broadest near middle or at least obviously narrowed apically and not uniform in width, ovate to spatulate or sometimes narrowly oblong-elliptic and the lateral lobes nearly at 90° to midrib, the terminal lobe often the largest, venation pinnate with somewhat distinct tertiary reticulations, glabrous or subglabrous, margins usually entire to coarsely few- toothed, sometimes ciliolate, apex acute to sometimes obtuse. Capitulescence monocephalous(-2-capitulate), long-pedunculate; peduncles 15-30+ cm, scapiform. Capitula 10-16 mm, at anthesis 4-7 cm across the expanded rays and typically very showy; inner involucre 7-12 mm, narrowly campanulate; phyllaries nearly subequal, conspicuously dark-nerved, some nerves obviously interrupted, glabrous; outer phyllaries 8, (5)7-11 × 2.5-4 mm, broadly lanceolate, subherbaceous and pale yellow-green between striations, 6-10-nerved; inner phyllaries 5-8, 8-12 × 3-6 mm. Ray florets 8(-10); corolla dark purple to sometimes pinkish, limb 16-30 × (8-)10-16 mm, oblong, commonly overlapping, basically glabrous abaxially, apex entire or obscurely denticate. Disk florets 30-50+; corolla 5-7 mm, yellow or rarely reddish, tube more or less about the same length as lobes, lobes 1-1.5 mm, minutely papillose within. Cypselae 9-18 mm, only slightly and gradually narrowed in 1/3 but not obviously rostrate, glabrous or sometimes tuberculate-hispidulous; pappus awns 2-3(-5), 1-2(-3) mm. 2n = 24, 48. Flowering July-Oct. Alpine meadows, mountain slopes, pinares, Pinus-Quercus forests. Ch (Webster 17989, MO); G (Proctor 25353, MO). 500-3400 m (Mexico, Mesoamerica.)

Although infraspecies are occasionally recognized within it, **Cosmos diversifolius** is circumscribed broadly here with infraspecies being neither recognized nor treated formally in synonymy. Occasional reports of this species in South America are all based on inclusion of it in synonymy of **C. peucedanifolius** Wedd., which is similarly subscapose and with dark-nerved phyllaries, but recognized here as a South American endemic.


**Bidens artemisiifolia** Kuntze non Poepp., **Bidens artemisiifolia** var. sulphurea (Cav.) Kuntze, **Bidens sulphurea** (Cav.) Sch. Bip., **Coreopsis artemisiifolia** Jacq., **Coreopsis artemisiifolia** Sessé & Moc.,
Flora Mesoamericana, Volume 5 (2), Asteraceae page 273 of 1362.

_Nomenclature:_


Simple-stemmed annual herbs 0.3-1.5(-2) m, from tap-root, branching only in distal half in the capitulescence; stems subterete but sometimes pressing subtetragonal, striate, glabrous to sparsely pilose-hirsute. Leaves 3-15(-20) cm, deltate to triangular-ovate in outline, (1-)2-3-pinnatifid, primary segments 7-11, at least the larger ones usually again lobed, ultimate lobes mostly 1-4 × 0.2-0.5(-0.7) cm, linear-lanceolate to oblong, broadest near middle or at least obviously narrowed apically and not uniform in width, venation reticulate, surface glabrous or sparsely pubescent along the veins, margins obscurly spinulose-ciliate, apex aciculate. Capitulescence in distal half of plant, diffuse, each ultimate branchlet 1-few capitula; peduncles usually 8-20 cm. Capitula usually 12-20 mm at anthesis, at anthesis 3-6.5 cm across the expanded rays, very showy; inner involucre 8-13 x 6-10 mm, campanulate; phyllaries usually unequal at anthesis; with outer series of phyllaries usually about 1/2 to 3/4 as long as inner phyllaries, sometimes outer series much longer than inner series, never conspicuously dark-nerved, nerves never interrupted; outer phyllaries c. 8, 4.5-9(-15+) × 1-2.2 mm, subulate to linear-lanceolate to triangular-lanceolate, sometimes noticeably broad-based, sometimes (especially pre-anthesis) nearly contiguous basally, 3-5-nerved, glabrous throughout or margins sometimes scabrous-ciliate, apex attenuate; inner phyllaries c. 8, 8-13 × 1.8-3 mm, oblong, often rosaceous, apex acute to obtuse, sometimes slightly dilated and fimbriate. Ray florets generally 8; corolla orange to orangish-yellow or rarely yellow, tube c. 1 mm, limb 17-29 x 8-17 mm, broadly obovate, well exerted from involucre, usually overlapping, apices broadly rounded or truncate, 1-5-denticulate. Disk florets 20-40; corolla 6-9 mm, tube 1.5-2 mm, lobes 1.5-2 mm; style branches 1.1-2.3+ mm. Cypselae (including rostrum) 12-29 mm, curved, obviously rostrate, rostrum about as long as body, hispidulous distally; pappus awns (0)2(-3), mostly 2.5-5.5 mm, usually spreading to reflexed, sometimes deciduous. 2n = 24. 

_Cultivated areas, disturbed areas, mountain slopes, open forests, pastures, Pinus forests, roadsides, streamsides._ Ch (Purpus 6793, F); Y (Carnevali et al., 2010: 91); C (Martínez et al., 2001: 24); QR (Arellano et al. 2003: 126-127); G (Boeke 138, MO); H (Molina R. 2638, MO); ES (Calderón 93, NY); N (Rueda 17455, MO); CR (Pruski y Sancho 3814, MO); P (Hammel 4383, MO). 1100-2100 m. Mexico, Mesoamerica; cultivated and sometimes adventive in Estados Unidos, Colombia, Venezuela, Guyana, Ecuador, Peru, Bolivia, Brazil, Paraguay, Argentina, Cuba, Jamaica, Hispaniola, Puerto Rico, Virgin Islands, Lesser Antilles; Africa, Asia, Australia, Pacific Islands.)

*Cosmos sulphureus* is widely cultivated for its attractive capitula with rays florets with long orange corolla limbs. Material from the Yucatan Peninsula was not seen, but is likely cultivated or introduced.

Some plants in Mesoamerica have been annotated by T. Melchert (en sched.) as erostrate yellow-rayed Asian-centered *Cosmos calvus* (Sch. Bip. ex Miq.) Sherff, but I interpreted such Mesoamerican plants as
immature or acid soil-occurring moderately pale-flowered single-gene-different variants of rostrate \textit{C. sulphureus} or perhaps as hybrids with extra-Mesoamerican \textit{C. pacificus}. Similar plants from Panama have been described as \textit{C. gracilis}, but these plants are obviously long-rostrate, very unequal-phyllaried, and treated here in synonymy of \textit{C. sulphureus}.

\section*{5. \textit{Dahlia} Cav.}
\textit{Georgina} Willd.

Por J.F. Pruski.

Perennial herbs to vining shrubs, rarely hemi-epiphytic, roots tuberous, when vining not climbing by means of twisting petioles; stems erect or ascending, mostly unbranched except in capitulescence, our species usually with fistulous internodes or when woody variously chambered. Leaves cauline, opposite or sometimes ternately whorled to distally alternate, simple or 1-3-pinnatifid, usually petiolate, when pinnatifid the leaflets opposite (ours) or alternate on the rachis, leaflets linear to ovate. Capitulescence open-cymose and paucicapitulate or capitula single; peduncles elongate, often 10+ cm. Capitula radiate, large, 40-150 mm across the expanded rays; involucre mostly 10-25+ mm, turbinate or campanulate to hemispherical; phyllaries biseriate and dimorphic; outer phyllaries 5(4-8), smaller than the inner, erect or spreading to reflexed, herbaceous and often subcarnose; inner phyllaries 8(7-9), ovate, chartaceous-membranous with scarious margins, variously colored, striate, crescent; clinanthium flat, paleate; paleae scarious, similar to inner phyllaries. Ray florets usually 8, sometimes double+ in cultivated plants, sterile or sometimes pistillate; corolla usually large and showy, limb usually broad and well-exserted, plurinerved, apex acute, sometimes denticulate. Disk florets (0-)20-150+, bisexual; corolla tubular-funnelform, shortly 5-lobed, yellow to reddish or purplish, tube shorter than throat, often sparsely setose near juncture; anthers with filament glabrous; style obviously branched, appendiculate, apex appendage deltate to subulate, long-papillose. Cypselae linear-oblong to rarely broadly spatulate, monomorphic, obcompressed, erostrate but sometimes constricted just below annulus, gray or tan to black, often striate or obscurely sulcate, sometimes puberulent or extra-Mesoamerica minutely tuberculate; pappus usually absent (or of 2 aristate 0.1-1 mm and much shorter than the cypselae, rarely of 2-5 filamentous aristae, usually persistent). x = 16, 17, 18. 18-34 species largely Mexican and Central America, but three species extending into or introduced into South America.

\textit{Dahlia} is a relatively small genus, but is among the most well-known and widely cultivated \textit{Compositae}. Garden \textit{Dahlia} are perennials herbs with very showy large nearly spherical capitula. Most florets are usually manipulated into rays with corollas that may be basically any color other than blue. The popular ball dahlias have ray limbs nearly orbicular and often no disk florets, whereas most garden
Dahlias, while having pluriseriate rays with elongate limbs, do nevertheless have at least some disk flowers. Few native diploid Dahlias, e.g., *D. coccinea*, *D. imperialis*, *D. merkii*, and *D. sorensenii*, have been used as the parents in the thousand or so named cultivars that pass under the umbrella of the multiple-flowered *Dahlia pinnata*, a garden hybrid that is unknown in the wild (Sutton, 2001; Hansen y Hjerting, 1996). In addition to *D. pinnata*, *D. coccinea* and *D. imperialis* are often grown in tropical gardens.


1. Strictly cultivated garden herbs; ray florets typically 16-100+ and pluriseriate.  
2. Native herbs, shrubs, or vines; ray florets 5-8, 1-seriate.  
   3. Ray corollas orange to red or sometimes yellow.  
   4. Ray corollas white, pink, lavender, or purplish.  
   3. All leaves simple, surfaces glabrous; peduncles 5-9 cm.  
   5. Mid-stem leaves typically 1-3-pinnatifid, distal ones sometimes simple, surfaces sometimes pubescent; peduncles (2-)6-20+ cm.  
   4. Non-vining perennial herbs or subshrubs to 1.5(-3) m; outer phyllaries with both surfaces usually glabrous.  
   4. Vining perennial herbs or shrubs, 2-9 m; outer phyllaries usually adaxially pubescent.  
3. *D. imperialis*  

   *Dahlia australis* var. *chiapensis* P.D. Sørensen, *Dahlia australis* var. *liebmannii* P.D. Sørensen, *Dahlia australis* var. *serrator* (Sherff) P.D. Sorensen, *Dahlia scapigera* fo. *australis* Sherff, *Dahlia scapigera* fo. *purpurea* Sherff, *Dahlia scapigera* fo. *serrator* Sherff, *Dahlia scapigera* var. *australis* Sherff, *Dahlia scapigera* var. *liebmannii* Sherff.  
   Native non-vining perennial herbs 0.5-1.2 m; stems glabrous to pubescent, usually fistulose. Mid-stem leaves 3-21 cm, 1-2-pinnatifid, petiolate; primary pinnules 3-5(-7), 2-5(-9) cm, lanceolate to ovate or rhombic-ovate, surfaces glabrous to pubescent along veins, base attenuate to cuneate, margins serrate, apex acute to acuminate; petiole 1-9 cm. Capitulescence 1-3-capitulate; peduncles 8-15(-20) cm. Capitula showy; involucre turbinate to broadly campanulate; outer phyllaries 5-6, 7-15 x 1.5-6 mm, oblanceolate to
spatulate, reflexed at anthesis, both surfaces usually glabrous; inner phyllaries c. 8, 10-18 x 3-9 mm. Ray florets 5(-6), 1-seriate; corolla 15-35 mm, purple or sometimes pink. Disk florets 40-70; corolla 6-9 mm, yellow to purple. Cypselae 7-11.5 mm, black or at least dark; pappus absent. $2n = 32, 64$. Flowering Jul-Nov. Montane forests, Pinus-Quercus forests, rocky hillsides. Ch (Ghiesbrecht 558, MO); G (Skutch 1180, GH). 1400-3000 m. (Mexico, Mesoamerica.)


Native non-vining perennial herbs 0.4-1.5(-3) m; stems glabrous to sometimes moderately pubescent especially at the nodes, usually fistulose. Mid-stem leaves 12-35 cm, 1-3-pinnatifid or rarely simple, opposite or sometimes whorled, petiolate; primary pinnules 3-7(-11), 3-8(-12) cm, lanceolate to ovate, surfaces glabrous to scabridulous, base cuneate to truncate, margins finely to coarsely serrate, apex acute or acuminate; petiole 1-6(-8) cm. Capitulescence 1-3-capitulate; peduncles (2-)8-17(-25+) cm. Capitula very showy; outer phyllaries 5(-8), 6-15 x 3-7 mm, narrowly spatulate to obovate, spreading to reflexed, both surfaces usually glabrous; inner phyllaries c. 8, 11-19 x 3-8 mm. Ray florets 8, 1-seriate; corolla (16-)25-40 mm, orange to red or sometimes yellow. Disk florets 70-150+; corolla 8-10.5+ mm, yellow to scarlet. Cypselae 8-13, gray to black; pappus basically absent. $2n = 32, 64$. Flowering (Mar-)Jun-Nov. Brushy slopes, montane forests, Pinus-Quercus forests, roadsides, rocky hillsides, secondary vegetation. Ch (Martínez S. 1460, MO); B (Strother, 1999: 43); G (Steyermark 50341, F); H (Nelson 2006: 161); ES (Sandoval y Chinchilla 583, MO). 900-3400 m. (Mexico, Mesoamerica; sometimes cultivated and adventive in Peru and Bolivia.)


Native vining perennial herbs or shrubs 2-6(-9) m; stems usually fistulose. Mid-stem leaves 35-90 cm, 2-3-pinnatifid or rarely simple, opposite or sometimes alternate distally, petiolate; primary pinnules 9-15, (3-)5-13 x (1-)3.5-6 cm, elliptic-lanceolate to ovate, surfaces subglabrous to sometimes heterotrichous and then weakly pilose on larger veins, base acute to rounded or sometimes hastate, margins serrate and ciliate, apex acuminate or less commonly acute, sessile or with petiolules < 5 mm; petiole 12-25 cm.

Capitulescence branches (3-)5-9+capitulate but plants often 50+-capitulate; peduncles (2-)6-10(-15) cm, sometimes nutant. Capitula 2-3 cm, 90-150 mm across the expanded rays, very showy; outer phyllaries 5(-8), 6-16 x 3-9 mm, oblanceolate to spatulate to obovate, reflexed, adaxial surface strigose; inner phyllaries 7-8+, 15-26 x 7-13 mm; paleae to 20 mm. Ray florets 8, 1-seriate; corolla 35-65 x 15-30 mm, pink to purple or white, limb elliptic to ovate, apex acute to obtuse. Disk florets 130+; corolla 9-11 mm, yellow; style branches and appendages yellow. Cypselae 13-17 mm, gray to black; pappus basically absent. 2n = 32. Flowering year round. Conifer forests, disturbed areas, hedge rows, meadows, as an ornamental, Pinus-Quercus forests, rocky hillsides, thickets. Ch (Matuda 4826, MO); G (Pruski y MacVean 4490, MO); H (Molina R. y Molina 30586, MO); ES (Berendsohn 368, MO); N (Stevens y Montiel 27114, MO); CR (Smith A-620, F); P (Tyson 6352, MO). 800-3200 m. (Mexico, Mesoamerica, Colombia; cultivated and sometime escaped in Estados Unidos, Venezuela, Peru, Bolivia, Brazil, Argentina, Greater Antilles, Lesser Antilles, Asia, Pacific Islands.)

*Dahlia excelsa* was reported in Guatemala by Sherff (*Amer. J. Bot.* 38: 54-73. 1951) and in Chiapas and Guatemala by Turner (2010), but was excluded from Mesoamerica by Sorensen (1969) and Nash (1976). Turner (2010) reduced *D. imperialis* to synonymy of *D. excelsa*, but Sorensen (1969) treated the two as distinct, and Hansen (2006) treated them as provisionally distinct. If proving to be conspecific, perhaps nomenclatural conservation of the well-known and often cultivated *D. imperialis* over the earlier *D. excelsa* should be proposed.


Strictly cultivated garden hybrid perennial herbs 1-2 m. Mid-stem leaves 13-25 cm, mostly 2-pinnatifid to distal ones sometime simple, petiolate; primary pinnules 3-5 5-12 x 2-7 cm, elliptic-lanceolate to ovate, surfaces glabrous to pubescent, base acute to truncate, margins serrate or dentate. Capitulescence 1-3-capitulate; peduncles 8-15+ cm. Capitula very showy, nearly spherical; outer
phyllaries 5, 12-18 mm, linear-lanceolate to spatulate or obovate, spreading to reflexed, surfaces glabrous; inner phyllaries 8, 17-22 mm, lanceolate to ovate. Ray florets typically 16-100+ and pluriseriate (rarely 8 and 1-seriate); corolla 35-65 x 15-30 mm, white or pink to purple or red (less commonly yellow and never blue), limb nearly orbicular to elongate, usually exserted and apex usually acute. Disk florets (0-)20-150; corolla 10-12 mm, yellow to purplish. Cypselae 11-13 mm; pappus absent. 2n = 64. Flowering year round. Cultivated, perhaps sometimes persisting or escaping and appearing naturalized. Ch (Breedlove 25992, CAS); ?Y (Standley, 1930: 442 as Dahlia variabilis Desf.); B (Balick et al. 2000: 150); G (Velez 98.6857, MO); H (Lara 73, MO); N (Vega y Quezada 198, MO); P (D’Arcy 10062, MO). 50-2200 m.

\( D. \) was interpreted by Hansen y Hjerting (1996) as a strictly cultivated garden hybrid species unknown in the wild. The name \( D. \) is nevertheless applied to a wide range of allopolyploids likely always having at least either \( D. \) or \( D. \) as one parent. Native Mexican plants called \( D. \) by Sorensen (1969) have been described as \( D. \) H.V. Hansen y Hjert. (Hansen y Hjerting. 1996). Plants from Costa Rica that Standley (1938: 1449) called \( D. \) and from El Salvador that Standley y Calderón (1941: 278) called \( D. \) are all taken here as \( D. \). I am unsure of the identity of plants from Yucatan.


Native non-vining perennial herbs < 1 m; stems glabrous, fistulose. Leaves 8-13 x 3-7 cm, ovate to oblong, simple, sessile, surfaces glabrous, base obtuse, margins serrate, apex acute. Capitulescence 1(-3)-capitulate; peduncles 5-9 cm. Capitula: involucre hemispherical; outer phyllaries 5, 8-12 x 3-4.5 mm, lanceolate to narrowly spatulate or obovate, reflexed, both surfaces usually glabrous; inner phyllaries c. 8, 14-16 x 5-8 mm. Ray florets c. 8, 1-seriate; corolla 30-40 mm, probably purplish. Disk florets c. 70+; corolla c. 10 mm, probably yellow. Cypselae immature, glabrous. Flowering Sep. Montane forests. Ch (Purpus 6680, NY); G (expected). 1500-2000 m. (Endemic.)


\( Caleopsis \) Fedde, \( Goldmania \) Greenm., non Rose ex Micheli

Por J.F. Pruski.
Low perennial herbs, producing long runners; stems glabrous proximally and crisped-pilose distally, sometimes deflected at distal nodes, rooting at the proximal nodes. Leaves mostly cauline, alternate, undivided, sessile or short-petiolate; blade elliptic or ovate to obovate or rhombic-ovate, chartaceous, arching-pinnately 3-6-veined from proximal 1/4 of blade, distal few secondary veins also strongly arching and nearly as prominent as the proximal 3-6 secondaries, surfaces glabrous or sparsely strigose, eglandular, base asymmetric. Capitulescence open cymose-umbellate; peduncles elongate, slender to filiform. Capitula radiate; involucre turbinate or campanulate; phyllaries all scarious, yellowish, reddish-brown paucistriate, c. 4-serial, obviously graduated, not dimorphic and more or less similar to each other in shape and texture, sometimes decurrent onto peduncle; clinanthium conical, paleate; paleae thin, membranous. Ray florets uniseriate, pistillate; corolla ochroleucous to pale yellow, limb moderately exserted but capitula small-sized thus rays never overly conspicuous, 5-7-nerved. Disk florets bisexual; corolla funnelform, shortly 5-lobed, yellow, tubes shorter than throat, lobes short-triangular; anthers with filaments glabrous, apical appendage deltate, without central resin canal; style obviously branched, branches appendiculate with apex acute, not long-papillose. Cypselae weakly dimorphic, the rays plump-obcompressed, the disk oblong-obconical and subterete in cross-section; pappus cartilaginous-coroniform or with 2-4 low stout thick corniculate awns. 1 sp. Mesoamerica.

Robinson (1981) gave Goldmanella as "thoroughly anomalous in the" tribe, but its position in Coreopsideae has been confirmed by Panero (2007).


Caleopsis sarmentosa Fedde.

Perennial herbs 0.1-0.5 m; stems terete. Leaves 3-10 x 1.5-7 cm, base oblique, one side obtuse to rounded, the other side cuneate, margins serrulate, apex acute. Capitulescence 5-10-capitulate; peduncles 1-6(-8) cm, substrigillose, sometimes densely so or in lines. Capitula: involucre 6-8 mm; phyllaries 15-22, appressed, glabrous; outer few phyllaries 1-2 mm, broadly lanceolate to ovate, apex acute, evenly grading to inner ones; inner phyllaries 5-7 mm, placed higher on the clinanthium than the outer phyllaries, thus not as long as involucre maximum length, oblong, subscarious-margined, apex obtuse to rounded; paleae golden-yellow with thin brown midrib, apex obtuse to rounded. Ray florets 5-8; corolla limb 5-6 x 3-4, obovate, apex broadly rounded, 2-3-dentate, infrequently deeply 3-lobed. Disk florets 15-25; corolla 3-3.5 mm. Cypselae 2-3 mm, reddish-brown, glabrous; pappus awns 0-4, to 1 mm. Flowering Dec-Apr. Open places, sandy soils, secondary areas, swampy places. T (Matuda 3279, MO); Ch (Strother, 1999: 54-55);
7. Heterosperma Cav.

Por J.F. Pruski.

Annual tap-rooted herbs mostly < 1 m; stems branched, erect to procumbent, glabrous to sparsely pubescent. Leaves opposite, simple to 1-2-pinnatisect with linear to filiform lobes. Capitulescence terminal or axillary, plants pluricephalous, open-cymose or loosely corymbiform but individual capitula single; peduncles slender. Capitula inconspicuously radiate; involucre 4-8+ mm, narrow-campanulate; phyllaries 2-seriate and dimorphic; outer phyllaries smaller than the inner, linear-lanceolate, erect, herbaceous, often ciliolate; inner phyllaries chartaceous-membranous, subtending the ray flowers, yellowish with several reddish veins, pluristriate, striae reddish-brown; clinanthis flat, paleate; paleae nearly flat. Ray florets 1-8, pistillate, 1-seriate; corolla yellow (or orange), 2-3-dentate. Disk florets few to several, bisexual; corolla tubular-funnelform, 5-lobed, yellow or orange, tube shorter than throat, lobes deltate; anthers with filament glabrous; style obviously branched, short-appendiculate, apical appendage usually triangular, papillose. Cypselae markedly heteromorphic in shape, obcompressed; ray cypselae broad-ovate in outline, flat or concave, erostate and emarginate to broadly rounded apically, thick-margined, glabrous, pappus usually absent or sometimes of 2 aristae; disk cypselae oblong, short-rostrate, pappus of 2(-4) aristae. $x = 25$. 8-10 spp. Neotropics.


Annual herbs 0.1-0.5(-0.9) m; stems striate, often diffuse and much-branched, weakly hispidulous to glabrous. Leaves 2-4(-6) cm, 1-2-pinnatisect into 3-7 lobes, petiolate; lobes mostly 0.5-2 x 0.1-0.2 cm, linear, 1-nerved, surfaces glabrous; petiole to 1.5 cm, often ciliolate. Capitulescence: peduncles 1-4(-7) cm, often longer than leaves, sparsely pilose. Capitula 6-23-flowered; involucre c. 6 mm; phyllaries obgraduate or subequal; outer phyllaries 2-5, 4-6(-7) x c. 1 mm, green, cilia 0.5+ mm; inner phyllaries 4-5, c. 2 mm diam., ovate, glabrous. Ray florets 1-4; corolla limbs 1-2 mm, ovate, pale yellow, sometimes teeth deeply cut. Disk florets 5-12+; corolla c. 2.5 mm, yellow. Cypselae black or dark brown with stramineous margins, margins and disk cypsela rostrum tuberculate-setose; ray cypselae 3-4.5 x 2-3 mm, usually strongly concave, epappose; disk cypsela 5-10+ mm, rostrum 1-2+ mm, pappus arista 2, 2-3 mm. $2n = 50$. Flowering (Apr +) Sep-Dec. Meadows, pastures, Pinus-Quercus forests, roadsides, streamside, thickets, volcano slopes. Ch (Breedlove 41253, MO); G (Pruski y MacVean 4497, MO); H
8. 

Hidalgoa La Llave

Por J.F. Pruski.

Vining perennial herbs to lianas 1-3 m, climbing by means of twisting petioles; stems at least distally herbaceous; herbage glabrous or nearly so. Leaves cauline, opposite, trifoliate or sometimes pedate to rarely bipinnatifid, petiolar; petiole elongate and twisting near base, often functioning as tendrils; pinnules 3(5+)-sessile or petiolate, margins serrate. Capitulescence diffuse, plants paucicapitulate; peduncles usually elongate and single, terminal or axillary. Capitula radiate, large and showy; involucre mostly 7-17+ mm, campanulate; phyllaries 2(-4)-seriate and dimorphic; outer phyllaries 3-5, linear-lanceolate to infrequently ovate, smaller than the inner, thick-herbaceous, uniseriate, spreading to more commonly obviously deflexed; inner phyllaries 1(-2)-seriate, chartaceous-membranous, erect; clinanthium flat, paleate; paleae large, nearly flat. Ray florets usually 5-8(-12), 1-seriate, pistillate; corolla orange or scarlet (but drying lavender) to sometimes bright yellow, large and showy, limb usually well-exserted, apex acute to broadly rounded, entire to 2-3-denticulate. Disk florets 25-55, functionally staminate; corolla tubular-funnelform, shortly 5-lobed, yellow to orange, tube shorter than throat, lobes often 3-nerved; anthers with filament glabrous; ovary sterile, style well exserted, basically undivided or weakly bifid only at very apex, long-papillose. Cypselae elongate, obcompressed, ribbed, black to dark green, glabrous, apex bicorniculate from margins, not from annulus; pappus absent. x = 15, 16. Approx. 3 spp., Neotropics.

Sherff y Alexander (1955) recognized four species of Hidalgoa, and a fifth, H. breedlovei, was added by Sherff (1966). Turner (2010) recognized four species in Hidalgoa (including H. breedlovei, also recognized by Nash, 1976) with three of these occurring in Chiapas, whereas Strother (1999) recognized formally only a single species in Chiapas. Sherff (1955, 1966) provided keys to species, and Turner provided a key to the four Mexican species recognized by him.


1. Leaves bipinnatifid.
3. H. wercklei
1. Leaves ternate.
   2. Ray corolla limbs orange or scarlet but drying lavender; leaf pinnules with secondary veins slightly raised abaxially, visible.
   1. H. ternata
2. Ray corolla limbs yellow-orange but drying bright yellow; leaf pinnules with secondary veins immersed and indistinct.

2. **H. uspanapa**


Slender vine 1-10+ m; stems often much branched, subglabrous to puberulent or hirsute especially at the nodes, fistulose. Leaves trifoliate pinnules 2-9 x 2-6 cm ovate or sometimes triangular to elliptic, the lateral ones asymmetrical, secondary veins slightly raised abaxially, visible, surfaces sparsely pilosulose, base obtuse or rounded to sometimes cuneate, apex acute or short-acuminate; petioles 3-9 cm, petiolules 0.2-0.9 cm. Capitulescence on herbarium sheets usually of 1-2 axillary capitula; peduncles 10-20 cm, glabrous to very sparsely hispid. Capitula 10-12 mm, showy: phyllaries 9-14, 2-seriate, glabrous or nearly so; outer phyllaries 4-8, mostly 8-15+ x 1.5-2 mm, linear-lanceolate to ovate, obviously reflexed; inner phyllaries 5-6, 6-10 x 2-3 mm, oblong, erect. Ray florets 5-6(-10); corolla limb 20-30 x 7-10 mm, orange or scarlet but drying lavender; anther appendage densely glandular. Disk florets 30-40+; corolla 8-9 mm, yellow, lobes c. 1.5 mm, strongly papillose within. Cypselae 7-11 x c. 4 mm, glabrous to sparsely pubescent. 2n = 32, 34. Flowering Nov-Mar. *Montane forests, thickets.*

T (*Cowan 2029, MO*); Ch (*Breedlove 20216, MO*); G (*Croat 41179, MO*); CR (*Burger et al. 10785, MO*); P (*Antonio 2029, MO*). 200-1900 m. (Mexico, Mesoamerica, Colombia, Ecuador, Peru.)


Vine. Leaves 6-10 x 6-9 cm wide, trifoliate; pinnules 4.5-6.5 x 2-3 cm, ovate, the terminal ones petiolulate, surfaces glabrous but finely postulate-pectinate, margins irregularly serrulate. Capitulescence with solitary capitula axillary; peduncles 10-20 cm. Capitula 5-8 cm wide across the expanded rays; phyllaries 18-20, 13-25 x 1-4 mm, lanceolate, midrib obvious. Glabrous, c. 4-seriate with 4-5 phyllaries in each of alternating series, the outer series spreading and not obviously deflexed), the inner series erect; paleae shorter than the disk florets. Ray florets 6-8; corolla limb 23-40 x 8-10 mm, yellow-orange but drying bright yellow; anther appendage densely glandular. Disk florets 40-60; corolla 14-15 mm, yellow, lobes 2-3 mm. Cypselae (immature) c. 3 mm. Flowering Nov. *Limestone ridge in lower montane forests.*

Ch (*Breedlove y Dressler 29706, CAS*). Approx. 900 m. (Mexico [Veracruz], Mesoamerica.)

Herbaceous vine; stems glabrous. Leaves 2-3 x 0.5-0.7 cm, ovate in outline, bipinnatifid, primary segments 0.5-0.6 x 0.1-0.2 cm, elliptic-ovate, subsessile, ultimate segments c. 1 cm, triangular to oblong, surface with veins usually hirtellous, otherwise glabrous, marginal lobes few-crenate, teeth and lobes mucronulate, terminal lobe apex acuminate, lateral lobe apices acute to obtuse; petioles 2-6 cm, filiform, petiolules 0-0.3 cm. Capitulescence of 1-2 axillary capitula; peduncles 1-2 cm, glabrous. Capitula 11-20 mm, 1-2 cm across the expanded rays: phyllaries 2-seriate, glabrous or nearly so; outer phyllaries 5(-8), 5-6 x 1-2 mm, lanceolate, obviously reflexed; inner phyllaries 7-9 x 2-3 mm, oblong, erect. Ray florets 6-10; corolla limb 5-10 x to c. 0.9 mm, orange, more deeply so adaxially; style branches 4-5 mm. Disk florets 20+; corolla to c. 10+ mm, yellow, lobes 2-2.5 mm. Cypselae c. 25+ x c. 12 mm, glabrous, apex bicorniculate. Flowering Jul, Oct. *Montane forests, potreros, thickets.* CR (*Webster et al. 12206*, MO). 1200-1900 m. (Mesoamerica, Colombia.)

**IX. Tribus Eupatorieae Cass.**

Tribal description and key to genera por H. Robinson.

Mostly perennial herbs or small shrubs, very rarely minute plants, sometimes vines or trees, rarely annuals, usually not epiphytic; stems leafy at anthesis, very rarely leafless at anthesis. Leaves mostly opposite, sometimes alternate, rarely rosulate, usually petiolate; blade linear to ovate or deltoid, usually chartaceous or membranaceous, pinnately to palmately veined, often glandular, rarely pellucid-dotted, entire or bipinnately dissected. Capitulescence simple to paniculate, sometimes scapose, panicles cymose to corymbiform or pyramidal. Capitula discoid, discrete; phyllaries typically 6+, unequal to sometimes subequal, usually graduated with distinctly shorter outer ones, few-many-seriate, typically spiral, rarely fused at base, rarely ranked, typically spreading with age and with at least some inner or outer phyllaries persistent on post-fruiting clinanthium rarely herbaceous; clinanthium foveolate, epaleate or rarely paleate, glabrous or with trichomes. Florets 1-300+, typically 6+, bisexual; corolla reddish or whitish, never yellow, all usually radially symmetrical and discoid, typically broadening gradually from base to apex, rarely with a constricted mouth scarcely broader than style branches, marginal floret corollas rarely zygomorphic, lobes usually 5, rarely 4, usually short, inner surface smooth or papillose, rarely with trichomes; bases of anther thecae neither spurred nor tailed, extending only
slightly below level of attachment, thecae pale, cells mostly with radial thickenings, apical anther appendage usually distinct, sometimes reduced or rarely lacking, usually not truncate, usually about as long as wide or longer; nectary surrounding style base; style obviously long-appendiculate, base usually slender or glabrous, sometimes with trichomes or inflated node, distal style sometimes with glands, branches subterete in fertile proximal portion, stigmatic surface in paired separate lines proximally, sterile appendage 1-3x longer than proximal stigmatic portions. Cypsela 2-10-ribbed, usually prismatic, rarely compressed or obcompressed, walls with phytomelanin, without raphids; distal end usually with apical callus, rarely fused directly with corolla, pappus usually present and usually of numerous (10+) typically basally free (when deciduous then individually so) capillary bristles, rarely partially fused at base and falling in groups or as units, rarely plumose, sometimes with fewer bristles or scales, sometimes lacking, rarely of glandular knobs; pollen regularly spinulose. Mostly neotropical, with a few Asiatic and pantropical elements; 48 genera and 333 species in Messoamerica.

Eupatorieae include about 185 genera and 2,200 species, about 8% of Asteraceae species, and have been consistently recognized basically as circumscribed as first described by Cassini (1819). Although Bentham and Hooker (1873) reduced several genera described in the mid 1800s to synonymy, the more recent publication in the 1900s of a series works by B.L. Robinson (1913a, 1913b, 1918a, 1918b, 1920, 1926, 1930), and especially by R.M. King and H. Robinson, reinstated several genera and brought more order to the Benthamian classification. The status of dozens of genera segregated from *Eupatorium* s. lat. by King and Robinson were summarized in their 1987 monograph and placed variously by them into the 18 subtribes. King y Robinson (1987) gave a world checklist of accepted species of the 180 then-recognized genera, as well as discussions of microfeatures stressed by them in their system. King y Robinson (1987) provided keys to genera and subtribes, as well as several regional generic keys. The King and Robinson system has been accepted in floras and family overviews by King y Robinson (1975), Bremer (1994), Pruski (1997), Hind y Robinson (2007), and Robinson (2008). Hind y Robinson (2007) recognized 17 subtribes of Eupatorieae.

Eupatorieae belong to the Heliantheae alliance sensu Panero (2007), and appear sister to Perityleae. Most Eupatorieae are native to the Americas, but some are found elsewhere. Eupatorieae may usually be recognized by their usually opposite leaves, well-exserted 2-banded styles, discoid and typically epiatele capitula having non-yellow corollas, and phytomelanin forming in the cypsela walls. Some better known Eupatorieae include the well-known sweetener *Stevia rebaudiana* and ornamentals *Ageratum* and *Liatris*. A few Eupatorieae have been documented as containing toxic alkaloids.
Pubescence when given for the phyllaries and corollas refers to the "outside" (the abaxial surface) of these structures, except when stated otherwise. Trichomes are eglandular and uniseriate, except where explicitly given as glandular. Glandular indumentum refers to sessile or punctate glands, except where explicitly given as stipitate-glandular.


1. Capitula 3-5-flowered; phyllaries 3-5.

2. Pappus absent; anther appendages vestigial or lacking, filaments short-papilllose; cypselae walls sparsely punctate internally. **41. Piqueria**

2. Pappus present; anther appendages distinct, as long as wide or longer, filaments without papillae; cypselae walls densely punctate internally.

3. Plants usually scandent; capitula 4-flowered, principal phyllaries 4; corollas glabrous inside, lobes mostly smooth. **34. Mikania**

3. Plants erect herbs or shrubs; capitula 5-flowered; phyllaries 5, subequal; corollas with trichomes inside, lobes papilllose inside. **46. Stevia**

1. Capitula often 6+-flowered; phyllaries 6+.
4. Pappus absent or coroniform, of scales, squamellae, knobs, or 5(-7) or less awns or bristles.

5. Pappus of glandular knobs.
   6. Anther appendages distinctly shorter than wide; pappus of 3-6 terete glandular knobs, knob apex and outer surfaces viscid-glandular in dense elongate clusters.  
      2. Adenostemma
   6. Anther appendages as long as wide or longer; pappus of 5 slender clavate knobs, these spherically glandular in discrete apical clusters.

44. Sciadocephala

5. Pappus coroniform, of scales, squamellae, awns, bristles, or absent, not of glandular knobs.

7. Cypselae laterally flattened (compressed), with 2 ribs or 2 pairs of 2 ribs.  
    31. Macvaughiella

7. Cypselae prismatic to cylindrical or fusiform, or infrequently slightly curved, usually with 5 ribs.

8. Clinanthia paleate.
   9. Anther appendages very short, wider than long.  
      36. Nesomia

9. Anther appendages oblong or ovate, longer than wide.

10. Clinanthia plane or slightly convex; leaf blades with both short- and long-stalked stipitate glands, never with large sunken glands.  
    9. Blakeanthus

10. Clinanthia conical or columnar; leaf blades with glandular punctations, without long-stipitate glands.
   11. Capitula not becoming elongate; clinanthia conical; style appendages erect or scarcely spreading, prominent; style bases not enlarged.  
      4. Ageratum pro parte
   11. Capitula becoming elongate with columnar clinanthia; style appendages widely diverging; style bases usually enlarged.

29. Isocarpha

8. Clinanthia epaleate.

12. Plants minute; corollas 4-lobed.  
    28. Itisia

12. Plants mostly over 1 dm; corollas 5-lobed.
13. Marginal florets with corollas zygomorphic and pseudoradiate.

   **33. Micropernum**

13. All florets with corollas radially symmetrical.


15. Phyllaries herbaceous, not articulated at bases; clinanthia surfaces not sclerified between scars.

   **24. Gymnocrinon**

15. Phyllaries chartaceous, articulated at bases; clinanthia surfaces completely sclerified.

   **30. Koanophyillon pro parte**

14. Anther appendages as long as wide or longer.


   **4. Ageratum pro parte**

16. Clinanthia flat or slightly convex.

17. Pappus absent; leaf blades slightly succulent; plants often epiphytes in mangrove swamps; phyllary apices broadly rounded; carpopodium indistinct.

   **47. Tuberostylis**

17. Pappus of bristles or scales; leaf blades chartaceous; plants not epiphytes in mangrove swamps; phyllaries with acute to spinose apices; carpopodium distinct.

18. Capitula solitary on long peduncles, peduncles arising from pseudoverticillate clusters of leaves; phyllaries 50-100, florets (100-)150-175(-250); style branches smooth to slightly mamillose.

   **27. Hofmeisteria**

18. Capitula in diffuse alternately branching capitulescences; phyllaries 10-30(-60); florets 10-75(-150); style branches papillose.

19. Pappus of bristles; corolla tubes short and usually strongly ribbed; carpopodium with distinct projecting distal rim.

   **21. Fleischmannia pro parte**

19. Pappus a fimbriate crown or of 5 short lacinate persistent squamellae; corolla tubes not ribbed, long
and slender; carpopodium without distinct distal rim.

37. Oxylobus

4. Pappus of most or all cypselae with (5-)10 or more capillary bristles, sometimes plumose or easily deciduous.

20. Clinanthia paleate.

21. Phyllaries remaining appressed until falling, not spreading when dry or aged, all eventually deciduous, leaving bare clinanthia.

13. Chromolaena pro parte

21. Phyllaries spreading with age, at least some proximal ones persistent on aged clinanthia.

22. Capitula without multiseriate subphyllaries; stems fistulose; anther appendages about half as long as wide; central capitula of capitulescences not maturing distinctly before others.

19. Eupatoriastrum

22. Capitula with numerous multiseriate subphyllaries; stems not fistulose; anther appendages slightly longer than wide; central capitula of capitulescences maturing distinctly before others. 32. Matudina

20. Clinanthia epaleate or essentially epaleate.

23. Stems leafless at anthesis.

23. Stems leafy at anthesis.

24. Pappus bristles plumose, partially fused at bases and often deciduous in groups.

12. Carminatia

24. Pappus bristles not plumose, free basally.

25. Anther appendages mostly truncate, sometimes retuse apically, usually c. half as long as wide or shorter; style apices usually rather abruptly or distinctly broadened, sometimes narrowly linear.

26. Pappus bristles easily deciduous; clinanthia hemispherical, densely hirsute; leaves usually alternate. 18. Decachaeta

26. Pappus bristles persistent; clinanthia flat or slightly convex, glabrous; leaves mostly opposite.

27. Vines; style bases with enlarged hirsute node; style branches with fusiform apices. 23. Gongrostyles

27. Herbs or shrubs; style bases glabrous, without node; style branches with flattened apices.
28. Pappus bristle bases mostly non-contiguous; anther thecae often reddish, visible through pale corollas; corolla veins terminating at sinuses, not extending into lobes, lobes without glands; phyllaries often white.

22. **Fleischmanniopsis**

28. Pappus bristles contiguous at bases; anther thecae not reddish; corolla veins extending into lobes, lobes with numerous glands on outer surfaces; phyllaries not whitish.

29. Phyllaries 18-23, stramineous, deciduous, inner phyllaries linear; leaf blades eglandular.

17. **Critoniadelphus**

29. Phyllaries 7-16, not stramineous, inner phyllaries not linear, sometimes deciduous; leaf blades usually with glandular punctations abaxially.

30. **Koanophyllon** pro parte

25. Anther appendages usually not truncate, usually about as long as wide or longer; style branches linear to filiform or clavate.

30. Leaf blades pellucid-dotted, without glandular punctations; phyllaries usually stramineous, inner easily deciduous.

16. **Critonia**

30. Leaves blades not pellucid-dotted, often glandular; phyllaries often not stramineous, inner phyllaries often persistent.

31. Corollas constricted near mouths, narrower than bases, scarcely broader than thickened style branches.

32. Bases of petioles not broadened or clasping; style bases with enlarged pubescent nodes; cypselae 10-ribbed; pappus bristles smooth on outer surfaces.

10. **Brickellia**

32. Bases of petioles often broadened and clasping; style bases not enlarged, glabrous; cypselae 5-ribbed; pappus bristles not smooth on outer surfaces.

43. **Pseudokyrsteniopsis**

31. Corollas not narrower near mouths than at bases, not narrower than the usually flattened or linear style branches.
33. Phyllaries not obviously gradated, mostly subequal, with few shorter outer phyllaries.

34. Clinanthia usually conical, sometimes highly rounded.

35. Conical clinanthia higher than wide, fistulose; corollas campanulate, limb obviously ampliate.

48. Zyzyura

35. Conical clinanthia wider than high, not fistulose; corollas narrowly funnelform, limb only slightly broader than tube.

36. Capitula 12-18 mm; cypselae faces and ribs discolorous, faces black, ribs prominent, pale; style bases usually pubescent.

11. Campuloclinium

36. Capitula 3.5-5.5 mm; cypselae black, faces and ribs concolorous, ribs thin; style bases glabrous.

15. Conoclinium

34. Clinanthia flat or slightly convex.

37. Carpopodia with distinct projecting distal rim, cell walls greatly thickened; pappus bristles persistent to sometimes slightly fragile; style bases without thickened node.

21. Fleischmannia pro parte

37. Carpopodia vestigial, lacking, or without projecting distal rim, cell walls thin; pappus bristles often fragile and deciduous; style bases usually with enlarged nodes.

38. Leaves trifoliolate; style bases scarcely thickened.

45. Standleyanthus

38. Leaves not dissected; style bases usually with enlarged nodes.

39. Carpopodium differentiated; inner surfaces of corolla lobes papillose.

3. Ageratina

39. Carpopodium vestigial or lacking; inner surfaces of corolla lobes with short cells
mamillose to nearly smooth.

40. *Piptothrix*

33. Phyllaries graduated with distinctly shorter outer ones.
40. Phyllaries remaining appressed until falling, not spreading with age, all eventually deciduous, leaving bare clinanthia.  

13. *Chromolaena* pro parte

40. Phyllaries spreading with age, at least some proximal ones persistent on aged clinanthia.
41. Plants epiphytic or growing in deep humus; leaves rather fleshy or coriaceous; corolla limbs usually with large subquadrate cells with non-sinuous walls; leaves opposite or ternate.

35. *Neomirandea*

41. Plants not epiphytic; leaves usually chartaceous or membranaceous; corolla limbs without subquadrate cells below the lobes; leaves opposite.
42. Capitula 4-15-flowered.
43. Leaves dissected into filiform segments; cypselae with carpopodium obsolete or lacking.

20. *Eupatorium*

43. Leaves with broad blades; carpopodia distinctly enlarged.
44. Phyllaries in 5 ranks of 3; carpopodium at bases of cypselae asymmetric.

14. *Condylidium*

44. Phyllaries usually distinctly spirally arranged; carpopodium essentially symmetric.
45. Style bases densely puberulent, pappus bristle apical cells blunt.

6. *Austroeupatorium*

45. Style bases glabrous; pappus bristle apical cells pointed.
46. Many capitula sessile in fascicles of 2-3; capitula cylindrical; phyllaries
stramineous to brownish; corollas tubular to narrowly funnelform.  

1. **Adenocritonia**

46. All capitula pedunculate; capitula campanulate, with non-stramineous phyllaries; corollas narrowly funnelform.

8. **Bartlettina** pro parte

42. Capitula 17+-flowered.

47. Pappus bristles non-contiguous or scarcely contiguous basally, easily deciduous at fragile bases, apices distinctly broadened.

39. **Peteravenia**

47. Pappus bristles contiguous or persistent, mostly without broadened apices.

48. Cypselae 5-7 mm, densely minutely powdery-glandular.  

5. **Amolinia**

48. Cypselae mostly 1.5-4 mm, without dense minute powdery-glands, with setulae, glandular dots, or glabrous.

49. Carpopodia procurent onto ribs of cypsela, without projecting distal rim, with thin-walled cells; clinanthia often hirsute.

50. Clinanthia slightly convex, with parenchymatous core and sclerified surfaces; style branches narrowly linear or slightly widened distally; all phyllaries usually persistent.

8. **Bartlettina** pro parte

50. Clinanthia hemispherical, composed of highly sclerified cells, central part easily broken off; style branches filiform; inner phyllaries often easily
deciduous.

25. Hebeclinium

49. Carpopodia at bases of cypselae with obvious projecting distal rims, not procurent on ribs, with thick-walled cells; clinanthia surfaces glabrous or minutely puberulent.

51. Both surfaces of corolla lobes prorulose with papillae formed by projecting distal ends of elongate cells; veins of corollas thickened in proximal half; style bases not enlarged.

21. Fleischmannia pro parte

51. Corolla lobes smooth on both surfaces; veins not thickened; style bases enlarged.

52. Outer phyllaries broad, 6-10-ribbed; carpopodia about twice as long as wide, without basal row of distinctly larger cells.

26. Heterocondylus

52. Outer phyllaries only 2- or 4-ribbed; carpopodia shorter than wide, with basal row of distinctly larger cells.

53. Clinanthia surfaces glabrous; style branches with long hair-like papillae; corolla throats with filament insertions at a uniform level.

7. Ayapana

53. Clinanthia surfaces usually puberulent with fine trichomes;
42. *Polyanthina*

1. **Adenocritonia** R.M. King et H. Rob.

Por H. Robinson.

Erect small shrubs, moderately branched; stems glabrous to minutely puberulent, pith solid. Leaves opposite, distinctly petiolate; blade ovate, broad, venation trinervate from above base, gland-dotted on both surfaces, non-glandular trichomes sparse to dense on veins, without internal resin pockets except on veins. Capitulecence broadly corymbiform with hirtellous corymbiform branches; capitula short-pedunculate or many sessile in fascicles of 2-3. Capitula discoid, 4-5-flowered, cylindrical; phyllaries 15-35, strongly subimbricate, spirally arranged, unequal, graduated, stramineous to brownish, glabrous to partly puberulent, usually glandular, outer persistent and sometimes in many short series, inner deciduous; clinanthium slightly convex, epaleate, surface sclerified, glabrous. Corolla tubular to narrowly funnelform, white to pink, limb tubular, without subquadrate cells below the lobes, with glands on lobes, otherwise glabrous, lobes ovate-triangular, smooth with oblong cells on both surfaces; anther collar with many subquadrate cells proximally, with or without weak reticulate thickenings on walls, appendage half as long as wide to longer than wide, not truncate; style base without node, glabrous, branches filiform to slightly spatulate at tip, nearly smooth. Cypselae prismatic, 5-ribbed, ribs pale, short setulose or sparsely to densely minutely glandular, carpopodium distinctly enlarged, essentially symmetric, a short cylinder of small subquadrate cells with thickened walls; pappus of 30-35 persistent scabrous bristles, not noticeably broadened at apex, apical cells pointed. 3 spp. S. Mexico, Guatemala, Jamaica.

Turner (1997) transferred *A. heathiae* to *Kyrsteniopsis* and treated *Adenocritonia* as strictly West Indian.

1. Leaf apices narrowly acuminate, margins crenulate-serrulate; capitula c. 6 mm, 4-flowered; cypselae c. 2 mm, with distinct setulae on ribs and distal faces, eglandular.

1. *A. heathiae*

1. Leaf apices acute to short-acuminate, margins closely coarsely serrate; capitula c. 9 mm, 5-flowered; cypselae c. 3.5 mm, with few or no setulae, with numerous minute glands.

2. *A. steyermarkii*


*Kyrskeniopsis heathiae* (B.L. Turner) B.L. Turner.

Shrubs to 2 m; stems glabrous and corky with age, hirtellous distally. Leaves petiolate; blade 7-13 × 3-6 cm, ovate, weakly trinervate from c. 5 mm above base, surfaces mostly glabrous, glandular-dotted, more obvious abaxially, few trichomes on large veins, densely puberulent adaxially on midvein, base obtuse, margins crenulate-serrulate, apex narrowly acuminate; petiole 1.5-3 cm. Capitulescence 5-6 × 9-10 cm; peduncles 0-2 mm. Capitula c. 6 mm; phyllaries c. 15, 1-5 × 0.6-1 mm, mostly oblong to linear, c. 4-seriate, apex rounded. Florets 4; corolla 4 mm, tube constricted above nectary, lobes c. 0.3 mm, with a few glands; anther appendage as long as wide. Cypselae c. 2 mm, with distinct short setulae on ribs and distal faces, eglandular; pappus bristles c. 3.5 mm. *Montane evergreen seasonal forest, disturbed area, cloud forests. Ch (Heath y Long 1128, TEX). 1200-2500 m. (Endemic.)*


Shrubs to 2.5 m; stems with evanescent puberulence. Leaves petiolate; blade mostly 7-15 × 3.5-10 cm, ovate, subpinnate near base with weakly trinervate pair of veins near proximal 1/4, surfaces with few trichomes, densely puberulent adaxially on midvein, both surfaces sparsely glandular-dotted, base obtuse to short-acute, margins closely coarsely serrate, apex acute to short-acuminate; petiole 2-5 cm. Capitulescence 12-16 × 9-12 cm; peduncles 0-5 mm. Capitula c. 9 mm; phyllaries 16-18, 1.5-5 × 1-1.5 mm, 3-4-seriate, short-oblong to oblong-linear, apex rounded. Florets 5; corolla 6-6.5 mm, tube slightly narrowed above nectary, lobes glandular; anther appendage longer than wide. Cypselae c. 3.5 mm, with numerous minute glands, with few or no setulae on ribs; pappus bristles
mostly 3.5-4.5 mm. *Damp mixed hillside forest, wet sandy quebrada*. G (Standley 83777, F). 2400-3000 m. (Endemic.)


*Lavenia* Sw.

Por H. Robinson.

Short-lived perennial herbs, creeping or erect from procumbent bases. Leaves opposite; petiolate; blade ovate to triangular, trinervate or veins strongly ascending secondary. Capitulescence terminal, laxly cymose. Capitula discoid, 10-60-flowered, campanulate; involucre of 10-30 eximbricate phyllaries, herbaceous, continuous with peduncle, not articulated at base; clinanthium convex, surface not sclerified between scars, glabrous. Corolla often held in group after anthesis by long trichomes on lobes, lobes 5, non-papilllose; anther collars usually enlarged proximally, with few to many quadrate cells, walls ornamented, appendage distinctly shorter than wide, truncate; style base glabrous, not enlarged, style shaft with or without trichomes, appendages fleshy. Cypselae slightly curved, weakly 3-5-angled, without distinct ribs; pappus of 3-6 terete glandular knobs, knob apex and outer surfaces viscid-glandular in dense elongate clusters. 25 spp., 12 spp. in Tropical America; Africa, S. Asia, Pacific Islands.


1. Leaf margins sharply serrate.
   2. Pappus of 3 knobs; leaf blades trinervate from near base, diverging from proximal margins; shaft of style glabrous; capitulescences oppositely branched at base.

   **1. A. flintii**

   2. Pappus of 5 knobs; basal secondary veins nearly parallel to proximal leaf margin; style shaft hirtellous; capitulescences alternately branched throughout.

   **3. A. hirtiflorum**

1. Leaves margins bluntly crenate-serrate or less commonly subentire.
   3. Corolla limb shortly and broadly campanulate, densely hirsute; style branches linear; capitulescences branches usually opposite proximally.

   **2. A. fosbergii**
3. Corolla limb cylindrical, nearly glabrous proximally; style branches distinctly broadly clavate distally; capitulescences usually alternately branched throughout.

4. **A. platyphyllum**


   Erect herbs to 0.5 m; stems and leaves glabrous or subglabrous. Leaves petiolate; blade mostly 4-5 × 3.5-4.5 cm, broadly ovate, trinervate from near base, diverging from proximal margins, base subtruncate, margin closely sharply multi-serrate, apex short-acute; petiole 2-3 cm, indistinctly winged distally. Capitulescence oppositely branched at proximal nodes, ultimate branches minutely puberulent; peduncle to 3.5 mm. Capitula c. 5 × c. 6 mm; phyllaries c. 23. Florets c. 25; corolla c. 2 mm, white, broadly funnelform, limb c. 1 mm, densely pilosulose; style shaft glabrous, branches linear. Cypselae c. 2.5 mm; pappus c. 0.8 mm, of 3 viscid knobs. * Hábitat desconocido. N (Flint 6, US).*

   Elevation unknown. (Endemic.)

   This species was treated by Dillon et al. (2001) as a synonym of *A. laevenia* (L.) Kuntze, which also has a densely pilosulose corolla limb and a glabrous style shaft. However, *A. flintii* has glabrous or subglabrous stems, whereas *A. laevenia* differs by its stipitate-glandular to glabrescent stems and was treated as endemic to Sri Lanka by King y Robinson (1987).


   Erect herbs to 1 m; stems and leaves minutely puberulent mostly near nodes and on veins. Leaves petiolate; blade to 13 × 10 cm, broadly ovate, not angulate, trinervate from above base, base rounded and abruptly acuminate, margin shallowly and bluntly crenate-serrate to subentire, apex short-acute; petiole 1-7 cm, distally narrowly winged. Capitulescence branches usually opposite proximally, ultimate branches minutely puberulent; peduncle c. 2.5 mm. Capitula c. 3.5 × 4-4.5 mm; phyllaries c. 15-20. Florets 15-20; corolla 1.3-1.5 mm, white, limb very shortly and broadly campanulate, c. 0.5 mm, densely hirsute; style shaft hirtellous, branches linear. Cypselae c. 2 mm; pappus c. 0.5 mm, of 3 viscid knobs. *Wet soil in woods. P (Hamilton et al. 941, US). 1000-2200 m. (Panamá, Colombia, Ecuador, Perú.)*

Ascending herbs to 0.5 m; stems minutely puberulent, leaves mostly glabrous. Leaves petiolate; blade mostly 6-9 × 4-5 cm, ovate, basal secondary veins nearly parallel to basal margin, base acute to short-acuminate, margin sharply serrate, strongest teeth at widest part, apex acute to slightly acuminate; petiole 1-3 cm. Capitulescence alternately branched throughout, ultimate branches densely whitish puberulent; peduncle c. 5 mm. Capitula 6-7 × 4-5 mm; phyllaries c. 10. Florets c. 12; corolla c. 3 mm, white, limb c. 2 mm, rather cylindrical, glabrous proximally, densely hirtellous distally; style shaft hirtellous, branches linear to scarcely clavate. Cypselae c. 2.5 mm; pappus c. 1.2 mm, of 5 viscid knobs. *Wet montane forest or forest openings.* G (*Skutch 1449*, US). 1200-1500 m. (Endémica.)


Erect herbs to 1 m; stems and veins of leaves minutely puberulent. Leaves petiolate; blade mostly 7-18 × 4-13 cm, broadly ovate, not angulate, trinerve from distinctly above base, base rounded and abruptly acuminate, margin bluntly crenate-serrate, apex generally acute, at extreme tip usually narrowly obtuse; petiole 2-8 cm, becoming winged distally. Capitulescence usually alternately branched throughout, ultimate branches minutely puberulent, often with minute stipitate glands; peduncle c. 5 mm. Capitula c. 6 × 4-5 mm; phyllaries 18-30. Florets c. 15-40; corolla c. 2 mm, white with reddish-tinged throats, limb c. 1.5 mm, rather cylindrical, nearly glabrous proximally, with few long trichomes distally; style shaft hirtellous, branches distinctly broadly clavate. Cypselae c. 3 mm; pappus c. 0.8 mm, of 3 viscid knobs. *Stream banks and steep wet slopes.* ?H (Nelson Sutherland, 2008: 146); CR (*Wilbur 20579*, DUKE); P (*Duke y Bristan s.n.*, MO). 0-700(-1100) m. (Mesoamerica, Colombia, Venezuela, Ecuador, Perú, Bolivia, Argentina.)

3. **Ageratina** Spach

*Batschia* Moench, non J.F. Gmel. (1791), non Mutis ex Thumb. (1792), nec Vahl (1794), *Mallinoa* J.M. Coult., *Kyrstenia* Neck. ex Greene

Por H. Robinson.
Sparingly to densely branched herbs or shrubs. Leaves usually opposite, not dissected, short- to long-petiolate, rarely sessile; blade deltoid or cordiform to narrowly lanceolate, venation pinnate to more typically (in Flora Area) strongly trinervate with some veins in proximal third ascending at less than 45° divergence from midrib, concolorous or rarely discolorous, toothed or lobed to entire, usually serrate. Capitulescence terminal, rarely subterminal, laxly to densely cymose in corymbiform or thyrsoid panicles, rarely scapose, typically with ascending, leafy branches, branches rarely spreading at 90°. Capitula discoid, 5-60-(-125)-flowered, campanulate; involucre of up to 30 eximbricate to weakly subimbricate phyllaries, spreading with age; clinanthium slightly convex, epaneate, surface sclerified, without obvious trichomes. Corolla white to much less commonly pink, tube broad to narrow, throat typically longer than lobes, lobes 5, inner surface of corolla lobes densely papillose near apex, very rarely with numerous trichomes inside at bases of lobes, outer surface smooth; anther collars cylindrical, usually elongate with numerous quadrate cells proximally, walls not or slightly ornamented, appendage oblong-ovate as long as wide, not truncate; style base usually with enlarged node, glabrous, branches with appendages linear, densely papillose. Cypselae prismatic to fusiform, usually 5-angled, setulose, rarely glabrous, much less commonly glandular, carpododium differentiated, without projecting distal rim, carpododium cell walls thin; pappus of 5-40 slender scabrid bristles, often enlarged distally, often easily deciduous, much less commonly persistent and spreading with age, usually with an outer series of short squamae. Aprox. 250 spp. mostly of western North and Suramérica, with two species widely adventive in paleotropics.

Turner (1997) and Dillon et al. (2001) treated *Pachythamnus* as a synonym of *Ageratina*, but here *Pachythamnus* is treated as distinct. The report by Breedlove (1986) of *A. oaxacana* in Chiapas is based on a misdetermination.


1. Corolla lobes as long as throat; pappus bristles rather persistent, spreading with age; abaxial leaf surfaces much paler than adaxial, membranaceous.

5. **A. anisochroma**

1. Corolla throats longer than lobes; pappus bristles erect or deciduous with age; abaxial leaf surfaces not much paler than adaxial.
2. Leaf blades with all strongly ascending veins diverging at more than 45° from midrib, venation essentially pinnate, blades usually widest near middle.

3. Leaves with sometimes sparse or numerous glandular punctations.
4. Phyllaries densely stipitate-glandular; cypselae with numerous small glandular dots; leaf blades with no basal auricles. 12. A. caeciliae
5. Phyllaries without stipitate glands; cypselae eglandular, with only setulae; leaf blades usually with lobules and strongly recurved margins at bases.

31. A. ligustrina

3. Leaves without glandular punctations.
4. Leaves sessile or subsessile; stems glabrous; capitula 6-10-flowered.

18. A. contigua
5. Leaves petiolate; stems puberulent; capitula 20-30-flowered.
7. Capitula 28-30-flowered. 54. A. tonduzii

2. Leaf blades with some veins in proximal third ascending at or less than 45° divergence from midrib, often strongly trinervate usually; leaf blades widest distinctly below middle.

7. Peduncles and also often phyllaries with numerous distinctly stipitate glands.
8. Cypselae glabrous or glandular.
9. Cypselae glabrous; leaves trinervate from very bases of blades; capitula 4-5 mm; corollas with abruptly narrowed tube.

1. A. adenophora
9. Cypselae glandular; leaves usually trinervate from above bases of blades; capitula 7-12 mm; corolla tubes indistinctly delimited distally.
10. Capitulescences corymbiform; petioles 0.1-0.3 cm; leaf blades elliptic-ovate, widest near basal 1/3. 22. A. glauca
10. Capitulescences thyrsoid with densely corymbiform to pyramidal branches; petioles mostly 0.5-2 cm; leaf blades triangular-ovate, widest near basal 1/5-1/4. 40. A. pringlei

8. Cypselae setulose or scabrid, eglandular.
11. Leaves in basal rosette. 10. A. bellidifolia
11. Leaves cauleine.
12. Leaves with petioles and adaxial surfaces of leaf blades densely stipitate-glandular. 57. A. zunilana
12. Leaves without stipitate glands.

13. Leaves with petioles mostly less than 1 cm; leaf blades less than 5 cm, trinerved from base; internodes mostly c. 0.5-1 cm.

14. Leaves subsessile, petioles mostly 0.1-0.2 cm.

**17. A. chiriquensis**

14. Leaves with petioles mostly 0.7-1.3 cm.

**30. A. kupperi**

13. Leaves with petioles 1-7 cm, trinerved from above bases of blades; internodes mostly more than 1 cm.

15. Leaves and stems densely velutinous to hirsute or sublanate.

**56. A. vernalis**

15. Leaves and stems glabrous to minutely puberulent.


**28. A. intibucensis**

16. Corollas with apical tuft of trichomes on lobes, with sharply delimited slender tube.

**29. A. ixiocladon**

7. Peduncles and phyllaries essentially without stipitate glands, sometimes with sessile or nearly sessile glandular dots.

17. Scrambling shrubs with branches of capitulescences spreading at 90º angles; capitula 7-10-flowered.

18. Leaf blades pellucid-dotted.

**42. A. resinifera**

18. Leaf blades not pellucid-dotted.

19. Leaves subentire to slightly 6-12-serrulate; secondary veins divergent from basal margins; veinlets not prominulous; cypselae hispid distally.

**36. A. ovilla**

19. Leaves serrate; secondary veins parallel to basal margins; veinlets prominulous on both surfaces; cypselae glabrous or minimally scabrid distally.

**43 A. reticulifera**

17. Erect herbs, shrubs, or trees with ascending branches in capitulescence; capitula 12+-flowered.

20. Cypselae glabrous or glandular; essentially without setulae or scabrae.

21. Cypselae glandular; branchlets, young leaves, and axils of large secondary veins on leaf abaxial surfaces with appressed arachnoid tomentum.

**32. A. mairetiana**
21. Cypselae glabrous or subglabrous, without glands.
   22. Leaf blades elliptical with long-acuminate bases and apices;
       secondary veins strongly ascending in 3-4 pairs; capitula c. 6 mm,
       with c. 13 phyllaries. 11. A. burgeri
   22. Leaf blades ovate with bases short-obtuse to long-acute and apex
       short-acute to shortly narrowly acuminate, trinervate from 1.5 mm
       above bases; capitula c. 4 mm, with c. 20 phyllaries.
       33. A. malacolepis
20. Cypselae distinctly setulose or scabrid on ribs or distal surfaces.
   23. Corollas with glandular dots and few or no non-glandular trichomes
       on outer surfaces of lobes; leaf surfaces sometimes with obvious
       glandular punctations.
   24. Leaves without glandular dots abaxially; stem and leaf surfaces
       glabrous to subglabrous or with sparse appressed pubescence.
   25. Leaf blades 1.5-3.5 × 1-2 cm; abaxial surfaces without closely
       spaced reticulum of veinlets; capitulescences small with 10-20
       capitula; capitula c. 6 mm, with 12-16 phyllaries.
       46. A. saxorum
   25. Leaf blades usually 5-10.5 3-6 cm; abaxial surfaces with
       closely spaced reticulum of veinlets; capitulescences large with 50
       or more capitula; capitula 8-10 mm, with 18-25 phyllaries.
   26. Veinlets of leaf blades forming prominulous reticulum on
       both surfaces; leaf margins serrulate; capitula c. 17-flowered.
       45. A. salvadorensis
   26. Veinlets of leaf blades with reticulum not prominulous; leaf
       margins serrate; capitula 30-50-flowered.
       50. A. subcoriacea
24. Leaves with numerous glandular dots abaxially; stems and leaf
   surfaces with distinct usually erect pubescence.
   27. Leaf bases deeply cordate, trinervate from bases of blades at
       top of petioles. 38. A. petiolaris
   27. Leaf bases obtuse to scarcely cordate, trinervate from above
       bases of blades.
28. Leaf apices acute to short-acuminate; stems densely pilose or hirsute to tomentose or sublanate with often reddish trichomes.  

52. *A. subinclusa*

28. Leaf apices rounded to short-obtuse; stems densely grayish or yellowish pubescent.  

53. *A. tomentella*

23. Corollas usually with numerous long trichomes on outer surfaces of lobes; surfaces of leaf blades with only obscure glandular dots or eglandular.

29. Capitula with usually 20-24 phyllaries 1-2 mm diam., 50-125-flowered; plants herbaceous, mostly 30-80 cm, often with enlarged basal leaves and scapose or subscapose capitulescence.

30. Stems distinctly reddish; capitula 6-9 mm; leaf margins with 4-12 blunt or coarse crenations or serrations; cypselae 2.2-2.7 mm; phyllaries puberulent, peduncles densely puberulent to pilosulose.

41. *A. prunellifolia*

30. Stems brownish with at most a reddish tinge; capitula 4-6 mm; leaf margins with 10-20 crenations or blunt serrations; cypselae c. 1.5 mm; phyllaries mostly glabrous; peduncles glabrous to sparsely puberulent.

31. Capitulescences moderately lax with numerous capitula on short peduncles; leaf blades basally cordate to rounded; reduced leaves extending well up stem into capitulescence.

4. *A. anchistea*

31. Capitulescences laxly branching with few capitula per branch, peduncles to 75 mm; leaf blades oblong-ovate to broadly elliptical usually truncate to short-acute or acuminate at bases; leaves confined to proximal 1/4 of plant.

35. *A. muelleri*

29. Capitula with usually 10-16 phyllaries 0.3-1 mm diam., rarely > 45-flowered; plants generally herbs or subshrubs to shrubs without evident larger basal leaves; capitulescences on leafy stems.

32. Corollas with numerous trichomes inside at bases of lobes.

49. *A. subcordata*

32. Corollas with few or no trichomes inside at bases of lobes.
33. Phyllaries with small sessile glands, sometimes viscid, without non-glandular trichomes except at margins.

    **29. A. ixiocladon**

33. Phyllaries without glands, with few to many non-glandular trichomes.

34. Cypselae with only scabrae or short spicules that are 1-3 times as long as wide, not longer than space between them; plants restricted to Costa Rica and Panamá.

35. Leaf blade bases acute to slightly acuminate, strongest secondary veins located well above bases near basal 1/3 of blades.

36. Stems puberulent; leaf blades minutely puberulent, not pellucid-dotted.

    **3. A. allenii**

36. Stems hirsute; veins of leaf blades pilose, pellucid-dotted.

    **9. A. barbensis**

35. Leaf blade bases rounded or scarcely acuminate to scarcely obtuse or subcordate, strongest secondary veins arising from or within 5 mm of blade bases.

37. Leaf blades widest near basal 1/4, apices tapering to narrowly acuminate; capitula 4-5 mm.

    **20. A. croatii**

37. Leaf blades broadest near basal 1/3, apices short-acute to short-acuminate; capitula c. 6 mm.

38. Stems and leaves antrorsely or appressed puberulent to pilosulous; throats of corollas c. 1.5 mm, longer than wide; leaf margins coarsely crenate-serrate.

    **25. A. herrerae**

38. Stems and leaves hirtellous with erect trichomes; throats of corollas c. 1 mm, almost as wide as long; leaf margins with 15-20 slight blunt serrulations.

    **48. A. standleyi**

34. Cypselae with long setulae on ribs or distal faces (setulae many times as long as wide, distinctly longer than
distances between them); species from all parts of Mesoamerica.

39. Apices of phyllaries usually obtuse to short-acute, often broadly scarious and erose.

40. Leaves subsessile.  **16. A. chazaroana**

40. Leaves distinctly petiolate.

41. Stems tomentellous to densely hirsutulous with erect trichomes.

42. Bases of leaf blades rounded to slightly cordate, blades chartaceous.

39. **A. pichinchensis**

42. Bases of leaf blades usually acute to short-obtuse with short acumenation, blades membranaceous.

**55. A. valerioi**

41. Stems puberulent with short curved or appressed trichomes.

43. Stem surfaces reddish or reddish tinged.

44. Leaf margins with 10-20, sharp, usually coarse, single or double serrations, blades mostly 4-9 cm.  **37. A. pazcuarensis**

44. Leaf margins with 5-10 blunt serrations, blades mostly 2-5 cm.  **47. A. schaffneri**

43. Stems brownish, not reddish.

45. Leaf blades oblong-ovate to nearly elliptical; basal margins subparallel to basal secondary veins; capitula c. 4 mm.  **27. A. huehueteca**

45. Leaf blades ovate to broadly ovate, with basal margins strongly divergent from secondary veins in trinervation; capitula 5-7 mm.
46. Leaf blades trinervate from very bases, broadest in basal 1/5-1/4; cypselae with setulae on and between ribs.

6. A. atrocordata

46. Leaf blade trinervations arising from 1-7 mm above bases, blades widest near basal 1/4-1/3; cypselae with setulae mostly on ribs, often sparse or lacking between.

47. Stems without linear black maculae; bases of leaf blades obtusely rounded to short-acute; setulae evenly spaced on ribs of cypsela; leaf margins with 10-20 broad teeth. 2. A. alexanderi

47. Stems usually with obvious linear black maculae; bases of leaf blades often subtruncate to cordate; setulae densely pectinate on ribs of cypsela; margins of most leaves with 20-30 close sharp teeth.

44. A. rivalis

39. Apices of phyllaries narrowly acute to attenuate

48. Cypselae with setulae mostly or entirely restricted to ribs, sometimes dense.

49. Secondary veins in trinervation of leaves spreading from basal margins at c. 20° angle from midvein; stems coarsely curved-pilosulose. 15. A. cartagoensis

49. Secondary veins in trinervation of leaves nearly parallel to basal margins, at c. 25-35° angle from midvein; stems with spreading trichomes.
50. Stems and leaves with whitish or sordid trichomes, not reddish; internodes mostly 6-9 cm; corolla lobes with all trichomes slender-tipped. 7.

**A. austin-smithii**

50. Stem and leaves with reddish trichomes; internodes 1-3 cm; corolla lobes with trichomes dimorphic, some trichomes ending in a series of short broad cells.

21. **A. diversipila**

48. Cypselae with setulae rather evenly distributed on ribs and distal faces.

51. Stems densely hirtellous or hirsutulous with erect trichomes.

52. Leaf blades mostly 8-10 cm, trinervate from 7-15 mm above bases, margins with c. 22 blunt serrations; trichomes of stems reddish. 8.

**A. badia**

52. Leaf blades mostly 4-5 cm, trinervate from 2-3 mm above bases, margins with short sharp teeth; trichomes of stem pale.

26. **A. hirtella**

51. Stems puberulent with curved or appressed trichomes.

53. Leaf blades broadly ovate to rather rhomboid, over 3/4 as wide as long; secondary veins at bases of trinervation diverging from midvein at 30-35º; capitula 4-5 mm.

54. Corolla tubes 1-1.5 mm, about as long as limb; trinervation arising slightly above bases of leaf blades, intramarginal
in basal acuminations.

24. A. helenae
54. Corolla tubes 1.5-2 mm, distinctly longer than the limb; trinervation of leaf basal, at margins in basal acuminations.

34. A. molinae
53. Leaf blades 1/2-3/4 as wide as long; secondary veins of trinervation diverging from midvein at 15-25º; capitula 5-9 mm.
55. Petioles mostly 3-7 cm; leaf blades distinctly short- to long-acuminate at bases; peduncles 2-5 mm.

14. A. carmonis
55. Petioles 1-3 cm; leaf blades acute to subtruncate at bases; peduncles 3-12 mm.
56. Bases of leaf blades subacute to short-acute, broadest near 1/3-2/5; phyllaries with pale or sordid trichomes or nearly glabrous.

13. A. capillipes
56. Bases of leaf blades subtruncate to obtuse, broadest near basal 1/4; phyllaries with reddish to purplish trichomes.
57. Capitula c. 6 mm; leaf margins with c. 10 sometimes coarse simple to double serrations; stems slender, mostly c. 2 mm diam.

19. A. costaricensis
57. Capitula 8-9 mm; leaf margins with 10-20 low
serrations; stems mostly 3-4 mm diam.

23. A. guatemalensis


Erect subshrubs to 1.5 m; stems brownish to dark reddish; stems and petioles densely short-stipitate-glandular. Leaves petiolate; blade mostly 4-8 × 2-5 cm, ovate to subrhomboidal, widest between proximal 1/3-1/4, chartaceous, surfaces sparsely puberulent, without glandular dots, trinervate from very base, secondary veins diverging from midvein at 25-35º, base obtuse to short-acute with slight acumination, margins above widest point with c. 8 very slight to strongly projecting teeth, apex sharply acute to slightly acuminate; petiole mostly 1.5-3.5 cm. Capitulescences terminal on leafy stem, branchlets and peduncles densely stipitate-glandular. Capitula 4-5 mm; phyllaries 18-20, 3.5-4.5 × 0.8-1 mm, oblong-lanceolate, apex short- to long-acute, densely stipitate-glandular. Florets 50-60; corolla tube c. 1.8 mm, abruptly narrowed, throat c. 1.3 mm, lobes c. 0.5 mm, glabrous. Cypselae 1.5-1.8 mm, weakly narrowed distally, glabrous; pappus bristles 3-3.5 mm, fragile. 2n = 51. Expected in weedy areas. (C. Mexico, Chiapas; adventive in United States [California], West Indies, South America; Europa, Asia, Australia, Pacific Islands.)

This is a widely and commonly introduced weedy species native to Mexico, but apparently not yet known from Mesoamerica. Reports of the species in the area were based on misidentified material. Future discovery of the species in the area remains probable.


Subshrubs to 2 m; stems brownish, without linear black maculae; stems and petioles densely puberulent with short curved reddish trichomes. Leaves petiolate; blade mostly 6-10 × 3-6 cm, ovate, widest near basal 1/3, chartaceous, trinervate from 2-7 mm above base, veins spreading from midrib at c. 25-30º, proximal margins strongly divergent from
secondary veins in trinervation, both surfaces eglandular, adaxial surface sparsely appressed-puberulent, trichomes denser on veins abaxially, bases obtusely rounded to short-acute, slightly acuminate, margins with 10-20 broad serrations, apex short-acuminate; petiole mostly 2-4 cm. Capitulescence on leafy stem, with small foliar bracts at proximal alternate ascending branchlets, broadly corymbiform; branchlets or peduncles densely puberulent, without stipitate glands. Capitula 5-6 mm; phyllaries 15-17, 4-5 × 0.8-1 mm, puberulent, without stipitate or sessile glands, apex weakly scarious, not costate, crosely short-acute. Florets c. 25; corolla tube c. 1.8 mm, throat c. 1.5 mm, lobes c. 0.4 mm, pilosulous with numerous long trichomes, inside bases of lobes without evident trichomes. Cypselae c. 2 mm, fusiform, evenly long-setulose mostly on ribs, often sparse or lacking on distal faces; pappus bristles c. 3 mm. *Open streamside.* CR (Skutch 4196, US). 1500 m. (Endemic.)


*Ageratina whitei* R.M. King et H. Rob.

Erect herbs to 1.5 m; stems brownish, puberulent. Leaves petiolate; blade mostly 4-5 × 1.5-2.5 cm, ovate, widest near basal 1/3, subcoriaceous, secondary veins mostly moderately ascending, with 2 or more pairs congested in basal 1/3, of these the more ascending pair spreading at 25º, strongest secondary veins located well above base near proximal 1/3 of blade, surfaces sparsely minutely puberulent, veins mostly densely appressed puberulent, eglandular, not pellucid-dotted, base acute to slightly acuminate, margins with 12-20 serrations, tapering to acute or acuminate tip; petiole mostly 0.5-1 cm. Capitulescence on leafy stem, broadly densely corymbiform, branches ascending; peduncles appressed-puberulent, without stipitate glands. Capitula c. 5 mm; phyllaries 13-15, to 4 × 0.5-0.7 mm, narrowly lanceolate, without stipitate or sessile glands, apex short-acute to acute, mostly herbaceous, sparsely appressed-puberulent. Florets 25-29; corolla tube very narrow, 1-1.5 mm, throat c. 1.5 mm, lobes c. 0.6-0.7 mm, pilosulous with numerous long trichomes, inside bases of lobes without evident trichomes. Cypselae 1-1.5 mm, fusiform, scabrid with small spicules on ribs, spicules less than 3 times long as wide, not longer than space between them; pappus bristles 3-3.5 mm, fragile. *Mountain summits.* CR (*Allen 597*, F); P (*White y White 118*, US). 2500-2600 m. (Endemic.)


Perennial herbs 0.4-0.6 m; stems pale brownish, grayish puberulent to sparsely pilose. Leaves petiolate; blade mostly to $2 \times 2$ cm, broadly ovate, widest at basal $1/3$, in larger basal leaves to 5 cm, in reduced distal leaves extending well into capitulescence trinervate from base, veins spreading from midrib at c. 30º, pilosulous adaxially, trichomes mostly on veins abaxially, eglandular, base rounded to subcordate, margins with 10-20 crenations, apex short-acuminate; petiole 0.5-3 cm. Capitulescence a moderately lax, subscapose panicle with numerous capitula on short peduncles on stem with reduced leaves, with corymbiform branches; peduncles sparsely puberulent, without stipitate glands. Capitula c. 5 mm; phyllaries 20-22, 3.5-4 × 1-1.2 mm, oblong, usually mostly glabrous, without stipitate glands, apex membranaceous, obtuse. Florets c. 50; corolla tube very narrow, c. 1 mm, throat c. 1 mm, lobes c. 0.5 mm, pilosulous with numerous long trichomes. Cypselae c. 1.5 mm, fusiform, with setulae mostly on ribs; pappus bristles c. 3 mm, fragile. Rocky pine forest, mixed forest. G (*Molina y Molina* 25013, F); H (*Standley* 29294, F); N (Dillon et al., 2001: 286). 500-2000 m. (Endemic.)


Lectotype (designated by King y Robinson, 1975): Costa Rica, *Pittier* 1940 (GH!).


Subshrubs or shrubs to 2 m, few- to many-branched; stems yellowish with small red maculae or dark reddish brown, sparsely to densely hirtellous. Leaves petiolate; blade mostly 7-11 × 2-4 cm, ovate to narrowly lanceolate, in some forms mostly c. 2 cm, widest near basal 1/3-1/2, subcoriaceous, secondary veins strongly ascending from midrib at c. 30º, strongest pair trinervate near basal 1/4, adaxial surface dark green, glabrous, glandular or eglandular abaxially pale, smooth, usually with scattered glandular dots, base narrowly acute, margins closely to remotely serrulate with 10-15 low blunt teeth, apex shortly to narrowly acute or slightly acuminate; petiole 0.1-0.5 cm. Capitulescence on leafy stem, broadly dense corymbiform, branchlets densely puberulent. Capitula 4-5 mm; phyllaries c. 10, 2.5-3 × c. 1 mm, broadly oblong to ovate, puberulent with small glandular dots and not costate, obtuse to short-acuminate. Florets c. 17; corolla white or
lavender, tube c. 1 mm, slender, with glands and often with short spreading biseriate trichomes, throat c. 0.7 mm, broadly subsalverform, lobes c. 0.7 mm, 1.5 times as long as wide, slightly glandular, otherwise without trichomes. Cypselae c. 1 mm, broadly prismatic, with short spicules on ribs; pappus bristles c. 2.2 mm, rather persistent, spreading with age. $2n = 34$. *Wet bank, wet thicket, wet meadow, cut-over cloud forest, evergreen elfin forest, intersection of páramo and forest, open slope in cloud forest, forested slopes, weedy thicket on steep roadside banks, rough shaded cliff faces, rocks at pool.*

N (King y Robinson 1987: 434); CR (Pruski et al. 3837, MO); P (Tyson y Lofton 5996, US). 500-3600 m. (Endemic.)


Holotype: Mexico, Chiapas, Purpus 6796 (UC). Illustr.: no se encontró. N.v.: none.

*Ageratina fosbergii* R.M. King et H. Rob.

Suffrutilose herbs c. 1 m; stems sparsely pale to dark brownish puberulent with short curved trichomes. Leaves petiolate; blade mostly 4-5 × 2-3.5 cm, ovate, widest at proximal 1/4-1/5, trinervate from very base, veins spreading from midrib at 40-45º, proximal margins strongly divergent from secondary veins in trinervation. both surfaces eglandular, puberulent on veins, otherwise glabrous, base shallowly cordate, abruptly short-acute in middle, margins shallowly crenate to serrulate from near widest part, apex narrowly acuminate; petiole 1-2 cm. Capitulescence on leafy stem, broadly dense corymbiform, branches ascending; peduncles puberulent, without stipitate glands. Capitula 6-7 mm; phyllaries 15-18, 3-3.5 × 0.8-1 mm, narrowly oblong, without stipitate or sessile glands, apex membranous, short-acute, minutely appressed-puberulent. Florets c. 23; corolla tube very narrow, 1-1.5 mm, throat c. 1 mm, lobes c. 0.5-0.7 mm, pilosulous with numerous long trichomes, inside bases of lobes without evident trichomes. Cypselae 1.5-2 mm, fusiform, long-setulose on and between ribs; pappus bristles c. 3 mm, fragile. *Open earth banks, disturbed forest on steep slope.* Ch (Croat 47259, US); G (Fosberg 27263, US). 1400-1700 m. (Mexico, Mesoamerica.)

Turner (1997: 20) treated *A. peracuminata* R.M. King et H. Rob. from Oaxaca in synonymy of *A. atrocordata*, whereas elsewhere in the same text Turner (1997: 40) *A. peracuminata* is recognized as a distinct taxon.

Coarse erect herbs to 2 m, without evident basal leaves; stems brownish, densely pilosulous with whitish or sordid trichomes, internodes mostly 6-9 cm. Leaves petiolate; blade 9-15 × 4-8 cm, ovate-elliptical, widest near basal 1/3, chartaceous, weakly trinervate from 10-40 mm above base, veins spreading from midrib at c. 25°, nearly parallel to basal margins, surfaces sparsely pilosulous with whitish or sordid trichomes, denser on nerves, eglandular, base acute, margins with 15-20 crenate-serrations above widest part, apex short-acuminate; petiole mostly 1-2 cm. Capitulescence on leafy stem, with small foliar bracts alternate, ascending branches, broadly densely corymbiform; peduncles hirtellous, without stipitate glands. Capitula c. 6 mm; phyllaries c. 15, c. 5 × 0.5-0.7 mm, densely puberulent, without stipitate or sessile glands, apex narrowly acute, scarcely membranaceous. Florets c. 23; corolla tube 1.5-2 mm, throat c. 1.5 mm, lobes 0.7-0.9 mm, pilosulous with numerous long trichomes, all trichomes slender-tipped. Cypselae 1.5-2 mm, fusiform, long-setulose on ribs; pappus bristles c. 3.5 mm, fragile. *Subtropical zone*. CR (*Smith* P2242, US). C. 2400 m. (Endemic.)


*Eupatorium chlorophyllum* Klatt.

Erect perennial herbs to 0.8 m; stems brownish, densely reddish hirtellous with erect trichomes. Leaves petiolate; blade mostly 8-10 × 4-5 cm, ovate, widest near 2/5, chartaceous, trinervate from 7-15 mm above base, veins spreading from midrib at 20-25°, weakly but distinctly divergent from basal margin, surfaces moderately pilose, hirtellous on veins, eglandular, base obtuse to slightly acuminate, margins with c. 22 short blunt serrations, apex short-acuminate; petiole c. 2 cm. Capitulescence on leafy stem, densely broadly corymbiform; peduncles densely hirtellous, without stipitate glands. Capitula 6-7 mm; phyllaries 13-15, c. 6 × c. 0.8 mm, densely puberulent, without stipitate or sessile glands, apex narrowly acute to acuminate. Florets c. 20-25; corolla tube c. 1.5 mm, throat c. 1.5 mm, lobes c. 0.7 mm, pilosulous with numerous long trichomes, inside bases of lobes without evident trichomes. Cypselae c. 2 mm, fusiform, rather evenly densely long-setulose on ribs and distal surfaces; pappus bristles c. 3.5 mm, fragile. *Cloud forest, sendero, sotobosque*. CR (*Pittier* 3429, BR). 1100-2900 m. (Endemic.)

Erect perennial herbs to 1 m; stems brownish, hirsute. Leaves petiolate; blade mostly 7-13 × 2.5-7 cm, ovate to ovate-elliptical, widest near basal 1/3, chartaceous, ascending secondary veins congested near basal 1/3, parallel to basal margins, strongest secondary veins located well above base near proximal 1/3 of blade, surfaces eglandular, adaxial surface polygonally divided by insculpate veinlets, pilose mostly on veins, abaxially pilose on veins pellucid-dotted, base short-acute, margins below widest part with 20-27 short crenate-serrations, apex short-acute to short acuminate; petiole 1.5-3 cm. Capitulescence on leafy stem, broadly dense corymbiform, branches ascending; peduncles densely pilosulous or hirtellous, without stipitate glands. Capitula c. 6 mm; phyllaries c. 15, 5-5.5 × 0.7-0.9 mm, puberulent, without stipitate or sessile glands, apex narrowly acute, subscarious. Florets c. 20; corolla pilosulous with numerous long trichomes mostly on lobes, tube c. 1.5 mm, throat c. 1.8 mm, lobes c. 0.7 mm, inside bases of lobes without evident trichomes. Cypselae c. 2 mm, fusiform, sparsely spiculiferous on ribs, spicules less than 3 times long as wide, not longer than space between them; pappus bristles c. 4 mm, fragile. 2n = 34. Cut over forests. CR (*Utley y Utley 4576*, US). 2500-2800 m. (Endemic.)


Erect scapose perennial herbs; stems brownish, sparsely pilose and pilosulous. Leaves in basal rosette; blade 1-6 × 0.8-4 cm, broadly ovate to broadly elliptical, widest near proximal 2/5 or 1/5, chartaceous, 3 or 5 secondary veins from 0.5-1 mm above base, stronger veins spreading from midrib at 30-40°, adaxial surface evenly pilosulous or canescent-pilose, abaxially pilose on veins, glandular, base rounded with small to large acumination, margins with c. 8-10 slight crenulations or rarely serrulations, apex obtuse to rounded; petiole mostly 1-3 cm. Capitulescence laxly and usually alternately thyrsoid, with only small bracts on long internodes, scape and branches sparsely to densely stipitate-glandular. Capitula 7-9 mm, broadly campanulate; phyllaries 20-22, c. 5.5-7 × 0.8-1 mm, apex thinly scarious, short-acute. Florets 40-100; corolla tube 1.5-2 mm, throat
c. 1.5 mm, lobes 1-1.2 mm, pilosulose. Cypselae 1.5-2 mm, fusiform, with scattered
setulæ, not concentrated on ribs, eglandular; pappus bristles c. 3 mm, fragile, sometimes
reddish. 2n = 136, 138. Pine forest, pine-oak forest, open rocky bank. Ch (Breedlove
31548, CAS); G (Williams et al. 23215, US); H (House 1202 MO). 2000-2800 m. (W.
Mexico, Mesoamerica.)

Costa Rica, Molina et al. 17782 (F!). Illustr.: no se encontró. N.v.: none.

Eupatorium burgeri (R.M. King et H. Rob.) L.O. Williams.

Subshrubs to 0.5 m; stems brownish, puberulent to glabrescent. Leaves petiolate;
blade mostly 10-15 × 3-5 cm, elliptical, widest near middle, chartaceous, secondary veins
in 3-4 pairs strongly ascending from midrib at c. 15º, strongest pair scarcely distinct,
surfaces minutely appressed-puberulent on veins, glabrous between, distinctly paler
abaxially, eglandular, base and apex long-acuminate, margins from proximal 1/3 with 10-
20 strongly antorse serrations; petiole 1-1.5 cm. Capitulescence on leafy stem, densely
broadly corymbiform, branches ascending; peduncles minutely appressed-puberulent,
without stipitate glands. Capitula c. 6 mm; phyllaries c. 13, mostly c. 4 × 0.6-0.8 mm,
narrowly lanceolate, without stipitate glands, narrowed to short-acute mostly scarios
apex, glabrous. Florets c. 23; corolla tube c. 2 mm, throat c. 1.5-1.8 mm, lobes c. 0.7 mm,
pilosulose. Cypselae 1.5-1.8 mm, fusiform, glabrous or subglabrous; pappus bristles c.
3.5 mm, fragile. Wet cloud forest, cut over mountain forest. CR (Molina et al. 17782, F).
C. 2300 m. (Endemic.)

Guatemala, Seler y Seler 2361 (GH!). Illustr.: no se encontró. N.v.: none.

Eupatorium vetularum Standl. et Steyerm.

Shrubs 2-5 m; stems brown, puberulent to hirsutulous, distal portions of stems,
petioles, adaxial leaf surface, branches of capitulescence and phyllaries with sparse to
dense stipitate glands. Leaves petiolate; blade 5-10 × 2-4 cm, elliptical, widest near
middle, chartaceous, veins pinnate, with 4 pairs of secondaries spreading from midrib at
65-75º and arching apically, surfaces with numerous glandular punctations, not or
scarcely paler abaxially, base shortly to long-acute, with no basal auricles, margins with
10-20 minute serrulations, apex short-acute; petiole 0.5-1 cm. Capitulescence on leafy
stem, broadly dense corymbiform. Capitula 10-11 mm; phyllaries c. 12, mostly 4-7 × 0.8-1.2 mm, moderately unequal, narrowly lanceolate, apex short-acute, densely stipitate-glandular. Florets 6-9; corolla tube 1-1.5 mm, indistinctly delimited, throat 4-5 mm, lobes c. 1 mm, with sparse minute glandular dots and non-glandular trichomes. Cypselae 3.5-4.5 mm, prismatic, with numerous minute trichomes on ribs and distal faces, with numerous small glandular dots; pappus bristles mostly 5-6 mm, moderately persistent.

Cloud forest, cut over forest. G (Molina 15932, US): H (Dario 5, TEFH). 2500-3600 m. (Endemic.)


Weak erect herb to 1 m; stems brownish, subglabrous to sparsely appressed-puberulent. Leaves petiolate; blade mostly 4-7 × 2-3.5 cm, oblong-elliptical to ovate, widest near 1/3-2/5, thinly herbaceous, trinervate from 2-5 mm above base, secondary veins of trinervation spreading from midrib at 15-20º, moderately diverging from basal margins, surfaces sparsely puberulent, scarcely denser on veins, eglandular, base subacute to short-acute, margins with 10-15 short single to double crenate-serrations, apex moderately acute; petiole mostly 1-2 cm. Capitulescence on leafy stem; branchlets 5-9 mm, minutely subappressed-puberulent; peduncles 3-7 mm, without stipitate glands. Capitula c. 7 mm; phyllaries c. 10-14, 4-5 × 0.4-0.6 mm, puberulent with pale or sordid trichomes or nearly glabrous, without stipitate or sessile glands, apex narrowly acute, subscarious. Florets 12-22; corolla tube c. 1.5 mm, throat c. 2 mm, lobes c. 1 mm, pilosulose with numerous long trichomes, inside bases of lobes without evident trichomes. Cypselae 2-2.2 mm, fusiform, rather evenly densely long-setulose on ribs and distal surfaces; pappus bristles c. 3 mm, fragile. Cloud forest on steep slopes, banks of creek, primary forest. Ch (Croat 47287, MO); G (Steyermark 36000, F). 2200-2700 m. (Endemic.)

Erect coarse herbs to 1.2 m; stems pale brownish, puberulent with curved trichomes. Leaves petiolate; blade mostly \(8-12 \times 4-8\) cm, ovate, widest from \(1/3\) to just below \(1/2\), trinerved from usually \(1-2\) cm above base, secondary veins of trinervation spreading from midrib at \(20^\circ\) angle, adaxial surface sparsely short-pilose, subglabrous and puberulent on nerves, eglandular, base distinctly and narrowly short- to long-acuminate, margins crenate-serrate below widest part, with 15-30 teeth, apex very shortly broadly acuminate; petiole mostly \(3-7\) cm. Capitulescence on leafy stem, broadly dense corymbiform; branchlets and peduncles densely puberulent, without stipitate glands; peduncles 2-5 mm. Capitula \(5-6\) mm; phyllaries c. \(15, 4-5 \times 0.8-1\) mm, narrowly lanceolate, without stipitate or sessile glands, apex narrowly acute, scarious, puberulent. Florets 23-25; corolla tube c. \(1.5\) mm, throat 1.2-1.5 mm, lobes c. \(0.5\) mm, pilosulose with numerous long trichomes, inside bases of lobes without evident trichomes. Cypselae c. \(1.5\) mm, fusiform, rather evenly long-setulose on ribs and distal surfaces; pappus bristles c. \(3\) mm, fragile. Cloud forest, steep rocky disturbed area. G (Standley 63743, F); H (Clewell 3358, EAP). 1600-2200 m. (Mexico [Oaxaca], Mesoamerica.)


Erect coarse herbs to 1 m; stems brownish, coarsely densely curved-pilosulous. Leaves petiolate; blade mostly \(4-14 \times 2.5-9\) cm, ovate, widest near \(2/5\), chartaceous, trinerved from \(5-10\) mm above base, secondary veins of trinervation spreading from midrib at \(20^\circ\) angle, surfaces sparsely pilosulous, puberulent to hirtellous on veins, eglandular, base scarcely to distinctly acuminate, margins with 15-20 coarse crenate-serrations, apex broadly short-acuminate; petiole mostly 2-4 cm. Capitulescence on leafy stem, densely broadly corymbiform; branchlets ascending, densely puberulent to hirtellous. Capitula c. \(6\) mm; phyllaries 16-18, c. \(6 \times 0.8\) mm, puberulent, without stipitate or sessile glands, apex narrowly acute, rather herbaceous. Florets 29-45; corolla tube 1.5-1.7 mm, throats 1.2-1.5 mm, lobes 0.4-0.7 mm, pilosulose with numerous long trichomes, inside bases of lobes without evident trichomes. Cypselae 1.5-2 mm, fusiform, densely long-setulose on ribs, sparse distally on some sides; pappus bristles 3-3.5 mm, fragile. *Forest, roadside*. CR (Grayum 8165, MO). 2500-2900 m. (Endemic.)

This species was treated by Dillon et al. (2001) as a synonym of *Ageratina pichinchensis*. 

Erect perennial herbs 0.3-0.6 m, with few branches; stems dark reddish, pilose to sparsely hirsute. Leaves opposite, sessile or subsessile; blade 2-5 × 1.5-4 cm, broadly ovate, widest near basal 1/3, chartaceous, 3-5-nervate from base, surfaces eglandular, adaxial surface sparsely pilose, abaxially pilose mostly along veins, base rounded, margins with 5-8 large rather irregular teeth, apex acute to short-acuminate; petiole 0-0.2 cm. Capitulescence with corymbiform clusters of 10-20 capitula, branches ascending; peduncles puberulent to pilose, without stipitate glands. Capitula c. 5 mm; phyllaries c. 14, 4-5 × c. 0.8 mm, narrowly oblong, without stipitate or sessile glands, apex obtuse, ciliate, otherwise glabrous. Florets 15-25; corolla tube c. 1 mm, limb c. 2 mm, ampliate, lobes pilosulose with long trichomes, inside bases of lobes without evident trichomes. Cypselae c. 1.5 mm, fusiform, sparsely long-setulose along ribs; pappus bristles c. 20, c. 3 mm, in single series, fragile. *Wooded slope.* Ch (*Breedlove 12603*, US). C. 2300 m. (Mexico [Veracruz], Mesoamerica.)


Small shrubs to 0.5 m, with many branches; stems dark brownish, puberulent, internodes mostly c. 0.5-1 cm. Leaves without stipitate glands, subsessile; blade 1-3 × 0.5-1 cm, narrowly ovate, widest near basal 1/3, chartaceous, trinervate from base, veins spreading from midrib at c. 30°, adaxial surface glabrous, abaxial surface slightly paler, sparsely puberulent on veins, base rounded, margins with 5-8 blunt low serrations, apex acute; petiole mostly 0.1-0.2 cm. Capitulescence on leafy stem, broadly dense corymbiform; branchlets and peduncles usually densely stipitate-glandular. Capitula 5-7 mm; phyllaries c. 16, mostly 3.5-5.5 × 0.6-0.8 mm, narrowly oblong, apex obtuse to sharply acute, with scattered stipitate glands, few or no non-glandular trichomes. Florets c. 26; corolla white to pale pink, tube 1.5-2 mm, throat c. 1.5 mm, lobes 0.5-0.7 mm, with to many trichomes. Cypselae 1.7-2 mm, fusiform, sparsely to densely short-setulose mostly on ribs, eglandular; pappus bristles mostly 3.5-4 mm, fragile. *Páramo vegetation*, *mountain upper slopes and summits.* P (*Tyson y Loftin 6157*, US). 2500-3600 m. (Endemic.)

Shrubs to 1.2 m, laxly branching; stems brownish, glabrous. Leaves sessile to subsessile; blade mostly 3-10 × 0.5-6 cm, narrowly oblong-lanceolate, widest near or slightly above middle, chartaceous, proximal secondary veins spreading at more than 45° from midrib, pinnate and close, strongest pair near proximal 2/5 of blade, distal pairs ascending and more remote, surfaces glabrous or sparsely appressed-pilosulose on nerves abaxially, eglandular, base rounded to acute, subclasping, margins with 15-20 low blunt serrations, apex narrowly acute; petiole 0-0.3 cm. Capitulescence on leafy stem, broadly corymbiform, moderately lax to rather dense; branchlets slender, puberulent. Capitula c. 8 mm; phyllaries c. 12, mostly 4-5 × 0.7-0.8 mm, narrowly acute, glabrous above base. Florets 6-10; corolla tube c. 2 mm, throat c. 2.5 mm, lobes c. 0.9 × 0.6 mm, sparsely puberulent. Cypselae 1.5-1.8 mm, somewhat fusiform, short-setulose on ribs and distally; pappus bristles 4-4.5 mm, fragile. *Quercus* forest with *Chusquea* understory, post burn. CR (*Almeda et al. 6735, US*). 2200-2800 m. (Endemic.)


Subshrubs to 0.75 m; stems slender, mostly c. 2 mm diam., dark reddish-brown, densely reddish puberulent with curved trichomes. Leaves petiolate; blade mostly 2.5-4 × 1.5-3 cm, triangular-ovate, widest between basal 1/3-1/4, chartaceous, trinervate from 1-3 mm above base, secondary veins of trinervation spreading from midrib at 20-25°, slightly curving into base, adaxial surface sparsely pilosulose, abaxially puberulent mostly to completely on veins, glandular, base obtuse to subtruncate, margins from just below widest part with 5-10 sometimes coarse simple to double serrations, often sharp, apex sharply acute to slightly acuminate; petiole mostly 1-1.5 cm. Capitulescence on leafy stem, broadly corymbiform in 1-3 strata, moderately lax; branchlets 3-12 mm, densely short-puberulent; peduncles 3-12 mm, without stipitate glands. Capitula c. 6 mm; phyllaries c. 16, 4.5-5 × 0.6-0.9 mm, narrowly lanceolate, without stipitate or sessile glands, apex narrow and membranaceous, surface puberulent often with reddish trichomes. Florets c. 20; corolla tube c. 1.5 mm, throat 1.3-1.5 mm, lobes c. 0.5 mm, pilosulose with numerous long trichomes, inside bases of lobes without evident trichomes. Cypselae c. 1.5 mm, fusiform, with long-setulae as dense on sides as ribs;
pappus bristles 3-3.5 mm, fragile. $2n = 140-200$. *Wet thicket, wet bank. CR (Standley 35300, US). 2000-2800 m. (Endemic.)

Although D'Arcy (1987) listed this name in the Checklist for Panamá, this species is known only from Costa Rica.


*Ageratina almedae* R.M. King et H. Rob.

Coarse perennial herbs to 1.5 m; stems pale brownish, pilosulous to hirsute. Leaves petiolate; blade mostly 6-10 × 1.5-4 cm, ovate, widest near basal 1/4, thinly chartaceous, trinervate from within 5 mm of base, veins spreading from midrib at c. 20º, surfaces eglandular, adaxial surface sparsely pilosulous, abaxially puberulent mostly on veins, base rounded to scarcely acuminate, margins usually closely serrate, tapering to narrowly acuminate apex; petiole mostly 2-4 cm. Capitulescence on leafy stem, broadly dense corymbiform, branches ascending; branchlets and peduncles densely puberulent to hirtellous, without stipitate glands. Capitula 4-5 mm; phyllaries 13-16, 3.5-4 × 0.4-0.7 mm, overlapping, narrowly lanceolate, sparsely to densely puberulent, without stipitate or sessile glands, apex acute, not attenuate, membranaceous. Florets 10-25; corolla tube 1-1.5 mm, very narrow, throat c. 1 mm, lobes c. 0.4 mm, pilosulous with numerous long trichomes, inside bases of lobes without evident trichomes. Cypselae 1.3-1.7 mm, fusiform, spiculiferous on ribs, spicules less than 3 times long as wide, not longer than space between them; pappus bristles 2.5-2.8 mm, fragile. *Mountain slopes. CR (King 6777, US); P (Croat 26432, MO). 1600-2000 m. (Endemic.)*


Shrubs to 2 m; stems brown, densely hirsute, trichomes reddish, spreading, internodes 1-3 cm. Leaves petiolate; blade mostly 5-7 × 2.5-3.5 cm, ovate, widest near 1/3-2/5, chartaceous, trinervate from c. 10 mm above base, weaker trinervation near 5 mm above base, both pairs of secondaries spreading from midrib at 30-35º, nearly parallel to basal margin, surfaces eglandular, adaxial surface pilosulous, abaxially erect-puberulent, slightly denser on veins, both surfaces with reddish trichomes, base short-acuminate, margins below widest part c. 15 low crenate-serrulations, very remote proximally, apex short-acuminate; petiole mostly 1-1.5 cm. Capitulescence on leafy stem, densely narrowly
corymbiform, branches ascending; branchlets and peduncles densely hirtellous, without stipitate glands. Capitula 6-7 mm; phyllaries c. 13, 4.5-5 × 0.5-0.7 mm, narrowly lanceolate, without stipitate or sessile glands, apex narrowly acute to attenuate, puberulent, more strongly puberulent abaxially. Florets c. 20; corolla tube c. 1.5 mm, throat c. 1.8 mm, lobes c. 0.8 mm, pilosulose, trichomes dimorphic, with numerous long trichomes typically slender-tipped, with few distinctive trichomes ending in a series of short broad cells at tip, inside bases of lobes without evident trichomes. Cypselae c. 2.2-2.5 mm, fusiform, densely long-setulose on ribs; pappus bristles c. 4 mm, fragile. 

Openings in forest. CR (Skutch 3045, US). 1900 m. (Endemic.)


Erect shrubs to 1 m; stems dark brown, young stems, petioles, peduncles and involucre densely stipitate-glandular, internodes mostly 1-2 cm. Leaves petiolate; blade mostly 0.8-1.8 × 0.5-1.1 cm, elliptic-ovate, widest near basal 1/3, stiffly chartaceous, weakly trinervate from 1-2 mm above base, veins spreading from midrib at 40-45º, veins scarcely prominulous abaxially, both surfaces gland-dotted, usually with few trichomes on veins, paler abaxially, base rounded to obtuse, margins with few blunt serrulations, apex obtuse; petiole 0.1-0.3 cm. Capitulescence on leafy stem, rather densely corymbiform; peduncles mostly 0.2-1 cm. Capitula 9-11 mm; phyllaries c. 15, 4-6 × 1-1.3 mm, narrowly oblong, often reddish, with stipitate glands, short-acute. Florets 10-12; corolla often pink, tube 1.5-2 mm, indistinctly delimited distally, throat 3-3.5 mm, lobes c. 1 × 0.5 mm, subglabrous. Cypselae 3-3.5 mm, prismatic, gland-dotted, without setulae; pappus bristles 5-6 mm, rather fragile. In moist mixed cloud forest, gravelly slopes with scattered pines and low shrubs, cool ridge above cloud forest. G (Steyermark 48470, F). 2700-3300 m. (Mexico [Veracruz], Mesoamerica.)


Erect subshrubs to 1.5 m; stems mostly 3-4 mm diam., dark castaneous-brown, sparsely appressed-puberulent, glabresent. Leaves petiolate; blade 3-7 × 1.5-3.5 cm, ovate, widest near basal 1/4, chartaceous, trinervate from short basal acumination, secondary veins of trinervation spreading from midrib at c. 25º, adaxial surface evenly
pilose between veins, densely puberulent on veins, abaxially slightly paler, pilose only on 
veins, eglandular, base rounded to subtruncate, margins with 10-15 low serrations, apex 
acute to sharply short-acuminate; petiole 1-3 cm. Capitulescence on leafy stem, with 
dense corymbiform branches; branchlets and peduncles 3-9 mm, densely puberulent, 
without stipitate glands. Capitula 8-9 mm; phyllaries c. 13, c. 7 × 0.8-1 mm, narrowly 
lanceolate, usually purplish, without stipitate or sessile glands, apex narrowly acute, 
densely puberulent with reddish trichomes. Florets c. 17; corolla tube c. 2 mm, throat c. 
2.5 mm, lobes c. 0.8 mm, reddish puberulent with numerous long trichomes, inside bases 
of lobes without evident trichomes. Cypselae c. 2.2 mm, fusiform, rather evenly strongly 
long-setulose on ribs and surfaces; pappus bristles 4.5-5 mm, fragile. In forest, mountain 
shakes. G (Standley 67644, US). 2400-3800 m. (Endemic.)

Turner (1997) treated this name as a synonymy of *A. pazcuarensis*.


*Ageratina reserva* B.L. Turner.

Weak perennial herbs 0.5-2 m; stems brownish, short-puberulent with curved 
trichomes. Leaves with a slender petiole mostly 2-5 cm; blade mostly 2-4 × 1.5-3.5 cm, 
broadly ovate to rather rhomboid, widest near basal 1/3, membranaceous, trinervate from 
slightly above base with secondary veins at base of trinervation diverging from midvein 
at 30-35º, intramarginal in basal acumination, surfaces sparsely puberulent, hirtellous on 
veins, eglandular, base obtuse to subtruncate, margins with 5-10 lax crenate-serrations, 
apex short-acuminate. Capitulescence on leafy stem, paniculate with dense corymbiform 
branches; branchlets slender, 2-6 mm, puberulent; peduncles without stipitate glands. 
Capitula c. 5 mm; phyllaries c. 13, c. 3.5 × 0.3-0.5 mm, narrowly lanceolate, scarcely 
overlapping, sparsely appressed-puberulent, without stipitate or sessile glands, attenuate. 
Florets 15-23; corolla tube very narrow, 1-1.5 mm, about as long as limb, throat c. 1 mm, 
lobes c. 0.3 mm, pilosulous with numerous long trichomes, inside bases of lobes without 
evident trichomes. Cypselae c. 2 mm, fusiform, long-setulalae sparse but rather evenly 
distributed on and between ribs; pappus bristles c. 3 mm, fragile. *Montane cloud forest, 
ravines in mixed forest. Ch (Matuda 758, US); G (Williams, et al. 26883, US); ES 
(Davidse et al. 37293, MO). 1400-2600 m. (Endemic.)*
Williams (1976a) treated this name as a synonym of herbaceous *Eupatorium capillipes* Benth. (now *Fleischmannia capillipes*), a different plant with markedly unequal phyllaries.


Subshrubs to 1 m; stems pale brownish, densely antrorsely puberulent to pilosulous. Leaves petiolate; blade 6-10 × 3.5-10 cm, ovate, broadest near basal 1/3, chartaceous, trinervate from 2-5 mm above base, veins spreading from midrib at c. 35º, surfaces moderately antrorsely puberulent between veins, more densely puberulent on veins, eglandular, base scarcely obtuse to subtruncate or broadly cordate, margins coarsely sometimes doubly 10-20 crenate-serrate, apex shortly broadly acuminate; petiole mostly 3-8 cm. Capitulescence on leafy stem, densely broadly corymbiform, branches ascending; branchlets and peduncles densely puberulent to hirtellous, without stipitate glands. Capitula c. 6 mm; phyllaries c. 15, c. 5 × 0.8-1 mm, puberulent to pilosulose, without stipitate or sessile glands, apex narrowly acute to attenuate, herbaceous. Florets c. 25; corolla tube c. 1.5 mm, throat c. 1.5 mm, longer than wide, lobes c. 0.4 mm, pilosulose with numerous long trichomes, inside bases of lobes without evident trichomes. Cypselae 1.8-2 mm, weakly constricted distally, sparsely scabrid with minute setulae distally, spicules less than 3 times long as wide, not longer than space between them; pappus bristles 3-4 mm, fragile. *Moist forest, cloud forest in narrow canyon*. P (Hamilton y Stockwell 3373, US). 2500-2800 m. (Endemic.)

Turner (1997) treated this species as a synonym of *Ageratina conspicua* (Kunth et Bouché) R.M. King et H. Rob., but *A. conspicua* is here excluded from Mesoamerica.


Erect herbs to 0.75 m; stems pale brown, densely hirsutulous with erect pale trichomes. Leaves petiolate; blade mostly 4-5 × 2.5-3.5 cm, ovate, widest near basal 1/3, chartaceous, strongly ascending trinervation from 2-3 mm above base, veins spreading from midrib at c. 20º, surfaces moderately puberulent, densely puberulent abaxially on veins, eglandular, base broadly rounded, margins from above proximal 1/3 with 15-20 short sharp evenly spaced serrulations, apex sharply and distinctly short-acuminate; petiole mostly 1-2 cm. Capitulescence on leafy stem, loosely thyrsoid with dense
corymbiform branches; branchlets and peduncles densely pilosulous, without stipitate glands. Capitula 5-6 mm; phyllaries c. 16-18, c. 5 × 0.8-1 mm, densely puberulent, without stipitate or sessile glands, apex acute to narrowly acute, subherbaceous. Florets 29-40; corolla tube c. 1.5 mm, throats c. 1.5 mm, lobes 0.5-0.7 mm, pilosulous with numerous long trichomes, inside bases of lobes without evident trichomes. Cypselae c. 2 mm, fusiform, rather evenly long-setulose on ribs and distal surfaces; pappus bristles 2.5-3.5 mm, fragile. Mixed forest. CR (Davidse et al. 25629, US). 1700-2500 m. (Endémica.)


Erect herbs to c. 1 m; stems pale brownish, sparsely ascending, pilosulous with short curved trichomes. Leaves petiolate; blade mostly 3-6 × 1.5-2 cm, oblong-ovate to nearly elliptical, widest near 2/5, chartaceous, strongest secondary veins ascending at c. 15º, from c. 0.5 cm above base, mostly subparallel to basal margin, surfaces sparsely puberulent on and between veins, eglandular, base short-acute, margins with c. 10 incurved serrulations, apex short-acute to scarcely acuminate; petiole mostly 1.5-2 cm. Capitulescence on leafy stem, broadly dense corymbiform, branches ascending; branchlets and peduncles puberulent, without stipitate glands. Capitula c. 4 mm; phyllaries c. 14, c. 3.5 × c. 0.5 mm, narrowly oblong, minutely appressed-puberulent, without stipitate or sessile glands, short-acute. Florets 25-30; corolla tube 1-1.5 mm, very narrow, throat c. 1 mm, lobes c. 0.4 mm, pilosulous with numerous long trichomes, inside bases of lobes without evident trichomes. Cypselae c. 1.5 mm, fusiform, long-setulose on ribs; pappus bristles c. 2.5 mm, fragile. Moist thicket. G (King 7304, US). 1800-2000 m. (Endémica.)


Shrubs 1-2 m; stems brownish, glabrous, internodes mostly more than 1 cm. Leaves without stipitate glands, with petiole 2.5-5 cm; blade 5-10 × 2-6 cm, ovate, widest near 1/3-2/5, chartaceous, trinervate from c. 10-20 mm above base, veins spreading from midrib at or less than 45º, adaxial surface sparsely pilosulous to subglabrous, abaxially slightly paler with dark reticulum of veinlets, few slender trichomes mostly on veins,
base broadly acute, margins 15-20-serrate, apex narrowly short-acuminate.
Capitulescence on leafy stem; broadly thyrsoid with dense corymbiform branches;
branchlets pilosulose and densely stipitate-glandular. Capitula 9-10 mm; phyllaries c. 20-22, 5-8 × 0.6-0.9 mm, linear lanceolate, pilosulose and stipitate-glandular, apex narrowly acute. Florets c. 45; corolla white to pinkish, tube c. 2.5 mm, indistinctly delimited distally, throat c. 3 mm, lobes c. 1 mm, glabrous. Cypselae c. 3.5 mm, base elongate, scabrid on ribs and short-setulose distally, eglandular; pappus bristles c. 4.5 mm, moderately fragile, outer series 0.1-0.25 mm. *Cut over cloud forest. H (Standley 25310 GH); ES (Wilbur et al. 16376, DUKE). 1500-1900 m. (Endemic.)

N.v. None.

Subshrubs or shrubs to 3.6 m, sparsely to densely branched; stems pale to medium-brown, usually puberulent, sometimes glandular, internodes mostly more than 1 cm. Leaves without stipitate glands, with petiole mostly 1-4 cm; blade 5-12 × 2-6 cm, ovate, widest between 1/4-1/3, chartaceous, trinervate from 1-18 mm above base, veins spreading from midrib at 35-45º, surfaces minutely puberulent on veins, abaxially slightly paler with minute dark reticulum of veinlets, with scattered obscure glandular dots or occasional stipitate glands, base rounded to short-acute, margins serrulate to crenulate with 10-15 teeth, apex slightly to slenderly acuminate. Capitulescence on leafy stem, broadly dense corymbiform, branches ascending, branchlets and peduncles minutely puberulent, without stipitate glands. Capitula 4-6 mm; phyllaries c. 16, 3.5-5.5 × 0.4-0.8 mm, linear to linear-lanceolate, usually without stipitate glands, apex narrowly acute, with scattered indistinct small sessile glandular dots, rarely with few stipitate glands, with few or no non-glandular trichomes except at margin. Florets 19-30; corolla white to pink, tube 1-1.5 mm, throat 1-1.2 mm, lobes 0.3-0.4 mm, with few or no evident trichomes on inner surface, pilosulous with numerous long trichomes. Cypselae c. 2 mm, fusiform, setulae or spicules mostly on ribs, eglandular; pappus bristles mostly 3.5-4 mm, fragile.

2n = 34. *Wet forests and thickets, disturbed dry forest, shrubby edge of light montane forest. CR (Pittier 14077, US); P (Stein et al. 1294, MO). 2000-3400 m. (Endemic.)

Shrubs 1-2 m; stems brown to dark reddish brown, internodes mostly 0.5-1 cm. Leaves without stipitate glands, with petiole mostly 0.7-1.3 cm; blade mostly 1.8-5 × 0.6-2 cm, narrowly ovate, widest near basal 1/4-1/3, subcoriaceous, trinervate from base, veins spreading from midrib at c. 20°, adaxial surface glabrous, appressed puberulent on major veins, puberulent abaxially on veins and veinlets, with few obscure glandular dots, base rounded to short-acute, margins with 10-12 often sharp serrations, apex sharply acute. Capitulescence on leafy stem, broadly dense corymbiform; branchlets densely stipitate-glandular. Capitula 6-8 mm; phyllaries 13-15, mostly 4.5-5.5 × 0.6-0.9 mm, narrowly lanceolate, apex short-acute to short-acuminate, glabrous or with few stipitate glands and few or no non-glandular trichomes. Florets 21-23; corolla tube 1.5-1.8 mm, throat 1.8-2.2 mm, lobes 0.8-1 mm, sparsely puberulent. Cypselae 2-3 mm, weakly fusiform, short-setulose on ribs and distal surfaces, eglandular; pappus bristles 4-5 mm, rather fragile. *Low páramo, cloud forest.* CR (*Pruski et al. 3889*, MO); P (*Davidse et al. 25311*, US). 3000-3500 m. (Endemic.)

*Eupatorium ligustrinum* DC., *Prodr.* 5: 181 (1936). Holotype: Mexico, Tamaulipas, *Berlandier 2143* (G-DC). Illstr.: no se encontró. N.v.: Ch'a te', k'anal ton ch'a te', muk'tik ch'a te', sakil ch'ajtez, sakil payte, Ch; bac-ché, Bacché, baq ce', barretillo, chicajol, q'eqci káy, G; amargoso, escoba amarga, flor de Pascua, hoja lisa, mafitero, pascua, H.


Shrubs or trees 1-8 m; stems brownish, densely puberulent to hirsutulous. Leaves petiolate; blade mostly 5.5-13.5 × 1.5-6 cm, elliptical, widest at or slightly below middle, subcoriaceous, veins pinnate, c. 4-6 secondaries on each side of midrib, spreading from midrib at 45-50°, surfaces densely glandular-punctate, rarely sparsely, without trichomes or minutely puberulent, slightly paler abaxially, base acuminate, usually with pair or two pairs of slight but often distinct lobules and strongly recurved margins, margins subentire or with 4-8 remote serrations, apex obtuse to short-acute; petiole mostly 0.5-1 cm.
Capitulescence on leafy stem, broadly densely corymbiform; branchlets puberulent to hirtellous with often crisped or stipitate-glandular trichomes, with numerous sessile glands. Capitula 7-8 mm; phyllaries 8-10, mostly 2.5-4 × 0.6-0.8 mm, slightly unequal, puberulent and with many sessile glands, without stipitate glands, apex obtuse, margins scarcely scarious. Florets usually 6-12; corolla tube 1-1.5 mm, with moderately distinct limit distally, throat 2.5-3.5 mm, lobes 0.8-1.2 mm, with sessile glands and usually minute trichomes. Cypselae 2.5-3.5 mm, prismatic, short-setulose on ribs and distal surfaces, eglandular; pappus bristles mostly 3.5-5 mm, moderately persistent, sometimes reddish. 2n = 34, c. 50, 55. *Wet cloud forest, disturbed forest, deciduous forest, pine forest.* Ch (Miranda 9243, US); G (Williams et al. 40052, US); H (Williams y Williams 18695, US); ES (Davidse et al. 37204, MO); CR (Standley 43017, US). 1200-3700 m. (C. Mexico to Mesoamerica.)

Williams (1976a) recognized *E. semialatum* Benth. (with *E. plethadenium* in synonymy) and excluded *A. ligustrina* (sub *Eupatorium*) form Guatemala.


Shrubs or trees 4-12 m; stems moderately brownish or grayish, branchlets and young leaves with evanescent sparse appressed arachnoid tomentum. Leaves petiolate; blade (4-) 8-15 × (1.5-) 3-8 cm, rather triangular-ovate, widest near basal 1/5-1/4, chartaceous, trinervate from 2-10 mm above base, veins spreading from midrib at 40-50º, slightly bowed near base, surfaces glabrous to sparsely minutely puberulent, paler abaxially with minute dark reticulum of veinlets, with minute glandular dots, arachnoid tomentum dense and persistent abaxially in axils of large secondary vein, base obtuse to subtruncate, margins usually with 15-20 close serrations, apex shortly narrowly acute or acuminate; petiole mostly (0.5-) 1-2 cm. Capitulescence on leafy stem, thyrsoid with dense corymbiform to pyramidal ascending branches; peduncles without stipitate glands. Capitula 10-15 mm; phyllaries 16-20, mostly 5-8 × 1-1.5 mm, often partially reddish, without stipitate glands, sparsely to densely glandular-dotted and usually thin arachnoid tomentum, apex narrowly acute. Florets usually 15-30; corolla tube 2.5-3 mm, weakly delimited distally, throat c. 3 mm, lobes c. 1 mm, glabrous to short-pilosulose. Cypselae
5-6.5 mm, long-prismatic, glandular, with few or no setulae; pappus bristles mostly 7-8.5 mm, moderately deciduous, short outer series mostly 0.5-1.5 mm. 2n = 34. *Wet mixed forest, edge of pine forest, along streams. Ch (Purpus 10629, US); G (Williams et al. 41504, F); ES (Williams, 1976a: 78 sub *Eupatorium mairetianum*). 800-3500 m. (C. Mexico to Mesoamerica.)


*Ageratina xanthochlora* (B.L. Rob.) R.M. King et H. Rob., *Eupatorium xanthochlorum* B.L. Rob.

Subshrubs to 1.2 m; stems pale to dark brownish, sometimes reddish tinged, sparsely puberulent. Leaves petiolate; blade 5-9 × 2-6 cm, ovate, widest in basal 1/4-1/3, mostly chartaceous, trinervate from 1-5 mm above base, veins spreading from midrib at c. 20°, surfaces puberulent on and between veins, denser abaxially on veins, eglandular, base short-obtuse to short-acuminate, margins with usually 6-12 small to large serrations above widest part, apex short-acute to shortly narrowly acuminate; petiole mostly 1-3 cm. Capitulescence on leafy stem, densely broadly corymbiform, branches ascending; branchlets and peduncles moderately to densely puberulent, without stipitate glands. Capitula c. 4 mm; phyllaries c. 20, 2.5-3 × 0.7-1 mm, narrowly oblong, without stipitate glands, apex thin, blunt to short-acute or erose, densely puberulent. Florets c. 40; corolla tube c. 1 mm, throat c. 1 mm, lobes c. 0.5 mm, sparsely and minutely pilosulous. Cypselae c. 1 mm, scarcely constricted distally, glabrous; pappus bristles 2-2.3 mm, fragile. *On rocks in mountain stream, roadside in oak woods, tropical deciduous forest.* Ch (*Breedlove 34326*, US). 800-1000 m. (W. Mexico to Mesoamerica.)


Erect to decumbent weak herbs c. 1 m; stems mostly yellowish brown, puberulent with curved trichomes. Leaves with slender petiole mostly 1.5-4 cm; blade mostly 2-4.5 × 1.5-3.5 cm, broadly ovate to somewhat rhomboid, widest between basal 1/3-2/5, trinervate from base, veins marginal in basal acumination, secondary veins at base of trinervation spreading from midrib at 30-35°, adaxial surface sparsely pilose, abaxially glabrous with puberulent veins, eglandular, base obtuse to short-acuminate, margins with
5-10 strong crenate-serrations, apex short-acuminate. Capitulescence on leafy stem, densely broadly corymbiform; branchlets and peduncles puberulent, without stipitate glands. Capitula 4-5 mm; phyllaries c. 13, 3.5-4 × 0.3-0.6 mm, narrowly lanceolate, without stipitate or sessile glands, attenuate, scarcely overlapping, sparsely appressed puberulent. Florets 19-28; corolla very narrow, tube 1.5-2 mm, distinctly longer than the limb, limb c. 1 mm, lobes c. 0.2 mm, pilosulose with numerous long trichomes, inside bases of lobes without evident trichomes. Cypselae c. 1.5 mm, fusiform, rather evenly long-setulose on ribs and distal sides; pappus bristles c. 2.5 mm, fragile. *Cut-over cloud forest area, dry woodland floor, oak forest, edge of clearing, moist thicket, bank of stream.* G (Kellerman 7436, US); H (Evans 1446, MO); ES (Molina et al. 16880, US); CR (Skutch 4193, US); P (Allen 1543, US). 1300-3200 m. (Endemic.)

Williams (1976a) treated this name as a synonym of herbaceous *Eupatorium capillipes* Benth. (now *Fleischmannia capillipes*), a different plant with markedly unequal phyllaries.


*Mallinoa corymbosa* J.M. Coul.

Erect perennial herbs 0.3-0.6 m; stems brownish with reddish tinge, rather densely pilose and pilosulous. Leaves mostly confined to proximal 1/4 of plant, subrosulate; blade 2.5-8 × 1-6 cm, oblong-ovate to broadly elliptical, widest near proximal 2/5-1/2, chartaceous, subtrinervate from 5-10 mm above base, veins spreading from midrib at 30-40°, surfaces eglandular adaxial surface coarsely and evenly pilose, abaxially paler, pilose only on veins, base truncate to short-acute or cuneate to truncate, margins usually with 15-20 low crenations, apex obtuse to scarcely acute; petiole mostly 1-4 cm.

Capitulescence scapose to subscapose, with only reduced leaves or sessile bracts, openly and laxly branching, with few capitula per branch, branchlets ascending, glabrous; peduncles to 75 mm, glabrous. Capitula 4-6 × 6-9 mm; phyllaries 20-24, 5-6 × 1-2 mm, oblong-elliptical, glabrous, apex rounded and narrowly scarious. Florets 85-125; corolla tube 1.5-2 mm, throat 1.5-2 mm, lobes c. 0.5 mm, short pilosulose with numerous long trichomes. Cypselae c. 1.5 mm, fusiform, setulose on ribs and distal surfaces; pappus bristles c. 3.5 mm, fragile. \(2n = 68\). *Mixed forest, steep rocky slope with Quercus, pine*

Scrambling shrubs to 1.3-2 m; stems brownish, densely hirsute. Leaves petiolate; blade mostly 2.5-5 × 1.5-3 cm, ovate to triangular-ovate, widest near basal 1/4-1/3, chartaceous, trinerve from 1-3 mm above base, proximal pair of secondary veins spreading from midrib at 30-35º, divergent from proximal margin, veinlets not prominent, adaxial surface sparsely evenly pilosulose, abaxially slightly paler, densely glandular-dotted, pilose or pilosulose mostly on veins, base short-obtuse to subtruncate, margins subentire to slightly 6-12-serrulate, apex short-acute to scarcely acuminate; petiole mostly 0.5-1.5 cm. Capitulescence on leafy stem, elongate-pyramidal, with dense corymbiform branches spreading from midrib at 90º; branchlets densely puberulent to pilosulose; peduncles without stipitate glands. Capitula 9-10 mm; phyllaries 12-15, 4.5-8 × 0.8-1.2 mm, without stipitate glands, with minute obscure glandular dots and sparse small trichomes, apex short- to long-acute. Florets 8-10; corolla tube c. 1.5 mm, with indistinct distal limit, throat 2-2.5 mm, lobes 1-1.2 mm, glabrous. Cypselae 2.5-2.7 mm, prismatic, glabrous proximally, hispid distally; pappus bristles 4-5 mm, moderately persistent. *Cloud forest dominated by pines, wet area with fog in dry season*. Ch (*Breedlove 31728*, US); G (*Skutch 334*, US). 2200-3400 m. (Mexico [Oaxaca], Mesoamerica.)


Subshrubbs to shrubs to 1 m; stems reddish or reddish-tinged, densely often reddish puberulent to pilosulose, trichomes subappressed. Leaves petiolate; blade 4-9 × 2-6.5 cm, ovate, widest near basal 1/3, mostly chartaceous, trinervate from 1-5 mm above base,
veins spreading from midrib at c. 30°, becoming c. 20° distally, surfaces eglandular, adaxial surface evenly pilose, abaxially slightly paler, pilosulose mostly on veins, veins often whitish, base rounded to short-obtuse, margins usually coarsely and sharply 10-20 singly or doubly serrate, apex acute to short-acuminate; petiole mostly 1-4 cm. Capitulescence on leafy stem, broadly dense corymbiform, branches ascending; branchlets and peduncles densely puberulent or pilosulose, without stipitate glands. Capitula 5-8 mm; phyllaries c. 15, mostly 5-6 × 0.6-0.9 mm, narrowly lanceolate, without stipitate or sessile glands, apex weak to scarious, shortly acute, sparsely puberulent. Florets c. 25-35; corolla tube 1-1.5 mm, throat c. 1.5 mm, lobes c. 0.6 mm, pilosulose with numerous long trichomes, inside bases of lobes without evident trichomes. Cypsela mostly 2-2.2 mm, fusiform, long-setulose on ribs and distal sides; pappus bristles mostly 3-3.5 mm, fragile. 2n = c. 51. Wet mountain forest, scrub forest area of Baccharis and Quercus, stony slope in Pine forest, plains. Ch (Breedlove, 1986: 41); G (Skutch 767, US); H (Nelson Sutherland, 2008: 169 sub Eupatorium pazcuarense). 1400-3600 m. (W. Mexico a Mesoamerica.)


Shrubs 0.7-1.5 m; stems brownish, canescent with dense short crisped trichomes or stiffly puberulent with persistent erect trichome bases. Leaves petiolate; blade mostly 2.5-13 × 2-9 cm, broadly ovate, widest near basal 1/4, chartaceous, trinervate from base, veins spreading from midrib at c. 45°, larger leaves often absent at anthesis, surfaces with numerous short usually erect whitish trichomes, abaxially dense on veins, with numerous small sessile often dark glandular dots, base distinctly deeply cordate, margins with 15-30 short crenations, apex obtuse to short-acute; petiole 1-4.5 cm. Capitulescence on leafy stem, broadly rounded-corymbiform, branches ascending, curved; branchlets and peduncles densely puberulent and with sessile or subsessile glands, without stipitate glands. Capitula 8-10 mm; phyllaries c. 20, 3-5 × c. 0.7 mm, without stipitate glands, apex narrowly acute, white-puberulent and with granular glandular trichomes. Florets c. 40-50; corolla tube 1.5-2 mm, not sharply delimited distally, throat 2-2.5 mm, lobes c. 1 mm, without trichomes and usually gland-dotted. Cypselae 2-8 mm, long-prismatic, with short or long setulae mostly on ribs; pappus bristles 3.5-4 mm, moderately fragile. 2n =
34. *Open oak-pine forest, arid tropical scrub zone, ladera caliza con vegetación de encinar, rocky hillside with scattered oaks and cacti.* Ch (Breedlove 9208, CAS). 1900-2400 m. (W. Mexico to Mesoamerica.)


Shrubs or subshrubs to 1.5 m; stems often pale brownish, with reddish trichomes abaxially, coarsely tomentellous to densely hirsutulous, trichomes patent, rarely only puberulent in northern part of range. Leaves petiolate; blade mostly 3-8 × 2-6 cm, ovate, widest near basal 1/3, chartaceous, trinervate from base or within 5 mm of base, veins spreading from midrib at 25-35º, surfaces eglandular, adaxial surface puberulent to pilosulose, denser on veins, abaxially densely puberulent to hirtellous, often densely hirsutulous or subtomentose on veins, base truncate to rounded or slightly cordate, margins below curve with usually 15-25 low crenulations or crenulate-serrulations, apex obtuse to scarcely acute, sometimes slightly acuminate; petiole mostly 1-2.5 cm. Capitulescence on leafy stem, broadly dense corymbiform at 1-3 levels, branches ascending; branchlets and peduncles densely hirtellous to tomentellous, without stipitate glands. Capitula 5-6 mm; phyllaries 13-18, 3-4.5 × 0.7-1 mm, oblong-lanceolate, without stipitate or sessile glands, apex becoming scarious, weakly short-acute, often erose, puberulent to prominently pilosulose. Florets 25-55; corolla with tube 1-2 mm, throat c. 1 mm, lobes 0.3-0.4 mm, pilosulose with numerous long trichomes, inside bases of lobes without evident trichomes. Cypselae 1.5-1.8 mm, fusiform, densely long-setulose on ribs and often on distal sides; pappus bristles mostly 3-3.5 mm, fragile. 2n = 34, c. 60-68, c. 168. *Steep rocky slopes, bosque de pino-encino, alto respingo, cloud forest, disturbed*
forest, grassy slope, dry hillside, edge of woods. Ch (Breedlove 9267, US); G (Skutch 262, US); H (Morton 6944, US); ES (Standley 20636, US); N (Stevens 17059, US); CR (Skutch 4190, US); P (Tyson 1024, US). 600-3000 m. (C. Mexico to Mesoamerica.)

The typical variety as recognized here is restricted to northern South America. Dillon et al. (2001) placed each Ageratina cartagoensis and A. ciliata (Less.) R.M. King et H. Rob., and A. pichinchensis var. bustamenta into synonymy of A. pichinchensis, which he recognized without infraspecies.


Shrubs 1.3-3 m; stems brownish, with petiole, capitulescence branchlets, peduncles, and phyllaries densely stipitate-glandular. Leaves petiolate; blade mostly 3.5 × 1.5-3.5 cm, triangular-ovate, widest near basal 1/5-1/4, chartaceous, trinervate from 2-7 mm above base, veins spreading from midrib at 40-50º, without persistent tomentum in vein axils, adaxial surface sparsely evenly stipitate-glandular, abaxially paler with stipitate glands mostly on major veins, with minute reticulum of dark veinlets, base broadly obtuse to subtruncate, margins with 12-15 small serrations, apex short-acute to shortly slightly acuminate; petiole mostly 0.5-2 cm. Capitulescence on leafy stem, thyrsoid with dense corymbiform to pyramidal branches. Capitula 10-12 mm; phyllaries 16-18, mostly 5-6 × 0.8-1 mm, stipitate-glandular, often partially reddish, apex acute. Florets 20-25; corolla tube 2.5-3 mm, indistinctly delimited distally, throat 2.5-3 mm, lobes c. 1 mm, glabrous or with few minute glandular dots or trichomes. Cypselae 4-4.5 mm, longprismatic, gland-dotted, without setulae; pappus bristles mostly 5.5-7 mm, outer series scarcely to 0.5 mm, moderately deciduous. Pine-Oak forest. Ch (Croat 46442, MO); G (Skutch 168, US); H (House 1194, TEFH). 1400-3000 m. (Mexico [Oaxaca], Mesoamerica.)


Erect herbs mostly 0.5-0.7 m; stems reddish to purplish, densely puberulent to pilosulose. Leaves usually more crowded near base, smaller and more remote distally; blade 2-9 × 1-5 (-6) cm, ovate to elliptical or slightly obovate, widest near proximal 1/3-1/2 or slightly distally, chartaceous, often somewhat fleshy on abaxial surface, 3-7-nervate from 1-5 mm above base, strongest veins spreading from midrib at 20-25°, surfaces eglandular, adaxial surface evenly pilose or pilosulose, abaxially paler, sparsely pilose, sometimes denser on veins, base usually obtuse, sometimes acute to acuminate in proximal leaves, margins bluntly to coarsely crenate or serrate with 4-12 teeth, apex usually short-acute, extreme tip usually blunt; petiole of proximal leaves to 3 cm, petiole of distal leaves mostly 0.3-1 cm. Capitulescence usually scapose or subscapose on elongate distal internodes, each branch with small dense cymose or corymbiform cluster of capitula, branches ascending; branchlets and peduncles densely puberulent or pilosulous, without stipitate glands. Capitula 6-9 mm; phyllaries 18-22, 5-8 × 1-2 mm, oblong-elliptical, often partly purplish, without stipitate glands, apex short-acute to narrowly apiculate, sparsely to densely puberulent or pilosulous (some Mexican plants with stipitate glands). Florets 40-80; corolla tube 1.8-2 mm, throat 1.5-2 mm, lobes c. 0.8 mm, pilosulose with numerous long trichomes. Cypselae 2.2-2.7 mm, fusiform, sparsely to moderately setulose on ribs and distal sides; pappus bristles 3-4 mm, fragile. 2n = 100-104. Steep banks among coarse grasses, en ladera seca, bosque de los pinos, en bosque mixto de pinos y encinos, open pine woods, open wet meadows, burned area, brushy places in thin soil on sloping limestone rocks. G (Molina 21238, F). 2500-3900 m. (W. Mexico, Mesoamerica.)


Scrambling shrubs to 0.6 m; stems pale brownish, sparsely puberulent. Leaves petiolate; blade mostly 3.5-6 × 1.8-3.5 cm, ovate, subcoriaceous, trinervate from 2-4 mm above base, veins spreading from midrib at less than 25-30°, apex slightly short-acuminate, surfaces glabrous, paler abaxially, with bulging pellucid dots, base rounded to obtuse, margins subentire to subserulate; petiole 0.5-1.2 cm. Capitulescence on leafy stem, rounded corymbiform, with branches at c. 45°; peduncles 6-10 mm, without
stipitate glands. Capitula 7-8 mm; phyllaries 13-15, mostly 1.3-3 × 0.9-1.3 mm, without stipitate glands, minutely puberulent, apex short-acute to rounded, reddish. Florets 7-9; corolla white or less commonly pink, glabrous, tube 1 mm, throat c. 2.5 mm, with yellow resin ducts along veins, lobes c. 0.7 mm, with pink apex. Cypselae c. 2.5 mm, setulose on ribs and distal sides; pappus bristles c. 4 mm, without outer series, bristles moderately deciduous. Evergreen cloud forest. Ch (Breedlove 42812, CAS-DS). C. 2600 m. (Endemic.)

43. Ageratina reticulifera (Standl. et L.O. Williams) R.M. King et H. Rob., 

Scrambling shrubs 3-4 m; stems brownish, densely coarsely short-hirtellous. Leaves petiolate; blade mostly 4-7.5 × 2.5-4 cm, ovate, widest near basal 1/3, chartaceous, trinervate from c. 10 mm above base, veins spreading from midrib at 30-35°, both surfaces with net of prominent veins and glandular dotted, adaxially almost hairless, abaxially paler with pilosulose veins and larger veinlets, base obtuse, margins coarsely c. 10-serrate, apex narrowly short-acuminate; petiole 1-1.5 cm. Capitulescence on leafy stem, elongate pyramidal, with densely corymbiform branches spreading at 90°; peduncles without stipitate glands. Capitula 7-8 mm; phyllaries c. 10, mostly 4.5-7 × 0.8-1 mm apex, without stipitate glands, puberulent and sparsely to densely glandular-dotted, apex rounded to obtuse. Florets c. 10; corolla tube 1.5-2.5 mm, indistinctly delimited distally, throat 1.5-2 mm, lobes c. 1 mm, with few small glandular dots, otherwise glabrous. Cypselae c. 2.5 mm, prismatic, glabrous except for few setulae distally; pappus bristles c. 4.5 mm, moderately persistent. Cloud forest. CR (Jiménez 281, CR). (1800-2500-3500 m. (Endemic.)


_Ageratina skutchii* (B.L. Rob.) R.M. King et H. Rob., *Eupatorium skutchii* B.L. Rob.

Shrubs 1-3 m; stems brownish, sparsely to densely puberulent with short curved trichomes, usually with numerous obvious scattered linear black maculae. Leaves petiolate; blade 4-13 × 2-11 cm, broadly ovate, widest near basal 1/3, chartaceous,
trinervate from 1-5 mm above base, veins spreading from midrib at c. 30-45°, proximal margins strongly divergent from secondary veins in trinement, surfaces eglandular, adaxial surface evenly puberulent, abaxially scarcely puberulent between veins, densely on veins, base broadly rounded to subtruncate or cordate, margins with usually 20-30 close sharp teeth, apex acute to usually short-acuminate; petiole mostly 2-6 cm. Capitulescence on leafy stem, densely broadly corymbiform in 1-3 layers, branches ascending; branchlets and peduncles densely puberulent, without stipitate glands. Capitula c. 7 mm; phyllaries c. 13, c. 5 × 0.6-1 mm, narrowly lanceolate, without stipitate or sessile glands, apex short- to sharply acute, puberulent. Florets c. 20-40; corolla tube c. 2 mm, throat 1.7-2 mm, lobes c. 0.3-0.5 mm, densely pilosulous with numerous long trichomes, inside bases of lobes without evident trichomes. Cypselae c. 2.2 mm, narrowly fusiform, densely long-erect pectinate-setulose on ribs, sides glabrous; pappus bristles c. 4 mm, fragile. Primary cloud forest, Pine-Oak forest, bosque mesofilo, open field. Ch (Ton [aka Mendez] 719, US); G (Skutch 333, US); H (Nelson et al. 4030, US). 1300-3200 m. (C. Mexico a Mesoamerica.)

Turner (1997) treated this species and E. skutchii as synonyms of Ageratina conspicua "(Kunth et Bouché) R.M. King et H. Rob.," but Ageratina conspicua R.M. King et H. Rob. is treated here as a nom. nov. for Eupatorium conspicuum Kunth et Bouché (non Martius ex Colla) and is a different species than that treated here. The report by Breedlove (1986) of A. conspicua in Chiapas as vouched by Breedlove 9800 is presumed to be in reference to material treated here as A. rivalis.

45. Ageratina salvadorensis R.M. King et H. Rob., Phytologia 38: 337 (1978). Holotype: El Salvador, Allen y Armour 7284 (US!). Illstr.: no se encontró. N.v.: none. Shrubs c. 2 m; stems brownish, glabrous to minutely appressed-puberulent, distinctly lenticelled. Leaves petiolate; blade 5-6.5 × c. 3 cm, ovate, widest near basal 1/3, distal leaves subcoriaceous, trinervate from 3-7 mm above base, veins spreading from midrib at c. 30-40°, both surfaces with minute prominulous closely spaced reticulum, adaxially glabrous or subglabrous, abaxially paler and minutely appressed-puberulent, eglandular, base rounded to short-obtuse, margins 12-15-serrulate to subentire, apex shortly narrowly acuminate; petiole 1-2 cm. Capitulescence on leafy stem, large with 50 or more capitula, broadly thyrsoid with dense corymbiform ascending branches; branchlets and peduncles densely puberulent, without stipitate glands. Capitula 8-9 mm; phyllaries 18-20, c. 5 × 1-1.3 mm, mostly oblong, without stipitate glands, apex rounded to obtuse, finely sparsely
pilosulose. Florets c. 17; corolla tube c. 2 mm, throat c. 2.5 mm, lobes c. 0.8 mm, with few trichomes, also glanduliferis. Cypselae c. 2.5 mm, narrowly prismatic, mostly glabrous, with few short setulae apically on ribs; pappus bristles c. 4 mm, moderately persistent. Elfin woodland at summit. ES (Allen y Armour 7284, US). C. 2500 m. (Endemic.)


Ageratina thomasii R.M. King et H. Rob., Fleischmannia saxorum (Standl. et Steyerm.) R.M. King et H. Rob.

Small erect shrubs to 0.5 m; main stems pale brownish, subcarnose, glabrous, with short internodes; branches sparsely appressed-puberulent, usually with elongate internodes. Leaves petiolate; blade 1.5-3.5 × 1-2 cm, ovate, widest near basal 1/3, trinervate from 1-6 mm above base, veins spreading from midrib at c. 30º, chartaceous, surfaces subglabrous, with sparse minute appressed trichomes on larger veins and margins, eglandular, veinlets not forming closely-spaced reticulum, base obtuse, margins with 3-7 blunt teeth, apex short-acute; petiole mostly 0.3-0.8 cm. Capitulescences on elongate branches often bearing reduced leaves, corymbiform, small with 10-20 capitula, branches ascending; branchlets and peduncles puberulent, without stipitate glands. Capitula c. 6 mm; phyllaries 12-16, c. 3.5 × c. 0.8 mm, oblong-elliptical, without stipitate glands, apex acute, essentially glabrous. Florets 20-23; corolla tube c. 1.5 mm, throat c. 1.5 mm, broadly campanulate, lobes c. 0.8 × c. 0.4-0.5 mm, without trichomes. Cypselae c. 1.5 mm, narrowly prismatic, base narrow, short-setulose on ribs and distal surface; pappus bristles 2-3 mm, moderately deciduous. Dry shaded rocky slopes. Ch (Croat 47279, US); G (Standley 81808, F). 1600-4000 m. (Endemic.)


Erect herbs to 0.8 m; stems reddish, puberulent with short curved trichomes. Leaves petiolate; blade mostly 2-5 × 1.5-3.5 cm, ovate, widest near basal 1/3, chartaceous,
trinervate from at or in basal 1 mm of blade, veins spreading from midrib at 30-35°,
surfaces eglandular, adaxial surface evenly pilosulous, abaxially pilosulous mostly on
veins, base rounded, margins with 5-10 slight to strong blunt serrations, apex short-acute;
petiole mostly 0.2-1 cm. Capitulescence of many ascending branches with many elongate
internodes, terminating in many dense corymbiform clusters; branchlets and peduncles
densely puberulent to pilosulous, without stipitate glands. Capitula c. 6 mm; phyllaries c.
13, 3.5-4 × 0.8-1 mm, narrowly oblong, appressed-puberulent, without stipitate or sessile
glands, apex short-obtuse. Florets 16-40; corolla tube 1.2-1.5 mm, throat c. 1.3 mm, lobes
c. 0.5 mm, pilosulous with numerous long trichomes, inside bases of lobes without
evident trichomes. Cypselae c. 1.8 mm, fusiform, long-setulose on ribs and faces; pappus
bristles c. 3 mm, fragile. *Bosque de pinos, loma descubierta, ladero de cerro. CR (Pittier
14081, US). 2300-3700 m. (W. + C. Mexico, Costa Rica.)

Turner (1997) reduced this name to synonymy of *A. oligocephala* (DC.) R.M. King et
H. Rob.

Costa Rica, Standley 38395 (US!). Illustr.: no se encontró. N.v.: none.

Subshrubs to 1.2 m; stems brown densely hirtellous with erect trichomes. Leaves
petiolate; blade mostly 5-9 × 3.5-6 cm, broadly ovate, widest near basal 1/3, chartaceous,
trinervate from 2-10 mm above base, veins spreading from midrib at 30°, surfaces
hirtellous with erect trichomes, denser on veins especially abaxially, eglandular, base
short-obtuse to subtruncate, margins from just below widest part minutely serrulate or
crenulate with 15-20 teeth; petiole mostly 1.5-2.5 cm. Capitulescence on leafy stem,
densely broadly corymbiform, branches ascending; branchlets and peduncles densely
hirtellous or hispidulous, without stipitate glands. Capitula c. 6 mm; phyllaries c. 14, c.
4.5-5 × 0.6-0.8 mm, narrowly lanceolate, without stipitate or sessile glands, apex
narrowly acute to attenuate, densely puberulent to hirtellous. Florets 21-23; corolla tube
1-1.2 mm, throat c. 1 mm, broadly campanulate, almost as wide as long, lobes c. 0.7 × c.
0.7 mm, pilosulous with numerous long trichomes, inside bases of lobes without evident
trichomes. Cypselae c. 2 mm, fusiform, moderately narrowed distally, with numerous
spicules on ribs, spicules less than 3 times long as wide, not longer than space between
them; pappus bristles c. 2.5 mm, fragile. *Cloud forest, wet bank. CR (Standley 38395,
US). 1500-1900 m. (Endemic.)

Shrubs 1-1.5 m; stems brown to dark brown, minutely appressed-puberulent, glabrescent. Leaves petiolate; blade mostly 3-8 × 1.5-6 cm, ovate, widest near basal 1/4-1/3, chartaceous, veinlets forming minute dark reticulum abaxially, trinerve from 1-10 mm above base, veins spreading from midrib at c. 30-35º at base, adaxial surface evenly puberulent, densely puberulent on veins, abaxially paler, puberulent only on veins, usually with obscure immersed glandular dots, base broadly rounded to slightly cordate, margins mostly with 10-15 single or double crenate-serrations, sometimes coarse, apex acute to short-acuminate; petiole mostly 1-4 cm. Capitulescence on leafy stem, broadly rather dense corymbiform, branches ascending branchlets and peduncles densely finely puberulent; peduncles without stipitate glands. Capitula mostly 6-8 mm; phyllaries 15-17, c. 5 × 0.7-1 mm, narrowly lanceolate, without stipitate glands, puberulent and often with minute sessile glandular dots, apex shortly to narrowly acute, slightly membranaceous. Florets 24-35; corolla tube 1-2 mm, throat 2-3 mm, lobes 0.4-0.7 mm, pilosulous with numerous long trichomes outside and at base inside. Cypselae 2-2.5 mm, weakly fusiform, densely erect-setulose or spiculiferous on ribs, usually glabrous between; pappus bristles 4-5 mm, fragile. $2n = 34$. *Cloud forest, elfin cloud forest, open páramo on exposed slopes and ridges*. CR (Wilbur y Teeri 13735, US). 2000-3300 m. (Endemic.)


Erect shrubs to 3 m; stems pale brownish, subcarnose, sparsely minutely appressed-pilose. Leaves petiolate; blade mostly 5.5-10.5 × 3-8 cm, broadly ovate, widest near basal 1/3, subcoriaceous, trinerve from 5-10 mm above base, veins spreading from midrib at 30-40º, adaxial surface sparsely minutely appressed puberulent, abaxially more strongly appressed-pilose in vein axils, eglandular, with dark, closely spaced reticulum of non-prominulous veinlets, base broadly obtuse to subtruncate, margins coarsely serrate to doubly serrate, apex short-acuminate; petiole 2-6 cm. Capitulescence on leafy stem, large with 50 or more capitula, densely broadly corymbiform, branches ascending; branchlets and peduncles puberulent, without stipitate glands. Capitula c. 9-10 mm; phyllaries 20-25, 8-9 × c. 0.5 mm, oblong-lanceolate, without stipitate glands, apex long-attenuate,
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Shrubs to 1.2 m; stems pale- to medium-brown, sometimes reddish tinged, densely antrorsely puberulent. Leaves petiolate; blade 8-15 × 3-5 cm, elliptical, widest near middle, chartaceous, secondary veins near base spreading from midrib toward margin at c. 70º, essentially pinnate, with congestion of diverging veins near proximal 2/5 of blade, surfaces smooth, minutely appressed-puberulent, not or scarcely denser on veins, eglandular, often pellucid-dotted, base acuminate to attenuate, margins with 15-20 usually slight blunt serrulations, apex shortly to slanderly acuminate; petiole mostly 1-3 cm. Capitulescence on leafy stem, densely and broadly corymbiform; branchlets subapressed-puberulent. Capitula c. 6 mm; phyllaries c. 15, 3.5-4 × 0.6-0.8 mm, narrowly lanceolate, apex short-acute, scarious to subherbaceous, sometimes reddish, appressed-puberulent. Florets 20-22; corolla tube 1-1.5 mm, throat 1.3-1.8 mm, lobes c. 0.5 mm, pilosulose with multiseptate trichomes. Cypselae c. 2 mm, subfusiform, densely spreading short-setulose on ribs; pappus bristles 3-3.5 mm, fragile. Oak forest, dense wet forest, moist thicket, shady riverside. CR (Standley 42233, US). 1500-2400 m. (Endemic.)
base, veins spreading from midrib at c. 40-45º, surfaces with numerous minute glandular
dots, adaxially evenly pilose, abaxially slightly paler or reddish, with dark minute
reticulum of veinlets, pilosity mostly on veins, base obtuse or truncate to scarcely
cordate, margins mostly with 12-20 crenate-serrations, apex short-acute to slightly short-
 acuminate; petiole mostly 1-3 cm. Capitulescence on leafy stem, broadly dense
corymbiform, branches ascending; branchlets and peduncles densely pilosulous, without
stipitate glands. Capitula 8-10 mm; phyllaries c. 15, mostly 3-5 × 0.5-0.8 mm, somewhat
unequal, often partially reddish, without stipitate glands, apex acute, sparsely pilosulous
and minutely glandular-dotted. Florets 15-25; corolla white to pinkish, tube 1.5-2 mm,
poorly delimited distally, throat 3-3.5 mm, lobes 0.5-1 mm, glabrous or with few minute
glandular dots. Cypselae 2.5-3 mm, prismatic, with many short setulae on ribs and some
distal sides; pappus bristles mostly 4-5 mm, moderately deciduous. Oak-Pine-Cypress
forest area, forested mountain slopes and ravines. Ch (Breedlove 14078, US); G
(Williams, et al. 41471, US). 2200-3700 m. (C. Mexico to Mesoamerica.)

Turner (1997) treated A. subinclusa and most of the synonyms of it listed here as
synonyms of A. vernalis.

53. Ageratina tomentella (Schrad.) R.M. King et H. Rob., Phytologia 19: 227
Holotype: grown from seed?, Anon. (GOET?). Illustr.: no se encontró. N.v.: none.

Shrubs 1-2 m; stems pale brownish, densely grayish or yellowish pubescent. Leaves
petiolate; blade mostly 2-6 × 2-5 cm, broadly oblong-ovate, widest near basal 1/5-1/4,
subcoriaceous, trinervate from base to 5 mm above base, veins spreading from midrib at
c. 45º, both surfaces with numerous glandular-dots, adaxially evenly puberulent,
abaxially paler with dense slightly yellowish puberulent to pilosulous, pubescence
obscuring minute dark reticulum of veinlets, base truncate to slightly cordate, margins
entire or with c. 10 crenulations, apex rounded to short-obtuse; petiole 1-3 cm.
Capitulescence on leafy stem, branches ascending; branchlets and peduncles with thin
arachnoid tomentum and glandular dots, without stipitate glands. Capitula c. 7 mm;
phyllaries 14-18, mostly 3-4 × 0.6-1 mm, broadly oblong, without stipitate glands, apex
short-acute, thinly arachnoid tomentose and glandular dotted. Florets 12-25; corolla white
to pinkish, tube c. 1.5 mm, poorly delimited distally, throat 2-3.5 mm, lobes 0.8-1 mm,
glabrous or minutely glandular-dotted. Cypselae mostly 2.2-2.5 mm, prismatic, with
many short setulae on ribs and distal sides; pappus bristles mostly 3.5-4 mm, moderately
fragile. *Tropical deciduous forest, dry hillside, sunny areas in pine-oak forest.* Ch (Breedlove y Almeda 47603, US); G (Williams et al. 22505, US). 900-2500 m. (C. Mexico to Mesoamerica.)

Turner (1997) treated *Ageratina hebes* (H. Rob.) R.M. King et H. Rob. and *Ageratina loeseneri* (B.L. Rob.) R.M. King et H. Rob. as synonyms, but these are recognized here as distinct taxa.


Shrubs to 1 m; stems brownish, puberulent, glabrescent. Leaves petiolate; blade 10-13 × 2.5-3 cm, elliptical to lanceolate, widest near proximal 1/3-1/2, chartaceous, veins semipellucid, c. 7 pairs of arching secondaries spreading at base from midrib at 50º or more, essentially pinnate, a more ascending pair near proximal 2/5 of blade, surfaces sparsely appressed-puberulent, eglandular, base acute, margins with c. 20 single to double serrulations, apex narrowly acute to slightly acuminate; petiole mostly c. 1 cm. Capitulescence terminal on leafy stem, broadly corymbiform, laxly branched, distally dense; branchlets sparsely appressed-puberulent. Capitula 4-5 mm; phyllaries 15-18, c. 5 × 0.5-0.8 mm, narrowly lanceolate, apex narrowly acute to short-attenuate, margins weakly membranaceous, sparsely appressed-puberulent or subglabrous. Florets 28-30; corolla tube 1-1.5 mm, throat c. 1.5 mm, lobes c. 0.5 mm?, pilosulose. Cypselae c. 1.8 mm, fusiform, shortly sparsely spiculiferous on ribs, a few longer setulae near base and apex; pappus bristles c. 3.5 mm?, fragile. *Wet thickets.* CR (*Tonduz 7799*, GH). C. 1900 m. (Endemic.)


Erect herbs to 0.8 m; stems pale to medium brown, hirsute, trichomes patent. Leaves petiolate; blade mostly 6-10 × 3-6 cm, ovate, widest near basal 1/3, trinervate from 2-5 mm above base, ascending at 2-25º, membranaceous, surfaces minutely puberulent, somewhat denser on veins, eglandular, base usually obtuse to shortly acute with short acumination, margins from widest part with 10-20 low crenate serrulations, apex shortly broadly acuminate; petiole 1.5-3.5 cm. Capitulescence on leafy stem, densely rounded, pyramidal, branches ascending; branchlets and peduncles densely puberulent to
hispidulous, without stipitate glands. Capitula c. 5 mm; involucre with phyllaries c. 13, 3.5-4 × 0.6-0.8 mm, costate to 7/8, puberulent, without stipitate or sessile glands, apex obtusely erose, thinly scarious. Florets 25-30; corolla tube c. 1.5 mm, throat c. 1.5 mm, lobes c. 0.7 mm, pilosulose with numerous long trichomes, inside bases of lobes without evident trichomes. Cypselae c. 1.5 mm, fusiform, densely long-setulose on ribs and some on distal sides; pappus bristles c. 3 mm, fragile. Moist thicket. G (Standley 84307, F); ES (Monro et al. 2192, MO); CR (Standley y Valerio 49493, US). 1200-2800 m. (Endemic.)


Ageratina chiapensis (B.L. Rob.) R.M. King et H. Rob., Eupatorium chiapense B.L. Rob.

Shrubs to 3 m; stems brownish, sometimes reddish-tinged, densely tawny often retrorsely hirsute to sublanate, internodes mostly more than 1 cm. Leaves without stipitate glands, with petiole mostly 2-5 cm, hirsute; blade mostly 6-13 × 3-10 cm, ovate, widest near basal 1/3, chartaceous to subcoriaceous, trinervate or subtrinervate from 10-20 mm above base, veins spreading from midrib at 35-45º, adaxial surface evenly densely pilosulose, abaxially paler, densely velutinous, very dense on main veins, with often obscure minute sessile glandular dots, veinlets forming minute dark reticulum, base broadly rounded to slightly cordate, margins with usually 15-25 small to coarse serrations, apex acute to scarcely acuminata. Capitulcrence on leafy stem, broadly rather dense corymbiform or pyramidal; branchlets densely stipitate-glandular, intermixed non-glandular trichomes sparse to dense. Capitula 8-10 mm; phyllaries c. 16, 6-7 × 0.7-1.1 mm, narrowly lanceolate, often purplish, 2-ribbed, apex narrowly acute to attenuate. Florets 25-45; corolla tube 1.5-2 mm, poorly delimited distally, throat 2.7-3 mm, lobes c. 0.7 mm, sparsely short-pilosulose. Cypselae 3-4 mm, narrowly prismatic, with narrowed elongate base, setulose on distal part of ribs and faces, eglandular; pappus bristles 4.5-6 mm, slightly fragile, distinct outer series to 1 mm. Evergreen cloud forest, steep rocky wooded slopes, disturbed primary forest, bosque mesofilo. Ch (Ton [aka Mendez] 795, US); G (Skutch 293, US). 1100-3300 m. (W. Mexico to Mesoamerica.)
Turner (1997) recognized *Ageratina chiapensis* and *A. vernalis* as distinct species. Williams (1976a), under the name *Eupatorium chiapense*, gave the upper elevational limit of this species as "3700 m", which I cannot verify.

### 57. Ageratina zunilana


*Ageratina motozintlensis* R.M. King et H. Rob.

Subshrubs to 0.9 m; stems greenish, drying yellowish brown, distal portions of stems and petioles with dense spreading elongate-stipitate glands. Leaves petiolate; blade 2-7.5 × 1.5-6 cm, broadly ovate to ovate-deltoid, widest near basal 1/4-1/3, chartaceous, trinervate from or near base, veins spreading from midrib at 40-50º, whole abaxial surface and on veins abaxially with numerous stipitate glands, without sessile glandular dots, base subtruncate to subcordate, margins with 10-12 crenations or blunt serrations, apex acute to scarcely acuminate; petiole 1-6.5 cm, slender. Capitulescence terminal on leafy stem, broadly corymbiform, branches laxly cymose, branchlets mostly 7-13 mm, densely stipitate-glandular. Capitula 8-12 mm; phyllaries 16-20, broadly 5-8 × c. 0.9-1.1 mm, linear, sometimes purpurascent, apex narrowly acute and scarious, densely stipitate-glandular. Florets 30-35; corolla tube 1.5-2.5 mm, throat 2-3 mm, lobes 1-1.2 mm, sparsely pilosulose with 0-3 trichomes. Cypselae 2.2-2.5 mm, fusiform-oblong, setulate dense on ribs, nearly lacking between, eglandular; pappus bristles 4-5.5 mm, fragile. *NE slopes of barranco in Abies forest.* Ch (Breedlove y Bartholomew 55832, US); G (Steyermark 34905, F). 2500-3800 m. (Endemic.)

This species is similar to *A. adenophora* but differs by stems and petioles with elongate- (vs. short-) stipitate glands and by setulose (vs. glabrous) cypselae.

### 4. Ageratum L.


Por H. Robinson.
Annual to perennial herbs or subshrubs. Leaves opposite or sometimes alternate, short- to long-petiolate; blade elliptical or lanceolate to deltoid or ovate, usually trinervate from near base, leaves with glandular punctations, without long-stipitate glands, entire to dentate. Capitulescence terminal, cymose to subcymose, sometimes subumbellate, rarely congested into few dense synflorescences. Capitula discoid, 20-125-flowered, campanulate, not becoming elongate; involucre of 30-40 eximbricate phyllaries, spreading with age; clinanthium conical, epaleate or paleate, surface sclerified, glabrous; paleae (when present) about as long as florets. Corolla funnelform or with distinct tube, usually blue or lavender, lobes 5, papillose on inner surface, partially papillose and sometimes hispidulous on outer surface; anther collars cylindrical, cell walls densely transversely ornate, appendage oblong-ovate, as long as wide; style base without enlarged node, glabrous, branches linear, usually densely short-papillose and with bluish pigment, style appendages erect or scarcely spreading. Cypselae prismatic, 4-5-ribbed, glabrous or ribs short-setulose, carpopodium usually large and asymmetrical, cell walls thin; pappus persistent, coroniform, of usually 5 or less scales or awns, or lacking. Aprox. 40 spp.

Mostly Mexico, Mesoamerica, Suramérica, 2 sp. adventive pantropically, 1 sp. cultivated as ornamental.

The reports by Breedlove (1986) and Turner (1997) of *A. paleaceum* (Gay ex DC.) Hemsl. in Chiapas are presumably based on material I would refer to either *A. elassocarpum* or *A. rugosum*.

**Bibliografía:**

1. Clinanthia with stiff paleae throughout capitula.
2. Leaves narrowly ovate to lanceolate, with bases of blades abruptly narrowed into distinct petioles, with spreading trinervation. **5. A. elassocarpum**
3. Proximal internodes and leaf bases strongly hirsute with coarse, large-celled trichomes.
4. **A. echioides**
5. Internodes and leaf bases pilosulose to sparsely puberulent with slender trichomes or subglabrous.

20. **A. platylepis**
1. Clinanthia epaleate or paleate inside only outermost florets.

4. Capitulescences with 1 terminal and 1 or 2 axillary dense synflorescences on branches.

   23. A. salvaneutrae

4. Capitulescences not congested into few dense synflorescences of capitula.

5. Corolla tubes short, c. 0.4 mm; capitulescences diffuse, sparsely branched.

6. Pappus often present; stems hirsute with coarse, large-celled trichomes; branches of capitulescences few, laxly ascending, with linear bracteoles.

   7. Involucres 2.5-3 mm; leaf blades strictly chartaceous; pappus when present usually of 5 subulate scales.

   7. A. gaumeri

7. Involucres 3-4 mm; leaf blades chartaceous to slightly carnose; pappus when present of 5 short scales.

   13. A. maritimum

6. Pappus absent; stems sparsely minutely puberulent with fine trichomes; branches of capitulescences stiffly diverging, with short-ovate to subulate bracteoles.

8. Stems brownish; leaf blades mostly 4-9 cm, trinervate from c. 5 mm above bases.

   12. A. lundellii

8. Stems reddish; leaf blades c. 1.5-2.5 cm, trinervate from bases.

   16. A. munaense

5. Corolla tubes ≥ 0.8 mm; capitulescences with some congested clusters of capitula.

9. Stems proximally densely long-pilose or hirsute with coarse trichomes mixed with sparse to dense puberulence of smaller trichomes; phyllaries glabrous or pilose, never glandular, hispidulous, or tomentose.

10. Pappus absent or short-coroniform; sides of cypselae without setulae, glabrous, or slightly scabrid.

11. Phyllaries usually pilose or pilosulous, margins scarious, sometimes erose; corolla tubes with powdery cover of many minute short-stipitate glands.

   14. A. microcarpum

11. Phyllaries glabrous, margins herbaceous, entire; corolla tubes with few or no minute glands.

   17. A. oerstedii

10. Pappus of 5 separate, usually long-subulate scales; ribs of cypselae setulose.

12. Corollas c. 1.7 mm; style branches often whitish, filiform with blunt papillae forming 1/4 of width.

   3. A. conyzoides
12. Corollas 2.3-3 mm; style branches lavender pigmented, slightly broader distally, with minute pointed papillae forming less than 1/4 of width.

10. *A. houstonianum*

9. Stems not hirsute with coarse trichomes, with only trichomes of more uniform size; phyllaries sometimes glandular, hispidulous, or tomentose.

13. Plants maritime or from elevations lower than 30 m; without glandular punctations; involucres not abruptly rounded proximally; phyllaries mostly lanceolate, acute with stiff apices; pappus when present of 5 long subulate, separate awned scales.

14. Leaf surfaces and peduncles sparsely pilose, blades broadly elliptical.

6. *A. ellipticum*

14. Leaf surfaces and peduncles subglabrous, sometimes veins sparsely puberulent with few trichomes or glabrous, blades narrowly elliptical or linear to ovate.

15. Leaf blades usually ovate to rhombic-ovate, thinly carnose with narrow often with veins sparsely puberulent; cypselae glabrous or setulose even in pappose forms. 11. *A. littorale*

15. Leaf blades narrowly elliptical to linear, thickly carnose on veins; involucres tapering or slightly rounded at bases; cypselae strongly setulose.

18. *A. peckii*

13. Plants not maritime, mostly from elevations above 30 m; glandular dots present on at least abaxial leaf surfaces; involucres typically strongly abruptly rounded proximally; phyllaries often linear, oblong, or broadly lanceolate with short or curved apices; pappus formed of a continuous or denticulate rim or corona.

16. Leaf blades lanceolate, more than three times as long as wide, trinervation becoming longitudinal; glands of leaf undersurface usually deeply recessed in pits.

1. *A. chiriquense*

16. Leaf blades ovate to oblong-ovate, less commonly ovate-lanceolate, less than three times as long as wide, trinervation not becoming longitudinal distally; abaxial leaf surfaces with emergent or scarcely recessed glandular dots.

17. Phyllaries eglandular, glabrous or pilosulose or scarcely puberulent; leaf surfaces sparsely pilose to pilosulous, never densely
velutinous or tomentose; roots fibrous or adventitious on procumbent or stoloniferous bases; species of Nicaragua, Costa Rica, or Panamá.

18. Phyllaries linear, 0.7-0.9 mm diam., with numerous trichomes; petioles to 4 cm; cypselae with pappus often bearing an awn or bristle.

**19. A. petiolatum**

18. Phyllaries broadly lanceolate, 0.8-1.2 mm diam., with pubescence mostly on distal margins or along center; petioles 0.2-1 cm; pappus never with awns or bristles.

**21. A. riparium**

17. Phyllaries often glandular; leaf surfaces sometimes densely tomentellous; tomentose abaxially; roots often from tubers or taproots; species mostly of El Salvador, Honduras, Guatemala, or Mexico.

19. Abaxial surfaces of leaf blades with trichomes densest on veins, areoles visible.

20. Branching of capitulescence, when branched, alternate or unequal to rarely opposite at bases, lateral branches, when present, mostly longer than central branch; petioles 0.3-0.5 cm.

**8. A. guatemalense**

20. Branching of capitulescences usually opposite and equal proximally; petioles up to 3 cm.

21. Leaf abaxial areolar surfaces hispidulous with mostly erect trichomes; basal lateral branches of capitulescences as long as central axis.

**22. A. rugosum**

21. Leaf abaxial surfaces finely and sparsely erect or appressed-puberulent; basal lateral branches of capitulescences shorter than central axis.

22. Stems and veins of leaf abaxial surfaces with appressed trichomes.

**9. A. hondurensis**

22. Proximal internodes and veins of leaf abaxial surfaces with erect trichomes.

**15. A. molinae**

19. Leaf blades abaxially whitish tomentose to grayish tomentellous, areoles usually obscured.
23. Leaves with petioles 0.8-2 cm; phyllaries mostly c. 5 mm, shortly and stiffly acute; plants with taproots.

25. *A. tehuacanum*

23. Leaves with petioles 0.2-0.6(-1.5) cm; phyllaries to mostly c. 4 mm, with slender, usually curved apices; plant bases where known (1 of 3 spp.) with tubers.

24. Leaf blades eglandular adaxially, trinervation at 3-8 mm above bases of leaf blades, with proximal weaker secondary veins nearer bases.

2. *A. chortianum*

24. Leaf blades sparsely to densely glandular adaxially, trinervation at 0-3 mm above bases of leaf blades, without weaker secondary veins nearer bases.

25. Leaves adaxially finely puberulent with reclining trichomes to subglabrous; stems puberulent with ascending trichomes.

24. *A. standleyi*

25. Leaves adaxially densely hispidulous, with mostly erect trichomes; stems grayish with spreading trichomes.

26. *A. tomentosum*


Erect perennial herbs and subshrubs to 0.6 m, bases not seen; stems brown to reddish, obscurely puberulent with trichomes of uniform size, not hirsute with intermixed larger trichomes, glabrescent. Leaves petiolate; blade to 9 × 1.7 cm, narrowly elliptical or lanceolate, longitudinally trinervate from near base, adaxial surface with bullate shiny surface, pilosulose with scattered trichomes, abaxial surface pale, carnose with deeply sunken glandular dots, pilosulose on veins, base cuneate, margins remotely serrate to subentire, apex narrowly acute to slightly acuminate; distal leaves remote, reduced; petiole usually c. 0.5 cm. Capitulescence subscapose, ending in rather congested, corymbiform clusters. Capitula c. 6 mm, 50-100-flowered; involucre strongly abruptly rounded proximally; phyllaries 20-25, mostly 4-5 × 0.5-0.8 mm, linear, without obvious
scarious margins, apex slender and curved, hirtellous and glandular; clinanthium epaleate. Corollas 3-3.5 mm, glandular dotted, tube c. 1.2 mm. Cypselae 1.2-1.5 mm, glabrous; pappus absent or a slightly lobed rim. Disturbed primary forest, in and about steep ravines. P (Antonio 2584, MO). 800-3400 m. (Endemic.)


Erect subshrubs 1-1.5 m, moderately branched; base not known; stems dark brown, densely grayish puberulent with minute trichomes of uniform size, not hirsute with intermixed coarse larger trichomes. Leaves petiolate; blade mostly 3-5 × 1.3-2 cm, oblong-ovate, less than three times as long as wide, trinervate from 3-8 mm above base, not becoming longitudinal distally, with proximal weaker secondary veins nearer base, adaxial surface dark, hirsute, eglandular, abaxially evenly grayish to whitish tomentose, gland-dotted, areoles obscured, base obtuse to rounded, margins slightly crenulate, apex short-acute; distal leaves moderately reduced, not remote; petiole 0.2-0.5 cm. Capitulescences with opposite proximal branches, branches densely congested distally, corymbiform. Capitula 5-6 mm, c. 50-flowered; involucres narrowly to broadly rounded proximally; phyllaries c. 20, 3-4 × 0.5-0.8 mm, linear, densely hirsute, with few glandular dots near base, apex slender, curved, without obvious scarious margins; clinanthium epaleate. Corollas c. 2 mm, tube 0.8-1 mm, with sparse glandular dots and some trichomes. Cypselae c. 1.7 mm, glabrous; pappus a low toothed rim to 0.2 mm. Cut over mixed forest. G (Pruski et al. 4541, MO); H (Molina 22445, US). 1200-1500 m. (Endemic.)

Ageratum ciliare L., Carelia conyzoides (L.) Kuntze, Eupatorium conyzoides (L.) E.H.L. Krause, non Mill.

Annual or short-lived perennial herbs or subshrub, erect or spreading to 1.5 m, moderately branched; roots fibrous and adventitious; stems green or yellowish to partly reddish, densely hirsute with coarse, large-celled trichomes with admixed puberulence of sparse to dense smaller trichomes. Leaves petiolate; blade mostly 3-6 (-10) × 3-4 (-7) cm, ovate to broadly ovate, trinervation strong from base, adaxial surface dull green, sparsely long-pilose, abaxially slightly paler, glandular-dotted, sparsely pilose on veins, base rounded to obtuse, margins usually crenate to crenate-serrate, apex short-acute to obtuse; distal leaves moderately reduced, not remote; petiole mostly 1-2.5 cm. Capitulescences cymose to subcymose or compactly corymbiform, with some congested clusters of capitula, with mostly alternate branches. Capitula 4-4.5 mm, strongly rounded proximally, c. 50-flowered; phyllaries 25-30, mostly 3-4 × to 1 mm, oblong-lanceolate, narrowly bicostate with broad scarious margins that often end before tip, apex sharply subaristate, pilose with few trichomes, eglandular; clinanthium epalate. Corollas c. 1.7 mm with few trichomes distally; tube 0.8-1 mm, sparse to dense minute powder-like or short-stipitate glands; lobes c. 0.2 mm; style branches filiform, rather short, often whitish, blunt papillae forming 1/4 of width. Cypselae c. 1.2 mm, short-setulose on ribs; pappus usually of 5 large separate usually long-subulate scales, usually to 2 mm with slender apical awns. 2n = 40. Brushy slopes, roadsides, railroad and dock yards, by ponds, garden weed, on chicken house waste. CR (Gómez P. 22012, US); P (Tyson 6285, US). 10-1400 m. (Mexico, Mesoamerica; adventive pantropically and in temperate gardens.)

The report of A. conyzoides in Tabasco by Turner (1997) and Perez et al. (2005), Chiapas by Breedlove (1986) and Turner (1997), Yucatán by Turner (1997), Quintana Roo by Sousa y Cabrera (1983), Belice by Balick et al. (2000), Guatemala by Williams (1976a) , Honduras by Standley y Calderon (1941) and Clewell (1975), El Salvador by Berendsohn y Araniva (1989), and Nicaragua by Dillon et al. (2001) are each based on material with well-exserted lavender styles, material here referred to A. houstonianum. Additionally, all common names reported as applying to A. conyzoides in the preceding references are applied herein to A. houstonianum. Thus, although Turner (1997) treated Ageratum pinetorum as a synonym of A. conyzoides, I refer it to synonymy of A. houstoniana.
The common names given in Williams (1976a) for material from Guatemala and in Standley y Calderón (1941) for material from El Salvador may not apply to this species.


Perennial herbs, erect from decumbent bases, mostly 30-70 cm, unbranched above base; roots fibrous and adventitious; stems becoming reddish, strongly hirsute with coarse, large-celled trichomes and puberulent with small trichomes. Leaves petiolate; blade mostly 4-11 × 0.5-2.5 cm, narrowly elliptical to linear, trinervation from 2-15 mm above base, mostly longitudinal, adaxial surface dull green, pilose, abaxially slightly paler, densely pilose, with numerous reddish glandular dots, base gradually narrowed to indistinct petiole, cuneate, margins entire to coarsely serrate-dentate, apex narrowly acute; distal leaves reduced and remote; petiole mostly c. 0.5 cm. Capitulescence scapose, with 1 or few dense corymbiform clusters, with or without long proximal opposite or subopposite branches. Capitula 5-7 mm, abruptly rounded proximally, 35-55-flowered; phyllaries c. 20, 4.5 × 0.8-1.2 mm, oblong-lanceolate, puberulent with few or no glands, margins narrow, scarious, apex stiffly short-acute; clinanthium stiffly paleate throughout. Corollas c. 2.5 mm, with few short trichomes on tube and lobes, tube c. 1 mm. Cypselae 1.5-1.7 mm, glabrous; epappose. 2n = 40. *Steep wooded slopes, grassy openings in forest, loam soil in pine oak forest, damp sunny field.* T (Cowan, 1983: 24); Ch (Breedlove 12057, US); G (Nelson 3581, US). (900-)1100-2200 m. (C. Mexico to Mesoamerica.)

Williams (1976a) recognized the name *A. isocarphoides*, which is here reduced to synonymy.


Holotype: Mexico, *Purpus 6628* (US!). Illustr.: no se encontró. N.v.: none.

*Ageratum albidum* var. *nelsonii* B.L. Rob., *Ageratum nelsonii* (B.L. Rob.) M.F. Johnson.
Perennial herbs to 1 m, scarcely to moderately branched, bases not seen; stems becoming brownish to reddish, densely whitish hirsutulous. Leaves petiolate; blade mostly 5-12 × 1.5-3 cm, narrowly ovate to lanceolate, trinervation spreading from 5-10 mm above base, with weaker secondary veins nearer base, adaxial surface dull green, usually densely hispidulous or puberulent, abaxially scarcely paler, densely hispidulous mostly on veins, rarely sparsely appressed-puberulent or white-tomentose, densely glandular dotted, base abruptly narrowed into distinct petiole, obtuse to short-acute or rarely constricted to long decurrency, margins crenate to crenate-serrate, apex short-acute to acuminate; distal leaves moderately smaller and more remote; petiole mostly 1-2.5 cm. Capitulescences with or without long, ascending, usually alternate, proximal branches, weakly cymose or with dense corymbiform clusters. Capitula usually c. 5 mm, abruptly rounded proximally, c. (31-)50-flowered; phyllaries c. 20, c. 4 × 0.7-0.9 mm, narrowly oblong to linear, hispidulous, with few or no glands, margins not obviously scarious, apex pale, stiffly acute apex; clinanthia paleate throughout; paleae stiff, apex narrower than apex of phyllaries. Corollas 2-2.5 mm, with few or no trichomes distally; tube 0.8-1 mm, with sparse minute stipitate glands or non-glandular trichomes. Cypselae c. 1.8 mm, glabrous, ribs sometimes pale; pappus absent or coroniform to 0.3 mm. 2n = c. 20.

Wooded slopes, brushy savannas, open grazed areas, in partial shade and open sun. Ch (Cronquist 9680, US); G (Williams et al. 41257, F). 500-1500 m. (C. Mexico to Mesoamerica.)

Turner (1997) treated this species as a synonym of *A. microcephalum* Hemsl., which he circumscribed as having both pappose and epappose forms.


Short-lived perennial herbs to 0.5-0.8 m, sparingly branched, without glandular punctations, bases not seen; stems greenish, sparsely pilosulous and pilose near nodes with trichomes of uniform size, not hirsute with intermixed larger trichomes. Leaves petiolate; blade 2.5-4.5 × 0.7-1.7 cm, broadly elliptical, trinervation from at or near base, surfaces nearly concolorous, sparsely pilose mostly on veins, eglandular, base acute, margins subentire to serrulate, apex short-acute; leaves rather remote, becoming smaller and slightly more remote distally; petiole mostly 0.5-1 cm. Capitulescence on elongate branches, weakly corymbiform to cymose, with rather dense distal clusters of few capitula; peduncles sparsely pilose. Capitula c. 5 mm; involucre broadly funnelform
proximally, not abruptly rounded proximally, c. 25-flowered; phyllaries c. 15, 3-3.5 × 0.5-0.7 mm, narrowly lanceolate, glabrous, margins moderately broadly scarious, apex erect, narrowly acute apex; clinanthium eapaleate. Corollas c. 2 mm, glabrous; tube c. 0.8 mm. Cypselae 1.2-1.5 mm, with numerous long setulae; pappus of 5 separate subulate long, awned scales c. 1.8 mm. Near coast, savanna. B (Karling 31, US). < 50 m. (Endemic.)

Williams (1976a) reported this species as new to Guatemala, but his cited voucher (Molina 15591) is here provisionally redetermined as A. molinae.


*Ageratum gaumeri* fo. *fallax* B.L. Rob.

Annual or short-lived perennial herbs 0.2-0.5 m, erect or with procumbent bases, moderately branched; roots fibrous and adventitious; stems greenish or yellowish, hirsute with coarse, large-celled trichomes and puberulent with sparsely to densely small trichomes. Leaves petiolate; blade mostly 2-7 × 1-5 cm, ovate, strictly chartaceous, trinervation from basal 2 mm of blade, adaxial surface dull green, sparsely pilose, abaxially scarcely paler, sparsely pilose on veins, eglandular, base obtuse to subtruncate, margins crenate, apex short-acute; distal leaves slightly reduced; petiole mostly 1-4 cm. Capitulescence diffuse, cymose, branches subscapose, few, laxly ascending, capitula few, on ascending peduncles mostly 10-60 mm, bracteolate, bracteoles few, to 2 mm, linear. Capitula 4-5 mm, broadly rounded proximally, c. 50-flowered; phyllaries c. 20, 2.5-3 × c. 0.8 mm, oblong-ovate to oblong-lanceolate, sparsely pilosulose to glabrous, margins rather broad, scarious, apex stiffly acute, erect apex; clinanthium eapaleate. Corollas c. 1.8 mm, minutely puberulent on lobes; tube c. 0.4 mm. Cypselae 1.2-1.5 mm, setose on ribs; pappus absent or 0.5-1.5 mm and of 5 separate, scarious, subulate scales. In clearings. Y (Steere 1009, US); ?C (Martínez et al., 2001: 23); QR (Steere 2643, GH); G (Williams, 1976a: 38); ?H (Molina, 1975: 111). < 100 m. (Endemic.)

The vouchers of range extensions cited in Martínez et al. (2001), Williams (1976a), and Molina (1975) were not verified by me.

Erect perennial herbs to 0.5-0.8 m, sparingly branched proximally; roots fibrous from small basal tubers; stems dark reddish, usually spreading pilosulous and minutely puberulent with trichomes of uniform size, not hirsute with intermixed coarse larger trichomes. Leaves petiolate; blade 2.5-6 × 1.2-2.2 cm, ovate, less than three times as long as wide, mostly trinervation from 2-5 mm above base, not becoming longitudinal distally, adaxial surface dull green, usually rugulose, densely hispidulous, usually eglandular, abaxially scarcely paler, densely pilosulous on veins, with numerous glandular dots, areoles visible, base obtuse to short-acute, margins crenulate to crenate-serrate, apex short-acute; distal leaves somewhat reduced, more remote; petiole 0.3-0.5 cm. Capitulescences subscapose, with densely cymose to corymbiform clusters, with some congested clusters of capitula, with or without longer alternate or unequal to rarely opposite proximal branches, lateral branches, when present, mostly longer than central branch. Capitula 4-5 mm, 70-120-flowered; involucre strongly abruptly rounded proximally; phyllaries 25-35, c. 5 × 0.5-0.7 mm, linear, pilosulous to hispidulous, with some glandular dots, with narrow scarious margins, apex slender and curved; clinanthium epaleate or with few filiform paleae inside only outermost florets. Corollas 2.5-3 mm, with sparse glandular dots, small trichomes mostly near base; tube 0.8-1 mm. Cypselae c. 1.7 mm, glabrous; pappus a denticulate corona to 0.3 mm. 2n = 20. Open hillsides, dry meadows, and cut banks. Ch (Ownbey y Muggli 3985, US); G (King 3389, US). 1500-2300 m. (Endemic.)

This name was placed in synonym of *A. corymbosum* by Williams (1976a). The Chiapas material differs in the distinct glands on the leaf adaxial surface and the densely pilosulous corolla lobes.


Erect subshrubs 0.5-1 m, with numerous branches, bases not seen; stems greenish to reddish, sparsely to densely puberulent with appressed trichomes of uniform size, not hirsute with intermixed coarse larger trichomes. Leaves petiolate; blade mostly 3-6 × 1.8-3.5 cm, ovate, less than three times as long as wide, trinervation from c. 5 mm above base, not becoming longitudinal distally, adaxial surface dull green, short-pilosulous, glands sparse or lacking, abaxially slightly paler, densely glandular dotted, finely and sparsely appressed-puberulent with minute, appressed trichomes densest on veins, areoles visible, base obtuse to subtruncate, margins crenulate, apex short-acute; distal leaves
slightly reduced and slightly more remote; petiole 0.4-2 cm. Capitulescence with rather congested, corymbiform clusters, proximal opposite, usually equal-sized branches always distinctly shorter than terminal branch. Capitula 5-6 mm, c. 50-flowered; involucre strongly abruptly rounded proximally; phyllaries c. 25, c. 4 × 0.5-0.7 mm, linear, weakly puberulent, sparsely glandular dotted, without obvious scarious margins, apex of inner phyllaries slender and curved; clinanthium epaleate. Corollas c. 2.5 mm, with small trichomes and sparse glandular dots mostly on tube; tube c. 1 mm. Cypselae c. 1.8 mm, glabrous; pappus a denticulate corona to 0.2 mm. *Open pine forest, roadside thickets.* H *(Molina y Molina 24582, US).* 1100-1500 m. (Endemic.)


Annual or short-lived perennial herbs, erect or spreading to 0.9 m, sparingly to moderately branched; roots fibrous and adventitious; stems green or yellowish to partly reddish, densely hirsute with coarse, large trichomes mixed with puberulence of sparse to dense small trichomes. Leaves petiolate; blade mostly 3-6 (-10) × 3-4 (-7) cm, ovate to triangular-ovate, trinervation strong from base, adaxial surface dull-green, sparsely long-pilose; abaxially slightly paler, usually glandular dotted, sparsely pilose on veins, base subcordate or truncate to obtuse, margins crenate to crenate-serrate, apex short-acute to obtuse; distal leaves moderately reduced, not remote; petiole mostly 1-4 cm.
Capitulescences cymose to subcymose or compactly corymbiform, with some congested clusters of capitula, mostly with alternate branches. Capitula 4.5-6.5 mm, strongly rounded proximally, 50-75-flowered; phyllaries 20-30, mostly 3.5-5 × to 1 mm, oblong-lanceolate, narrowly bicostate with broad scarious margins sometimes ending below tip, apex sharply subaristate, pilose with few long trichomes, eglandular; clinanthium epaleate. Corollas 2.3-3 mm, with few trichomes distally, lavender or less commonly white; tube 1-1.5 mm, sparsely to densely minutely powder-like or short stipitate-
glandular; style branches long, lavender pigmented, slightly broader distally, with minute pointed papillae forming less than 1/4 of width. Cypsela c. 1.2 mm, sparsely setulose on ribs; pappus usually of 5 large separate usually long-subulate scales, up to 2-2.5 mm, usually lanceolate with apical awn. 2n = 20. Densely wooded slopes, dry woods, roadside thickets, among roadside weeds, river banks, along railroads, widely cultivated and adventive. T (Juzepczuk 1923, US); Ch (Ton [aka Mendez] 1867, US); ?QR (Sousa y Cabrera, 1983: 77); B (Bartlett 12098, US); G (King 3311, US); H (Standley 55005, US); ES (Standley 21793, US); N (Baker 2021, US); CR (Grayum y Nevers 4639, MO); P (Lazor et al. 2432, MO). 5-1800 m. (Mexico, Mesoamerica, Suramérica, West Indies, widely cultivated pantropically and in temperate gardens, adventive.)

Cultivated forms of *A. houstonianum* are sometimes epappose. *Alomia pinetorum* is typified by epappose specimens, and is here treated in synonymy, albeit referred by Turner (1997) to synonymy of *A. conyzoides*.

### 11. Ageratum littorale*


Lectotype (designated by Johnson, 1971): United States, Bennett s.n. (GH!). Illust.: no se encontró. N.v.: tup-tan-xix, B.


Short-lived perennial herbs mostly 0.4-0.5 m, without glandular punctations, base erect or decumbent, often with many short branches proximally; roots fibrous and adventitious; stems greenish to yellowish, glabrous to very sparsely pilosulous with trichomes of uniform size, not hirsute with coarse intermixed larger trichomes. Leaves petiolate; blade mostly 2-5 × 1.2-3 cm, ovate to rhombic-ovate, thinly carnose, trinervation from base, surfaces concolorous, subglabrous, with narrow often sparsely puberulent veins, base short-acute, margins abruptly crenate-serrate above widest part, apex short-acute; distal leaves moderately reduced and more remote; petiole 1-4 cm. Capitulescence subscapose, with alternate branches, with weakly cymose clusters of few capitula, with some congested clusters of capitula, sometimes with long proximal branches; peduncles glabrous to subglabrous. Capitula 4-5 mm, slightly rounded proximally, 50-75-flowered; involucre not abruptly rounded proximally; phyllaries 18-22, c. 3 × 0.7 mm, lanceolate, glabrous to sparsely puberulent, margins narrowly scarious, apex stiffly acute, erect; clinanthia epaleate. Corollas c. 2 mm, with few trichomes
proximally and minute trichomes on lobes; tube c. 0.8 mm. Cypselae c. 1.5 mm, glabrous or setulose; pappus absent or with 5 separate, subulate, awned scales 0.8-1.3 mm. *At tops of beaches or under coconuts, on coral sand, sand cays*. Y (Rzedowski 26371, US); QR (Gaumer 93, K); B (Stoddart 130, US); H (Molina 20693, US). <50 m. (United States [Florida], Mesoamerica, Cuba, Grand Cayman Isl.)

This name was treated as a synonym of *A. maritima* by Turner (1997).


Annual or short-lived perennial herbs to 0.5 m, moderately branched; base erect with fibrous roots; stems brownish, sparsely minutely puberulent with fine trichomes. Leaves petiolate; blade mostly 4-9 × 1.5-5 cm, ovate, membranaceous, trinervation c. 5 mm above base, adaxial surface dull green, sparsely pilose; abaxially paler, sparsely pilose on veins, base obtuse to slightly acuminate, margins crenate-serrate to serrate, apex acute; distal leaves somewhat reduced; petiole 3-17 cm. Capitulescence diffuse, lax, with stiffly diverging branches, peduncles mostly 8-12 mm, bracteolate, bracteoles c. 1 mm. short-ovate to lanceolate. Capitula c. 4 mm, abruptly rounded proximally, c. 70-flowered; phyllaries c. 20, 2.5-3 × c. 0.7 mm, broadly oblong-ovate, glabrous, margins broadly scarious, apex sharply acute, erect; clinanthium epaleate. Corollas 1.5-1.7 mm; tube c. 0.4 mm, puberulent proximally. Cypselae c. 1 mm, with rudimentary setulae on ribs; epappose. In tintal. ?QR (Sousa y Cabrera, 1983: 77); G (Contreras 471, US). <100 m. (Endemic.)


*Caelestina maritima* (Kunth) Torr. et A. Gray, *Carelia maritima* (Kunth) Kuntze.

Annual or short-lived perennial herbs, erect or with decumbent bases, 0.25-0.4 m, sparsely to densely branched; roots fibrous and adventitious; stems greenish to yellowish-brown, hirsute with coarse, large-celled trichomes and puberulent with sparsely to densely small trichomes. Leaves petiolate; blade mostly 1.5-2.5 × 1-2 cm, ovate, chartaceous to slightly carnose, trinervation from basal 1 mm, surfaces dull green, sparsely pilose, eglandular, base obtuse to subtruncate, margins crenate, apex short-acute; distal leaves moderately reduced; petiole mostly 1-1.5 cm. Capitulescence diffuse, with
few laxly ascending cymose branches, capitula scarcely clustered; peduncles mostly 5-20 mm, bracteolate, bracteoles numerous, c. 2 mm, linear. Capitula 5-6 mm, broadly rounded proximally, 40-50-flowered; phyllaries 3-4 × c. 0.8 mm, oblong-ovate to oblong lanceolate, glabrous, margins rather broad, scarious, apex stiffly acute, erect apex; clinanthium epaleate. Corollas 1.8-2 mm, with sparse trichomes proximally and minute trichomes on lobes, tube c. 0.4 mm. Cypselae c. 1.5 mm, subglabrous; pappus when present of 5 short, denticulate, firm scales appearing coroniform. Coastal sands, limestone plains. Y (expected); ?QR (Sousa y Cabrera, 1983: 77). < 100 m. (W. Cuba, Dominican Republic.)

I have been unable to verify the report of this species in Quintana Roo by Sousa y Cabrera (1983). Other previous citations, including that of Johnson (1971), were based on a broader concept that included *Ageratum intermedium* which has proven to be *Ageratum littorale*.


*Alomia microcarpa* (Benth.) B.L. Rob.

Annual or short-lived perennial herbs, erect to 1.2 m, sparsely to densely branched; roots fibrous and adventitious; stems yellowish to partly reddish, densely hirsute with coarse trichomes with puberulence of sparse to dense smaller trichomes. Leaves petiolate; blade mostly 3-5 (-7) × < 4.5 cm, ovate, trinervation strong from base, adaxial surface dull-green, pilose and often sparsely puberulent, abaxial surface slightly paler, gland-dotted and numerous slender trichomes, base usually truncate to subcordate, margins closely crenate-serrate, apex short-acute to scarcely acuminate; distal leaves moderately reduced, not remote; petiole 1-3.5 cm. Capitulescences corymbiform to cymose with corymbiform branches, with some congested clusters of capitula, with mostly alternate branches. Capitula 4-5 mm, strongly rounded proximally, 60-75-flowered; phyllaries c. 25, c. 4 to 1 mm, oblong-lanceolate, usually pilose or pilosulous with few long trichomes, eglandular, narrowly bicoastate with broad scarious margins often ending below apex, apex sharply subaristate; clinanthium epaleate. Corollas c. 2.3 mm, with short trichomes distally, tube c. 1 mm, with powdery cover of many minute short-stipitate glands; style branches long, lavender pigmented. Cypselae c. 1.2 mm, sparsely scabrid to
essentially glabrous; pappus absent. Cloud forest, pine woods, marshy open ground, pasture, open slopes with cutover forest, roadside. H (Pfeifer 1428, US); N (Miller y Griscom 39, US); CR (Tonduz 8479, US); P (Hamilton y Stockwell 3546, US). 900-2200(-2600) m. (Mesoamerica, Venezuela.)

This species was excluded from Ageratum by Johnson (1971) and treated by him as Alomia microcarpa. Turner (1997) and Dillon et al. (2001) placed Ageratum microcarpum in synonymy of A. conyzoides.


Erect perennials to 0.5 m, decumbent from short rhizomes, weakly branched proximally, proximal internodes with erect trichomes; stems brownish, hispidulous with erect trichomes of uniform size, not hirsute with intermixed coarse larger trichomes. Leaves petiolate; blade 2.5-3.5 × 1-1.5 cm, oblong-ovate, less than three times as long as wide, trinervation from c. 2 mm above base, not becoming longitudinal distally, adaxial surface slightly rugulose and shiny, pilosulose with persistent trichome bases, cells large, to 0.1 mm; abaxially slightly paler with membranaceous glandular-dotted areoles, hispidulous on veins, areoles visible, base short-acute, margins crenulate, apex short-acute; distal leaves slightly reduced, more remote; petiole 0.2-0.4 cm. Capitulescences rather densely congested, corymbiform, with proximal opposite, usually equal-sized branches distinctly shorter than central axis. Capitula 4-5 mm, 25-30-flowered; involucre strongly abruptly rounded proximally; phyllaries c. 22, 2.5-3 × c. 0.5 mm, linear, short-pilosulose, with some glandular dots, scarios margins very narrow, apex narrowly acute, weakly curved; elianthium epaleate. Corollas c. 2 mm, gland-dotted mostly on tubes, without trichomes, tube c. 1 mm. Cypselae c. 1.5 mm, glabrous; pappus to 0.3 mm, coroniform. Open woods. G (Molina 15591, F); H (Molina 14412, US). 1500 m. (Endemic.)


Short-lived perennial herbs, erect from decumbent bases, 0.3-0.4 m, moderately branched at and above base; roots fibrous or adventitious; stems reddish, sparsely minutely puberulent with fine trichomes. Leaves petiolate; blade 1.5-2.5 × 0.5-1 cm, ovate, slightly carnose, trinervation from base, surfaces subglabrous with minute
trichomes on veins, abaxial surface paler, minutely glandular dotted, base obtuse, margins crenulate, apex acute; distal leaves moderately reduced, slightly more remote; petiole 0.3-0.5 cm. Capitulescences diffuse, lax, with stiffly divergent branching; peduncles mostly 5-20 mm, bracteolate, bracteoles c. 1 mm, short-ovate to lanceolate. Capitula 4 mm, abruptly rounded proximally, c. 25-flowered; phyllaries c. 18, 2.7-3 × c. 0.8 mm, oblong-ovate, glabrous, margins broad, scarious, apex stiffly acute, erect; clinanthium epaleate. Corollas c. 1.8 mm, with small trichomes on base and lobes; tube c. 0.4 mm. Cypselae c. 1.5 mm, glabrous or subglabrous; epappose. Roadside. Y (Lundell y Lundell 8172, US). < 100 m. (Endemic.)


Ageratum latifolium (Benth.) Hemsl., non. Cav., Ageratum oliveri R.M. King et H. Rob., Carelia latifolia (Benth.) Kuntze.

Annual or short-lived perennial herbs, erect to 1 m, with few branches; roots fibrous and adventitious; stems brown to reddish, proximally densely long-pilose with coarse, larger trichomes intermixed with minute puberulence of few to many smaller trichomes, distally sometimes merely sparsely long-pilose. Leaves petiolate; blade mostly 5-9 (-12) × 4-7 cm, ovate, trinervation strong from just above base, adaxial surface smooth, sparsely pilose; pale abaxially, sparsely glandular dotted, sparsely pilose on veins, base rounded to slightly cordate, margins crenate to crenate-serrate, apex short-acuminate; distal leaves reduced; petiole 0.5-4 cm. Capitulescence laxly cymose, with opposite proximal branches, with rather densely cymose terminal clusters. Capitula 5-6 mm, abruptly rounded proximally, 60-75-flowered; phyllaries 20-25, mostly c. 4 × 0.8-1 mm, principal ones oblong lanceolate to broadly lanceolate, glabrous, margins entire, apex obtuse to short-acute; clinanthium epaleate. Corollas 2.3-2.7 mm, with few glands; tube c. 1 mm, with few or no minute glands. Cypselae c. 1.5 mm, glabrous; pappus absent or short-coroniform, to 0.3 mm, corona lobed, serrulate. Roadside banks, cloud forests, edge of cleared ridge. CR (Haber 952, MO); P (Wilbur 15556, US). 600-1300 m. (Endemic.)

King and Robinson (1975) used the name A. oliveri for the Panamanian material of this taxon.

*Ageratum radicans* B.L. Rob.

Short-lived perennial herbs with erect or procumbent bases, 0.2-0.7 m, moderately branched, without glandular punctations; roots fibrous and adventitious; stems greenish to reddish, glabrous or scarcely puberulent with trichomes of uniform size, not hirsute with coarse intermixed larger trichomes. Leaves petiolate; blade mostly 3-7 × 0.3-1.3 cm, narrowly elliptical to linear, thickly carnose on veins, trinervation from 2-4 mm above base, veins longitudinal, surfaces glabrous or subglabrous, moderately paler abaxially, base narrowly cuneate, margins remotely serrate to subentire, apex narrowly acute; distal leaves reduced, more remote; petiole 0.4-1 cm, indistinctly delimited distally, pilosulose. Capitulescences scapose or subscapose, cymose, with capitula in small rather dense clusters, with or without long, proximal, opposite or alternate branches; peduncles glabrous to subglabrous. Capitula 4-5 mm, c. 30-flowered; involucre tapering proximally or slightly rounded at base; phyllaries 17-20, 3-4 × 0.5-0.7 mm, lanceolate, glabrous or subglabrous, margins narrowly scarious, apex stiffly acute, erect; clinanthia epalete. Corollas c. 2 mm, minutely puberulent on lobes, tube c. 0.8 mm. Cypselae 1.5 mm, strongly setulose on ribs; pappus of 5 separate, subulate, long, awned scales to 1.8 mm. *Pine forests, savannas, flat granite outcrop, airport*. B (*Dwyer 14698*, MO); G (*Contreras 9687*, US). 100 m or below. (Endemic.)

Williams (1976a) recognized the name *A. radicans*, which is here reduced to synonymy.


Perennial herbs to 0.75-1 m, usually moderately branched, bases appearing procumbent or stoloniferous with adventitious roots, sometimes appearing taprooted; stems brownish, sparsely puberulent with trichomes of uniform size, not hirsute with coarse intermixed larger trichomes. Leaves petiolate; blade mostly 3-7 × 2-5 cm, ovate, less than three times as long as wide, trinervation from within proximal 0-2 (-4) mm, not
becoming longitudinal distally, adaxial surface dull green, sparsely pilose to pilosulose; abaxially paler, membranous, with slightly immersed glandular dots, pilosulose on veins, base obtuse, margins crenate or serrate, apex short-acute to slightly acuminate; distal leaves very reduced and remote; petiole mostly 1-4 cm. Capitulescence scapose, cymose with rather congested, distal clusters, with or without long opposite proximal branches. Capitula 5-7 mm, 100-125-flowered; involucre strongly broadly rounded proximally; phyllaries 25-35, 4-5 × 0.7-0.9 mm, linear, eglandular, pilosulous, margins narrowly scarious, apex slender, erect or curved; clinanthium epaleate. Corollas 2.3-3 mm; tube c. 1 mm, with few trichomes. Cypselae 1.5-2 mm, glabrous; pappus a denticulate corona, to 0.3 mm, often bearing a long bristle to 2.5 mm. Forest edge, disturbed forest, elfin forest, shaded lava slope. N (Maxon 7661, US); CR (Croat 46808, MO). 8-1700 m. (Endemic.)


Ageratum benjamin-lincolnii R.M. King et H. Rob., Alomia guatemalensis B.L. Rob.

Short-lived perennial herbs to 0.5 m, with erect or decumbent bases; roots fibrous and adventitious; stems reddish, sparsely puberulent with slender trichomes. Leaves petiolate; blade mostly 4-10 × 0.5-2.5 cm, lanceolate to linear, trinervation from c. 5 mm above base, becoming longitudinal, adaxial surface moderately shiny, sparsely pilosulose with slender trichomes, abaxially paler, densely glandular dotted, subglabrous to pilosulose on veins with slender trichomes, base gradually narrowed to indistinct petiole, narrowly cuneate, margins serrulate, apex narrowly acute; distal leaves reduced and more remote; petiole 0.5-1 cm. Capitulescence subscapose to scapose, with dense distal corymbiform clusters, with or without long, opposite, proximal branches. Capitula 5-7 mm, broadly rounded proximally, c. 50-flowered; phyllaries c. 20, 4-5 × 0.8-1.2 mm, narrowly lanceolate, sparsely pilosulose, margins narrowly scarious, apex stiffly acute, erect to slightly reflexed; clinanthium paleate throughout; paleae stiff, narrow, the whitish apex obvious before anthesis. Corollas c. 2.5 mm, with minute trichomes on lobes; tube 0.8-1 mm, sparsely to densely minutely stipitate-glandular. Cypselae c. 1.5 mm, glabrous; pappus absent or a denticulate corona to 0.3 mm. Moist pastures. Ch (Breedlove 10533, US); G (Heyde y Lux 6153, US). 600-1200 m. (Endemic.)
The Guatemalan material lacks a pappus, the Chiapas collection has a coroniform pappus. The elevation of the type, Nelson 3528, is given as "3000-1000 feet", and I believe the species does not occur at elevations lower than 2000 feet (= 610 meters).


*Ageratum panamense* B.L. Rob., *Ageratum rivale* B.L. Rob. non Sessé et Moc.

Short-lived perennial herbs 0.5-0.8, base usually becoming procumbent; roots fibrous, usually adventitious; stems brownish to reddish, sparsely to densely puberulent or hirtellous with trichomes of uniform size, not hirsute with intermixed coarse trichomes. Leaves petiolate; blade 2-7 × 1-3 cm, ovate to ovate-lanceolate, less than three times as long as wide, trinervation from 1-2 mm above base, not becoming longitudinal distally, adaxial surface green, somewhat shiny, sparsely pilose, abaxial surface pale to reddish, membranaceous with slightly immersed glandular dots, sparsely pilose mostly on veins, base rounded to short acute, margins serrulate to crenate-serrate, apex acute; distal leaves moderately to strongly reduced and remote; petiole 0.2-1 cm. Capitulescence scapose, distally rather congested clusters, corymbiform or weakly cymose. Capitula 5-7 mm, 50-100-flowered; involucre strongly abruptly rounded proximally; phyllaries 20-30, 4-6 × 0.8-1.2 mm, broadly lanceolate, eglandular, glabrous or with pubescence on distal margins or along center, margins not obviously scarious, apex acute, erect to slightly reflected; clinanthium eplerate. Corollas 2.5-3.5 mm, tube c. 1 mm, glabrous or subglabrous. Cypselae 1.5-2.5 mm, glabrous; pappus a denticulate corona to 0.5 mm, never with bristles. 2n = 20. Pastures, wet meadows, roadsides. CR (Pittier 4914, GH); P (Davidson 590, US). 500-1500 m. (Endemic.)

King and Robinson (1975) used the name *A. panamense* B.L. Rob. (homotypic with *A. rivale* B.L. Rob.) for the Panamanian material of this taxon.


Perennial herbs or subshrubs mostly 1-2 m, bases appearing erect and taprooted, with some adventitious roots; stems usually brownish to partly reddish, densely whitish hirsutulous with trichomes of uniform size, not hirsute intermixed with larger coarse trichomes. Leaves petiolate; blade mostly 4-12 × 2-6 cm, ovate, less than three times as long as wide, trinervation usually from basal 2-4 mm, not becoming longitudinal distally, adaxial surface densely erect puberulent, abaxially pale, densely whitish pilosulose with mostly erect trichomes, trichomes densest on veins, densely glandular-dotted, areoles visible, base rounded to subtruncate, margins crenulate to crenate-serrate, apex short-acute; distal leaves gradually reduced and moderately more remote; petiole mostly 0.5-3 cm. Capitulescences with congested, corymbiform clusters, usually with opposite, usually equal-sized, proximal branches as long as central axis. Capitula 5-6 mm, 50-75-flowered; involucre strongly abruptly rounded proximally; phyllaries 20-25, 3.5-4.5 × 0.5-0.7 mm, linear, densely pilosulose to hispidulous, usually with few glandular dots at base, without obvious scarious margins, apex slender and curved; clinanthium epaleate. Corollas c. 2.5 mm, with sparse glandular dots and few trichomes, tube 0.8-1 mm, lobes usually without obvious pubescence. Cypselae c. 1.5 mm, glabrous; pappus usually with denticulate corona to 0.3 mm. 2n = 40. Mixed forest in deep ravine, grassy pine forest, steep slopes and roadsides in cultivated area. Ch (Matuda 2493, US); B (Bartlett 11396, US); G (Skutch 713, US); H (Standley 27458, US); ES (Standley 20361, US); N (Stevens 4020, US). 200-3500 m. (C. Mexico to Mesoamerica.)

Williams (1976a) recognized both *Ageratum corymbosum* Zuccagni and *A. rugosum* as occurring in Guatemala. Turner (1997: 53) and Dillon et al. (2001: 288) reduced *A. rugosum* to synonymy of *A. corymbosum*. The common names for *A. corymbosum* in Nelson Sutherland (2008) may refer to *A. rugosum*.


Annual? herbs to 50(-100) cm, sparingly branched, with fibrous roots or adventitious at basal nodes; stems green or yellowish, erect or sometimes decumbent, sparsely pilose to glabrous. Leaves opposite; blade mostly 3-8 × 2-5 cm, ovate to broadly ovate, trinervate from slightly above basal acumination, membranaceous, surfaces without glandular dots, adaxial surface smooth, sparsely pilose, abaxial surface paler green, with few trichomes mostly on veins, base narrowly and sometimes asymmetrically acuminate,
margins serrate to crenulate-serrate, apex shortly acuminate; petiole 0.5-7 cm, very
narrowly winged. Capitulescences with a long terminal pilosulous peduncle to 100 mm,
bearing dense globular synflorescence of many sessile capitula, branches and distal axils
each with 1 or 2 smaller dense synflorescences on short peduncles; synflorescence 10-
15(-20) mm diam. Capitula c. 20-30-flowered; involucre c. 6 × 2.5-3.5 mm, cylindrical;
phyllaries subequal, biseriate, herbaceous, 2-4-costate and 3-nerved, eglandular, partially
ciliate, margin broad, membranaceous, acute to acuminate, outer phyllaries c. 1 mm
diam., linear-lanceolate, inner phyllaries to 2 mm diam., broadly lanceolate; clinanthium
highly conical, epaleate. Corollas 3.5-4.5 mm, purplish lavender distally, glabrous or with
few trichomes; tube c. 1.5 mm. Cypselae c. 1.3 mm, glabrous; epappose. Open places in
secondary and primary forest. ES (Smalla 113, LAGU). 500-1000 m. (Endemic.)

Honduras, Standley 56234 (F). Illustr.: no se encontró. N.v.: Flor de Octubre, H.
Erect perennial subshrubs to 0.5-0.9 m, in clusters at base, moderately branched above
base; roots fibrous from small basal tubers; stems brown to reddish, densely puberulent
with ascending trichomes of uniform size, not hirsute with coarse large-celled trichomes.
Leaves petiolate; blade mostly 2-4 × 1-2.5 cm, ovate to oblong-ovate, less than three
times as long as wide, trinervation at or within 2 mm of base, not becoming longitudinal
distally, without weaker secondary veins nearer base, adaxial surface shiny green,
densely glandular dotted, finely puberulent with reclining trichomes to subglabrous,
abaxially dense whitish tomentum obscuring areoles, glandular-dotted, base obtuse to
acute, margins crenulate, rarely serrulate, apex short-acute to acute; distal leaves usually
reduced and remote; petiole 0.2-0.4 cm. Capitulescence with congested, corymbiform
clusters, usually with opposite basal branches as long as central branch. Capitula c. 5 mm,
70-90-flowered; involucre strongly abruptly rounded proximally; phyllaries c. 25, 4-4.5 ×
c. 0.5 mm, linear, puberulent, densely glandular dotted near bases and apex, with no
obvious scarios margins, apex slender and usually curved; clinanthium epaleate.
Corollas c. 2.5 mm, densely glandular dotted, with few small trichomes, tube 0.8-1 mm.
Cypselae 1.5-2 mm, glabrous; pappus a denticulate corona to 0.3 mm. Pine forest, forest
clearings. H (Molina 13163, US). 800 m. (Endemic.)
Holotype: Mexico, Puebla, Davidse y Davidse 9308 (US!). Illustr.: no se encontró. N.v.: none.

Erect perennial plants mostly 0.4-0.5 m, moderately branched; base with taproot; stems brown to reddish, densely white-puberulent to pilosulose with trichomes of uniform size, not hirsute with intermixed coarse larger trichomes. Leaves petiolate; blade mostly 2.5-5 × 1.5-3.5 cm, ovate, less than three times as long as wide, trinervation from basal 1-2 mm, not becoming longitudinal distally, adaxial surface with green surface mostly visible through dense puberulence, abaxially dense white-tomentum obscuring areoles, gland-dotted when trichomes removed, base obtuse, margins crenate, apex short-acute; petiole mostly 0.8-2 cm. Capitulescence scapose, usually without elongate subopposite or alternate proximal branches, ending in rather congested, corymbiform clusters of few capitula. Capitula 6-7 mm, c. 50-flowered; involucre strongly abruptly rounded proximally; phyllaries c. 25, mostly c. 5 × 0.7-1 mm, narrowly oblong-lanceolate, densely whitish pilosulose, margins narrowly scarious, apex shortly and stiffly acute; clinanthia partially to completely epaleate, sometimes paleate inside only outermost florets. Corollas 3-3.5 mm, sparsely to densely glandular-dotted, lobes sparsely to densely setulose, tube c. 1 mm. Cypsela 2-2.5 mm, glabrous; pappus a denticulate corona to 0.4 mm. 2n = 20. Limestone hills, dry meadows, limestone outcrop, sandy soil in open sun. Ch (expected). Mexico.

Specimens have not been seen from Mesoamerica, but material cited from Chiapas under the name Ageratum tomentosum f. bracteatum Johnston may be this species.


Carelia tomentosa (Benth.) Kuntze.

Erect subshrubs mostly 0.6-2 m, bases not seen; stems reddish brown, densely grayish hispidulous with spreading trichomes of uniform size, not hirsute with coarse large-celled trichomes. Leaves petiolate; blade mostly 2-6 × 1.5-3 cm, ovate, less than three times as long as wide, trinervation from 2-3 mm above base, not becoming longitudinal distally, without weaker secondary veins nearer base, adaxial surface densely hirtellous with mostly erect trichomes and sparsely glandular, abaxial surface densely whitish
tomentellous on veins, pale greenish surface and glandular dots more visible between veins, base rounded, margins serrulate to crenulate-serrate, apex shortly, sharply acute; leaves moderately reduced basally; petiole 0.2-0.6 (-1.5) cm. Capitulescence corymbiform, usually with long, ascending, opposite, basal branches, ultimate clusters rather congested, bracteoles linear. Capitula 4-5 mm, c. 50-75-flowered; involucre rounded proximally; phyllaries c. 22-25, 3-4 × c. 0.5 mm, linear, hispidulous and sparsely glandular, strongly bicostate with narrow scarious margins, apex slender, curved; clinanthium epealeate. Corollas c. 2 mm, gland-dotted and few trichomes, tube c. 1 mm. Cypselae c. 2 mm, glabrous; pappus a very short crown. *Grassy areas and pine forests on mountain slopes*. Ch (Dressler 1633, US); G (Goll 114, US). 900-1200 m. (Endemic.)

5. **Amolinia** R.M. King et H. Rob.

Por H. Robinson.

Erect shrubs or small trees. Leaves opposite, long-petiolate; blade ovate, trinervate from near base, base obtuse or rounded, margins nearly entire. Capitulescence terminal, corymbiform paniculate. Capitula discoid, 20-25-flowered, narrowly campanulate, c. 1 cm; involucre of c. 15 graduated phyllaries in 2-3 weakly subimbricate series, persistent, spreading with age; clinanthium slightly convex, epealeate, surface sclerified, with or without trichomes. Corolla narrowly funnelform, white to lavender, limb without subquadrate cells below the lobes, lobes 5, short-triangular, smooth on both surfaces; anthers with collars elongate, with numerous quadrate cells proximally, cell walls ornate, appendage oblong, slightly longer than wide, not truncate; style base without node, glabrous, branches with appendages linear, mamillose. Cypselae elongate, prismatic, 5-ribbed, with narrow base, densely minutely powdery-glandular, surface minutely glandular and sparsely setulose, carpodium short, distinct; pappus of c. 30 slender persistent bristles, contiguous basally, not broadened apically. 1 sp. Restricted to southern Mexico and Guatemala.


Shrubs or trees 5-10 m, laxly branched; stems densely brown-tomentellous. Leaves petiolate; blade mostly 9-16 × 4-9 cm, apex short-acuminate, adaxial surface minutely puberulent, densely hirtellous on veins abaxially; petiole 3-6 cm. Capitulescence with peduncles mostly 5-10 mm. Capitula with phyllaries 3-6 × 0.7-0.9 mm, pilosulose, apex short-acute. Corollas c. 5 mm, with only few minute glands on lobes. Cypselae 5-7 mm, base attenuated, over 1 mm; pappus bristles mostly c. 5 mm. On mountain slopes and in canyons in rain and cloud forests. Ch (Breedlove y Smith 31931, UC); G (Williams et al. 26893, US). 2000-2400 m. (Endemic.)

Turner reported this species occurring as low as 1300 m elevation, but I have been unable to confirm this report.


Por H. Robinson.

Erect perennial herbs or subshrubs. Leaves usually opposite, usually short-petiolate; blade ovate to narrowly oblong, broad, mostly trinervate, usually crenulate to serrulate. Capitulescence terminal, a flattened corymbiform panicle. Capitula discoid, 9-23-flowered, campanulate; phyllaries 12-18, subimbricate, spirally arranged, unequal, graduated, 2-3-seriate, spreading at maturity; clinanthium plane or slightly convex, epaleate, surface sclerified, glabrous. Corolla narrowly funnelform, usually white, glandular, tube rather narrow, limb without subquadrate cells below the lobes, lobes 5, smooth on both surfaces; anther collars narrow with quadrate cells proximally, cell walls with annular thickenings, appendage longer than wide, not truncate; style base not enlarged, densely puberulent, hirsute, branches with appendages linear, densely short-papillose. Cypselae prismatic with 5 ribs, usually with glands, without setulae, carpopodium distinctly enlarged, essentially symmetric, with enlarged thin-walled cells; pappus of 30-40 persistent scabrous bristles, apical cells blunt, often enlarged. Aprox. 13 spp. mostly in eastern Suramérica, with one species north to Panamá; adventive in south Asia, Indonesia and the Philippines.


Herbs to subshrubs to 3 m, with few branches; stems brownish, densely puberulent to tomentulose. Leaves petiolate; blade to 15 × 6 cm, narrowly ovate to lanceolate, strongly trinervate from near base, adaxial surface slightly rugose, puberulent, abaxially densely puberulent to tomentellous with numerous glandular punctations, base rounded to abruptly cuneate, margin slightly serrulate to crenate-serrate, apex narrowly acuminate; petiole to 1.5 cm. Capitulescence dense corymbiform; peduncles to 3 mm, tomentellous. Capitula 6-7 mm; phyllaries 1.5-6 mm, suborbicular to broadly oblong, apex short acute to rounded, scarious apex. Florets 8-15; corolla 4-4.5 mm. Cypselae 1.8-2 mm, glabrous or with few glands, carpopodium short and broad; pappus bristles 3.5-4 mm, apical cells blunt, not broadened. Roadsides and mountain slopes. P (Croat 12021, MO). 300-2700 m. (Panamá, Colombia, Venezuela, Guayanas, Ecuador, Perú, Bolivia, Brasil, Uruguay, Paraguay, Argentina, Trinidad; adventive in Sumatra, Philippines and Ceylon.)

7. Ayapana Spach

Por H. Robinson.

Erect perennial herbs, vegetative branching basal or lacking. Leaves mostly opposite, sessile or winged to base; blade narrowly ovate to elliptical, pinnately to trinervately veined, margin entire to serrulate. Capitulescence with lax to dense corymbiform or subcymose branches; capitula usually pedunculate. Capitula discoid, (5-)20-40-flowered, campanulate; involucre with phyllaries 15-35, 2- or 5-ribbed, outer phyllaries only 2- or 4- ribs, graduated, subimbricate, persistent, spreading with age; clinanthium slightly convex, epaneate, surface sclerified, glabrous. Corolla narrowly funnelform to nearly tubular, rarely with narrow tube and campanulate throat, white to reddish, veins not thickened, limb without subquadrate cells below the lobes, throats with filament insertions at a uniform level, lobes triangular to oblong, smooth on both surfaces; anther collars cylindrical, cell walls densely transversely ornate; appendage oblong-ovate, longer than wide, not truncate; style base enlarged, glabrous, branches with appendages linear, with long hair-like papillae. Cypselae 1.2-3 mm (ours), prismatic, 5-ribbed, sparsely to densely setulose, without dense minute powdery-glands, carpopodium oblong, shorter than wide, with obvious projecting distal rim, not procurent on ribs, with basal row of distinctly larger cells, cell walls thickened; pappus of 20-40 slender, persistent
bristles with narrow apex and pointed apical cells. Aprox. 14 spp. Mostly in Andean South America with a few species in Central America and eastward to French Guiana and Brasil.


1. Leaves alternate, blades linear to linear-oblanceolate; corollas with narrow tubes and campanulate throat.

3. **A. herreræ**

1. Leaves mostly opposite, blades elliptical to oblong, obovate or lanceolate; corollas narrowly funnelform.

2. Leaves narrowly acuminate apically; corollas whitish to greenish, with short broad lobes.

2. **A. elata**

2. Leaves short-acute to rounded apically; corollas reddish to purplish, lobes distinctly longer than wide.

3. Leaves sessile or very short-petiolate; capitula 21-25-flowered.

4. **A. stenolepis**

3. Leaves usually with narrow petioliform bases; capitula 30-40-flowered.

1. **A. amygdalina**


*Eupatorium barclayanum* Benth.

Herbs or subshrubs mostly 1.5-2 m; stems, leaves, and involucres glabrate or puberulent to hirsute or stipitate-glandular. Leaves opposite, slightly to distinctly imbricate, usually with narrow petioliform bases; blade 5-10(-16) × 2-3(-5.5) cm, oblong to obovate, venation pinnate, surfaces glandular-punctate, base cuneate to slightly auriculate, margins entire to crenate-serrate, apex rounded to short-acute. Capitulescence thyrsoid with cymose branches; peduncles 1-20 mm. Capitula 7-10 mm; phyllaries 30-40, 1-9 mm, 4-5-seriate, mostly narrowly oblong to linear, usually reddish, apex short-acute or apiculate to long-attenuate. Florets 30-40; corolla reddish, 6-8 mm, glabrate proximally, lobes 0.5-1 mm, distinctly longer than wide, glandular, sometimes with a few trichomes. Cypselae 1.5-2.3 mm, with numerous setulae mostly on ribs; pappus bristles c. 35, 3.5-4.5 mm. *Open savannas and mountain slopes*. G (*Kellerman* 7605, US); H


*Eupatorium sprucei* B.L. Rob.

Herbs to 3 m; stems minutely puberulent. Leaves to 25 × to 7 cm, opposite, usually laxly imbricate, narrowly elliptical to lanceolate, venation pinnate, abaxially glandular-punctate and puberulent with short trichomes, auriculate at base, petioliform part narrowly winged becoming broader and indistinct distally, margins entire to serrulate or submedially crenate-serrate, apex narrowly acuminate. Capitulescence thyrsoid with laxly cymose branches; peduncles mostly 3-7 mm. Capitula c. 5 mm; phyllaries c. 25, 1-4.5 mm, c. 3-seriate, ovate to oblong, margins broadly scarious, apex rounded to short-acute. Florets 20-25; corolla c. 3 mm, white to greenish, lobes c. 0.2 × c. 0.2 mm, short, broad, glandular. Cypsela c. 1.5 mm with numerous setulae mostly on ribs; pappus bristles c. 35, 2.5-3 mm. *In thickets, hedgerows, secondary and moist forests.* CR (*Skutch 4019*, US); P (*Fendler 157*, US). 80-1100 m. (Costa Rica south to Mesoamerica, Colombia, Ecuador, Perú.)


Herbs, erect from matted rhizomatous base, mostly 0.3-0.4 m; stems sparsely pilose to subhirsute. Leaves alternate; blade 3-6 × 2-6 mm, linear to linear-oblanceolate, secondary veins weak from near base, sublongitudinal, with numerous glandular dots abaxially, base narrowly cuneate, margins remotely serrulate above, apex acute. Capitulescence laxly cymose; peduncles densely hirtellous with stipitate glands. Capitula 5-6 × 4-5 mm; phyllaries c. 20, 1.5-3 × 0.6-0.9 mm, c. 3-seriate, oblong-elliptical, greenish, apex with few laciniate teeth. Florets c. 20; corolla c. 3 mm, white or reddish, glabrous, tube c. 1.5 mm, narrow, throat c. 0.8 mm, campanulate, lobes c. 0.8 mm, oblong. Cypsela 1.8-2 mm, with numerous setulae mostly on ribs; pappus bristles c. 20, c. 2.5 mm. *Epipetric.* P (*Herrera et al. 1148*, US). 200-400 m. (Endemic.)


Herbs or subshrubs to 1 m; stems densely hirtellous with minutely gland-tipped trichomes. Leaves 4-12 × 0.7-2 cm, opposite, usually crowded and imbricate, sessile or very short-petiolate, oblong-elliptical to oblanceolate, venation pinnate, surfaces obscurely glandular-punctate and densely hirtellous with minutely gland-tipped trichomes, base usually narrowly cuneate and rather petioliform, margins entire or subentire, apex obtuse with a mucro; petiole weakly demarcated, 3-5 mm. Capitulescence thyrsoid with densely cymose branches; peduncles 1-8 mm. Capitula 7-8 mm; phyllaries c. 25, 2-6 mm, 2-3-seriate, linear, hirtellous with many non-glandular trichomes, margin slightly scarious to not at all so, apex attenuate. Florets 21-25; corolla c. 5 mm, reddish to lavender, lobes 0.5-0.7 mm, distinctly longer than wide, sparsely glandular. Cypselae 1.2-1.5 mm, with numerous setulae mostly on ribs; pappus 25 bristles c. 25, 3.5-4 mm. Rain forest. P (Stern et al. 1781, US). 100-700 m. (Panamá, Bolivia.)

8. **Bartlettina** R.M. King et H. Rob.

*Neobartlettia* R.M. King et H. Rob., non Schltr.

Por H. Robinson.

Subshrubs or small trees, branching sparse to moderate; herbage minutely puberulent to tomentose or less commonly glabrous. Leaves opposite, usually long-petiolate; blade ovate or deltoid to lanceolate, broad, trinervate from base or strictly pinnate to more commonly unevenly pinnate to weakly trinervate venation with strongest veins arising distinctly above base, proximal secondary veins often congested, serrate to remotely denticulate, usually with denser pubescence on veins. Capitulescence terminal, with branches usually bearing densely crowded large clusters of more than 25 capitula, all capitula short-pedunculate. Capitula discoid, (5-)20-150-flowered, broadly campanulate; involucre of 15-50 weakly or strongly subimbricate spirally arranged graduated non-stramineous phyllaries, 3-4-seriate or less commonly 4-5-seriate, all phyllaries usually persistent, innermost sometimes deciduous; clinantheum slightly convex, epaneate, with parenchymatous core and sclerified often puberulous to hirsute surface. Corolla narrowly funnelform, white, blue, pink, lavender, or reddish to more commonly lavender, limb without subquadrate cells below the lobes, lobes 5, as wide as long, smooth on both
surfaces, often densely puberulent or glandular; anther collars elongate, with numerous quadrate to short-rectangular cells proximally, walls without strong thickenings, appendage oblong to oblong-ovate, nearly as long as wide or longer, not truncate; style base without node, glabrous, branches narrowly linear to scarcely broader distally, nearly smooth to short-papilllose. Cypselae 1.5-4 mm, prismatic, 5-ribbed, glabrous to sparsely setulose, occasionally glandular, without dense minute powdery-glands, carpopodium slightly to distinctly enlarged, symmetrical, without projecting distal rim, usually with smaller cells near base, larger elongate cells distally and procurent onto enlarged bases of ribs, with thin-walled cells; pappus of 30-40 slender, scabrid, persistent bristles, basally contiguous, rarely broadened distally, apical cells pointed. Aprox. 35 spp. Mexico, Mesoamerica, northern Andes, 1 sp. cultivated as ornamental.


1. Phyllaries mostly 1.5-3.0 mm wide, with broadly rounded apices, in ca, 4-6 series.
   2. Leaf blades pinnately veined, with acute bases; corollas lavender.

1. Phyllaries mostly 0.8-1.3 mm wide, with narrowly rounded to acute apices; weakly 3-4-seriate.
   5. Leaf blades narrowly elliptical, with strictly pinnate venation, secondary veins evenly spaced; stems and leaves glabrous.

2. B. chiriquensis

2. Leaf blades strongly trinervate from bases, corollas white.
   3. Nodes of stem without foliar disks united with bases of petioles; capitula 60-75 flowered; leaf blades sometimes angled at widest part; cypselas glabrous.

14. B. platyphylla

3. Nodes of stem with foliar disks at bases of petioles; capitula 20-25 flowered; leaf blades usually with sharp angles or points at widest part; cypselae glandular.
   4. Leaves with petioles lacking wings except in basal disk, blades usually with strong acute to acuminate angle at widest part.

4. B. hastifera

4. Leaves with petioles winged throughout, blades with or without strong acute to acuminate angles at widest part.

19. B. williamsii
6. Leaf margins serrulate to serrate with short usually close-set teeth; clinanthia glabrous; capitula c. 10-flowered.  
13. B. pinabetensis

18. B. tuerckheimii

5. Leaf blades broadly to narrowly ovate or obovate to subrhomboid or triangular-ovate; with unequally pinnate to strongly trinervate venation, proximal secondary veins often congested; stems and leaves minutely puberulent to tomentose.

7. Cypselae minutely glandular; leaf surfaces eglandular; corolla lobes glabrous.

8. Venation of leaf blades irregularly pinnate; phyllaries densely appressed pilosulous; plants of Guatemala.  
8. B. montgena

8. Leaves with a pair of more strongly ascending secondary veins from near proximal fourth of blades; outer phyllaries tomentellous, inner phyllaries minutely puberulent; plants of Costa Rica.

16. B. silvicola

7. Cypselae glabrous or with few setulae; eglandular; leaf surfaces minutely glandular-dotted abaxially; corolla lobes pilosulous to sparsely puberulent.

9. Leaf blades widest near middle, without strong angle on lateral margins, venation unequally pinnate or subpinnate.

10. Inner phyllaries narrow with apices rounded to obtuse; anther appendages about as long as wide.  
12. B. pansamalensis (p.p.)

10. Inner phyllaries lanceolate with apices acute; anther appendages longer than wide

11. Capitulescence corymbiform, broadly rounded; capitula 40-75-flowered; stems with pith mostly solid.  
17. B. sordida

11. Capitulescence pyramidal panicle; capitula 25-35-flowered; stems broadly fistulous.  
6. B. luxii

9. Leaf blades widest near or below basal 1/3; sometimes with strong angle on margins, venation often strongly trinervate.

12. Capitulescence broadly corymbiform, without leaves or large bracts below lowest branches; capitula 40-75-flowered.

17. B. sordida (p.p.)

12. Capitulescence often pyramidal, with leaves or leafy bracts almost always at basal 2-4 pairs of branches; capitula 5-35-flowered.
13. Clinanthia bearing small to large spines or crests; capitula 5-12-flowered.  

   11. B. ornata

13. Clinanthia without spines or crests; capitula 14-35-flowered.

14. Leaf blades triangular-ovate, with sharp acuminate angles on lateral margins; stems with solid pith.  

   10. B. oresbioides

14. Leaf blades mostly broadly ovate, without sharply pointed angles on lateral margins; stems with or without solid pith.

15. Anther appendages distinctly longer than wide; species of Costa Rica and Panama.

   16. Pappus bristles attenuate apically, nearly smooth and less densely scabrous apically than proximally; corollas pilosulous on lobes and distal part of throat; stems fistulose

   7. maxonii

16. Pappus bristle not attenuate apically, more densely scabrous apically than proximally; corollas pilosulous only on lobes; stem with solid pith.  

   15. B. prionophylla

15. Anther appendage as wide as long; species of Mexico, Guatemala and El Salvador.

17. Leaf blades c. twice as long as wide or longer.

   5. B. hylobia

17. Leaf blades c. half again as long as wide or shorter.

18. Leaf blades broadest near basal 1/4, with bases obtuse to subtruncated; branches of capitulescence ascending, spreading at only c. 35°.

   1. B. breedlovei

18. Leaf blades broadest nearer basal 1/3, with bases rounded to short-acute; branches of capitulescence spreading at 45° angles or more,

   19. Leaf margins coarsely crenate-serrate.

   3. B. guatemalensis

19. Leaf margins closely and sharply mucrono-serrate.

   9. B. oresbia

Holotype: Mexico, Chiapas, *Breedlove 9075* (US!). Illistr.: no se encontró. N.v.: none.


Shrubs to 3.5 m; stems reddish hirtellous, narrowly fistulose. Leaves petiolate; blade mostly 5-9 × 3.5-7.5 cm, broadly ovate, broadest near proximal fourth, subpinnate with congested proximal veins or weakly trinervate or with strongest secondary veins from 5-10 mm above base, adaxial surface dark green, sparsely pilosulous, abaxially minutely glandular-dotted, densely pilosulose on veins, base subtruncate, margins rounded, minutely mucronate-serrulate, without sharply pointed angles, apex short-acute; petiole to 4 cm, slender. Capitulescence pyramidally paniculate with branches ascending, diverging from stem at 35º or less, with leaves or leafy bracts at proximal 3-4 pairs of branches. Capitula 7-8 mm; phyllaries c. 20, to 5-6 × 0.8-1 mm, narrowly lanceolate to linear, acute, apex of inner phyllaries short-acute, scarious; clinanthium glabrous, without spines or crests. Florets 25-35; corolla reddish, 3.5-4.5 mm, lobes as wide as long, pilosulous to sparsely puberulent; anther appendages as wide as long. Cypselae c. 2 mm, glabrous; pappus bristles 4-5 mm, apex moderately attenuate. 2n = 16. *Cloud forests on steep slopes*. Ch (*Breedlove 31188*, US). 2500-3000 m. (Endemic.)

This species was recognized as _Eupatorium tenejapanum_ B.L. Turner by Turner (1997) and as a synonym of _Eupatorium luxii_ by Williams (1976a). Turner (1997) gave the elevational range of this species as 1300-3000 m, but I cannot confirm elevations lower than 2500 m.


Holotype: Panamá, *Cochrane et al. 6288* (WIS!). Illistr.: no se encontró. N.v.: none.

Subshrubs with many branches to 1(-3) m; stems minutely puberulent. Leaves petiolate; blade 4-7.5 × 1.2-1.7 cm, lanceolate, secondary veins few, pinnate, strongly ascending, surfaces sparsely minutely puberulent, base narrowly acute, margins rather remotely mucronate-denticulate to sharply serrate, apex narrowly acuminate; petiole 1-2 cm. Capitulescence diffuse to loosely corymbiform, 1-15 capitula in each group; peduncles 7-20 mm. Capitula c. 8 mm; phyllaries c. 40, 1.5-6 × 1-1.8 mm, 3-4-seriate, oblong to broadly oblong, apex narrowly rounded to obtuse; clinanthium sparsely hirsute. Florets 20-25; corolla c. 4.5 mm, pale lavender, lobes broader than long, sparsely hirsute; anther appendages longer than wide. Cypselae c. 2.3 mm, glabrous; pappus bristles 4.5-5
mm, apex distinctly broadened and more densely scabrid. Lower montane rain forest on west-facing slopes. P (Hammel et al. 6544, MO). 1700-2100 m. (Endemic.)

Holotype: Guatemala, Sketch 1700 (US!). Illust.: no se encontró. N.v.: none.

Shrubs to 3.5 m; stems minutely puberulent, pith solid. Leaves petiolate; blade up to 12 × 8 cm, ovate-rhomboidal, broadest nearer proximal third, trinervate from distinctly above base, adaxial surface sparsely puberulent, minutely glandular dotted abaxially, base subacute, margins coarsely crenate-serrate, without sharply pointed angles, apex short-acute; petiole to 7 cm. Capitulescence broadly pyramidally paniculate with corymbiform branches, branches of capitulescence spreading main axis at 45º or more, with leaves or leafy bracts at proximal 2 pairs of branches. Capitula 7-8 mm; phyllaries c. 18, 2-5 mm, oblong-lanceolate to narrowly oblong, apex obtuse to short-acute; clinanthium glabrous, without spines or crests. Florets c. 20; corolla c. 4 mm, lavender, lobes as wide as long, sparsely puberulent; anther appendages as wide as long. Cypselae 1.8-2 mm, glabrous; pappus bristles 3-3.5 mm, apex slightly attenuate. 2n = 16. Virgin forest and cloud forest, mountain slopes. Ch (Breedlove 7800, CAS); G (Breedlove 8718, F). 2600-3200 m. (Endemic.)

A variant of the species with less rounded teeth occurs in the Sierra de las Minas area of Guatemala: Baja Verapaz: Sharp 45240 (F); El Progresso: Steyermark 43679 (F). This species was treated as a synonym of Eupatorium luxii by Williams (1976a) and of E. oresbium by Turner (1997).


Neobartlettia hastifera (Standl. et Steyerm.) R.M. King et H. Rob.

Subshrubs to 5 m, moderately branched; stems hexagonal, glabrous, pith solid. Leaves petiolate; blade mostly 9-15 × 6.5-14 cm, deltate-ovate, widest near the proximal fifth, strongly trinervate from base, adaxial surface minutely puberulent, glandular-dotted abaxially, base broadly rounded, margins with strong and acute to acuminate angles at widest part, apex narrowly acuminate; petiole 2-4 cm, unwinged, arising from foliar disk around node. Capitulescence corymbiform paniculate, with leaves or leafy bracts at two
or more pairs of branches. Capitula c. 9 mm; phyllaries c. 25, 1-6 × 1.5-2 mm, 5-seriate, apex broadly rounded; clinanthium glabrous. Florets c. 20; corolla c. 6 mm, white, lobes as long as wide, glandular; anther appendages as wide as long. Cypselae 1.8-2 mm, glandular dotted; pappus bristles c. 5 mm, apex moderately attenuate. *Wet forest*. G (King 7361, US); H (Nelson Sutherland, 2008: 167 sub *Eupatorium hastiferum*). 1500-1700 m. (Endemic.)


*Neobartlettia hylobia* (B.L. Rob.) R.M. King et H. Rob.

Weak shrubs to 2 m, branches slender, flexuous; young stems densely puberulent, pith solid. Leaves petiolate; blade mostly 5-9 × 1.5-3 cm, ovate, more than two-thirds to nearly twice as long as wide, without angle on lateral margin, widest near basal third, trinervate from 7-10 mm above base, parallel with proximal margin, minutely sparsely puberulent to subglabrous, abaxially minutely glandular-dotted, base subacute to short-acute, margins with many mucronate-serrations, apex acute to slightly acuminate; petiole mostly 1-3 cm, slender. Capitulescence pyramidally paniculate, as high as wide or higher, branches spreading from main axis at 70-85º, with leaves or leafy bracts at 1-2 basal pairs of branches. Capitula c. 7 mm; phyllaries 15-20, 2-5 × 0.7-1 mm, narrowly oblong, apex of inner ones rather scarious, narrowly rounded; clinanthium glabrous. Florets 14-20; corolla 4.5-5 mm, purple to lavender, lobes as wide as long, sparsely puberulent; anther appendages as wide as long. Cypselae c. 2 mm, glabrous; pappus bristles c. 4 mm, apex slightly attenuate. *Montane forest, heavily wooded ravine*. Ch (Laughlin 537, US). 1300-1500 m. (Endemic.)

This species was treated as a synonym of *Eupatorium oresbium* B.L. Rob. by Turner (1997).


*Neobartlettia luxii* (B.L. Rob.) R.M. King et H. Rob.
Moderately branching shrubs or small trees to 7 m; stems hirtellous with erect reddish trichomes, broadly fistulose. Leaves petiolate; blade 7-17 × 3.5-8 cm, ovate, more than two-thirds to nearly twice as long as wide, without angle on lateral margin, broadest above proximal third of blade, venation subpinnate with few ascending secondary veins more congested near base, adaxial surface sparsely pilosulose, minutely glandular-dotted abaxially, base broadly acute, margins rather evenly serrate below widest part, apex narrowly acuminate; petiole mostly 2-4 cm. Capitulescence pyramidally paniculate, with leafy bracts at proximal 3-4 pairs of branches. Capitula c. 9 mm; phyllaries c. 30, 2-6 × c. 1 mm, ovate to lanceolate, reddish on exposed parts, apex acute; clinanthium hirtellous. Florets 25-35; corolla c. 6 mm, lavender, lobes as wide as long, sparsely puberulent; anther appendages longer than wide. Cypselae c. 2 mm, glabrous; pappus bristles 5.5-6 mm, apex moderately attenuate. By stream in cloud forest. G (Skutch 289, US); H (Molina, 1975: 114 sub Eupatorium luxii). 1500-2700 m. (Endemic.)

Williams (1976a) gave the distribution of this species as southern Mexico to El Salvador, and also placed in synonymy several species (B. breedlovei, B. guatemalensis, B. oresbioides, and B. pansamalensis) recognized here. Thus, the application of the common names used by Williams (1976a) is in doubt. The report of the species in Honduras by Molina (1975) was not verified by me, and may refer to plants I would identify as B. pansamalensis. Turner (1997) excluded this species form the flora of Mexico.


Neobartlettia maxonii (B.L. Rob.) R.M. King et H. Rob.
Freely and divaricately branched undershrubs 3-4 m; stems minutely puberulent, partly fistulose. Leaves petiolate; blade 8-14 × 7-11 cm, broadly ovate, broadest near proximal fourth of blade, trinervate from c. 10 mm above base, adaxial surface sparsely puberulent, minutely glandular dotted abaxially, base broadly obtuse to subtruncate, margins densely serrate, without sharply pointed angles, apex short acute; petiole to 8 cm, slender. Capitulescence weakly pyramidally paniculate, with leafy bracts only at basal pair of branches. Capitula c. 9 mm; phyllaries c. 23, 3-7 × 0.8-1 mm, narrowly oblong to linear, apex of inner phyllaries scarious, narrowly rounded to obtuse; clinanthium glabrous, without spines or crests. Florets 20-25; corolla 5-6 mm, lavender, throat distally
and lobes sparsely puberulent, lobes broader than long; anther appendages nearly twice as long as wide. Cypselae c. 1.5 mm, glabrous; pappus bristles c. 5 mm, apex attenuate and nearly smooth, much less scabrid apically than proximally. *Wet forest. P* (Maxon 4942, US). 1000-1300 m. (Endemic.)


Shrubs or small trees 3-6 m; stems densely villous-pilose, pith solid. Leaves petiolate; blade 11-17 × 5-8 cm, oblong-elliptical to elliptic-ovate, widest near proximal third, venation irregularly pinnate, eglandular, adaxial surface puberulent, abaxially villous-pilosulose or subtomentose, base obtuse, margins slightly serrate-dentate especially toward apex or almost entire, apex acute or short-acuminate; petiole 1.5-3.5 cm, slender. Capitulescence corymbiform paniculate, rounded. Capitula 7-8 mm; phyllaries 15-20, 3-6 × c. 1 mm, ovate to oblong, apex narrowly rounded or obtuse to subacute, densely appressed pilosulose; clinanthium glabrous. Florets c. 10; corolla c. 4 mm, white, lobes glabrous; anther appendages longer than wide. Cypselae (immature) c.1 mm, minutely glandular; pappus bristles (submature) c. 2.5 mm, apex not narrowed. *Moist mountain forest, mountain slopes.* G (Steyermark 32836, F). 2000-3000 m. (Endemic.)

The species is known only from the type and the paratype, which have somewhat immature capitula. The label of the holotype gives the elevation as "2400-3333 m" but the protologue elevation of "2400-3000 m" is taken by me as correct.


*Neobartlettia oresbia* (B.L. Rob.) R.M. King et H. Rob.

Moderately branched shrubs 1.5-3 m; stems with brownish mostly appressed trichomes, often broadly fistulose. Leaves petiolate; blade mostly 8-14 × 6-11 cm, broadly ovate to subrhomboidal, widest near basal third, weakly to distinctly trinervate from 5-15 mm above base, minutely sparsely puberulent to subglabrous, abaxially minutely glandular dotted, base obtuse to subacute, margins closely and sharply mucrono-serrate, usually with large tooth or small angle at widest part, without sharply
pointed angles, apex sharply acute to narrowly acuminate; petiole 3-9 cm, slender.
Capitulescence pyramidal paniculate, branches spreading from main axis 45° or more,
leaves or leafy bracts at proximal 2-3 pairs of branches. Capitula c. 7 mm; phyllaries 20-
24, 3-6 × 0.5-1 mm, narrowly oblong, apex rather scarious, narrowly rounded;
clinanthium glabrous, without spines or crests. Florets 20-30; corolla 4.5-5 mm, usually
lavender, lobes as wide as long, sparsely puberulent; anther appendages as wide as long.
Cypsela c. 2 mm, glabrous; pappus bristles 4-4.5 mm, apex moderately attenuate.

*Barranca in pine-oak forest above stream bed, common in forest.* H (Molina, 1975: 114
sub *Eupatorium oresbium*); ES (Molina y Montalvo 21633, US). 1800-1900 m. (C. y SW.
Mexico, Mesoamerica.)

Turner (1997) included *B. guatemalensis*, *B. hylobia*, and *B. oresbioides* in synonymy
under this species, and give the distribution as Mexico, Guatemala, and El Salvador.

Holotype: Mexico, Oaxaca, *Conzatti 1738* (US!). Illust.: no se encontró. N.v.: none.

*Neobartlettia oresbioides* (B.L. Rob.) R.M. King et H. Rob.

Moderately branching shrubs to 2 m; stems reddish hirtellous to tomentellous, pith
solid. Leaves petiolate; blade mostly 6-10 × 6-10 cm, triangular-ovate, broadest near
proximal fourth of blade, widely trinervate from near 5 mm above base, adaxial surface
subglabrous, abaxially dark minutely glandular dotted, base broadly rounded to
subtruncate, margins with crowded mucronate-denticulations, with sharply acuminate
angles at widest part, sometimes with second marginal point, apex narrowly acuminate;
petiole mostly 2-7 cm, slender. Capitulescence pyramidal paniculate with widely
spreading branches, with leaves or leafy bracts at proximal 2 pairs of branches. Capitula
c. 7 mm; phyllaries 16-18, 3-6 × c. 0.8 mm, lanceolate to linear, apex of most phyllaries
rather scarious, narrowly rounded to obtuse; clinanthium glabrous, without spines or
crests. Florets 15-20; corolla c. 4.5 mm, lavender, lobes as wide as long, puberulent;
anther appendages about as wide as long to slightly longer than wide. Cypsela 1.5-1.8
mm, glabrous; pappus bristles c. 4 mm, apex moderately attenuate. *Ridge with evergreen
cloud forest, bosque mesofilo.* Ch (Breedlove 33552, US). 1800-2300 m. (Mexico
[Oaxaca], Mesoamerica.)
This species was treated as a synonym of *Eupatorium luxii* by Williams (1976a) and of *E. oresbium* by Turner (1997). The report of this species in Honduras by Molina (1975) was presumably based on a misidentification.


Moderately branched shrubs to 3 m; stems brownish puberulent with often evanescent trichomes, fistulose or solid. Leaves petiolate; blade mostly 5-16 × 4-16 cm, broadly ovate to subrhomboidal, broadest near basal 1/3, trinervate from 5-20 mm above base, minutely sparsely puberulent to subglabrous, abaxially minutely glandular dotted, base obtuse, lateral margins sharply serrate, with sharp sometimes acuminate angle at widest part, apex shortly to narrowly acuminate; petiole mostly 1.5-6 cm, slender.

Capitulescence pyramidal paniculate, leaves or leafy bracts at proximal 2 or 3 pairs of branches. Capitula c. 7 mm; phyllaries 16-18, 4-5 × c. 1 mm, narrowly oblong, longer apices scarious, narrowly rounded; clinanthium with short to long spines. Florets 5-12; corolla 4-4.5 mm, usually lavender, lobes as wide as long, sparsely puberulent; anther appendages nearly as wide as long. Cypselae c. 2 mm, glabrous; pappus bristles 3-4 mm, some with moderately attenuate apex. *Disturbed primary cloud forest, edge of forest, wooded ravine.* Ch (*Croat 47339*, US); G (*Smith 2326*, US. 1000-2700 m. (Endemic.)

On the basis of the description and photo, *Eupatorium prionophyllum* var. *asymmetrum* is the same as *B. ornata*. The floral count provided by Robinson (1920)(2-18) is slightly excessive.


Moderately branching shrubs or small trees 2-5 m; stems puberulent, pith usually solid. Leaves usually opposite; blade mostly 6-15 × 2.5-8 cm, ovate to elliptic-ovate, more than two-thirds to nearly twice as long as wide, usually widest above proximal 1/3,
venation unevenly pinnate with ascending secondary veins more crowded near base, adaxial surface sparsely minutely puberulent, subglabrous, abaxially minutely glandular-dotted, base obtuse to short-acuminate, margins densely serrulate to double-serrate, without angle, apex narrowly acuminate; petiole mostly 1.5-4 cm. Capitulescence corymbiform paniculate, broadly rounded, broader than high, with leafy bracts at only proximal 1 or 2 pairs of branches. Capitula 6-7 mm; phyllaries 30-40, 2-6 × c. 0.8 mm, narrowly oblong or lanceolate to linear, longer apex rather scarious, apex of inner ones narrowly rounded to obtuse; clinanthium glabrous. Florets 20-45; corolla 4-4.5 mm, lavender, lobes as wide as long, sparsely puberulent; anther appendages about as wide as long. Cypselae 1.5-1.7 mm, glabrous; pappus bristles c. 4 mm, apex scarcely attenuate. 2n = 16. Evergreen cloud forest, wooded slopes, bordering forest in second growth. Ch (Breedlove 9552, US); G (Standley 6821, US); H (Molina 7695, US); ES (Tucker 1102, US). 1200-2700 m. (Mexico to Mesoamerica.)

This species was treated as a synonym of *Eupatorium luxii* by Williams (1976a), whereas Turner (1997) recognized this species as *E. pansamalense*.


*Neobartlettia pinabetensis* (B.L. Rob.) R.M. King et H. Rob.

Moderately branching shrubs or small trees 2-5 m; stems essentially glabrous, pith solid. Leaves petiolate; blade mostly 7-17 × 2-5 cm, narrowly elliptical, broadest near middle, venation strictly pinnate with evenly spaced arching secondaries, both surfaces including veins essentially glabrous, base narrowly acute, margins closely to rather remotely serrate or serrulate with short, usually close teeth, apex narrowly acute to slightly acuminate; petiole 1-2.5 cm. Capitulescence corymbiform paniculate, broadly rounded, without leafy bracts above lowest pair of branches. Capitula 5-6 mm; phyllaries c. 20, 1.5-6 × 0.8-1.2 mm, oblong or ovate to linear, apex of longer phyllaries rather scarious, narrowly rounded; clinanthium glabrous. Florets c. 10; corolla 3-4 mm, pink or blue to white, lobes as wide as long, glabrous; anther appendages nearly as wide as long. Cypselae c. 1.5 mm, glabrous; pappus bristles 3-4 mm, apex less scabrous attenuate. 2n = 16. Montane cloud forest, steep heavily wooded ridge. Ch (Breedlove 15396, US); G (Standley 67880, F); ES (House 117, MO). 2000-2700 m. (Endemic.)

Neobartlettia platyphylla (B.L. Rob.) R.M. King et H. Rob.

Moderately branched shrubs or small trees to 5 m; stems hirtellous in younger parts, pith solid. Leaves petiolate; blade to 15 × 12 cm, broadly ovate, broadest near proximal fourth, strongly trinervate from at or near base, surfaces glabrate, sparsely glandular dotted, abaxially, base broadly rounded to subtruncate, margins broadly rounded or sometimes angled at broadest part, serrate to weakly double-serrate, apex narrowly short-acuminate; petiole to 9 cm, slender, without foliar disks at bases. Capitulescence pyramidal paniculate with dense corymbiform branches, with leaves or leafy bracts at proximal 3 or 4 pairs of branches. Capitula 15-20 mm; phyllaries c. 40-50, 3-12 × 1.5-3 mm, 4-6-seriate, broadly ovate to oblong, with broadly rounded sometimes erose reflexed apex; clinanthium glabrous. Florets 60-75; corolla 6-8 mm, white, lobes nearly as wide as long, without trichomes; anther appendages nearly as broad as long. Cypselae 2-2.2 mm, glabrous or minutely glandular; pappus bristles c. 6 mm, apex attenuate nearly smooth. Montane evergreen forest, on slopes and in ravines. Ch (Nelson 3765, US); G (Tuerckheim 8415, US); CR (Standley 34651, US); P (Maxon 5051, US). 500-2000 m. (Mexico [Puebla, Veracruz], Mesoamerica).

This species was reported for El Salvador by Weberling y Lagos (1960), but I am unable to verify this report.

Holotype: Costa Rica, Pittier 1705 (GH!). Illustr.: no se encontró. N.v.: none.

Neobartlettia prionophylla (B.L. Rob.) R.M. King et H. Rob.

Laxly branching shrubs or small trees 2-3 m; stems minutely puberulent, pith solid. Leaves petiolate; blade 6-11 × 3.5-6 cm, ovate to narrowly ovate, broadest near proximal third, trinervate with 1-2 pairs of ascending secondary veins in proximal fourth, adaxial surface sparsely minutely puberulent, minutely glandular dotted abaxially, base obtuse to acute, margins sharply and sometimes erosely serrate, without sharply pointed angles, apex shortly or narrowly acuminate; petiole to 5 cm, slender. Capitulescence pyramidal...
paniculate, usually without leaves or leafy bracts above proximal pair of branches. Capitula c. 8 mm; phyllaries 20-30, 2-5 × c. 1 mm, ovate to oblong, apex obtuse or short-acute; clinanthium glabrous, without spines or crests. Florets 22-32; corolla 4-5 mm, lavender, tube and throat glabrous, lobes as wide as long, pilosulous; anther appendages distinctly longer than wide. Cypselae 1.5-2 mm, glabrous; pappus bristles c. 4 mm, not attenuate apically, more densely scabrous apically than proximally. Rain forest, mixed oak forest, in clearings, under bridge. CR (Pittier 1900, US); P (Croat 13724, MO).

1200-2600(-3000) m. (Endemic.)


Moderately branching shrubs 2-3 m; stems densely sordid-tomentose, pith solid. Leaves petiolate; blade 7-15 × 4-10 cm, broadly oblong-ovate, broadest near proximal third, subtrinervate with slightly more ascending veins near proximal fourth or fifth, adaxial surface puberulent to pilosulose, abaxially pilose to subtomentose, eglandular, base obtuse, margins slightly crenate-serrulate, often more serrate toward tip, apex slightly short-acuminate; petiole 3-7 cm, slender. Capitulescence pyramidal paniculate, with leaves or leafy bracts at proximal 2-3 pairs of branches. Capitula c. 8 mm; phyllaries 15-18, 2-7 × 0.8-1 mm, narrowly ovate to linear, apex obtuse to subacute, outermost phyllaries subtomentose, other phyllaries minutely puberulent; clinanthium glabrous. Florets 7-10; corolla c. 5 mm, lobes as wide as long, glabrous or rarely with minute trichomes; anther appendages longer than wide. Cypselae c. 4 mm, minutely glandular; pappus bristles c. 5 mm, apex not narrowed. In forest. CR (Tonduz 11694, US). 1800-2700 m. (Endemic.)


Moderately branched shrubs or small trees 1.5-4; stems reddish to grayish tomentose, pith usually solid. Leaves petiolate; blade mostly 7-18 × 4-15 cm, narrowly oblong to
broadly ovate, broadest near proximal third and middle, venation subpinnate to weakly trinervate from well above base, secondary veins sometimes numerous and congested in basal fourth, surfaces pilose to pilosulose, abaxially minutely glandular-dotted, base obtuse to subtruncate, margins closely serrulate to serrate, apex short-acute to short-acuminate; petiole 2-6 cm. Capitulescence corymbiform, broadly rounded, without leaves or leafy bracts above proximal pair of branches. Capitula 8-10 mm; phyllaries 30-40, 3-6 × 0.8-1 mm, lanceolate to linear lanceolate, apex narrowly acute to short-acute and scarious, densely puberulent; clinanthium minutely hirtellous, sometimes nearly glabrous. Florets 40-75; corolla 5-5.5 mm, lavender, lobes as wide as long, sparsely puberulent, glandular; anther appendages longer than wide. Cypselae c. 1.5 mm, glabrous or with a few setulae distally; pappus bristles 4.5-5 mm, slightly to distinctly attenuate, apex slightly to distinctly less strongly scabrous than proximal part of bristles. 2n = 16.

Primary forest, subevergreen or deciduous secondary forest, steeply wooded slopes, oak-pine forests. Ch (Breedlove 9408, US); G (Lundell y Contreras 20931, US). 300-2500 m. (C. Mexico to Guatemala; cultivated pantropically.)


Neobartlettia tuerckheimii (Klatt) R.M. King et H. Rob.

Moderately branched shrubs or small trees 1.5-5 m; stems essentially glabrous, usually broadly fistulous. Leaves petiolate; blade 7-17 × 1.5-6 cm, narrowly elliptical to lanceolate, broadest near proximal 2/5 or middle, venation strictly pinnate with evenly spaced arcuate secondary veins, surfaces including veins essentially glabrous, base acute, margin remotely serrate with projecting mucronate teeth, apex narrowly acuminate, sometimes caudate; petiole mostly 1-3 cm. Capitulescence corymbiform, broadly rounded, usually without leaves or leafy bracts above basal branches. Capitula 6-7 mm;
phyllaries 30-40, 3-6 × 0.8-1 mm, lanceolate to linear, apex acute to obtuse, inner phyllary apices rather scarious; clinanthium hirsute. Florets 30-40; corolla 3.5-4 mm, lavender, puberulent on distal part of throat and lobes, lobes broader than long; anther appendages as broad as long. Cypselae c. 1.5 mm, glabrous; pappus bristles c. 4 mm, apex scarcely to slightly attenuate. 2n = 16. Cloud forests, primary forest, wooded ravines. Ch (Breedlove y Raven 8242, US); G (Steyermark 43075, F); H (Morton 7262, US). 1300-2600 m. (Endemic.)

Turner (1997) gave the upper elevational limit of this taxon 3000 m, which I cannot confirm.

Holotype: Honduras, Morton 7164 (US!). Illustr.: no se encontró. N.v.: tatascán.
Sparingly branched subshrubs or small trees to 2 m; stem hexagonal, glabrous, pith solid. Leaves petiolate; blade 9-16 × 8-15 cm, deltate-ovate, broadest near proximal third, strongly trinervate from base, adaxial surface scarcely minutely puberulent, minutely glandular-dotted abaxially, base broadly rounded to subtruncate, margins with or without short sharp angle at broadest part, serrate, apex short-acute to short-acuminate; petiole 5-10 cm, distinctly winged throughout, arising from foliar disk around node. Capitulescence an elongate pyramidal panicle, with dense corymbiform branches, with leaves or leafy bracts at many pairs of branches. Capitula c. 12 mm; phyllaries c. 25, 1.5-7 × 1.5-3 mm, c. 5-seriate, orbicular to broadly oblong, margin broadly scarious, apex broadly rounded; clinanthium glabrous. Florets 19-25; corolla c. 7 mm, white, lobes nearly as wide as long, glabrous; anther appendages nearly as wide as long. Cypselae c. 2 mm, minutely glandular; pappus bristles 5-6 mm, apex attenuate. Cloud forest. H (Lagos-Witte et al. 146, US). 1600-2000 m. (Endemic.)


Por H. Robinson.

Moderately to densely branched shrubs. Leaves opposite, with distinct narrow petiole; blade ovate to slightly cordate, trinervate from near base, surfaces with erect non-glandular trichomes, usually with both short- and long-stalked stipitate glands, and glandular dots, never with large sunken glands, crenulate serrate. Capitulescence terminal on leafy branches, with or without proximal opposite branches, ultimate branches
forming dense glomerules of many slender capitula. Capitula discoid, 14-27-flowered, cylindrical; involucre of c. 20 narrow, stiffly herbaceous, eximbricate phyllaries, spreading with age; clinanthium plane, sclerified, somewhat paleate. Corolla narrowly funnelform with broadly cylindrical tube, usually white, lobes 5, triangular, scarcely longer than wide, inner surface smooth with oblong cells, glandular and minimally papillose; anther collars cylindrical with subquadrate cells proximally, walls inornate or weakly transversely annulate distally, appendages oblong, longer than wide; style base without node, glabrous, branches oblong, subcylindrical, c. 8 rows of small rounded to subquadrate cells with thin walls; pappus absent or very rarely with 1-2 bristles. 1 sp. Guatemala and Honduras.

Turner (1997) followed Williams (1976a) by treating *Blakeanthus* as a synonym of *Ageratum*. The one species is restricted to Mesoamerica.


*Ageratum cordatum* (S.F. Blake) L.O. Williams.

Shrubs 1-2 m; densely brownish hirtellous. Leaves petiolute; blade mostly 4-9 × 2.5-7.5 cm, ovate to slightly cordate, trinervate from at or near base, surfaces hirtellous and glandular with stipitate and sessile glands, pubescence denser abaxially, margins crenulate to weakly serrate, apex short-acute to slightly short-acuminate; petiole 0.7-3.5 cm. Capitulecence corymbiform; glomerules of capitula often c. 1 × 2 cm. Capitula c. 6 mm; phyllaries c. 20, mostly 4.5-5 × 0.8-1 mm, hirtellous with white trichomes, apex acute, weakly to strongly reflexed; paleae linear, c. 5 mm. Florets 14-27; corolla 3-3.5 mm, white or faintly purplish in bud. Cypselae c. 1.8 mm, mostly glabrous with glands at apex. *Moist bushy hillside, forested ravine, rocky thicket.* G (Steyermark 42712, F); H (Standley 27597, US); ES (Berendsohn y Araniva de González 1989: 290 - 2). 600-1600 m. (Endemic.)
This species was recognized by Williams (1976a) as *Ageratum cordatum* (S.F. Blake) L.O. Williams. I have been unable to confirm the report of this species in El Salvador by Berendsohn y Araniva de González (1989).

10. **Brickellia** Elliott, nom. cons.


Por H. Robinson.

Erect annual or perennial herbs, subshrubs, or shrubs, unbranched or branched; stems glabrous or pubescent. Leaves opposite or alternate, sessile or petiolate; blade linear, lanceolate, ovate, deltoid, or lobate, venation usually trinervate, abaxial surface gland-dotted, bases acute to cordate; petiole bases not broadened or clasping. Capitulescence usually a thyrsoid panicle, sometimes corymbiform or cymose, capitula rarely solitary. Capitula discoid, sessile to long-pedunculate, campanulate, 4-100-flowered; involucre with phyllaries 14-45, subimbricate, persistent, spreading with age, outer phyllaries rarely herbaceous, progressively shorter and less than half as long as the inner ones; clinanthium flat, epaneate, with sclerified surface. Corolla usually tubular with constricted distal throat, constricted near mouth, narrower than base, scarcely broader than thickened style branched, usually whitish to yellowish, sometimes purplish, without trichomes, occasionally sessile-glandular, lobes ovate-oblong, 1-2 times as long as wide, smooth with oblong cells on both surfaces; anther collars with subquadrate cells proximally, with transverse beaded thickenings on walls, appendages slightly longer than wide, not truncate; style base with enlarged pubescent node, covered with contorted trichomes, branches usually long-clavate, thickened, usually appearing yellow. Cypselae prismatic, 10-ribbed, setulose, carpopodium with slight rim distally, often asymmetric, having small subquadrate to short-oblong cells with thickened walls; pappus of 10-80 usually persistent bristles, smooth and flattened on outer surface, scabrous or plumose on margins, not broadened at apex. 98 sp. in United States, Mexico, and Mesoamerica, and 1 sp. throughout neotropics.

The presence of *B. cavanillesii* (Cass.) A. Gray in Chiapas, as listed by Turner (1997), was not verified by me.

1. Leaves linear to narrowly oblong, alternately inserted; pappus bristles sordid-white to brownish.  

6. **B. scoparia**

1. Leaves oblong to ovate, opposite; pappus bristles white.

   2. Annual herbs; stems glabrous; leaf blades broadly ovate with abruptly short-acuminate apices; capitula 6-7 mm; phyllaries bicostate; style branches filiform, apically tapering.  

   **2. B. diffusa**

   2. Subshrubs or shrubs; stems variously pubescent, less commonly glabrate; leaf blades with obtuse or short-acute apices; capitula 10 mm or more; outer phyllaries 6-8-costate; style branches clavate.

   3. Leaf blades oblong; petioles 0.1-0.5 cm.  

   4. **B. kellermanii**

   3. Leaf blades ovate; petioles 0.2-8 cm.

   4. Outer phyllaries half or more as long as the inner phyllaries, herbaceous or at least mostly so.

   **3. B. glandulosa**

   4. Outer phyllaries progressively shorter, less than half as long as the inner, not herbaceous.

   5. Peduncles puberulent to densely pilose, sometimes with slender stipitate glands among longer trichomes; inner phyllaries to 13 mm, whitish apically; petioles mostly 1-8 cm.  

   **1. B. argyrolepis**

   5. Peduncles densely stout-stipitate-glandular; inner phyllaries to 10 mm, not whitish at tip; petioles 0.2-1 cm.  

   **5. B. paniculata**


   Shrubs 2-3 m; stems puberulent, glabrate. Leaves petiolate; primary leaves 5-15 × 5-10 cm, branch leaves sometimes only 2 × 1 cm, blade ovate, trinervate from base, often in
acute angle, adaxial surface densely pilose, abaxially submentose with pale trichomes and glandular-dotted, base slightly cordate to subtruncate, margins closely crenate-serrulate, apex short-acute; petiole of primary leaves mostly 1-8 cm, slender.

Capitulescence thyrsoid-paniculate with loosely corymbiform clusters of capitula on leafy branches; peduncles puberulent to densely pilose, sometimes with slender stipitate glands among longer trichomes. Capitula 14-16 mm; phyllaries c. 35, > 4 × 2 mm, short-ovate to narrowly lanceolate, chartaceous, puberulent or with small glands, apices acute, broadest outer phyllaries 6-8 costate, outer phyllaries progressively shorter and less than half as long as the inner, inner ones to 13 mm, apex whitish. Florets c. 25; corolla c. 8 mm, creamy-white. Cypselae 4.5-5.5 mm, densely setulose, setulae spreading, also sessile glandular; pappus bristles c. 8 mm, white. 2n = 9. Montane rain forest, oak-pine forest and roadside vegetation, dry thicket, partial shade. Ch (Ton [aka Mendez] 634, US); G (Croat y Hannon 64753, MO); H (Molina 11337, US); ES (Berendsohn y Araniva de González, 1989: 290 - 2); N (Dillon et al., 2001: 299); CR (King 6431, US); P (Wilbur 24325, US). 1100-3400 m. (Mexico [Oaxaca], Mesoamerica.)


Eupatorium diffusum Vahl, Symb. Bot. 3: 94 (1794). Type: "America meridionali" (C?).

Illustr.: Pruski, Fl. Venez. Guayana 3: 221, t. 175 (1997). N.v.: Culantrillo, Ch; arito, botoncillo, sabanera, sierra picuda, visquita, G; pico de alacrán, pie de paloma, plumon, ES.


Sparingly branched annual herbs to 2 m; stems yellowish to slightly reddish, glabrous. Leaves petiolate; blade mostly 3-10 × 2.5-11 cm, broadly ovate, trinerved from acute base, adaxial surface sparsely pilose, abaxially with numerous oblong or reniform glandular dots, base acute, laterally becoming broadly rounded or subtruncate, margins closely serrate-dentate, apex abruptly short-acuminate; petiole to 6 cm, slender.
Capitulescence a lax profusely branching elongate panicle with paniculate branches; peduncles glabrous. Capitula 6-7 mm, slender; phyllaries c. 20, 1.5-6 × ≤ 1 mm, lanceolate to linear-lanceolate, chartaceous, bicostate, glabrous. Florets 8-14; corolla 4-5 mm, whitish; style branches filiform, apically tapering. Cypselae 1.5-2 mm, densely setulose, setulae appressed; pappus bristle 4-4.5 mm, white. 2n = 9. In thicket, in clearing, roadside, old field. T (Cowan 4701, MO); Ch (Pruski et al. 4196, MO); Y (Gaumer 24181, US); G (Heyde y Lux 4198, US); H (Molina 674, US); ES (Calderón 219, US); N (Baker 2167, US); CR (Skutch 3988, US); P (Williams 710, NY). 5 -1800 m. (Mexico, Mesoamerica, Colombia, Venezuela, Ecuador, Perú, Bolivia, Brasil, Paraguay, Argentina, Cuba, Hispaniola, Trinidad.)

The type citation of "South America, Forsskál" by King y Robinson (1975) is in error as Forsskál never collected in the Americas.


Subshrubs or shrubs 1-3 m; stems hirsutulous, with internodes often short, c. 2 cm, especially in capitulescence. Leaves: primary ones 4-10 × 2.5-6 cm, many secondary ones c. 2 × 1 cm, blade ovate, trinerved from base, surfaces densely pilosulose, more densely glandular dotted abaxially, base broadly rounded to subtruncate, margins crenulate-serrulate, apex short-acute; primary petiole 1-2 cm. Capitulescence thyrsoid with many opposite primary and secondary branches; peduncles densely stipitate-glandular. Capitula 12-14 mm; phyllaries 18-20, 5-7 × 1.5-2.5 mm, outer ones herbaceous or at least mostly so, half or more as long as the inner, 6-8-costate, inner ones 5-12 × 0.8-1.5 mm, chartaceous, mostly 4-costate, surfaces with many stipitate glands. Florets 22-25; corolla 5.5-7 mm, creamy white. Cypselae 2.5-3.5 mm, densely setulose, setulae ascending; pappus bristles c. 6 mm, rather easily deciduous, white. 2n = 9. Humid montane forest, between rocks on side of cliff, shrubby slope. Ch (Ton [aka Mendez] 2194, US); G (King 7385, US); H (Standley 56501, US); ES (Velasco 8900, US); N (Baker 2163, US). 600-1800 m. (SW. Mexico to Mesoamerica.)

*Brickellia kellermanii* f. *podocephala* B.L. Rob.

Slender shrubs 1-1.5 m; stems densely puberulent to hirtellous. Leaves petiolate; leaves 3.5-5 × 1.2-2.5 cm, secondary leaves mostly 0.8-2 × 0.3-0.7 cm, blade oblanceolate, primary trinervate from near base, both surfaces pilosulose and glandular dotted, base and apex obtuse or short-acute, margins serrulate; petiole 0.1-0.5 cm. Capitulescence thyrsoid-paniculate with spicate or racemose branches; peduncles short to elongate, puberulent to hirtellous. Capitula 12-14 mm; phyllaries c. 30, 2-12 × to 1.5-1.8 mm, chartaceous, often reddish, apex cuspidate, outer and broadest phyllaries 6-8 costate, pilosulose and glandular dotted mostly in distal median surface. Florets c. 12; corolla c. 5.5 mm. Cypselae c. 3 mm, densely setose, setulae erect-spreading; pappus bristles mostly c. 6 mm, white. *Rocky pine forest, pine tree savanna, in dense brush.* Ch (Breedlove, 1986: 43); B (*Innes 168*, US); G (*Kellerman 6127*, F); H (*Swallen 10913*, US); N (*Dillon et al., 2001: 300 sub B. oliganthes*). 300-2000 m. (Endemic.)

The report of *Brickellia kellermanii* in Chiapas by Breedlove (1986) is based on five Breedlove collections (#s 7629, 20100, 23427, 33415, and 33503) not seen by me. Turner (1997) and Dillon et al. (2001) treated this species as a synonym of *B. oliganthes* (Less.) A. Gray.


Shrubs 1-2 m; stems densely puberulent to densely stipitate-glandular. Leaves petiolate; primary blade 3-6 × 2.5-5 cm, ovate, trinervate from base, both surfaces glandular dotted, denser abaxially, adaxial surface densely pilosulose, abaxially densely pilosulose to tomentose, base subtruncate to slightly cordate, margins crenulate to dentate, apex short-acute; petiole 0.2-1 cm. Capitulescence thyrsoid-paniculate with many opposite racemose branches; peduncles densely stout-stipitate-glandular. Capitula 10-13 mm; phyllaries 18-20, 2-10 × 1-1.5 mm, chartaceous, in part stipitate-glandular,
outer and broader phyllaries 6-8 costate, inner ones not whitish apically. Florets c. 18; corolla c. 7 mm. Cypselae 2.7-3 mm, densely setulose, setae ascending; pappus bristles c. 6 mm, white. \(2n = 9\). Dry oak woods, pinewoods, mixed forest, open pasture, roadsides. Ch (Goldman 754, US); G (Kellerman 4750, US); H (Burch 6151, US); ES (Standley 20384, US); N (Molina 20618, US). 50-2700 m. (SW. Mexico to Mesoamerica.)

The citations by Williams (1976a) and Dillon et al. (2001) of this species in Costa Rica are possibly misdeterminations of material referable to \(B. \text{argyrolepis}\). \(Brickellia \text{adenocarpa}\), \(B. \text{argyrolepis}\), \(B. \text{guatemalensis}\), and \(B. \text{adenocarpa var. glandulipes}\) B.L. Rob. were treated by Williams (1976a) as synonyms of \(B. \text{paniculata}\). Dillon et al. (2001) treated \(Brickellia hebecarpa\) (DC.) A. Gray as a synonym of \(B. \text{paniculata}\).


\(Clavigera scabra\) Benth., \textit{Coleosanthes scoparius} (DC.) Kuntze.

Virgate subshrubs mostly 1-1.5 m; stems densely short-hispidulous. Leaves alternate, subsessile; blade 1-6 × 0.2-0.6 cm, linear to narrowly oblong, venation pinnate or weakly trinervate with short submarginal veins from near base, surfaces sparsely puberulent and glandular dotted, base and apex short-acute, margins entire; petiole less than 0.2 cm. Capitulescence an elongate thyrsoid panicle with numerous alternate ascending branches, capitula corymbiform to racemose on branches; peduncles densely puberulent. Capitula 10-12 mm; phyllaries c. 24, mostly 1.5-9 × 1-1.3 mm, chartaceous, mostly 4-costate, glabrous or apex sometimes glandular, margins hyaline, apex apiculate, outer phyllaries not herbaceous, progressively shorter and less than half as long as the inner. Florets 9 or 10; corolla c. 7 mm, whitish, lobes glandular; style branches linear. Cypselae c. 3.5 mm, sparsely setulose; pappus bristles c. 7 mm, sordid white to brownish. \(2n = 9\). \textit{Semihumid forest, oak woods, grassy slopes, lava field, damp limestone hillside}. Ch (Laughlin 2979, US); G (Seler 3023, US). 800-3000 m. (W. Mexico, Mesoamerica.)

11. \textbf{Campuloclinium} DC.

\textit{Eupatorium sect. Campuloclinium} (DC.) Benth. ex Baker

Por H. Robinson.
Erect coarse herbs or subshrubs, often from tuberous bases; stems usually hirsute. Leaves opposite or alternate, sessile or on narrowly winged petiole; blade ovate to narrowly oblong or narrowly elliptical, surfaces gland-dotted. Capitulescence cymose to corymbiform, capitula few to many. Capitula medium-sized to large, discoid, 30-120-flowered; phyllaries 15-30, eximbricate or weakly subimbricate, 2-3-seriate, not obviously gradated, mostly subequal, with few shorter outer phyllaries, often broad, persistent; clinanthium conical or highly rounded, wider than high, epaleate roughly sclerified with small prominences at cypsela vascular traces, without ridges, not fistulose. Corolla narrowly funnelform, pink to purple, limb only slightly broader than tube, lobes 5, broadly triangular, usually with rounded mamillose or papillose cells inside, slightly to strongly papillose; anther collars with subquadrate cells proximally, with dense transverse, oblique or vertical thickenings on walls, appendages oblong-ovate, to 1.5 times as wide as long, not truncate; style base without distinct node, usually pubescent, branches broadly linear, flat, mamillose or papillose. Cypselae 4-7 mm, prismatic, faces and ribs discolorous, faces black, ribs 5, prominent, pale, strongly setulose, base stipitate, carpopodium enlarged, a short-cylindrical ring, cells large and short, 6-8-seriate, walls slightly thickened; pappus of 25-40 persistent scabrous bristles, not broadened apically. 14 spp. mostly in Brasil, one species ranging north to Mexico and escaping in South Africa.

The species was not reported in Guatemala by Williams (1976a).


Eupatorium albertinae Ant. Molina.

Coarse herbs 0.5-1 m, usually unbranched above base; stems stiffly hirsute. Leaves opposite to often alternate distally; blade 3-9 × 1-4 cm, decrescent distally, narrowly ovate to narrowly elliptical, weakly trinerved, secondary veins few, strongly ascending, surfaces coarsely pilose mostly on veins and margins, base acute, becoming narrowly acuminate, margins serrate, apex obtuse; petiole 0.5-2 cm, winged distally. Capitulescence subscapose, weakly cymose, capitula few to several, large. Capitula 12-18
× 12-18 mm; phyllaries c. 20, 8-14 × 3-6 mm, broadly elliptical, usually purplish, densely hirsutulous. Florets usually 90-120; corolla c. 5 mm, purple. Cypselae 5-6 mm; pappus bristles 4.5-5.5 mm, sordid. *Open meadow, old pasture.*

T (Cowan, 1983: 25 sub *Eupatorium macrocephalum*); Ch (Matuda 3816, US); G (Aguilar H. 113, MO); H (Davidse y Pohl 2427, MO). 80-1300 m. (C. Mexico to Honduras, Colombia, Bolivia, Brasil, Uruguay, Paraguay, Argentina; escaping in South Africa.

Perez et al. (2005: 84) erroneously cite Matuda 3268 (now determined as *Hebeclinium macrophyllum*) as documenting this taxon in Tabasco.

12. Carminatia Moc. ex DC.

Por H. Robinson.

Erect annual herbs, with few or no branches from base, short-taprooted or short-procumbent; stems with pubescence often in lines. Leaves opposite, with slender petiole; blade broad, trinerved from at or near base, eglandular. Capitulescence spicate in aspect, capitula single or clustered at nodes, usually sessile or on short lateral peduncles. Capitula discoid, 10-11-flowered; phyllaries c. 20, subimbricate, unequal, c. 3-seriate, persistent, spreading with age, lanceolate, with hyaline margins; clinanthium flat, epaleate, with sclerified surface, glabrous. Corolla white, tubular to narrowly funnelform, veins greatly thickened toward base, lobes 5, triangular to oblong-ovate, smooth with oblong cells on both surfaces; anther collars with subquadrate cells proximally, with weak annular thickenings on walls, appendages slightly longer than wide; style base not enlarged, glabrous, branches narrowly linear to scarcely clavate, slightly mammillose. Cypselae prismatic, 5-ribbed, minutely spiculose, carpopodium annuliform, with one series of enlarged narrow cells, walls thickened; pappus of 9-13 plumose bristles, partially fused at base, often deciduous in groups, bristles flattened and plumose by long flexuose marginal cells. 3 spp. Arizona, Mexico, Guatemala, and El Salvador.


1. Corollas narrowly funnelform, broadened above basal constriction, 0.7-1 mm diam. distally when pressed; capitula 1.6-1.8 cm; cypselae 5.5-7 mm, tapering in distal 1/3.

1. C. recondita
1. Corollas tubular, not broadened above basal constriction, less than 0.5 mm diam. distally; capitula 1.2-1.5 cm; cypselae 4-5.3 mm, not tapering in distal 1/3.

2. *C. tenuiflora*


*Brickellia recondita* (McVaugh) Keil et Pinkava.

Herbs 0.5-1.2 m; stems laxly pilose. Leaves petiolate; blade 2-9 × 2-11 cm, broadly ovate, trinervate from base of basal acumination, surfaces sparsely pilose, base subtruncate with short central acumination, each margin with 8-20 crenations or serrations, apex short acuminate; petiole mostly 1-4 cm. Capitulescence a compound spike, non-flowering proximal stem 10-30 cm, from half to one and a half times as long as spike, spike often strongly secund. Capitula 16-18 mm, spreading or nodding at anthesis; involucre 14-16.5 mm; phyllaries 2-15 × 1-1.5 mm. Florets 10-11; corolla narrowly funnelform, broadened above basal constriction, 7.5-9 × 0.7-1 mm distally when pressed; appendaged anthers 1.1-1.4 mm. Cypselae 5.5-7 mm, tapering and setulose in distal 1/3; pappus bristles 6-7 mm. 2n = 10. *Wooded ravines, forested or rocky slopes, river bluffs, pine or oak forest*. Ch (Cronquist 9667, NY); G (Heyde y Lux 4205, US); H (Pruski y Clase, 2012: 13); ES (*Calderón 1296*, US). 400-1800 m. (Pacific slopes from Nayarit, Mexico to Mesoamerica.)


*Brickellia tenuiflora* (DC.) Keil et Pinkava.

Herbs 0.5-1.4 m; stems laxly pilose. Leaves petiolate; blade 1.5-6(-9) × 1.2-7(-11) cm, broadly ovate, trinervate from base, surfaces sparsely pilose, base subtruncate central acumination to obtuse, each margin with 10-20 crenations or serrations, apex short acute to shortly bluntly acuminate; petiole mostly 1-4 cm. Capitulescence a compound spike, non-flowering proximal stem 5-15 cm, often a third as long as spike, spike mostly not secund. Capitula 12-15 mm, often ascending in early anthesis; phyllaries 2-13.5 mm, inner 11-33.5 × 1-1.5 mm. Florets c. 11; corolla less than 0.5 mm diam. distally, tubular, not broadened above basal constriction; appendaged anthers 0.7-0.8 mm. Cypselae 4-5.3
mm, not tapering in distal 1/3, glabrous distally; pappus bristles 6-7 mm. 2n = 10. On
bank, wet thicket and forest, deep canyon. G (Standley 81239, F). 1500-2400 m. (S.
Arizona, Pacific slopes in Mexico, disjunct to Mesoamerica.)

The report of the occurrence of *Carminatia tenuiflora* DC. in El Salvador by Standley
y Calderón (1925) and Williams (1976a) are presumably based on misdeterminations of
*C. recondita*.

13. Chromolaena DC.


Por H. Robinson.

Erect to rather scandent perennial herbs, shrubs or small trees, sparsely to densely
branched, sometimes from tuberous bases; stems usually pubescent. Leaves usually
opposite, sessile or petiolate; blade ovate or triangular to elliptical or linear, trinervate
from at or near base to rarely pinnate with secondary veins all ascending from distinctly
above blade base or unicostate. Capitulescence usually thyrsoid or candelabiform,
seldom with solitary capitula on long peduncles. Capitula cylindrical or campanulate,
discoid, 6-75-flowered; involucres typically more than twice as long as wide; phyllaries
18-65, imbricate, unequal, graduated, 4-6-seriate, remaining appressed until falling, not
spreading when dry or aged, all eventually deciduous, leaving bare clinanthia, outer ones
falling first; clinanthium flat to slightly convex, usually epauleate or rarely paleate. Corolla
rather cylindrical to narrowly funnelform, typically included in involucre, white, blue,
lavender or purple, lobes 5, triangular, 1-2 times as long as wide, papillose or sometimes
smooth inside, usually with distal cap of sclerified cells; anther collars often broadened
proximally, with many subquadrade cells bearing transverse, oblique or vertical
thickenings on walls, appendage longer than wide, not truncate; style base not enlarged,
glabrous, branches with appendages linear, slightly mamilllose to densely long-papilllose.
Cypselae prismatic, 3-5-ribbed, setulose, sometimes glandular, carpopodium short-
cylindrical or narrowed proximally; cells small, mostly subquadrade or broader, outer
layer of thick-walled cells in 7-10 tiers, larger sclerified cells inside; pappus of c. 40
persistent scabrid bristles, apex acute, not or scarcely broadened. Aprox. 165 spp. mostly
in or near Brasil, with species in the southeast United States, Mexico and West Indies.
1. Leaf blades pinnately veined, with ascending secondary veins all from distinctly above bases.

2. Clinanthia of capitula paleate; phyllary apices slightly cucullate; leaves subsessile, petioles 0.1-0.3(-0.8) cm, blades subamplexicaule basally.

9. C. opadoclinia

2. Clinanthia of capitula epaleate; phyllary apices flat; leaves petiolate, petioles 0.3-2 cm, blades acute to narrowly rounded basally.

3. Secondary veins of blades usually 4-6 pairs, rather evenly spaced, petioles 0.3-1 cm.

3. C. glaberrima

3. Secondary veins of blades usually 3 pairs, unevenly spaced, petioles 0.5-2 cm.

10. C. quercetorum

1. Leaf blades trinervate from at or near bases.

4. Involucres less than twice as long as wide; corollas exserted beyond involucres for half or more of their length; corolla lobes without large sclerified caps outside distally, smooth on inner surfaces.

5. Leaves trinervate from bases of blades, surfaces with veinlets not prominulous, abaxial surfaces densely glandular dotted. 2. C. collina

5. Leaves trinervate from 3-7 mm above bases of blades, both surfaces with prominulous veinlets, abaxial surfaces sparsely glandular dotted.

4. C. hypodictya

4. Involucres more than twice as long as wide; corollas mostly included in involucre; corolla lobes usually with distinct sclerified caps distally (lacking only in C. ivifolia), papillose on inner surfaces.

6. Plants with stems and peduncles glabrous or essentially so.

6. C. laevigata

6. Plants with at least peduncles minutely puberulent to pilose.

7. Inner phyllaries apices highly differentiated, rather expanded, often lavender apices; leaf blades lanceolate to narrowly elliptical.

5. C. ivifolia
7. Apices of inner phyllaries not differentiated; leaf blades usually ovate to deltoid to rhombic-ovate.

8. Phyllary apices narrowly acute.

1. **C. breedlovei**

8. Phyllary apices rounded or obtuse.

9. Branches of capitulescences mostly ascending at 45-55º, branchlets usually bearing only 2 or 3 capitula; cypselae faces and ribs minutely setulose.

7. **C. lundellii**

9. Branches of capitulescences mostly spreading at 70-90º, bearing clusters of numerous capitula; cypselae with setulae only on ribs.

8. **C. odorata**


Holotype: Mexico, Chiapas, *Breedlove 7936* (NY!). Illustr.: no se encontró. N.v.: none.

*Eupatorium breedlovei* (R.M. King et H. Rob.) B.L. Turner.

Moderately branched scrambling shrubs with stems to 2 m; stems minutely puberulent. Leaves petiolate; blade 2-8 × 1-3 cm, ovate, trinervate from at or near base, adaxial surface sparsely pilose, densely reddish glandular dotted abaxially, base acute to truncate, margins with c. 5 slight or coarse teeth, apex narrowly acute; petiole 0.5-1 cm. Capitulescence candelabriform, branches spreading at 50-90º; peduncles hirtellous to pilosulose. Capitula 12-16 mm; phyllaries c. 27, 3-14 mm, narrowly acute, inner phyllaries apex not differentiated; clinanthium epalete. Florets 19-25; corolla 6-7 mm, lavender, lobes with distal sclerified cap, papillose inside. Cypselae 6.5-7.2 mm, 5-angled, ribs yellow when mature, setulose; pappus bristles 5.5-6.5 mm, slightly broadened distally. *Seasonal evergreen forest, degraded deciduous forest on rocky slope.*

Ch (*Davidse et al. 30140*, MO). 400-1700 m. (Mexico [Oaxaca], Mesoamerica.)


Moderately branched shrubs and small trees 1-6 m; stems densely grayish puberulent, glabrescent. Leaves petiolate; blade mostly 4-12 × 2-7 cm, triangular-ovate, trinervate
from base, often bordering basal acumination, veinlets not prominulous on either surface, adaxial surface minutely puberulent, more strongly puberulent to pilosulose abaxially, densely yellowish glandular dotted abaxially, base broadly obtuse to truncate, margins serrulate to subentire, apex narrowly short-acuminate; petiole 1-3 cm. Capitulescence broadly corymbiform; peduncles puberulent to pilosulose. Capitula 6-9 mm; involucres less than twice as long as wide; phyllaries c. 20, 2-6 mm, obleng, greenish with some violet tinge, apex mostly obtuse, densely puberulent; clinanthium epaleate. Florets 24-46; corolla 4-4.5 mm, whitish, exserted beyond involucre for half or more of length, lobes without large distal sclerified cap outside, smooth on inner surface. Cypselae c. 4 mm, 5-angled, ribs concolorous, setulose on ribs and narrow base; pappus bristles c. 4 mm, not or scarcely broadened distally. 

Heavily wooded slope, grassy slope with Quercus, oak-pine forest, cloud forest, open dry bank. Ch (Ton [aka Mendez] 1459, US); G (Skutch 1991, US); H (Standley 55874, US); ES (Berendsohn et al, 1989: 290 - 3); N (Molina 20161, US); CR (Wilbur y Stone 9718, US); P (D'Arcy y Sytsma 14289, MO). 50-2100 m. (Mexico, Mesoamerica.)

The citation by McVaugh (1984) of *Eupatorium collinum* var. *mendezii* (DC.) McVaugh occurring Chiapas refers to material of *C. collina*.


Moderately branched 1-3 m; stems puberulent to hirtellous, glabrescent. Leaves petiolate; blade mostly 8-19 × 1.5-5 cm, oblong-lanceolate, venation pinnate, secondary veins 4-6 pairs, rather evenly spaced, surfaces with minutely prominulous reticulation, subglabrous adaxially, subglabrous to puberulent abaxially, minutely glandular-dotted, base acute to narrowly rounded, margins closely serrulate, apex narrowly acute to acuminate; petiole 0.3-1 cm. Capitulescence broadly and dense corymbiform; peduncles pilosulose. Capitula 8-10 mm; phyllaries c. 50, 3-8 mm, oblong to linear, brownish sometimes violet tinged, apex obtuse to obtuse, flat, mostly glabrous; clinanthium epaleate. Florets c. 40; corolla c. 4.5 mm, whitish, lobes without distal sclerified cap,
smooth inside. Cypselae c. 2.8 mm, 5-angled, sparsely spiculiferous, ribs often whitish; pappus bristles 4-4.5 mm, not or scarcely broadened distally. $2n = 10$. Mixed secondary forest in ravine, wooded hill, rocky hill, open areas on upper slopes, llanos. Ch (Croat et al. 65015, MO); B (Bartlett 11607, US); G (Pruski et al. 4544, US); H (Molina 18446, US); N (Dillon et al., 2001: 323 sub Eupatorium glaberrimum); CR (Pittier 3268, US). 55-1600 m. (C. Mexico, Mesoamerica.)

Williams (1976a) treated C. opadoclinia as a synonym of C. glaberrima.


Moderately branched shrubs c. 3 m; stems glabrous. Leaves petiolate; blade 5-9 × 4-6 cm, broadly ovate, trinervate from 3-7 mm above base, both surfaces with prominulous close reticulum of veinlets, adaxial surface thinly pilosulous, abaxially more densely pilosulose, sparsely glandular dotted, base rounded to subtruncate, margins obscurely crenate-serrate to subentire, apex acute or acuminate; petiole 1-2 cm. Capitulescence broadly dense corymbiform; peduncles sparsely tomentose. Capitula c. 10 mm; involucres less than twice as high as wide; phyllaries c. 20, 3-7 mm, oblong, apex obtuse, sordid-puberulent; clinanthium epaleate. Florets c. 25; corolla c. 5 mm, whitish, exserted beyond involucre more than half their length, lobes without large distal sclerified caps outside, smooth on inner surface. Cypselae c. 3 mm, 5-angled, glabrous; pappus bristles c. 5 mm, scarcely broadened at apex. G (Nelson 3595, GH). 900-1200 m. (Endemic.)

Williams (1976a) reports the plant to elevations of 2100 m, which may merely represent a typographical error for 1200.


Osmia ivifolia (L.) Sch. Bip.

Sparingly to moderately branched perennial herbs c. 1 m; stems sparsely hirsute. Leaves petiolate; blade mostly 3-6 × 0.6-2 cm, lanceolate to linear, trinervate from near base, adaxial surface scabridulous, densely yellowish to brownish glandular abaxially, base narrowly acute, margins remotely serrulate to subentire, apex narrowly acute to
acuminate; petiole 0.1-0.5 cm. Capitulescence multiltiered, corymbiform, candelabriform, branches usually ascending at 30-45°; peduncles puberulent. Capitula c. 8 mm; phyllaries c. 30, 1-5 mm, oblong, apex rounded to subtruncate, outer phyllary apices greenish-herbaceous, slightly recurved, puberulent and glandular, apex of inner phyllaries glabrous, scarious, highly differentiated, rather expanded, often lavender; clinanthisum epalecte. Flores c. 25; corolla c. 4 mm, usually lavender, lobes without obvious distal sclerified tip, papilllose inside. Cypselae 2-2.8 mm, 5-angled, short-setulose mostly on pale ribs; pappus bristles c. 4 mm, not broadened distally. $2n = 100$. Old pasture, meadow, roadside. Ch (Nelson 3260, US); G (Heyde y Lux 6156, US); H (Standley 18956, US); P (Pittier 2903, US). 60-1400 m. (SE. United States, Mexico, Mesoamerica, Colombia, Venezuela, Guyana, Ecuador, Perú, Bolivia, Brasil, Uruguay, Paraguay, Argentina, West Indies.)


Moderately branching perennial herbs or shrubs to 2 m; stems essentially glabrous. Leaves petiolate; blade 4-10 × 1.5-4 cm, elliptical, trinervate from base, surfaces glabrous, with prominent veins, with viscid glandular dots abaxially, base acute to slightly acuminate, margins serrate, apex acute to short-acuminate; petiole mostly 0.3-0.8 cm. Capitulescence broadly rather densely corymbiform; peduncles glabrous. Capitula c. 10 mm; phyllaries 25-30, 1-8 mm, oblong to narrowly oblong, glabrous, apex rounded; clinanthisum epalecte. Flores 15-20; corolla c. 5 mm, pale lavender, lobes with minute distal sclerified cap, papilllose inside. Cypselae c. 3.5 mm, 5-angled, ribs pale, scabridulous; pappus bristles c. 5 mm, slightly broadened distally. $2n = 20$. Pine forest, slope along stream, second growth, wet thicket, roadsides and waste places. Ch (Breedlove 57195, US); C (Martínez et al., 2001: 24); G (Kellerman 7334, US); H (Morton 7667, US); ES (Calderón 2452, US); N (Dillon et al., 2001: 325 sub *Eupatorium laevigatum*); CR (Skutch 2176, US); P (Pittier 5300, US). 10-1600 m. (C. Mexico, Mesoamerica, Colombia, Venezuela, Ecuador, Perú, Bolivia, Brasil, Paraguay, Argentina, Trinidad.)

Moderately branching perennial shrubs to 0.7 m; stems minutely puberulent. Leaves petiolate; blade mostly 2-4.5 × 0.9-2.3 cm, ovate to narrowly ovate, trinervation from very near base, surfaces sparsely puberulent, abaxial surface often without distinct glandular dots, base subacute to short-acute with short acumination, margins with few crenate serrations, apex subacute to narrowly rounded; petiole 0.3-1 cm. Capitulescence rather diffuse, with branches ascending mostly at 45-55º, usually only with 2 or 3 capitula at apex of branchlets; peduncles minutely puberulent. Capitula 9-10 mm; phyllaries c. 25, 1-5 mm, oblong to narrowly oblong, apex rounded, glabrous, apex of inner phyllaries not differentiated; clinanthium epaleate. Florets 25-30; corolla 3.5-4.5 mm, bluish, with distal sclerified cap, papillose inside. Cypselae c. 3.5 mm, 5-angled, minutely setulose on faces and ribs; pappus bristles c. 3.5 mm, slightly but distinctly broadened at apex. Y (*Lundell y Lundell 7977*, US); C (Martínez et al., 2001: 24); B (*Davidse y Brant 32679*, MO); G (*Contreras 7278*, US). 1-200 m. (Endemic.)

The Davidse and Brant specimen from Belize has the habit of *Chromolaena lundellii*, but the glandular punctations on the leaves as in *C. odorata*. The capitula are too immature to show cypselae pubescence.


Moderating branching perennial herbs to reclining shrubs to 3 m; stems glabrous to hirsute. Leaves petiolate; blade 3-9 × 1-5 cm, deltoid to rhombic-ovate, mostly trinervate from or near base, adaxial surface pilosulose to subglabrous, abaxially, sparsely to densely puberulent, usually densely reddish glandular-dotted, base acute to subtruncate,
margins entire to serrate, apex acute to narrowly acuminate; petiole mostly 0.5-2 cm. Capitulescence multitiered corymbiform candelabriform, branches mostly spreading at 70-90°, bearing clusters of numerous capitula; peduncles puberulent. Capitula 8-14 mm; phyllaries. 15, 2-10 mm, oblong to linear, yellowish green to brownish, c apex obtuse to rounded, mostly glabrous or subglabrous, basal phyllaries more herbaceous puberulent and glandular, small to rather large, apex of inner phyllaries not differentiated; clinanthium epaleate. Florets 15-25; corolla c. 6 mm, white, lavender, pink, or light bluish, lobes with distinct distal sclerified caps, papillose inside. Cypselae 4-5 mm, 5-angled, densely short-setulose only on pale ribs; pappus bristles c. 5 mm, slightly broadened distally. 2n = 29, 30, c. 40, 58, c. 64, c. 80. Pastures and second growth, strand area of beach, savanna, bordering stream, along road. T (Barlow 4/1C, US); Ch (Breedlove 9430, US); Y (Gaumer 914, US); C (Martínez et al., 2001: 24); QR (Sousa y Cabrera, 1983: 79 sub Eupatorium odoratum); B (Record s.n., Feb 1926, US); G (Tejada 24, US); H (Pittier 1835, US); ES (Standley 20667, US); N (Baker 2415, US); CR (Skutch 2310, US); P (Maxon 4731, US). 2-1600 m. (SE. United States, Mexico, Mesoamerica, Colombia, Venezuela, Guayanas, Ecuador, Perú, Bolivia, Brasil, Paraguay, Argentina, Cuba, Jamaica, Hispaniola, Puerto Rico, Virgin Islands, Lesser Antilles; widely introduced in paleotropical Africa and Asia.)


Eupatorium opadoclinium (S.F. Blake) McVaugh.

Moderately branched 1-2 m; stems densely hirsute with persistent trichome bases. Leaves subsessile; blade mostly 9-17 × 2-4.5 cm, oblong-lanceolate, venation pinnate, secondary veins, c. 4 pairs, surfaces with minutely prominulous reticulation, subglabrous adaxially, finely hirsutulous abaxially especially on veins, minutely glandular-dotted, base slightly cordate, subamplexicaule, margins scarcely to distinctly closely serrulate, apex narrowly acute; petiole 0.1-0.3(-0.8) cm. Capitulescence broadly and densely corymbiform; peduncles hirsutulous. Capitula c. 12 mm; phyllaries c. 45, 3-9 mm, oblong to linear, stramineous, mostly glabrous, apex rounded to obtuse, slightly cucullate; clinanthium paleate. Florets c. 45; corolla c. 5.5 mm, whitish, lobes without distal sclerified cap, smooth inside. Cypselae 3-4.3 mm, 5-angled, sparsely spiculiferous, ribs
sometimes whitish; pappus bristles c. 5 mm, not or scarcely broadened distally. \(2n = 10\).

_Pine woods, sandstone bluffs with Quercus, Oak-Pine forest above highway and weedy vegetation along road._ Ch (Croat 46513, MO). 800-2000 m. (Endemic.)

Williams (1976a) treated this species as a synonym within his concept of _Eupatorium glaberrimum._


_Holotype: Mexico, Chiapas, Breedlove 14046 (F)._ Illustr.: no se encontró. N.v.: none.

_Moderately branched 1-3 m; stems sparsely hirsute, glabrescent. Leaves petiolate; blade mostly 8-14 × 1.5-4 cm, elliptical, venation pinnate, secondary veins c. 3 pairs, unevenly spaced, surfaces with minutely prominulous reticulation, glabrous adaxially, sparsely pilosulose abaxially, with obscure minute glandular dots, base acute, margins closely serrulate, apex narrowly acute to acuminate; petiole 0.5-2 cm. Capitulescence broadly and densely corymbiform; peduncles pilosulose. Capitula 9-10 mm; phyllaries c. 35, 2-7 mm, oblong to linear, brownish, apex rounded to obtuse, flat, puberulent to glabrous; clinanthium epaleate. Florets 15-20; corolla 4-5 mm, whitish, lobes without distal sclerified cap, smooth inside. Cypselae 2.5-2.8 mm, 5-angled, glabrous, ribs often whitish; pappus bristles c. 4 mm, not or scarcely broadened distally._

_Heavily wooded slope, seasonal evergreen forest, rocky slope with Quercus, second-growth forest in tropical oak-forest, roadside._ Ch (Croat 47518, MO); G (Williams et al. 41242, F); H (Molina, 1975: 114 sub _Eupatorium quercetorum_). 100-1500 m. (Endemic.)

The reports of this species in Honduras by Molina (1975) and in Veracruz by Turner (1997) were not verified.


_Por H. Robinson._

_Perennial herbs or subshrubs with fibrous roots; stems puberulent. Leaves opposite; blade ovate to lanceolate, broad, trinervate from at or near base, surfaces gland-dotted; petiole distinct, usually narrowly winged distally. Capitulescence elongate thyrsoid-paniculate, branches with laxly divaricate cymose branching; peduncles mostly short. Capitula narrowly campanulate, discoid, 5-6-flowered; phyllaries 15, in 5 ranks of 3, unequal, graduated, persistent, spreading with age; clinanthium flat, epaleate, with sclerified_
surface. Corolla white, tube short, constricted, limb abruptly campanulate, without subquadrate cells below the lobes, lobes triangular, as wide as long, smooth with oblong cells on both surfaces; anther collars with subquadrate cells proximally, with weak annular thickenings on walls, appendage slightly longer than wide, not truncate; style base enlarged, densely short-hirsute, branches linear, densely long-papillose. Cypselae prismatic, 5-ribbed, short-setulose, carpododium distinctly enlarged, asymmetric, contorted with sigmoid trace, cells quadrate to oblong with rather thick walls; pappus of 30-40 persistent scabrous bristles, apex narrowed. 2 spp. with 1 sp. distributed from Guatemala and Greater Antilles south in Andes to Bolivia.

A single species in Mesoamerica.


Erect sparingly branched perennial herbs or subshrubs to 2 m; stems hirtellous. Leaves petiolate; blade 5-11 × 2-5 cm, adaxial surface sparsely puberulent, abaxial surface densely puberulent to tomentellous, glands yellowish, base rounded to acute, usually rather decurrent onto distal part of petiole, margins subentire to serrate-dentate, apex short-acuminate; petiole mostly 1-2.5 cm. Capitulescence with 3-5 pairs of opposite secondary branches, lateral branches and halves of pseudodichotomies often diverging at c. 45°; peduncles puberulent to hirtellous. Capitula 4-5 mm; phyllaries 0.5-3.5 mm, suborbicular to narrowly lanceolate, margins scarious. Florets 5 or 6; corolla 2.5-3.5 mm, tube 1-1.5 mm, lobes glandular and usually with few short submarginal trichomes. Cypselae 1.2-2 mm, with short scattered setulae on faces and ribs; pappus bristles 2.5-3.5 mm. 2n = 10. Rocky slope, brushy slope, in ramonal covering ruins, grassland, near beach, roadside. B (Balick et al, 2000: 149); G (Contreras 3768, US); H (Croat y Hannon 64489, MO); N (Stevens 4062, US); P (King 5263, US). 0-1200 m.

(Mesoamerica, Colombia, Venezuela, Guyana, Ecuador, Perú, Bolivia, Cuba, Lesser Antilles, Trinidad.)
15. **Conoclinium DC.**

Por J.F. Pruski y H Robinson.

Decumbent to erect perennial rhizomatous herbs; stems simple or few-branched. Leaves opposite, petiolate; blade ovate to deltoid-ovate, 3-nerved or tripartite from near base, surfaces glandular, margins crenate to bipinnatifid. Capitulescence laxly cymose, capitula short-pedunculate. Capitula 50-70-flowered, discoid; involucre hemispherical; phyllaries c. 25, lanceolate, eximbricate, not obviously gradated, mostly subequal, 2-3-seriate, with few shorter outer phyllaries; clinanthium conical, wider than high, epaleate, not fistulose. Corolla funnelform, white or blue, glandular, limb only slightly broader than tube, lobes 5, triangular, papillose distally, adaxial surface with short bulging cells, mamilllose to short-papillose; anther collars cylindrical, cells densely transverse-annulate, appendages as wide as long, not truncate; style base not enlarged, glabrous, branches linear to filiform, appendages very slightly broadened distally, densely papillose. Cypselae prismatic, black, faces and ribs concolorous, ribs 5, thin, glabrous or glandular, infrequently setulose distally, carpododium basically absent, cells subquadrate 8-10-seriate; pappus of c. 30 scabrid bristles. 3-4 spp. Canada, United States, Mexico.


**Conoclinium betonicum** DC., **Conoclinium betonicum** var. integrifolium A. Gray,

**Conoclinium integrifolium** (A. Gray) Small, *Eupatorium hartwegii* Benth.

Herbs to 1 m; stems pubescent, distal internodes longer than associated leaves. Leaves: blade 2.5-6 × 0.8-3.5 cm, usually deltate-ovate to narrowly so, base usually truncate to cordate, margins crenate, apex obtuse to rounded; petiole 0.5-2.5 cm. Capitulescence in terminal naked somewhat congested clusters; peduncles 1-10 mm. Capitula 3.5-5.5 mm; phyllaries 3.5-4.5 mm, pubescent; clinanthium c. 0.5 mm. Corolla c. 3 mm, blue. Cypselae 1.4-1.8 mm; pappus bristles c. 3 mm. Flowering May, Oct. *Costera de dunas, sandy soil.* T (Moreno et al. BD-1097, MO); ?Y (Turner, 1997: 89); ?C (Turner, 1997: 89). 0-5 m. (Mexico, Mesoamerica.)

The occurrence of *Conoclinium betonicifolium* in Campeche, Quintana Roo, Yucatán, and Guatemala as cited by Turner (1997: 89) cannot be verified, and it seem unlikely that
the species occurs in Quintana Roo and Guatemala. Turner (1997: 240) mapped C. *betonicifolium* from Tabasco to northern Mexico, but under the name *E. betonicifolium* (Turner, 1997: 242) also mapped it in Campeche and Yucatán. The species is here excluded from the eastern side of the Yucatan Peninsula in both Quintana Roo and Guatemala, and indeed the species was not clearly mapped in either by Turner (1999).

16. *Critonia* P. Browne

*Dalea* P. Browne, non L., *Wikstroemia* Spreng.

Por H. Robinson.

Coarse herbs or subshrubs to small trees or woody vines, moderately branched; stems terete or angled, glabrous to densely lanate. Leaves opposite, distinctly petiolate; blade narrowly elliptical or lanceolate to broadly ovate, venation pinnate or trinervate, areoles pellucid-dotted, without glandular punctations. Capitulescence usually thyrsoid-paniculate with usually numerous clustered capitula. Capitula cylindrical or fusiform, discoid, 4-20(-25)-flowered; phyllaries c. (15-)20-25(-50), strongly subimbricate, unequal, graduated, usually stramineous, outer persistent, inner easily deciduous; clinanthium flat to slightly convex, epaleate, with sclerified surface, usually glabrous. Corolla tubular to narrowly funnelform, white or rarely rosaceous, without trichomes, less commonly with few glands or setulae on lobes or lobes rarely densely puberulent, lobes oblong to narrowly long-triangular, smooth with oblong cells on both surfaces; anther collar with many subquadrate cells proximally, with few or no ornate thickenings on walls, appendages scarcely to distinctly longer than wide, not truncate; style base without node, glabrous, branches filiform to strongly broadened or clavate, nearly smooth, rarely strongly mamilllose. Cypselae prismatic, 5-7-ribbed, glabrous to setulose, carpopodium a ring or short cylinder of small subquadrate cells with thickened walls; pappus of 25-35 persistent scabrous bristles, usually slightly to distinctly broadened at apex. 40 spp. mostly in northern neotropics of W. y S. Mexico, Mesoamerica, West Indies, and N. Suramérica, with 2-3 sp. south to Argentina.

The report (sub Eupatorium) by Whittemore (1987) and Turner (1997) of *C. aromatisans* (DC.) R.M. King et H. Rob. in Edo. Yucatán is based type material of *Eupatorium hemipteropodium*, here treated in synonymy of *C. morifolia*. *Critonia hospitalis* (B.L. Rob.) R.M. King et H. Rob. was treated by Williams (1976a) as a
synonym of *Eupatorium nubigenum* Benth., but here Guatemalan collections of *C. hospitalis* s. lat. are redetermined as either *C. breedlovei* or *C. tuxtlae*.


1. Stems densely lanate; capitula 5-8 mm diam., 20-25-flowered.

8. *C. lanicaulis*

1. Stems tomentellous, or flocculose pubescent to sparsely pilose or glabrous; capitula 2-4 mm diam., 5-12-flowered.

2. Slender woody vines; leaf blades ovate to broadly elliptical or ovate-lanceolate.

3. Capitula 8-10-flowered; leaf areoles with pellucid dots obscure or usually so.

4. Stems narrowly fistulose; branches of capitulescence subglabrous; involucres more than two thirds as long as capitula.

2. *C. billbergiana*

4. Stems with solid pith; branches of capitulescence puberulent or pilosulous; involucres slightly over half as long as capitula.

16. *C. wilburii*

3. Capitula 5-6-flowered; leaf areoles usually minutely pellucid-dotted.

5. Capitulescence corymbiform, all capitula pedunculate; smaller stems with solid pith; stems whitish.

4. *C. campechensis*

5. Capitulescence branches bearing many sessile to subsessile capitula in fascicles; all stems usually narrowly fistulose; stems pale to light brown.

6. Leaf blades with short-acute to obtuse and apiculate apices; cypselae with sparse long antrorse setulae distally; at elevations mostly below 1500 m.

1. *C. bartlettii*

6. Leaf blades with narrowly short-acuminate apices; cypselae with numerous short spreading setulae distally; at elevations above 1000 m.

9. *C. laurifolia*

2. Erect or reclining coarse herbs, shrubs, or small trees.

7. Stems greenish to yellowish or yellowish brown, usually fistulose, often sharply tetragonal or hexagonal (except *C. morifolia*).

8. Capitula 5- or 6-flowered; pappus bristles not broadened at apices; stems and leaves glabrous.

13. *C. sexangularis*
8. Capitula 8-12-flowered; pappus bristles with slightly but distinctly broadened apices; stems and leaves glabrous or more commonly puberulent or with some flocculose or arachnoid pubescence.

9. Petioles mostly or completely unwinged; stems terete to slightly hexagonal, not speckled with linear spots, with evanescent flocculose pubescence. 

10. C. morifolia

9. Petioles broadly winged completely to bases; stems sharply to scarcely tetragonal, speckled with numerous linear dark spots, glabrous to sparsely arachnoid pubescent.  

12. C. quadrangularis

7. Stems often brownish, rarely becoming whitish or pale, pith solid, usually terete or subhexagonal.

10. Stems densely hirtellous to tomentellous; capitula c. 5 mm; corolla lobes densely puberulent.  

14. C. siltepecana

10. Stems sparsely pilose or hirsutulous to glabrous; capitula 6-15 mm; corolla lobes glabrous to sparsely setose or sparsely glandular.

11. Leaf blades with 1-4 strong secondary veins ascending at less than 45º angles, areoles with mostly rounded pellucid dots; capitula subsessile to short-pedunculate.

12. Leaf blades trinervate from bases, secondary veins reaching distal fourth of blades, without tufts of tomentum in axils; panicle broadly laxly corymbiform. 

17. C. yashanalensis

12. Leaf blades pinnate or trinervate with ascending secondary veins from well above bases, with tufts of tomentum in axils; panicle densely pyramidal or cylindrical.

13. Leaf blades elliptical to narrowly ovate without angulate margins; capitulescences a broad pyramidal panicle; capitula 6-7 mm; cypselae short-setulose on faces, ribs pale, glabrous; pappus of c. 25 bristles.  

6. C. hebebotrya

13. Leaf blades with angle near basal third of margins; capitulescences a small, cylindrical thyrsoid panicle; capitula 13-15 mm; cypselae densely long-setulose on faces and ribs; pappus of c. 50 bristles.  

7. C. iltisii
1. Leaf blades regularly pinnately veined with 5-9 secondary veins spreading from midrib at more than 45º angles; areoles with obvious pellucid lines and dots; capitula always sessile in fascicles.

14. Capitula c. 10-flowered; pappus of 30-36 bristles, c. 6 mm.

11. C. nicaraguensis

14. Capitula c. 5-flowered; pappus of 25-30 bristles, 3-4 mm.

15. Branches of capitulescence with densely spreading puberulent or short-pilose; style branches only slightly broadened distally.

5. C. daleoides

15. Branches of capitulescence subglabrous or thinly appressed-puberulent; style branches distinctly thickened distally.

16. Stems hexagonal; leaf apices narrowly acuminate; corollas funnelform, with short lobes c. 0.5 × c. 0.5 mm; cypselae scabrid mostly on ribs; pappus bristles narrowed before broadened apices.

3. C. breedlovei

16. Stems terete to subhexagonal; leaf apices slightly short-acuminate; corollas short-tubular, lobes slightly more than 1.5 times as long as wide; cypselae long-setulose on faces and ribs; pappus bristles broad from bases.

15. C. tuxtlae


*Eupatorium tunii* L.O.Williams.

Sparingly branched, flexuous, slender, woody vines; stems terete, pale to light brown, glabrous, narrowly fistulose. Leaves petiolate; blade mostly 5-11 × 1.5-6.5 cm, broadly elliptical, trinervate from 2-10 mm above base, proximal pair of secondary veins often parallel to basal margin, extending past midblade, surfaces glabrous, minutely pellucid-dotted, base rounded to obtuse, margins remotely serrulate, subentire, apex rounded with small apiculum to short-acuminate; petiole 0.5-1.7 cm. Capitulescence narrowly thyrsoid-paniculate, proximal internodes elongate, branches short, glabrous, bearing sessile or subsessile capitula in large dense fasciculate clusters. Capitula c. 10 × 2.5-3 mm; phyllaries c. 20, 1-7 mm, broadly ovate to lanceolate, glabrous to scarcely puberulent, apices narrowly rounded to short-acute. Florets 5; corolla c. 6.5 mm, glabrous, lobes c. 1
mm, narrowly oblong; style branches slightly broadened distally. Cypselae c. 3.5 mm, with sparse, long, antrorse setulae distally, glabrous proximally, ribs narrow, pale, base scarcely narrowed; pappus bristles c. 35-45, 6-7 mm, apex slightly broadened apically. 

*Primary forest remnants, secondary forest, in clearing. Ch (Davidse et al. 20462, US); B (Lundell 6481, US); G (Tun 1306, F); H (Croat y Hannon 64392, MO). 500-1700 m. (Mexico [Veracruz] Mesoamerica.)

Whittemore (1987) and Turner (1997) treated *C. bartlettii* and *E. tunii* as synonyms of *C. billbergiana*. Material cited from Veracruz by Turner 1997 under combined concept of *C. billbergiana* are probably this species.

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**Critonia eggersii** (Hieron.) R.M. King et H. Rob., *Critonia magistri* (L.O. Williams)


Sparingly branched, flexuous, slender, woody vines, often sprawling; stems terete, pale, glabrous, narrowly fistulose. Leaves petiolate; blade mostly 5-11 × 2.5-5 cm, ovate, trinervate, proximal pair of secondary veins parallel to basal margin, surfaces usually glabrous, sometimes sparsely pilose abaxially on veins, pellucid dots usually obscure, base rounded to obtuse, margins remotely serrulate to subentire, apex slightly short-acuminate; petiole to 2 cm. Capitulescence elongate pyramidal panicles with long primary internodes, branches subglabrous, bearing fascicles of sessile capitula often in threes. Capitula 9-11 × 2-3 mm; involucre more than two thirds as long as capitula; phyllaries 20-25, 1-6 mm, ovate to oblong-lanceolate, glabrous, apices narrowly rounded, innermost acute. Florets 8-10; corolla 5-7 mm, tubular or narrowly funnelform, glabrous, lobes 0.8-1 × 0.4-0.5 mm, narrowly triangular; style branches slightly broadened distally. Cypselae 3-4 mm, glabrous or weakly setulose distally, base scarcely narrowed; pappus bristles 35-45, 5-7 mm, apex slightly but distinctly enlarged. *Disturbed forest, forested slope, brushy slope, tree fall, forest edge*. B (Lundell 6254, US); G (Tuerckheim 8240, US); H (Nelson y Andino 14874, TEFH); N (Dillon et al., 2001: 322 sub *E. billbergianum*); P (D'Arcy 9372, MO). 15-700 m. (Mesoamerica a Ecuador.)

Turner (1997) treated *C. bartlettii, C. laurifolia, and E. tunii* as synonyms of *C. billbergiana*. Turner's (1997) report of *C. billbergiana* in Chiapas and Costa Rica was not
verified by me. Turner's report of *C. billbergiana* as occurring in Veracruz is based, at least in part, on *Williams 8431* (F), a paratype of *E. tunii*.


    Laxly branched shrubs or small trees to 5 m; stems hexagonal, dark brown, glabrous, pith solid. Leaves petiolate; blade 13-19 × 4.5-5.2 cm, ovate-lanceolate, venation regularly pinnate with c. 9 secondary veins on each side, spreading from midrib at more than 45º angles, surfaces glabrous, areoles with obvious pellucid lines and dots, base acute, margins serrulate, apex narrow, slightly acuminate; petiole 1.3-1.5 cm. Capitulescence pyramidally paniculate, branches sparsely appressed-puberulent, capitula sessile in fascicles. Capitula c. 8 × 2-3 mm; phyllaries c. 18, 1.5-4.5 mm, broadly ovate to oblong, glabrous, apices short-obtuse to rounded. Florets 5; corolla c. 4 mm, narrowly funnelform, glabrous or throat sparsely glandular, lobes c. 0.45-0.5 × c. 0.45-0.5 mm; style branches strongly broadened distally. Cypselae c. 3.25 mm, 5-ribbed, scarcely to distinctly scabridulous distally and proximally, faces glabrous, base short or long and narrow; pappus bristles c. 30, 3.3-4 mm, broadened distally. *Steep slopes with mixed forest, montane rain forest*. Ch (*Matuda 2822*, US); G (*Steyermark 43222*, F); H (*Nelson y Vargas 2438*, TEFH). 1500-2800 m. (Endemic.)

*Critonia breedlovei* was treated as a synonym of *C. hospitalis* (B.L. Rob.) R.M. King et H. Rob. by Whittemore (1987) and Turner (1997).


    Sparingly branched, slender, woody vines; stems terete to subhexagonal, whitish, youngest parts puberulent, older parts glabrous, smaller stems with solid pith, larger stems narrowly fistulose. Leaves petiolate; blade 6-11 × 2.3-4.5 cm, ovate, trinervate from 3-5 mm above base, proximal secondary veins extending past midblade, surfaces glabrous, areoles usually minutely pellucid-dotted, some longer dots along veinlets, base rounded to obtuse, margins subentire to remotely subserrulate, apex narrowly acute. ; petiole 0.5-1.5 cm Capitulescence broadly corymbiform, branches finely puberulent, all capitula pedunculate; peduncles 2-6 mm, slender. Capitula c. 10 × 2-3 mm; phyllaries c.
25, 1-7 mm, ovate to linear, glabrous, apices rounded. Florets 5; corolla c. 6 mm, narrowly funnelform, glabrous, lobes c. 1 mm, narrowly triangular; style branches slightly broadened distally. Cypselae c. 3.5 mm, short-setulose distally, setulae spreading, base narrow; pappus bristles 35-45, c. 6 mm, apices scarcely broadened. *Bosque tropical semi-húmedo, sobre el matorral, in bajo south of airfield.* C (Lundell 963, US); QR (as cited by Sousa y Cabrera, 1983: 78 sub *E. campechense*); B (Lundell 82, US); G (Contreras 1621, US). 0-500 m. (Endemic.)


   *Eupatorium daleoides* (DC.) Hemsl.

   Few to many branched shrubs or small trees to 8(-20) m; stems terete to subhexagonal, dark brown, sometimes becoming pale, glabrous to sparsely pilose, pith solid. Leaves petiolate; blade mostly 8-23 × 1.8-5 cm, narrowly elliptical, venation regularly pinnate with 5-7 secondary veins on each side, spreading from midrib at more than 45° angles, surfaces glabrous, a few trichomes on veins abaxially, areoles with obvious pellucid lines and dots, base narrowly acute, margins closely serrate, apex narrowly acute to slightly acuminate; petiole 0.5-1.5 cm. Capitulescence pyramidally paniculate, branches with dense spreading puberulence, capitula sessile in fascicles. Capitula 6-7 × 2-3 mm; phyllaries c. 20, 1-5 mm, ovate to oblong-elliptical, glabrous, apices rounded. Florets 5; corolla 4-4.5 mm, narrowly funnelform, glabrous or lobes sparsely setulose, tube broad, lobes 0.5-0.7 mm, 1/2 as wide as long; style branches only slightly broadened distally. Cypselae c. 2.5 mm, densely setulose mostly on faces and base, ribs broad, pale, base narrow; pappus bristles 25-30, 3-4 mm, apex slightly but distinctly broadened. 2n = 10. *Selva alta perennifolia, in quebrada along creek, remnants of evergreen forest among pastures, open Pine forest, llanos area, pine-oak forest, dry slope.* T (Rovirosa 99, US); Ch (Pruski et al. 4240, MO); Y (Lundell 1290, US); C (Martínez et al., 2001: 24); QR (Sousa y Cabrera, 1983: 79 sub *E. daleoides*); B (Liesner y Dwyer 1578, MO); G (Kellerman 5093, US); H (Croat y Hannon 63902, MO); ES (Standley 22612, US); N (Stevens 21467, US); CR (Standley 41883, US); P (McDaniel 8247, US). 200-3200 m. (NE. Mexico to Panamá.)


Moderately branched shrubs or trees to 10 m; stems terete to subhexagonal, light brown, often becoming whitish, hirsutulous, becoming glabrous, pith solid. Leaves petiolate; blade mostly 8-17 × 2.5-9 cm, elliptical without angulate margins, venation pinnate with c. 4 pairs of strong secondary veins from well above base ascending at less than 45° angles, two proximal pairs subparallel to basal margin, surfaces subglabrous, abaxially with tufts of tomentum in axils of major veins, pellucid dots mostly rounded, variously sized, base obtuse to short-acute, margins closely serrulate, apex narrowly acute to slightly acuminate; petiole 1.2-3.5 cm. Capitulescence a broad dense pyramidal panicle, branches widely spreading, tomentellous, with numerous subsessile to short-pedunculate capitula in dense clusters. Capitula c. 8 × 2-3 mm; phyllaries c. 16, 1-4 mm, ovate to oblong, glabrous, apex rounded. Florets 5; corolla c. 3.5 mm, tubular, glabrous, lobes c. 0.5 × c. 0.5 mm; style branches clavate distally. Cypselae c. 2.5 mm, faces with many spreading short setulae, ribs broad, pale, glabrous, base narrow; pappus bristles c. 25, 3.5-4 mm, apex slightly but distinctly broadened. Rocky slope in mixed forest, montane rain forest, steep hillsides among shrubs and small trees.  

Ch (*Breedlove 21744*, US); G (*Heyde y Lux 4249*, US); H (*Williams 26318*, F); ES (*Calderón 1991*, US); N (Dillon et al., 2001: 324 sub *Eupatorium hebebotryum*). 500-1600 m. (W. Mexico, Mesoamerica.)


Few branched shrubs to 3 m; stems terete, dark brown, glabrous, pith solid. Leaves petiolate; blade 12-18 × 3-8 cm, lanceolate, margins short-angled near basal third, trinervation near basal fourth or third, 1-4 strong secondary veins from well above base ascending t less than 45° degree angles, adaxial surface very sparsely pilosulose, abaxial surface minutely puberulent and with small tufts of tomentum in axils of major secondary veins, areoles with obvious small mostly rounded pellucid dots, base narrowly attenuate onto petiole, margins serrate above angle, apex narrowly short-acuminate; petiole c. 1.5-3
cm in unwinged part. Capitulescence a small loosely cylindrical panicle with capitula short-pedunculate, in axils of leaves longer than the capitulescence, branches subglabrous. Capitula 13-15 × 3-4; phyllaries c. 30, 1-10 mm, ovate to oblong-lanceolate, apex narrowly rounded. Florets c. 6; corolla c. 7 mm, tubular, mostly glabrous, lobes c. 0.8 × c. 0.4 mm, oblong, sparsely glandular and sparsely setulose; style branches slightly clavate distally. Cypselae 5-5.5 mm, densely long-setulose on faces and ribs, base narrow; pappus bristles c. 50, mostly 7.5-8 mm, apex slightly broadened. *Subtropical dry forest, barranca*. Ch (Laughlin 2994, CAS); G (Iltis G-72, US). 600-1300 m. (Endemic.)

Turner (1997) gives the upper elevational limit of this species as 1500 m, which I cannot verify.


Moderately branched shrubs 1-3 m; stems terete, pale brown, densely lanate, pith solid. Leaves petiolate; blade mostly 10-23 × 2-8 cm, ovate-lanceolate to narrowly elliptical, venation pinnate with 5-6 secondary veins per side, surfaces mostly glabrous, pilose on major veins, areoles distinctly pellucid-dotted, base narrowly obtuse to acute, margins usually coarsely serrate, apex narrowly short-acuminate; petiole 0.5-1 cm. Capitulescence cylindrical with 1-4 pairs of spreading lateral branches, branches villous, ending in small dense cymes of a few large sessile or pedunculate capitula, peduncles to 15 mm. Capitula 13-15 × 6-8 mm; phyllaries 45-50, broadly 2-12 × 1-3 mm, ovate to linear, mostly glabrous, apex broadly rounded to obtuse. Florets 20-25; corolla c. 6 mm, narrowly funnelform, glabrous, lobes c. 0.5 × c. 0.4 mm, triangular; style branches scarcely broadened distally. Cypselae c. 4.5 mm, faces short-setulose distally, base narrow; pappus bristles c. 40, c. 6.5 mm, scarcely broadened distally. *Selva alta perennifolia, lower montane rain forest, limestone hills with short deciduous forest*. T (Croat y Hannon 65363, MO); Ch (Breedlove 49225, US); B (Proctor 35818, US); G (Johnson 1256, US). 60-900 m. (Endemic.)

Although Turner (1997) gave 1200 m as the upper elevational limit of this species, I am unable to verify that this species occurs at elevations higher than 900 m.


Holotype: Costa Rica, _Pittier 16065_ (GH!). Illustr.: no se encontró. N.v.: none.

Sparingly branched, flexuous, slender, woody vines; stems terete, light brown, glabrous, usually narrowly fistulose. Leaves petiolate; blade mostly 6-12 × 2.5-6 cm, ovate to ovate-lanceolate, trinerved from 3-10 mm above base, secondary veins extending past midblade, subparallel to or more commonly somewhat diverging from basal margin, surfaces glabrous, minutely pellucid-dotted, dots sometimes obscure, base rounded to obtuse, margins serrulate, apex narrowly short-acuminate; petiole 1-2.5 cm.

Capitulescence an elongate pyramidal panicle, primary internodes long, branches puberulent, bearing dense clusters of subsessile capitula in fascicles of 4-20. Capitula 10-13 × 3-4 mm; phyllaries c. 20, 1-6 mm, ovate to obleng-lanceolate, glabrous, apex obtuse to short-acute. Florets 5 or 6; corolla c. 6 mm, narrowly funnelform, glabrous, lobes c. 1 mm, narrowly triangular; style branches slightly broadened distally. Cypselae c. 4 mm, with numerous short spreading setulae distally and on ribs, glabrous proximally, base narrowed; pappus bristles 40-45, 6-7 mm, apex slightly but distinctly broadened. In forest, in treefall, edge of forest, premontane wet forest remnant. CR (Skutch 3155, US); P (Stevens 18420, MO). 1100-2000 m. (Costa Rica to Ecuador.)


_Eupatorium morifolium_ Mill., _Gard. Dict._, ed. 8. no. 10 (1768). Holotype: Mexico, Veracruz, _Houstoun s.n._ (BM). Illustr.: no se encontró.: Green stick, B; chople, palo de agua, santa maría, vara de agua, vara de bajareque, G; carrizo de rio, cerbatana, palo hueco, vara blanca, H; carrizo, chimaliote, suelda con suelda, taco, vara hueca, vara negra, ES; nobar, P.

_Critonia hemipteropoda_ (B.L. Rob.) R.M. King et H. Rob., _Eupatorium critonioides_ Steetz, _E. hemipteropoda_ B.L. Rob., _E. populifolium_ Kunth.

Erect to scrambling shrubs or small trees to 6 m, sparsely to densely branched; stems terete to slightly hexagonal, pale greenish to yellowish brown, not speckled with linear spots, with evanescent floccose pubescence, becoming glabrous, broadly fistulose. Leaves petiolate; blade mostly 10-25 × 6-15 cm, ovate to broadly ovate, venation subpinnate with 2 or more pairs of secondary veins in proximal sixth of blade, the second
pair usually slightly to strongly more ascending than basal pair, surfaces glabrous to slightly puberulent or flocculose, areoles with obvious small pellucid dots, base acute to truncate, sometimes decurrent onto petiole, margins usually closely serrate to crenulate, apex slightly to sharply short-acuminate; petiole to 8 cm, mostly or completely unwinged. Capitulescence pyramidal or more elongate, branches puberulent to flocculose, capitula sessile or subsessile in fascicles. Capitula 8-10 × 2-3 mm; phyllaries 25-30, 1-6 mm, ovate to narrowly oblong, glabrous to finely puberulent, apex rounded. Florets 8-12; corolla 4-5 mm, tubular, glabrous, lobes c. 0.5 mm, narrowly oblong; style branches not broadened distally. Cypselae 2-3 mm, nearly glabrous to sparsely puberulent, ribs narrow, base slightly to strongly narrowed; pappus bristles 35-45, mostly 4.5-5.5 mm, apex slightly but distinctly broadened. 2n = 10. *Humid subtropical forest, wet ravine, wet thicket, edge of woods, disturbed forest, grown as hedge plant.* T (Perez et al., 2005); Ch (Seler y Seler 5458, US); Y (Gaumer 552, GH); QR (Sousa y Cabrera, 1983: 76 sub Eupatorium morifolium); B (Gentle 1593, US); G (King y Renner 7083, US); H (Blake 7395, US); ES (Allen y Armour 7251, US); N (Wright s.n., US); CR (Tonduz 12181, US); P (Seemann 1137, BM). 10-1700 m. (NE. Mexico, Mesoamerica, Colombia, Venezuela, Ecuador, Perú, Bolivia, Brasil, Paraguay, Argentina.)

Whittemore (1987) and Turner (1997) each treat *Eupatorium hemipteropodum*, as a synonym of *E. aromatisans*, a species excluded by me from Mesoamerica.


Laxly branched shrubs or small trees to 3 m; stems terete, brownish, glabrous, pith solid. Leaves petiolate; blade mostly 8-12 × 3-5.2 cm, ovate-lanceolate to oblong-ovate, venation regularly pinnate with 6-9 secondary veins on each side, spreading from midrib at more than 45º angles, surfaces glabrous, areoles with obvious pellucid lines and dots, base obtuse to short-acute, margins shallowly crenate-serrulate, apex narrowly short-acuminate; petiole 1-2 cm. Capitulescence a broad pyramidal panicle, branches appressed-puberulent, bearing numerous fascicles of 3-5 sessile capitula. Capitula 9-10 × c. 2 mm; phyllaries c. 20, 1-6 mm, broadly ovate to oblong-elliptical, glabrous, apex narrowly rounded. Florets c. 10; corolla 4-5.5 mm, tubular, throat sparsely setulose, lobes 0.8-1 mm, narrowly oblong, glabrous; style branches broadened distally. Cypselae 3-3.5 mm, ribs narrow, numerous short setulae distally mostly on ribs, base narrow, glabrous;
pappus bristles c. 30-36, c. 6 mm, apices broadened. H (Nelson Sutherland, 2008: 168
sub *Eupatorium nicaraguense*); N (Tate 157, K). 100-600(-2000?) m. (Endemic.)


Mexico, *Berlandier 2151* (G-DC). Illustr.: no se encontró. N.v.: Chimaliote, chimaliote
hueco, monte cuadrado, taco, H; chimaliote hueco, tallo hueco, vara blanca, vara hueca,
ES.

*Critonia thyroidea* (Moc. ex DC.) R.M. King et H. Rob., *Eupatorium thysoideum*
Moc. ex DC., *E. megaphyllum* M.E. Jones, non Baker.

Erect unbranched to sparingly branched, giant, coarse herbs, coarse shrubs, or small
trees to 4 m; stems sharply to scarcely tetragonal, pale yellowish green, speckled with
numerous dark linear spots, glabrous to sparsely arachnoid pubescent, broadly fistulose.
Leaves petiolate; blade 10-25 × 3.5-16 cm, ovate, venation usually subtrinervate with
strongly ascending secondary veins from above base, extending past midblade, surfaces
flocculose or arachnoid to subglabrous, areoles with numerous small pellucid dots, base
subtruncate to short-acute, continuous into petiolar wing, margins closely serrate to
serrulate, apex acute to slightly short-acuminate; petiole 2-6 cm, broadly winged
completely to base, wings narrowly fused across node. Capitulescence elongate
cylindrical with 4-6 pairs of spreading branches, branches subglabrous to tomentellous,
bearing dense corymbiform clusters of numerous capitula. Capitula 8-10 × 2.5-3.5 mm;
phyllaries c. 20, 1.5-7 mm, ovate to narrowly oblong, glabrous, apex rounded. Florets 9-
11; corolla 4.5-5 mm, tubular, glabrous, lobes c. 0.5 × c. 0.4 mm; style branches not or
scarcely broadened distally. Cypselae 2.5-3 mm, with numerous minute setulae on faces,
ribs narrow; pappus bristles c. 40, 4.5-5 mm, apex slightly but distinctly broadened. 2n =
10. Selva alta perennifolia, gallery forest, mixed forest, tropical deciduous forest, llano,
barranca, roadside in open sun. Ch (Matuda 781, US); G (Kellerman 5319, US); H
(Croat y Hannon 64149, MO); ES (Velasco 9010, US); N (Garnier 179, US). 40-1300 m.
(W. Mexico, Mesoamerica.)


*Piptocarpha sexangularis* Klatt, *Compos. Nov. Costaric.* 1 (1895). Holotype: Costa Rica,
*Tondaz 7760* (W). Illustr.: no se encontró. N.v.: Copalillo, lengua de vaca, H.

*Eupatorium sexangulare* (Klatt) B.L. Rob., *Eupatorium sotorum* C. Nelson.
Moderately branched weak shrubs or weak trees 2-5 m; stems hexagonal, greenish to yellowish, glabrous, with solid pith or usually broadly fistulose. Leaves petiolate; blade mostly 8-27 × 3.5-11 cm, elliptical to elliptic-ovate, venation pinnate to subpinnate with usually c. 4 strongly ascending secondary veins on each side subparallel with basal margin, second pair of secondary veins usually stronger and remote from third pair, rarely with some smaller spreading secondary veins near base, surfaces glabrous, areoles usually with many small pellucid dots, base rounded to short-acute, margins subentire to remotely serrate, apex narrowly acute to short-acuminate; petiole 1.5-6 cm, sometimes narrowly winged to base. Capitulescence broadly corymbiform to subpyramidal with corymbiform branches, branches glabrous, bearing dense clusters of many sessile capitula. Capitula 11-13 × c. 3 mm; phyllaries c. 20, 1-10 mm, ovate to linear, glabrous, apex narrowly rounded. Florets 5 or 6; corolla c. 6 mm, tubular, glabrous, lobes c. 0.5 mm, oblong-ovate; style branches scarcely broadened distally. Cypselae c. 4 mm, ribs narrow, faces with numerous small setulae, base narrow, tapered; pappus bristles 35-45, c. 6 mm, apex not broadened. 2n = 10. Mixed forest along river, montane rain forest or cloud forest, virgin forest on steep slopes, cut over cloud forest, roadside. ?T (Perez et al. 2005: 84); Ch (Breedlove 34390, CAS); B (Balick et al., 2000: 150); G (Croat y Hannon, 63763, US); H (Molina 24386, US); N (Williams et al. 27771, US); CR (Carvajal 65, CR). 300-2300(-2500) m. (Mexico, Mesoamerica.)


Shrubs 1-3 m?; stems terete, brown, densely hirtellous to tomentellous, pith solid. Leaves petiolate; blade mostly 9-18 × 5-8 cm, broadly ovate-elliptical, venation ascending pinnate with c. 4 veins more congested proximally, diverging at c. 45°, nearly parallel to basal margin, adaxial surface glabrous, abaxially sparsely minutely pilosulose, hirtellous on veins, areoles with round to oval pellucid dots, base short-acute, margins serrate, apex abruptly short-acuminate; petiole 1.5-5 cm. Capitulescence thyrsoid-paniculate, with widely spreading branches bearing capitula in subsessile glomerules; peduncles 0-1 mm. Capitula c. 5 × 2-3 mm; phyllaries c. 20, 1.5-4 × 0.7-1 mm, apex of outer phyllaries acute, sparsely puberulent, inner phyllaries glabrous, apically rounded; clinanthium with few trichomes. Florets c. 10; corolla c. 3 mm, funnelform from slender base, rosaceous, lobes 0.3-0.4 × 0.3-0.4 mm, densely puberulent; style branches filiform,
not or scarcely broadened at apex, strongly mamilllose. Cypselae c. 1.5 mm, ribs sparsely long-setulose, bases slightly narrowed; pappus bristles c. 50, 3-4 mm, not broadened at apex. *In advanced forest.* Ch (Matuda 5156, LL). 1600 m. (Endemic.)


Laxly branched shrubs or small trees 3-5 m; stems terete to subhexagonal, light brown, glabrous, pith solid. Leaves petiolate; blade mostly 8-12 × 3-4.5 cm, elliptical to elliptic-lanceolate, venation regularly pinnate with 6-7 secondary veins on each side, spreading from midrib at more than 45º angles, surfaces glabrous, areoles with obvious pellucid lines and dots, base and apex slightly short-acuminate, margins undulate-mucronate to serrulate; petiole 0.8-1.4 cm. Capitulescence pyramidal paniculately, branches glabrous, capitula sessile in fascicles. Capitula c. 7 × 2-3 mm; phyllaries 15-19, 1-5 mm, broadly ovate to oblong, glabrous, apex obtuse to rounded. Florets 5; corolla c. 3.5 mm, short-tubular, glabrous, lobes c. 0.8 × c. 0.5 mm, slightly more than 1.5 times as long as wide; style branches slightly broadened distally. Cypselae c. 3 mm, long-setulose on faces and ribs, setulae on faces, setulae multicellular in each cell row, ribs yellow, base narrow; pappus bristles 25-30, mostly 3 mm, broad from base, not or scarcely broader at apex. 2n = 10. *Montane cloud forest and rain forest, in low and medium deciduous and subdeciduous forest.* Ch (Breedlove 58451, US); G (Williams et al. 27195, US). 800-2700 m. (Endemic.)

*Critonia tuxtlae* was treated as a synonym of *C. hospitalis* (B.L. Rob.) R.M. King et H. Rob. by Whittemore (1987) and Turner (1997).


Sparingly branched, flexuous, woody vines; stems terete, sparsely puberulent to glabrous, pith solid. Leaves petiolate; blade mostly 5-7 × 1.8-3.5 cm, ovate, venation subtrinervate, proximal secondary veins parallel to proximal margin, extending past midblade, surfaces sparsely puberulent to subglabrous, pellucid dots obscure, base obtuse, margins serrulate, apex short-acuminate; petiole 1-2 cm. Capitulescence an elongate pyramidal panicle with long primary internodes, branches puberulent or pilosulose, bearing fascicles of 2 or 3 sessile or subsessile capitula. Capitula 9-10 × c. 3 mm; involucre scarcely over half as long as capitula; phyllaries c. 30, 1-5 mm, broadly
ovate to oblong, glabrous, apex rounded to obtuse. Florets 8-10; corolla c. 6.5 mm, narrowly funnelform, glabrous, lobes c. 1 mm, narrowly triangular; style branches slightly broadened distally. Cypsels c. 3.5 mm, glabrous or slightly short-setulose distally, base slightly narrowed; pappus bristles 35-45, c. 7 mm, base flattened, slightly but distinctly broadened distally. *Slopes, logging camp.* P (*Churchill et al. 4007*, MO). 200-800 m. (Endemic.)


Sparingly branched weak clambering shrubs to 5 m; stems terete to subhexagonal, dark brown, glabrous, pith solid. Leaves petiolate; blade mostly 10-16 × 3-7.5 cm, ovate to oblong-ovate, membranous, trinervate from base with pair of secondary veins strongly ascending at less than 45º degrees and reaching distal fourth of blade, surfaces glabrous, sparsely puberulent abaxially on veins, without tufts of tomentum in axils, areoles with distinct, small, mostly rounded pellucid dots, base rounded to short-obtuse, margins sharply serrate distally, apex abruptly narrowly acuminate; petiole 0.8-1 cm.

Capitulescence a broad pyramidal lax corymbiform panicle, branches glabrous, ultimate branches slender, bearing a single short-pedunculate capitulum or 2 or 3 subsessile capitula. Capitula c. 9 × 2-3 mm; phyllaries c. 22, 1-6 mm, broadly ovate to oblong, glabrous, apex narrowly rounded. Florets 5; corolla 4.5-5 mm, narrowly funnelform, glabrous, lobes c. 0.5 × c. 0.5 mm, broadly triangular; style branches not broadened apically. Cypsels c. 3-3.3 mm, ribs narrow, fine-setulose distally, faces and proximal parts of ribs glabrous, base gradually narrowed; pappus bristles 30-35, c. 5 mm, apices broadened. *In high evergreen forest, steep moist slope.* Ch (*Miranda 9180*, US). 1800-2000 m. (Endemic.)

The type (*Breedlove 49640*) was cited as *Critonia conzattii* Greenm. by *Breedlove* (1986).

17. **Critoniadelphus** R.M. King et H. Rob.

Por H. Robinson.

Moderately branching shrubs or small trees; stems terete or subhexagonal, glabrous to minutely puberulent, pith solid. Leaves opposite, distinctly petiolate; blade elliptical to
ovate-lanceolate or lanceolate, venation pinnate, both surfaces eglandular, totally glabrous, areoles with obscure minute internal translucent pellucid dots around veinlets. Capitulescence a pyramidal to broadly ovoid panicle, with capitula densely clustered on short peduncles or in sessile groups of 5-8. Capitula cylindrical or fusiform, discoid, 3-8-flowered; phyllaries 18-23, strongly subimbricate, unequal, graduated, stramineous, not white, outer persistent, inner deciduous, linear, glabrous; clinanthium flat to slightly convex, epauleate, with sclerified surface. Corolla tubular to narrowly funnelform, white, veins extending into lobes, glabrous below lobes, lobes equilaterally triangular, with numerous clustered glands on outer surface, smooth with oblong cells on both surfaces; anther collar with cells mostly subquadrate proximally, oblong distally, with little or no ornate thickening on walls, thecae not reddish, appendage slightly shorter than wide, apex truncate-rounded; style base glabrous, without node, branch apex distinctly broadened, flattened, nearly smooth. Cypselae prismatic, 5-ribbed, sparsely setulose and glandular, carpopodium a short cylinder of small subquadrate cells with thickened walls; pappus of 30-35 persistent scabrous bristles, contiguous at base, not broadened at apex. 2 spp. SE. Mexico, N. Central America.


1. Leaf blade margins entire to remotely subserrulate; stems terete, minutely puberulent.  
   **1. C. microdon**

1. Leaf blade margins closely serrulate; stems subhexagonal, glabrous.  
   **2. C. nubigenus**

Holotype: Guatemala, Türkheim II, 2261 (GH!). Illustr.: no se encontró. N.v.: none.

**Critonia microdon** (B.L. Rob.) B.L. Turner, *Eupatorium lucentifolium* L.O.Williams.

Shrubs or small trees 3-10 m; stems terete, brown, minutely puberulent. Leaves petiolate; blade 7-13 × 2.5-5 cm, elliptical to elliptic-oblong, pinnate venation with 5-7 secondary veins on each side, base obtuse to short-acute, margins entire to remotely serrulate, apex short-acuminate; petiole 1-1.3 cm. Capitulescence a broadly ovoid panicle, branches minutely puberulent. Capitula 6-7 mm; phyllaries c. 18, 1-6 mm, ovate to narrowly oblong or linear, apex rounded. Florets 3-5; corolla c. 4 mm, tubular, lobes c.
0.2-0.3 mm. Cypselae c. 1.8 mm, sparsely scabrid or short-setulose distally on pale ribs and distal surfaces; pappus bristles c. 35, mostly 2-3 mm, apex tapered. Tall woods, heavily forested slope, slopes with montane rain forest. Ch (Breedlove 9765, CAS); G (Türckheim II 2261, US). 1300-1600 m. (Endemic.)


Shrubs or small trees 3-8 m; stems subhexagonal, reddish brown to dark brown, glabrous. Leaves petiolate; blade mostly 9-17 × 2.5-6.5 cm, ovate-lanceolate to lanceolate, venation regularly pinnate with 6-12 secondary veins on each side, veins progressively closer to each other nearer base, base rounded to obtuse with slight acumination, margins closely serrulate, apex narrowly short-acuminate; petiole 1-3 cm. Capitulescence broadly pyramidal paniculate, branches glabrous, bearing sessile capitula in clusters of 5-8. Capitula 7-9 mm; phyllaries c. 23, 1.5-7 mm, suborbicular to oblong or linear, apex rounded. Florets 5-8; corolla 5-5.5 mm, narrowly funnelform, often reddish distally, lobes c. 0.2-0.3 mm. Cypselae c. 2.5 mm, minutely glandular distally on ribs and at top on faces, with few minute setulae; pappus bristles c. 50, 4-5.5 mm, with tapered apex. Primary cloud forest, shrubby slope, steep slopes. Ch (Ton [aka Mendez] 669, US); G (Nelson 3710, US); H (Molina, 1984: 133); ES (Tucker 1072, US). 1300-3000 m. (Endemic.)

18. **Decachaeta** DC.

Por H. Robinson.

Erect to arching subshrubs or shrubs, sparsely to moderately branched, most species with numerous glands on stems, leaves, and capitulescences; stems fistulose or solid. Leaves usually alternate, sometimes opposite; blade elliptical, ovate, or suborbicular, sometimes sublobate, venation usually trinervate, more rarely ascending-pinnate; petiole distinct and often long, sometimes winged. Capitulescence a thyrsoid panicle, usually leafy. Capitula on short peduncles, with campanulate involucres, discoid, 4-35-flowered; phyllaries c. 10-32, subimbricate, strongly unequal, graduated, 3-4-seriate, mostly persistent, a few innermost deciduous; clinanthium hemispherical, e paleate or rarely paleate, with
sclerified surface, densely hirsute. Corolla narrowly funnelform, white, violet, or bluish, glabrous or sparsely to densely glandular distally, lobes triangular, as wide as long or wider, smooth with oblong cells on both surfaces; anther collar with subquadrate cells proximally, without ornate thickenings on walls, appendage truncate, much shorter than wide, margin strongly reflexed; style base without node, glabrous, appendages narrowly linear or broadened distally, mamilllose. Cypselae prismatic, 4-5-ribbed, 1.8-3 mm, with numerous setulae, carpopodium short-cylindrical or stopper-shaped, not procurrent on ribs, subquadrate cells with slightly thickened walls; pappus of 10-40 slender scabrid rather easily deciduous bristles, with or without broadened apex. 7 spp. of Mexico and Central America.

Sundberg et al. (1986) treated *Erythradenia* (B.L. Rob.) R.M. King et H. Rob. as a synonym of *Decachaeta*, but King y Robinson (1987) excluded *Erythradenia*.


1. Leaves opposite; leaf margins mostly closely serrate, rarely with a larger tooth at widest parts; peduncles mostly 3-13 mm.

3. **D. perornata**

1. Leaves alternate; leaf margins prominently angled to sublobate; peduncles less than 5 mm.

2. Stems obviously deflected at nodes, rather zigzag; petioles unwinged; leaf blades abruptly obtuse to broadly rounded at bases; capitula c. 25-flowered.

4. **D. thieleana**

2. Stems not obviously deflected at nodes; leaf blades decurrent into petiolar wings; capitula 8-16-flowered.

3. Petioles winged to bases; stems often with solid pith; abaxial leaf surfaces with prominulous minute reticulum of veinlets; phyllaries obtuse apically; corollas whitish, gradually more densely reddish or yellowish glandular distally; pappus bristles slightly to distinctly broadened apically.

1. **D. incompta**

3. Petioles narrowly winged distally; stems fistulose; abaxial leaf surfaces with veinlets not prominulous; phyllaries narrowly acute apically; corollas reddish-violet distally, obscurely glandular-dotted; pappus bristles tapered apically.

2. **D. ovandensis**

Erect subshrubs to 3 m; glands of leaves, involucre, corollas and styles reddish or yellowish; stems straight, not obviously deflected at nodes, light brown, thinly tomentose, pith often solid. Leaves alternate, rarely subopposite; blade mostly 6-20 × 4-15 cm, ovate, subtrinervate from near base, adaxial surface puberulent, abaxially subtomentellous and densely glandular dotted, with close prominent minute reticulum of veinlets, base acute to subtruncate, decurrent into petiolar wings, margins closely crenulate to serrulate, prominently 1-3-angled or sublobate, apex short-acute to scarcely acuminate; petiole 1-5 cm, winged to base, wing broad distally. Capitulescence narrow, sometimes with long ascending branches from near base, branches tomentellous, bearing dense pyramidal or corymbiform clusters of short-pedunculate capitula; peduncles less than 5 mm. Capitula 5-6 mm; phyllaries c. 12, narrowly oblong, puberulent and densely glandular, apex obtuse. Florets 8-16; corolla 2.5-3 mm, white, gradually more densely reddish or yellowish glandular distally, lobes 0.2-0.3 × 0.4-0.5 mm. Cypselae c. 2 mm, ribs short-setulose; pappus bristles c. 20-27, c. 3 mm, slightly to distinctly broadened apically. 2n = 16. *Open oak-pine forest, open west slope with Acacia and Opuntia*. Ch (*Ton [aka Mendez] 1513*, CAS); G (*Nelson 3527*, US). 900-2000 m. (Mexico, Mesoamerica.)


Subshrubs 1-2 m?, pale glandular-dotted; stems straight, not obviously deflected at nodes, yellowish brown, puberulent, fistulose. Leaves alternate; blade 6-17 × 5-11 cm, ovate, subtrinervate from 10-30 mm above base, veinlets not abaxially prominulous, surfaces sparsely puberulent, pale glandular-dotted, base broadly rounded and decurrent into petiolar wings, margins closely serrulate, with 1 or 2 prominent large angles or teeth, apex short-acute; petiole 2.5-7 cm, narrowly winged distally. Capitulescence short with a few longer branches proximally, branches tomentellous, bearing corymbiform clusters of short-pedunculate capitula; peduncles less than 5 mm. Capitula c. 7 mm; phyllaries c. 15, lanceolate to linear, sparsely minutely puberulent and glandular-dotted, apex narrowly acute. Florets c. 15; corolla 3-3.5 mm, reddish-violet distally, obscurely glandular-dotted,
lobes c. 0.4 × c. 0.4 mm. Cypselae 2-3 mm, ribs setulose; pappus bristles c. 20, tapered apically. *Wooded slopes*. Ch (Matuda 16258, US). C. 1000 m. (Endemic.)


Scrambling or arching shrubs 1-2 m, yellowish glandular-dotted; stems straight, light brown, puberulent, fistulose. Leaves opposite; blade mostly 6-20 × 3-11 cm, ovate, trinervate from 5-10 mm above base, surfaces subglabrous, with few minute trichomes on veins, obscurely glandular-dotted abaxially, base broadly rounded, margins closely serrulate, rarely with a larger tooth at widest part, apex narrowly short-acuminate; petiole 1-3 cm, narrow and unwinged. Capitulescence of short spreading branches in axils of numerous pairs of leaves, branches densely puberulent, bearing numerous slenderly pedunculate capitula in pyramidal to corymbiform clusters; peduncles mostly 3-13 mm. Capitula 6-8 mm; phyllaries 25-32, lanceolate to narrowly oblong or linear, puberulent and sparsely glandular. Florets 25-35; corolla c. 4.5 mm, whitish or sometimes lavender, with few or no glands, lobes c. 0.5 × c. 0.5 mm. Cypselae c. 1.8 mm, with some small setulae distally, glabrous proximally; pappus of c. 40 bristles, c. 4 mm, not broadened at apex. *Steep slope with dense montane rain forest, steep canyon with evergreen cloud forest, selva mediana subperennifolia*. Ch (Breedlove 42550, US). 700-2200 m. (E. Mexico, Mesoamerica.)


Subshrubs or shrubs to 4 m, yellowish gland-dotted; stems obviously deflected at nodes, rather zigzag, brown, short-hirtellous, fistulose. Leaves alternate; blade mostly 7-17 × 6-15 cm, broadly ovate, proximal leaves to 25 × 24 cm, venation weakly trinervate from 5-20 mm above base, surfaces sparsely puberulent, glandular dotted abaxially, base broadly rounded to abruptly obtuse, margins serrulate with a prominent large angle or dentation on each side, apex acute to short-acuminate; petiole 3-7 cm, unwinged. Capitulescence densely pyramidal, peduncles less than 5 mm. Capitula 5-6 mm;
phyllaries c. 15, oblong-lanceolate, sparsely glandular-dotted, apex usually obtuse. 
Florets c. 25; corolla c. 3.5 mm, white to rarely lavender, glandular distally, lobes c. 0.4 ×
c. 0.4 mm. Cypselae c. 1.8 mm, short-setulose distally; pappus of 25-30 bristles, c. 3 mm,
apex not broadened. Cloud forest area, clearing in forest, moist bushy potrero, pasture,
among weeds and vines on open rocky slope, partial shade. ?H (Nelson Sutherland, 2008:170); CR (Skutch 2566, US); P (Maxon 4994, US). 200-3200 m. (Endemic.)

Por H. Robinson.

Erect or arching perennial herbs or subshrubs, moderately branched distally; roots fibrous
or forming a crown; stems terete, glabrous to puberulent, fistulose. Leaves opposite;;
blade deltoid or broadly ovate to suborbicular, basal leaves sometimes deeply lobed,
trinervate or palmately veined from or near base, both surfaces with prominulous veins,
punctate-glandular abaxially, base broadly rounded to cordate, margins serrate-dentate to
serrulate petiole narrow, abruptly demarcated distally. Capitulescence a lax, elongate,
pyramidal panicle terminal on branches, with elongate primary internodes, central
capitula not maturing distinctly before others; peduncles usually rather long. Capitula
broadly campanulate, discoid, 75-300-flowered; without multiseriate subphyllaries,
phyllaries 35-70, weakly to moderately subimbricate in unequal to subequal series, ovate
to linear, spreading with age, all or at least some proximal ones persistent on aged
clinanthium; clinanthium strongly convex, paleate, with sclerified surface throughout;
paleae filiform, apex slightly to distinctly broadened. Corolla narrowly funnelform, pink,
purple, red, or whitish, lobes broadly triangular, as wide as long, smooth with short-
oblong cells on both surfaces, clustered-glandular; anther collars with many subquadrade
cells proximally, walls weakly transversely thickened, appendage about half as long as
wide; style base without node, glabrous, branches filiform to scarcely broadened distally,
mamilllose. Cypselae prismatic, 5-ribbed, with numerous setulae on faces, carpopodium
shortly stopper-shaped, with distinct distal rim, cells small, subquadrade, walls thin to
slightly thickened; pappus of 13-35 scabrid bristles, persistent to rather deciduous, not or
scarcebly broadened at apex. 4 spp. from Mexico through Central America to Costa Rica.

Turner (1997) treated Matudina as a synonym of Eupatoriastrum, which he
recognized as containing 5 species.
1. Stems and involucres essentially glabrous, leaves glabrous or sparsely puberulent on veins; capitulescences with slender ascending glabrous branches; phyllaries c. 1 mm diam, narrowly oblong to linear; leaf blades usually 4-5-angled on each margin, not lobed; corollas lavender.

   **1. E. angulifolium**

1. Stems, leaves and involucres with few to many trichomes; capitulescences with rather squarrose-spreading pilose to densely pilosulous branches; phyllaries 1.5-2.5 mm diam., ovate to lanceolate; leaf blades not or rarely slightly angled, larger leaves often with 2-4 broad lobes; corollas white.

   **2. E. nelsonii**


Holotype: Guatemala, *Salvin y Godman 265* (K). Illustr.: no se encontró. N.v.: flor de algodón, madre contrahierba, G.

Coarse perennial herbs or arching subshrubs to 1 m; stems glabrous. Leaves petiolate; blade 10-22 × 9-22 cm, broadly ovate to suborbicular, not lobed, 3 pairs of secondary veins congested in basal fourth, third pair ascending-trinervate from 10-20 mm above base, at c. 45°, reaching distal third of blade, surfaces glabrous or sparsely puberulent on veins, base broadly cordate, each margin closely serrate-dentate and with 4-5 larger slight or sharp angles, apex obtuse with very short acumination; petiole 5-9 cm. Capitulescence with slender, ascending, glabrous branches; peduncles 7-30 mm, slender, glabrous. Capitula 7-10 × 7-10 mm; phyllaries c. 50-70, 2-5 × c. 1 mm, narrowly oblong to linear, glabrous; paleae c. 5 mm. Florets 75-100; corolla c. 5 mm, lavender, lobes c. 0.3 × c. 0.4 mm, glandular. Cypselae 2-2.5 mm, ribs setulose; pappus bristles c. 20, 4-4.5 mm, non-contiguous basally, deciduous. *Seasonal evergreen forest near stream.* Ch (*Breedlove 47660*, US); G (*Salvin y Goodman 265*, K); ?H (Nelson Sutherland, 2008: 165); N (Dillon et al., 2001: 318). 400-1400 m. (Endemic.)

Turner (1994, 1997) reported this species as occurring to 1500 m elevation.


Eupatoriastrum nelsonii var. cardiophyllum B.L. Rob. et Greenm., Eupatorium ultraisthmium McVaugh.

Arching coarse perennial herbs or subshrubs to 2 m; stems sparsely to densely pilose. Leaves petiolate; blade mostly 8-22 × 5-19 cm, broadly ovate, 2-3 pairs of secondary veins from base or from basal 1 cm of blade, strongest pair ascending trinerved at 30-40°, reaching distal 1/5 of blade or ending in lobes, surfaces sparsely pilose, base broadly rounded to shallowly cordate, margins serrulate to coarsely serrate-dentate, not or rarely slightly angled, larger leaves often incised and broadly 2-4-lobed, apex shortly narrowly acuminate; petiole 1-6 cm. Capitulescence with rather squarrose-spreading pilose to densely pilosulose branches; peduncles 5-30 mm, rather stout. Capitula 10-12 × ≤ 20 mm; phyllaries 35-50, 3-7 × 1.5-2.5 mm, ovate to lanceolate, puberulent; paleae 6-8 mm. Florets 150-300; corolla 5-6 mm, white, lobes c. 0.3 × c. 0.4 mm, with some glands and short trichomes. Cypselae 1.5-2 mm, setulose mostly on ribs; pappus bristles 18-22, 5-6 mm, moderately fragile. Cafetal in seasonal evergreen forest along streams, wooded slope. Ch (Purpus 7198, US); G (Aguilar 577, F); ES (Padilla 216, US); CR (Callaway 313, US). 200-700 m. (Mexico, Mesoamerica.)

20. Eupatorium L.

Por H. Robinson.

Erect annual or perennial herbs, few- to many-branched; stems glabrous to pubescent, fistulose or solid. Leaves opposite or alternate to subverticillate, distal leaves subopposite or alternate, sessile or petiolate; blade linear to ovate, deltoid, trilobed, or dissected, surfaces usually gland-dotted. Capitulescence a corymbiform or pyramidal panicle, with short-pedunculate capitula. Capitula campanulate, discoid, 3-23-flowered; phyllaries 10-22, weakly to strongly subimbricate, graduated, herbaceous to substramineous, usually persistent, inner phyllaries in some species somewhat deciduous; clinanthium flat to slightly convex, eпалate, with sclerified surface, glabrous. Corolla narrowly funnelform or with constricted tube and campanulate limb, white to purple or lavender, glands often concentrated on base of limb and on lobes, rarely with few trichomes, limb without subquadrate cells below the lobes, lobes triangular to oblholg-ovate, usually slightly longer than wide, smooth with oblong cells on both surfaces; anther collar with subquadrate cells proximally, cells with or without beaded thickenings on walls, appendages c. 1.5 times as long as wide, not truncate; style base puberulent, rarely
glabrous, with or without enlargement, branches filiform to scarcely broadened distally, papillose with spreading cells. Cypselae prismatic, 5-ribbed, sparsely to densely glandular, sometimes sparsely setulose, carpodopodium obsolete or lacking, sclerified cells when present subquadrate to broadly oblong, walls thin, firm; pappus of 25-40 scabrous persistent bristles, apical cells rounded or obtuse. Aprox. 45 spp., eastern United States, Cuba, adventive around Caribbean, Europe to E Asia.

Williams (1976a), Turner (1997) and Dillon et al. (2001) circumscribe Eupatorium more broadly, thus having treated as synonyms many genera recognized here. The following one species of Eupatorium s. str. is adventive in Mesoamerica.


Eupatorium foeniculoides Walt.

Slender erect annual herbs to 3 m, usually with many short ascending branches; stem densely puberulent, pith solid. Leaves mostly alternate, mostly 1-2-pinnately dissected into filiform segments, 1-3 cm, mostly glabrous but with scattered minute glandular dots. Capitulescence a tall dense thyrsoid panicle with ascending spiciform branches, capitula mostly sessile, directed upward, outward, and downward. Capitula 2-4 mm; phyllaries 12-15, 1-3 mm, oblong to lanceolate, essentially glabrous, apex apiculate. Florets usually 5; corolla 2-2.5 mm, whitish, tube narrow, lobes c. 0.2 × c. 0.2 mm, few glandular-dotted; style base with or without trichomes. Cypselae c. 1.5 mm, glabrous or few glandular-dotted; pappus bristles 25-30, 2-2.5 mm, apex not enlarged, apical cells with blunt apex. 2n = 10. Near beach, in scrub, swamp, open places in thicket. G (Williams, 1976a: 61); H (Molina, 1975: 114); N (Dillon et al., 2001: 322); CR (Poveda et al. s.n., US). 0-50 m (native to e. United States, Bahamas, Cuba; adventive in Mesoamerica, Venezuela.)


Por H. Robinson.
Erect to decumbent or prostrate annual or perennial herbs or subshrubs, not epiphytes in mangrove swamps; stems terete, pith usually solid. Leaves opposite or rarely alternate, often with slender petiole, rarely subsessile; blade elliptical to rhomboidal or broadly cordate-ovate, margins entire to dentate or very rarely bipinnately and ternately dissected into linear lobes, with or without glandular dots abaxially, veins pinnate to trinervate. Capitulescence diffuse, alternately branching, with laxly cymose to densely corymbiform branches; peduncles short to moderately long. Capitula campanulate, discoid, (10-)20-55(-150)-flowered; phyllaries 20-c. 60, subimbricate and graduate, rarely eximbricate and more nearly subequal, persistent, spreading with age, outer phyllaries typically several and regularly inserted to rarely few and irregularly disposed; clinanthium flat to slightly convex, epaleate, with sclerified surface, glabrous. Corolla usually bluish, lavender or whitish, with narrow short usually strongly ribbed tube, with narrowly campanulate limb, limb without subquadrate cells below the lobes, veins thickened in proximal half, tube with veins obviously thickened, proximal part of throat also with veins thickened, lobes broadly triangular, as wide as long, moderately spreading, both surfaces of lobes prorulose with papillae formed by projecting distal ends of elongate cells, sparsely to densely glandular or setulose; anther collars slender, cells mostly oblong, cell limits obscured by dense transverse annular thickenings on walls, appendage about as long as wide, not truncate; style base without thickened enlarged node, glabrous, branches linear to narrowly clavate, densely papilllose. Cypsela prismatic, 5-ribbed, usually scabrid or setulose, usually eglandular, without dense minute powdery-glands, carpopodium stopper-shaped with obvious projecting distal rim, not procurrent on ribs, carpopodium cells subquadrate, walls greatly thickened; pappus rarely absent in some outer cypsela, typically of 5-40 slender, scabrid, widely spaced to contiguous, persistent to sometimes slightly fragile bristles, not broadened at apex. Aprox. 80 spp. from southern United States, Mexico, Central America and in South America mostly in Andes south to Argentina.

Turner (1997: 243) mapped *F. gonzalezii* as occurring in Oaxaca and Chiapas, but it seems possible that the material from Chiapas is instead *F. matudae, F. pratensis*, or *F. pycnocephala*.

1. Leaf blades bipinnately or ternately dissected into linear lobes.

7. *F. carletonii*

1. Leaf blades entire to dentate, not dissected into lobes.

2. All or almost all phyllaries tapering into narrowly acute to acuminate herbaceous or papyraceous tips, often appearing rather eximbricate; capitula 20-150-flowered; pappus of 5-22 non-contiguous bristles.

3. Leaves usually alternate; pappus of 5 widely separated bristles; capitula 75-150 flowered.

3. *F. arguta*

3. Leaves usually opposite; pappus of 10-25 bristles; capitula 20-60-flowered.

4. Branches of capitulescences bearing many minute spreading stipitate glands, with or without antrorse non-glandular hairs.

5. Capitula 3-4 mm high, 35-40-flowered; pappus of 10-12 bristles.

15. *hammelii*

5. Capitula 5-6 mm high, 40-60-flowered; pappus of (8-)15-22 bristles.

6. Leaves ovate lanceolate to lanceolate; phyllaries 35-40 in c. 3 weakly subimbricate series.

17. *F. imitans*

6. Leaves deltoid; phyllaries c. 60, strongly subimbricate, graduate, c. 4-seriate.

25. *F. profusa*

4. Branches of capitulescences without minute spreading stipitate glands, often with antrorse non-glandular hairs.

7. Capitula c. 35-50-flowered; pappus of 10-12 non-contiguous bristles.

6. *F. capillipes*


8. Leaf blades rhomboid-ovate with obtuse to subtruncate bases.

30. *F. sinclairii*

8. Leaf blades narrowly elliptical with narrowly cuneate bases.

9. Capitula 3-4 mm high; leaf blades with weakly developed secondary veins.

20. *F. misera*

9. Capitula c. 5 mm high; leaf blades with well-developed sublongitudinal trinervation reaching beyond mid-blades.

29. *F. sideritidis*

2. Inner phyllaries obtuse to short-acute or apiculate with often highly scarious tips, with involucre appearing distinctly subimbricate; capitula 9-35-flowered; pappus of 15-30 non-contiguous to contiguous bristles
10. Cypselae totally black at maturity, ribs not persistently yellow.

11. Leaf blades with 2-4 pairs of well-developed pinnately arranged secondary veins in proximal fourth.

12. Capitula c. 5 mm high; leaf margins bi- to tri-crenate.

1. **F. allenii**

12. Capitula c. 3 mm high; leaf margins usually with simple sharp teeth.

16. **F. hymenophylla**

11. Leaf blades with secondary veins trinervately or palmately arranged, often at or very near bases.

13. Peduncles 5-12 mm, with numerous scale-like sessile glands; phyllaries obtuse to broadly rounded; style branches broadened distally.

34. **F. viscidipes**

13. Peduncles mostly 1-4 mm, without scale-like sessile glands; phyllaries obtuse to acute; style branches slender.

14. Leaf blades with distinct glandular dots abaxially.

15. Apices of leaves obtuse to rounded, venation subpalmate, with secondary veins decurrent into petioles; florets 40-50 in a capitulum.

10. **F. coibensis**

15. Apices of leaves acute to acuminate, venation strictly trinervate from or near bases of blades; florets mostly 20-25 in a capitulum.

16. Puberulence of stems, veins of leaves, branches of capitulescences and phyllaries reddish; capitulescences rather lax.

13. **F. gentryi**

16. Hairs of stems, leaves and capitulescences pale; capitulescence dense.

24. **F. pratensis**

14. Leaf blades not or obscurely gland-dotted.

17. Bases of leaf blades acute.

18. Leaf blades narrowly lanceolate, with apices narrowly acute to acuminate; cypselae with short setulae distally.

4. **F. blakei**

18. Leaf blades elliptical to ovate-elliptical, with apices short-acute; cypselae nearly or totally glabrous.

11. **F. crocodilia**

17. Bases of leaf blades subtruncate to subcordate.
19. Leaf blades with abaxial surfaces essentially glabrous.

   **9. F. ciliolifera**

19. Leaf blades with trichomes on abaxial surfaces, especially on veins.

20. Erect shrubby herbs with densely pubescent leaves; ribs of cypselae with many setulae.  **33. F. tysonii**

20. Subscandent herbs; leafs sparsely pubescent; ribs of cypselae sparsely scabrous to glabrous.

   **8. F. chiriquensis**

10. Cypselae black on lateral surfaces with persistently yellow ribs at maturity.


   22. Leaf blades 1.5-2 as long as wide, bases often asymmetric or with trinervation above bases.  **23. F. plectranthifolia**

   22. Leaf blades usually nearly as wide as long, bases symmetrical, trinervation basal.  **31. F. splendens**


23. Leaf blades with numerous glandular dots or stipitate glands abaxially.

   24. Annuals; pappus bristles broadened and essentially contiguous at the bases; capitulescences with lateral branches overtopping terminal capitula; larger stems fistulose.  **19. F. microstemon**

   24. Perennials; pappus bristles mostly slender and distinctly non-contiguous at bases; capitulescences with lateral branches not or scarcely overtopping terminal capitula; stems not fistulose.

25. Stems, petioles, branches of capitulescences and outer phyllaries with numerous short-stipitate glands.

   26. Leaf blades 4 cm or less long; capitulescence lax with squarrose-spreading branches.  **14. F. guatemalensis**

   26. Leaf blades mostly more than 4 cm; capitulescences with ascending branches bearing dense corymbiform clusters of capitula.  **27. F. pycnocephaloides** (p.p.)

25. Plants with glands mostly restricted to leaves.

   27. Often scrambling plants; internodes of capitulescences not notably longer than those of vegetative stems; petioles 1-5 cm; leaf blades
with trichomes mostly restricted to veins abaxially.

12. *F. deborabellae*

27. Erect plants with short vegetative internodes and long internodes in capitulescences; petioles 0.3-0.8 cm; leaf blades usually densely hirtellous to velutinous abaxially on and between veins.

22. *F. nix*

23. Leaf blades without many obvious glandular dots or stipitate glands.

28. Capitula 10-12-flowered; leaves membranaceous, narrowly ovate to lanceolate, apices narrowly acuminate; surfaces subglabrous.

18. *F. matudae*

28. Capitula c. 18-30-flowered; leaf blades lanceolate or ovate to oblong or deltoid; leaf surfaces often pubescent.

29. Capitulescences bearing dense corymbiform clusters of capitula; peduncles 1-5 mm, mostly less than 3 mm; cypselae with setulae mostly on ribs.

30. Outer lower phyllaries loosely inserted, intergrading with peduncular bracteoles.

5. *F. bohlmanniana*

30. Outer lower phyllaries closely inserted, abruptly differentiated from peduncular bracteoles.

31. Leaf blades oblong-ovate, narrowly rounded at apices; veins on abaxial surfaces glabrous or subglabrous with only minute appressed trichomes.

32. *F. suderifica*

31. Leaf blades ovate to ovate-deltoid, acute or acuminate at apices; veins on abaxial surfaces distinctly puberulent to tomentellous.

32. Stems puberulent throughout; all phyllaries glabrous to sparsely puberulous; style branches linear or scarcely broadened distally.

26. *F. pycnocephala*

32. Stems often becoming glabrous in internodes; outer phyllaries densely puberulent to hirtellous; style branches usually distinctly broadened distally.

27. *F. pycnocephaloides* (p.p.)
29. Capitulescences lax, with branches bearing loosely corymbiform to subcymose groups of capitula; peduncles 3-25 mm, mostly more than 5 mm; cypselae with setulae on distal faces and ribs.

33. Peduncles glabrous to subglabrous.  \textit{F. multinervis}

33. Peduncles minutely puberulent to pilosulous.

34. Decumbent flexuous herbs; distal leaves greatly reduced; leaf blades with trichomes mostly restricted to veins on abaxial surfaces.

2. \textit{F. anisopoda}

34. Erect herbs; leaves gradually reduced in capitulescences; abaxial surfaces of leaf blades with numerous trichomes on and between veins.

35. Stems densely hirsute; pappus bristles distinctly not contiguous at bases.

28. \textit{F. seleriana}

35. Stems puberulent; pappus bristles essentially contiguous at bases.

35. \textit{F. yucatanensis}


Erect perennial herbs 0.7-1.5 m; stems densely reddish puberulent. Leaves opposite; blade mostly 8-15 × 4-9 cm, broadly elliptical, venation pinnate or subpinnate, with 4 or 5 ascending secondary veins per margin, subparallel with or convergent with basal margin, proximal secondary veins from distinctly above base, veins puberulent, adaxial surface sparsely puberulent, abaxially gland-dotted, base acute to narrowly acuminate, margins distinctly bi- to tri-crenate, apex acute to scarcely acuminate; petiole to 5 cm. Capitulescence broadly corymbiform with dense corymbiform branches; peduncles 2-4 mm, densely puberulent. Capitula c. 5 mm; phyllaries c. 28-30, 1.3-3.5 × 0.6-0.8 mm, strongly subimbricate, graduate, oblong to ovate-oblong, margins scarious, apex obtuse to short-acute, surface puberulent, outer phyllaries several, densely inserted at base. Florets 20-25; corolla 2.8-3 mm, lavender, with many sharp-pointed trichomes distally and on lobes, lobes c. 0.3 mm; style branches slightly thickened. Cypselae c. 1 mm, black with black ribs, glabrous to sparsely setulose distally; pappus bristles c. 30, c. 2.5 mm, contiguous at base. \textit{Forested hill.} P (Croat 13516, US). 1200-2400 m. (Endemic.)


Decumbent flexuous perennial herbs c. 0.4-0.5 m; stems puberulent mostly near nodes. Leaves opposite; blade mostly 1.2-2.5 × 0.9-1.8 cm, ovate, distal leaves greatly reduced, smaller and more remote, strongly trinervate from base, surfaces eglandular, sparsely pilosulose adaxially, abaxial surface with veins puberulent, base obtuse to subtruncate, margins crenate-serrulate above widest part, apex short-acute; petiole 0.3-0.6 cm. Capitulescence sparse, lax, branches mostly alternate, bearing loosely corymbiform to cymose groups of capitula; peduncles mostly 5-25 mm, puberulent to pilosulous. Capitula 5-5.5 mm; phyllaries c. 25, 1.7-3.5 × 0.7-0.9 mm, subimbricate, graduate, ovate to oblong, apex shortly to sharply acute, surface scarcely puberulent. Florets 25-30; corolla 2.2-2.7 mm, whitish, glabrous, lobes c. 0.7 mm; style branches slightly broadened. Cypselae c. 1.5 mm, faces black, ribs persistently pale, ribs and distal faces shortly erect-setulose; pappus of c. 30 bristles, 2-25 mm, not reaching bases of corolla lobes, distinctly non-contiguous at base. Hábitat desconocido. G (*Türckheim 1177*, GH). 1600 m. (Endemic.)

Williams (1976a) treated *F. anisopoda* as a synonym of *Eupatorium pycnocephalum*.


*Eupatorium quinquesetum* Benth., *Fleischmannia rhodostyla* Sch. Bip.

Erect perennial herbs 0.25-0.45 m; stems flexuous, brownish to reddish; stems, leaves, and peduncles densely hispidulous with short-stipitate glands. Leaves usually alternate; blade 1-4.5 × 0.2-1.3 cm, elliptical-lanceolate to oblanceolate, ascending trinervate from base, base and apex acute, margins few serrulate distally or remotely sharply serrate; petiole 0.2-1.2 cm. Capitulescence lax with few capitula terminating alternate branches; peduncles 15-40 mm. Capitula 5-7 mm; phyllaries 30-40, 3-6 × c. 0.7 mm, appearing eximbricate, to rather densely inserted at base, lanceolate, apex attenuate, surface puberulent or with stipitate glands. Florets 75-150; corolla 3-3.5 mm, lavender, puberulent distally, lobes c. 0.3 mm; style branches linear. Cypselae c. 1.3 mm, minutely setulose mostly on ribs, ribs usually persistently yellow; pappus of 5 widely spaced
bristles, 2.8-3.3 mm. *Ladera húmeda, bosque de encinos, among rocks in stream bed, gravel bar along river, moist ledges of barrancas*. H (Standley 15804, US); N (Molina 20593, US). 50-2000 m. (SW y C. Mexico, Mesoamerica.)


Annual or short-lived perennial herbs 0.35-0.8 m; stems greenish to brownish, puberulent. Leaves opposite; blade 4-8 × 1-2 cm, narrowly lanceolate, strongly ascending trinervate sublongitudinal from base, surfaces sparsely puberulent, obscurely glandular-dotted abaxially, base and apex narrowly acute, margins serrulate to serrate above widest part; petiole 0.5-2 cm. Capitulescence laxly thyrsoid, branches bearing capitula in small dense corymbiform clusters; peduncles 2-5 mm, puberulent. Capitula 4-5 mm; phyllaries c. 23, 1.2-3.5 × c. 0.7 mm, subimbricate, graduate, ovate to oblong, margins broadly scarious, surface mostly glabrous, rather densely inserted at base, inner phyllaries apically obtuse to rounded. Florets c. 20; corolla 2.2-3 mm, bluish, glabrous, lobes c. 0.3 mm; style branches linear. Cypselae c. 1.8 mm, short-setulose distally mostly on ribs, ribs as dark as faces; pappus of c. 25 bristles, 2.1-2.5 mm, contiguous at base. *Rocks along river, river bank among shrubs*. Ch (*Breedlove 35361*, CAS); B (*Bartlett 11463*, US); H (*Blake 7347*, US). 100-300 m. (Endemic.)

The upper elevational limit of 1000 m for this species ranges as given by Williams (1976a) was not verified during this study.


*Eupatorium bohlmannianum* (R.M. King et H. Rob.) C. Nelson.

Erect perennial herbs 1-2 m; stems yellowish green to brown, minutely puberulent, glabrescent. Leaves opposite; blade mostly 2-5.5 × 1.5-3.7 cm, ovate, strongly trinervate from base, often in small acumination, not evidently glandular-dotted nor stipitate-glandular, sparsely short-pilose adaxially, puberulent mostly on veins abaxially, base short-acute to subtruncate, margins serrate to crenate-serrate, apex slightly short-acuminate; petiole 0.5-3 cm. Capitulescence laxly elongate-thyrsoid, branches ascending, ending in small dense corymbiform clusters of capitula; peduncles 1-2 mm, densely puberulent. Capitula 4-5 mm; phyllaries, c. 30, 1.5-3.5 × c. 0.8 mm, subimbricate,
graduate, ovate to narrowly oblong, margins widely scarious, mucronate, surface subglabrous or puberulent in middle, outer phyllaries several, loosely inserted at base, intergrading with peduncular bracteoles, inner phyllaries apically obtuse. Florets 22-25; corolla 2.5-2.8 mm, lavender, lobes c. 0.4 mm, with only a few glands; style branches narrowly linear. Cypselae 1-1.5 mm, with short setulae mostly on ribs, faces blackening, ribs persistently yellowish; pappus bristles 20-25, 2-2.3 mm, distinctly non-contiguous at base, a few outer cypselae sometimes calvous. 2n = 20. Roadsides. G (Heyde y Lux 4219, US); H (Nelson Sutherland, 2008: 171). 800-2300 m. (Endemic.)


Annual or short-lived perennial herbs 7-40 cm; stems greenish, sometimes fistulose; stems, petioles, leaf veins, peduncles, and phyllaries minutely puberulent. Leaves opposite; blade 1.4-4.5 × 1.2-3 cm, ovate to broadly ovate, membranous, spreading trinervation marginal in basal acumination, surfaces glabrous between veins, eglandular, base obtuse to subtruncate, margins closely crenate-serrate above widest part, apex short-acuminate; petiole 0.5-3 cm, slender. Capitulescence diffuse, branches subcymose, not stipitate-glandular; peduncles mostly 5-15 mm, slender. Capitula c. 3 mm; phyllaries c. 20, 2-3 × c. 0.5 mm, appearing eximbricate, with some loosely inserted at base, lanceolate, apically attenuate. Florets 40-50; corolla 2.3-3 mm, white to slightly lavender, lobes c. 0.4 mm, minutely puberulent; style branches linear. Cypselae 1-1.5 mm, short-setulose distally mostly in ribs, ribs persistently yellow; pappus of c. 10 bristles, 2-2.7 mm, non-contiguous at base. 2n = c. 20. Moist shaded bank, steep heavily wooded slope, bits of soil on rocks along tumbling mountain stream. Ch (Breedlove y Raven 13713, US); G (Standley 77714, GH); H (Nelson Sutherland, 2008: 171); ES (Tucker 439, US); N (Örsted 9569, US); CR (Liesner 4411, MO); P (Knapp et al. 3318, MO). 5-1200 m. (SW. Mexico, Mesoamerica.)

This species was not treated as Panamanian by King y Robinson (1975). Williams (1976a) recognized Eupatorium jejunum as distinct, and placed Ageratina helenae R.M. King et H. Rob. and A. molinae R.M. King et H. Rob. in synonymy of the present
species. The citation of this taxon in Honduras by Williams (1976a) is in error and is based on the Honduran type of *A. molinae*. I am unable to confirm the upper elevational limit of "2850 m" of *F. capillipes* given by Williams (1976a).


Erect perennial herbs 0.2-0.3 m; stems reddish, subglabrous. Leaves opposite; blade 1-4.5 × 1-4.5 cm, bipinnately and ternately dissected into linear lobes and lobules, segments c. 1 mm diam., surfaces subglabrous, sparsely to densely minutely glandular-dotted; petiole 0.5-1.5 cm, very narrowly winged. Capitulescence laxly cymose; peduncles 3-10 mm, sparsely puberulent. Capitula c. 3 mm; phyllaries c. 18, 1.5-3 × 0.2-0.4 mm, appearing eximbricate, linear-lanceolate, apically narrowly acute to short-attenuate, surface subglabrous. Florets c. 20; corolla 2.2-2.5 mm, lavender, lobes c. 0.3 mm, minutely puberulent; style branches broad. Cypsela 1.2-1.5 mm, with sparse minute spicules mostly on ribs, ribs persistently yellow; pappus of c. 20 bristles, 1.5-2 mm, nearly contiguous at base. On rocky cliff, mountain slope, streamside. G (Williams, 1976a: 62 sub *Eupatorium carletonii*); H (*Yuncker et al. 8729*, US). 80-1500 m. (Endemic.)


Flexuous perennial herbs or vines to 3 m; stems weakly pilose to subglabrescent. Leaves opposite; blade to 6 × 5 cm. ovate, trinervate from base, surfaces eglandular, sparsely pilose, base broadly slightly cordate to truncate, margins closely serrate-crenate above widest part, apex abruptly short-acuminate; petiole to 2.5 cm. Capitulescence broadly corymbiform with compact corymbiform branches; peduncle 2-4 mm, densely puberulous. Capitula c. 5 mm; phyllaries c. 20, subimbricate, graduate, ovate to oblong, 1.5-4.5 × c. 1 mm, outer phyllaries short-acute, outer surface pilose to sparsely puberulent, inner phyllary apices more scarious, rounded and apiculate. Florets 20-25; corollas 3.0-3.5 mm, lavender, lobes c. 0.4 mm, with few short trichomes; style branches slightly broadened distally. Cypsela c. 2.2 mm, faces and ribs black at maturity, sparsely scabrid or short-setulose on ribs; pappus of 27-30 bristles, c. 3 mm, contiguous at base.
Erect perennial often unbranched herbs to 1 m; stems brownish, sparsely minutely puberulent, rarely densely pilosulose distally. Leaves opposite; blade mostly 2.5-6 × 1.3-3 cm, ovate, strongly ascending-trinervate from base, veins abaxially with only minute appressed trichomes, surfaces often glabrous or subglabrous, eglandular, base broadly rounded, margins with few to many shallow to distinct crenate-serrations above widest part, apex narrowly acute to slightly acuminate; petiole 0.5-3.5 cm. Capitulescence thyrsoid, sparsely to densely ascending-branched, bearing dense corymbiform clusters of capitula; peduncles 1-3 mm, puberulent, without scale-like sessile glands. Capitula 5-6 mm; phyllaries 20-25, 1-4 × 0.7-0.9 mm, subimbricate, graduate, margins broadly scarious, apex obtuse or apiculate to rounded, surface glabrous to subglabrous, outer phyllaries several, densely inserted at base. Florets 20-25; corolla 3.5-4 mm, lavender, glabrous, lobes c. 0.5 mm; style branches slender. Cypselae 1.5-1.8 mm, black, minutely setulose on some ribs and distal faces, ribs as dark as faces; pappus bristles c. 30, 2.5-3 mm, scarcely contiguous at base. *Forest, moist forest and along trail. P (Hamilton y Stockwell 3376, MO). 1900-2600 m. (Endemic.)*

Prostrate or decumbent herbs to 0.4 m; stems slightly angled, brown, minutely puberulent. Leaves opposite; blade to 4 × c. 3.8 cm, broadly ovate, papyraceous, ascending trinervation from base, adaxial surface puberulent, abaxially puberulent only on larger veins, glabrous, sparsely minutely glandular-dotted between veins, base obtuse to truncate or subcordate, margins slightly crenulate, apex obtuse; petiole mostly 1-3.4 cm, slender. Capitulescence thyrsoid, branches erect-patent, bearing corymbiform clusters of few capitula; peduncles 2-6 mm, puberulent. Capitula c. 5 mm; phyllaries c. 16, nearly eximbricate, margins narrowly scarious, apex obtuse to short-acute,
subtomentose distally, outer phyllaries, few, 1.1-1.5 × 0.3-0.8 mm, tightly appressed, narrowly ovate. Florets 40-50; corolla c. 1.8-(-2.4) mm, pale lavender, mostly glabrous, lobes c. 0.4 × c. 0.5 mm, with few minute trichomes and glandular dots; style branches narrowly linear. Cypselae c. 1 mm, ribs scabrid, ribs as dark as faces; pappus of 15-20 often short bristles, bristles 0.8-2 mm, slightly broadened but partially non-contiguous at base. *Taludas de la playa, zona umbria rezumante, grietas de roca volcanica alterada*. P *(Galdames 2842, US)*. 2-200 m. (Endemic.)


Erect perennial herbs 0.35-0.5 m; stems reddish, sparsely appressed-puberulent. Leaves opposite; blade mostly 2.5-3.5 × 1-1.5 cm, elliptical to ovate-elliptical, venation strongly ascending-trinervate from base, surfaces and veins glabrous to subglabrous, evidently eglandular, veins abaxially with only minute appressed trichomes or glabrous, base short-acute, margins shallowly crenate-serrate from apex to basal 1/3, apex narrowly rounded; petiole 0.5-1 cm. Capitulescence of one or few small dense corymbiform clusters of capitula on long subscapose stems or branches; peduncles 1-3 mm, puberulent, without scale-like sessile glands. Capitula c. 5 mm; phyllaries c. 25, 1.5-4 × c. 0.8 mm, distinctly subimbricate, graduate, narrowly oblong, apex obtuse, surface glabrous. Florets c. 15; corolla 2.5-3 mm, lavender distally, lobes c. 0.3 mm, glabrous; style branches slender. Cypselae 1.2-1.5 mm, glabrous, ribs and faces black at maturity; pappus of 26-30 bristles, 2-2.3 mm, slightly broadened basally, contiguous at base. *Swampy places*. Ch *(Nelson 2978, US)*; G *(Steyermark 51498, F, US)*. 300-1000 m. (Endemic.)


Erect or often scrambling perennial herbs 0.4-1 m, punctate glands and stipitate glands mostly restricted to leaves; stems brownish to reddish, densely minutely pilosulous, not fistulose. Leaves opposite; blade mostly 3-8 × 1.5-5 cm, ovate to subdeltoid, trinervation strong from small basal acumination, adaxial surface minutely densely puberulent, sometimes velutinous, trichomes mostly restricted to veins abaxially, glandular dots
sparse adaxially, obviously glandular dotted abaxially, rarely stipitate-glandular, base obtuse to subtruncate, margins crenate to crenate-serrate from near widest part to apex, apex short-acute to scarcely acuminate; petiole 1-5 cm. Capitulescence laxly thyrsoid, with spreading branches topped by many rather dense corymbiform clusters of few to many capitula, lateral branches overtopping terminal capitula, internodes of capitulescence not notably longer than those of vegetative stems; peduncles 2-6 mm, densely puberulent. Capitula 4-5 mm; phyllaries 25-30, 1-4 × 0.8-1 mm, subimbricate, graduate, ovate to oblong, margins widely scarious, apex of inner phyllaries rounded, surface puberulent, outer phyllaries several, rather densely inserted at base. Florets 17-22; corolla 2-2.3 mm, pale lavender, lobes c. 0.3 mm, with only few glands; style branches broadened distally. Cypselae 1.3-1.6 mm, densely setulose distally and on ribs, faces blackening, ribs persistently yellowish; pappus bristles c. 22, 1.8-2 mm, pappus bristles mostly slender, distinctly non-contiguous at base. 2n = 20. Wet mixed forest, Oak-Pine woods, second growth on hill. Ch (Juzepczuk 1572, US); G (Skutch 242, US); H (Rodriguez 2755, F). 1200-2700 m. (Endemic.)

Turner (1997) treated this species as a synonym of *Eupatorium selerianum*.


Decumbent perennial herbs to 0.3 m; stems reddish, densely short-puberulent. Leaves opposite; blade mostly 2.5-6.5 × 1.5-3.5 cm, ovate, strongest veins distinctly trinervate from 2-5 mm above base, diverging distally from basal margins, adaxially finely puberulent, abaxially puberulent with minute red trichomes on veins and veinlets, numerously glandular-dotted, base rounded, margins crenate-serrate from near widest part, apex acute; petiole mostly 1-3 cm. Capitulescence of small terminal corymbiform panicles; peduncles mostly 5-9 mm, puberulent. Capitula c. 5 mm; phyllaries c. 20, 1.5-4 × 0.5-0.7 mm, weakly subimbricate, graduate, lanceolate to linear, margins narrowly scarious, surface minutely puberulent, apex acute to short-apiculate, outer phyllaries several, densely inserted at base. Florets c. 20; corolla c. 2.8 mm, lavender, puberulent distally, denser on lobes, lobes c. 0.3 mm; style branches narrowly linear. Cypselae 1.5-1.8 mm, sparsely scabrid on ribs, ribs as dark as faces; pappus bristles c. 30, 2.3-2.5 mm, contiguous at base. Premontane rain forest zone, evergreen cloud forest, shaded bank above stream. CR (*Burger y Gentry 8637*, US); P (*D'Arcy et al. 13244*, MO). 1600-2100 m. (Endemic.)
*Holotype: Guatemala, Williams et al. 41131 (US!). Illustr.: no se encontró. N.v.: none.*  
*Eupatorium enigmaticum* B.L. Turner.  
Erect to sprawling perennial herbs to 1 m, stems, petioles, branches of capitulescence, and outer phyllaries densely hirtellous with short stipitate-glandular (minutely viscid-tipped) trichomes; stems partly reddish, not fistulose. Leaves opposite; blade mostly 1.5-4 × 1-2.5 cm, triangular-ovate, widest near basal 1/5, strongly trinervate from small basal acumination, surfaces obviously densely stipitate-glandular, base truncate to subcordate with broad shallow sinus, margins closely crenate-serrate above widest part, apex short-acute; petiole 0.6-2.5 cm. Capitulescence an elongate pyramidal panicle, lax, with squarrose-spreading lateral branches not or scarcely overtopping terminal capitula, ending in corymbiform clusters of capitula; peduncles 2-8 mm. Capitula c. 5 mm; phyllaries c. 18, 1.5-4 × 0.6-0.8 mm, subimbricate, graduate, ovate to narrowly oblong, margins narrowly scarious, apex acute. Florets c. 25; corolla c. 2.5 mm, lavender, lobes c. 0.3 mm, short-stipitate-glandular; style branches narrowly linear. Cypselae c. 1.5 mm, with many small setulae on faces, faces blackening, ribs persistently yellowish; pappus bristles c. 20, c. 2.3 mm, slender, distinctly non-contiguous at base. *Clearings in mixed forest in mountains.* Ch (Turner, 1997: 120 sub *E. enigmaticum*); G (*Williams et al. 41131*, US). 900-1000 m. (Endemic.)

Short-lived herbs with clustered stems to 0.4 m, branches few, slender, mostly short and ascending; stems brownish, densely short-hirtellous. Leaves opposite; blade mostly 1-2 × 0.3-0.5 cm, narrowly elliptical, membranaceous, trinervation from base, adaxial surface green, pilosulose, abaxially paler, densely pilosulose to hirtellous on main veins, gland-dotted, base cuneate, distal margins bluntly 2-4-serrulate, apex bluntly acute; petiole 0.2-0.3 cm. Capitulescence diffuse, branches opposite proximally, alternate distally, ascending, with foliar smaller bracts distally, branches and peduncles densely minutely stipitate-glandular; peduncles 5-12 mm, slender. Capitula c. 3.5 × c. 3.5 mm; phyllaries c. 23, 1.5-3 × 0.3-0.4 mm, weakly subimbricate, c. 3-seriate, lanceolate or the inner ones oblong, apex narrowly acuminate, surface mostly glabrous or the outer phyllaries minutely pilosulose. Florets c. 35-40; corolla c. 2 mm, lavender, tube c. 0.3
mm, throat c. 1.4 mm, sometimes with colored resin in ducts, lobes c. 0.3 mm, with only
few minute short trichomes; styles narrowly linear. Cypselae c. 1.5 mm, ribs persistently
pale, faces and ribs scattered short-setulose; pappus of 10-12 non-contiguous slender
bristles, c. 1.8 mm. *On riverside rocks.* P (*Hammel 6263*, US). 0-400 m. (Endemic.)

16. **Fleischmannia hymenophylla** (Klatt) R.M. King et H. Rob., *Phytologia* 19: 203

_Eupatorium valerianum_ Standl., *Fleischmannia valeriana* (Standl.) R.M. King et H.
Rob.

Erect sparsely branching perennial herbs to 2 m; stems greenish to reddish, reddish
puberulent. Leaves opposite; blade 4-9 × 2-4 cm, ovate, secondary veins few, from 5-15
mm above base, subparallel with basal margin, adaxially sparsely puberulent, abaxially
puberulent on veins and gland-dotted, base rounded to obtuse, margins closely coarsely
crenate-serrate to serrate below widest part, usually with simple sharp teeth, apex
narrowly acute to slightly acuminate; petiole to 2.8 cm. Capitulescence broadly thyrsoid,
with erect-spreading branches bearing small corymbiform clusters of capitula; peduncles
1-6 mm, densely puberulent. Capitula c. 3 mm; phyllaries 20-25, 1-3 mm, subimbricate,
graduate, ovate to narrowly oblong, margins narrowly scarious, apex acute to rounded
with small apiculum, surface minutely puberulent, outer phyllaries several. Florets 20-25;
corolla c. 2 mm, lavender, numerous short trichomes distally, lobes c. 0.2 mm; style
branches narrowly linear. Cypselae 1-1.3 mm, with many setulae distally, ribs as dark as
faces; pappus bristles c. 30, c. 1.8 mm, contiguous at base. 2n = 8. *Moist forest, opening
in forest, wet thicket.* CR (*Brenes s.n.*, F); P (*Allen 1206*, US). 400-2000 m. (Endemic.)

17. **Fleischmannia imitans** (B.L. Rob.) R.M. King et H. Rob., *Phytologia* 19: 203
_Eupatorium imitans_ (1975). N.v.: Llovizna, G.

_Eupatorium rivulorum_ B.L. Rob., *Fleischmannia rivulorum* (B.L. Rob.) R.M. King et
H. Rob.

Perennial herbs 0.3-1 m, usually unbranched; stems brownish; stems, and most leaves
and peduncles densely hispidulous with minute powdery stipitate glands and few to many
non-glandular trichomes, rarely with only sparse appressed puberulence. Leaves mostly
opposite; blade mostly 1-6.5 × 0.5-2.5 cm, ovate-lanceolate to lanceolate, widest near basal 1/3, ascending-trinervate from base, surfaces eglandular, base and apex acute, margins serrate from apex to widest part; petiole 0.5-2.5 cm. Capitulescence diffuse with subcymose branches bearing few capitula; peduncles mostly 5-15 mm. Capitula 5-6 mm; phyllaries mostly 2-5 × 0.5-0.8 mm, appearing eximbricate or weakly subimbricate, lanceolate, apex attenuate, surface puberulent or hispidulous, often with powdery stipitate glands. Florets 40-55; corolla 2.8-3.3 mm, lavender, sparsely to densely setulose distally, lobes 0.3-0.4 mm; style branches narrowly linear. Cypselae 1.2-1.5 mm, short-setulose on ribs and distal surfaces, ribs usually as dark as sides; pappus of (8-) 15-22 bristles, 2.5-3 mm, slightly broadened but usually not contiguous at base. 2n = 58. On rocks in creek, along stream in Pine woods, in crevasses in limestone in Pine-Oak forest region, riverbank in shade. Ch (Purpus 34, US); G (Rojas 306, US); H (Molina 24125, US); ES (Tucker 582, US); N (Dillon et al., 2001: 325 sub Eupatorium imitans). 100-2000 m. (Mexico [Oaxaca], Mesoamerica.)

This species was cited for Costa Rica by Williams (1976a), but I have not been able to verify this distribution.

Holotype: Mexico, Chiapas, Matuda 2019 (US!). Illust.: no se encontró. N.v.: none.

Eupatorium matudae (R.M. King et H. Rob.) B.L. Turner.

Erect to subscandent perennial herbs 1-2 m; stems brownish, subglabrous, with few minute trichomes near nodes. Leaves opposite; blade mostly 4-8 × 1.8-3.7 cm, narrowly ovate to lanceolate, membranaceous, strong trinervation from at or near base, surfaces subglabrous, few or no trichomes on veins, without either punctate glands or stipitate glands, base obtuse, margins serrate above widest part, apex narrowly acuminate; petiole 1-4 cm. Capitulescence laxly pyramidal thyrsoid, with erect-spreading branches bearing rather dense corymbiform clusters of capitula; peduncles 2-3 mm, subglabrous. Capitula c. 4 mm; phyllaries c. 15, 0.8-3 × c. 0.7 mm, subimbricate, graduate, margins scarious, apex acute to rounded, surface glabrous. Florets 10-12; corolla c. 2 mm, glabrous, lobes c. 0.3 mm; style branches broadened at apex. Cypselae 1.3-1.5 mm, with many short setulae on faces and ribs, faces blackening, ribs persistently yellowish; pappus bristles c. 20, c. 2 mm, distinctly non-contiguous at base. Ch (Matuda 2019, US). 200-500 m. (Endemic.)


Erect annual herbs to 1 m; stems yellowish green to brown, glabrescent, larger stems fistulose. Leaves mostly opposite, alternate distally; blade 1.5-3.7 × 1-3 cm, usually broadly rhombic-ovate, membranaceous, strongly trinervate from basal acumination, adaxial surface sparsely pilosulose, abaxial surface obviously gland-dotted, veins puberulent, base short-acute to obtuse, margins crenate above widest part, apex short-acute; petiole 0.5-2.5 cm. Capitulescence a lax panicle with loosely cymose branches, lateral branches overtopping terminal capitula; peduncles 2-7 mm, puberulent or minutely stipitate-glandular. Capitula c. 4 mm; phyllaries 15-22, 1-4 mm, subimbricate, graduate, ovate to oblong, inner ones apically rounded to apiculate and scarious, setose along median line. Florets 20-35; corolla c. 2 mm, lavender or white, lobes c. 0.3 mm, surface without trichomes; style branches broadly linear. Cypselae c. 1.2 mm, usually scabrid distally and on ribs, faces blackening, ribs persistently yellowish; pappus bristles 25-30, 1.8-2 mm, broadened and usually contiguous at base, some outer cypselae sometimes calvous. 2n = 8. *Dry forest area, grassy area, corn field, roadsides.* G (Williams, 1976a: 79 sub *Eupatorium microstemon*); H (Standley 13132, F); ES (Berendsohn et al., 1989: 290 - 6); N (Dillon et al., 2001: 326 sub *Eupatorium microstemon*); CR (Skutch 4078, US); P (Standley 31443, US). 0-1100 m. (Mexico, Mesoamerica, Colombia, Venezuela, Ecuador, Perú, Bolivia, Brasil, Jamaica, Hispaniola, Puerto Rico, Lesser Antilles; adventive in Africa.)

Sousa y Cabrera (1983) cited this species as possibly occurring in Quintana Roo. Williams (1976a) cited this species as occurring up to "2800 m" elevation, but questioned his own identification of this taxon. Turner (1997) cited this species as occurring in Yucatán, but this report refers presumably to material here referred to *F. yucatanensis*. The common name used in Yucatan as given in Williams (1976a) do not refer to this species.


Erect short-lived perennial herbs to 0.4 m, usually unbranched from running stem; stems yellowish green, densely minutely puberulent. Leaves opposite; blade mostly 2.5-4.5 × 0.7-1 cm, narrowly lanceolate, widest near basal 1/3, strongly trinervate from base, sparsely pilosulose and puberulent adaxially, sparsely puberulent and gland-dotted abaxially, base acute, margins serrulate above widest part, apex narrowly acute; petiole to 1.5 cm. Capitulescence diffuse, a lax panicle with capitula on loosely cymose alternate branches; peduncles (3-)5-13 mm, minutely puberulent. Capitula 3-4 mm; phyllaries c. 25, 1.5-3.5 × c. 0.7 mm, subimbricate, graduate, narrowly ovate to lanceolate, margins narrowly scarious, apex narrowly acute to long-attenuate, surface minutely puberulent to subglabrous. Florets c. 25; corolla c. 2 mm, lavender to white, with short trichomes on lobes; style branches narrowly linear. Cypselae c. 1.2 mm, black, scabrid with short setulae mostly on ribs, ribs as dark as faces; pappus bristles c. 25, c. 2 mm, scarcely contiguous. *River margins and mouths.* P (*Kirkbride y Bristan 1463*, MO). 0-100 m. (Mesoamerica, NW. Colombia.)


Erect short-lived perennial herbs to 1 m; stems greenish to reddish, glabrous to sparsely pilosulose. Leaves opposite; blade mostly 3-6 × 1.8-4 cm, triangular ovate, reduced in size in capitulescence, rather membranaceous to subherbaceous, strongly trinervate from base, surfaces sparsely pilose to pilosulose, denser on veins, eglandular, base subtruncate to short-obtuse, margins closely crenulate to crenate-serrate distal from near widest part, apex shortly and sometimes sharply acute; petiole 0.5-2.5 cm. Capitulescence lax, pyramidal thyrsoid, with widely spreading to squarrose laxly cymose branches bearing loosely corymbiform to cymose groups of capitula; peduncles 3-12 mm, glabrous to subglabrous. Capitula 4-5 mm; phyllaries 20-25, 1.5-4 × to 0.8 mm, subimbricate, ovate to oblong, margins broadly scarious, apically acute to rounded, surface mostly glabrous. Florets 20-25; corolla c. 2 mm, usually white, without trichomes, lobes c. 0.4 mm; style branches broadly linear. Cypselae 1-1.3 mm, with numerous setulae on faces and ribs, faces blackening, ribs persistently yellow; pappus
bristles 20-25, 1.5-1.8 mm, distinctly non-contiguous at base, some peripheral cypselae sometimes calvous. *Cloud forest, Pine-Oak forest, rocky hillsides.* G (Molina y Montalvo 21896, US; ?H (Molina, 1975: 114 sub the invalid *Eupatorium multiplinerve* Benth. ex Ant. Molina). 400-2800 m. (Endemic.)


Erect short-lived perennial herbs to 1 m, punctate glands and stipitate glands mostly restricted to leaves; stems greenish to reddish, hirtellous to hirsutulous, not fistulose, vegetative internodes short. Leaves opposite; blade 1.8-3.2 × 1-2 cm, reduced in capitulescence, triangular-ovate, strongly trinervate from base, surfaces usually densely hirsutulous to velutinous on and between veins, abaxially obviously gland-dotted or stipitate-glandular, base subtruncate to broadly obtuse, margins closely crenulate to serrulate above widest part, apex shortly to sharply acute; petiole 0.3-0.8 cm. Capitulescence laxly pyramidally thyrsoid, internodes long, with remote widely spreading branches bearing rather dense clusters of few capitula, lateral branches not or scarcely overtopping terminal capitula; peduncles 1-4 mm, densely puberulent to hirtellous. Capitula c. 4 mm; phyllaries 18-20, 1-3 × c. 0.7 mm, subimbricate, graduate, ovate to oblong, margins broadly scarious, apex acute or aristate to rounded or apiculate, surface sparsely to densely pilosulous. Florets 20-25; corolla c. 2.3 mm, usually white, hairless, lobes c. 0.4 mm; style branches broadened distally. Cypselae 1.3-1.5 mm, with numerous setulae distally and on ribs, faces blackening, ribs persistently yellow; pappus bristles 20-25, 1.8-2 mm, slender, distinctly non-contiguous at base. *Pine forest, Pine barren, Pine-Oak forest with grasses.* Ch (Ki-Joong Kim 10040, US); H (Standley 55892, US); P (D’Arcy y Sytsma 14542. MO). 500-1500 m. (Endemic.)


Erect perennial herbs 0.5-3 m; stems greenish, puberulent. Leaves opposite; blade mostly 6-15 × 4-10 cm, ovate, membranaceous, strongest veins usually trinervate or plurinervate from above base, veins of trinervation diverging distally from basal margins, diverging from midrib at c. 30º, eglandular, sparsely pilosulous adaxially, pilosulous
mostly on veins abaxially, base cordate with narrow triangular sinus, often asymmetric, margins with many close crenations or crenate-serrations from near base, apex slightly short-acuminate; petiole 2-8 cm. Capitulescence broadly and rather densely corymbiform; peduncles 2-5 mm, puberulent. Capitula 5-6 mm; phyllaries 22-30, 1.5-5 × 0.7-1 mm, subimbricate, graduate, ovate to oblong-lanceolate, margins narrow scarious, apex short-acute with darkened mucronation, surface puberulent to nearly glabrous. Florets c. 20; corolla c. 3 mm, lavender, puberulent distally, lobes c. 0.3 mm; style branches linear. Cypselae 1-1.3 mm, glabrous, ribs persistently yellow; pappus bristles c. 30, c. 2.7 mm, contiguous at base. 2n = 20. Mixed oak forest along river, moist thicket. CR (King 6410, US). 1000-2600 m. (Endemic.)


Eupatorium roseum Klatt, non Gardner, E. pacacanum Klatt, Eupatorium schiedeanum var. capitatum Steetz, Eupatorium schiedeanum var. tomentosum Steetz, Fleischmannia croatii R.M. King et H. Rob., Fleischmannia panamensis R.M. King et H. Rob.

Erect to reclined perennial herbs and subshrubs to 3 m; stems greenish to reddish, densely puberulent to hirsutulous. Leaves mostly opposite; blade mostly 4-7 × 2-4 cm, rhomboidal to narrowly or broadly ovate, strongly trinervate from base, veins distinctly puberulent to tomentellous, coarsely to finely pilosulose adaxially, abaxial surface sparsely to densely pilosulose, often gland-dotted, base obtuse to truncate or subcordate with broad shallow sinus, margins closely crenate-serrate above widest part, apex short-acute to short-acuminate; petiole mostly 0.7-3 cm. Capitulescence broadly corymbiform with ascending dense corymbiform branches; peduncles 1-4 mm, puberulent to tomentellous, without scale-like sessile glands. Capitula 4-6 mm; phyllaries 20-25, 1.5-5 × 0.8-1 mm, subimbricate, graduate, ovate to oblong, margins broadly scarious, apex of outer phyllaries acute, inner ones apically rounded, surface scattered-puberulent. Florets 9-25; corolla 2.5-3.3 mm, lavender to white, lobes short-setulose; style branches slender. Cypselae 1-1.6 mm, black, scabrid or short-setulose mostly or exclusively on ribs, ribs as dark as faces; pappus bristles 25-30, 2.2-3 mm, slightly broadened basally, contiguous at base. 2n = 40. Pine woods, tropical evergreen forest, submontane rain forest, disturbed
King y Robinson (1975) recognized each *F. croatii*, *F. panamensis*, and *F. pratensis*, but here only *F. pratensis* is considered distinct. Williams (1976a) and Turner (1997) and Dillon et al. (2001) treated *F. pratensis* as a synonym of *Eupatorium pycnocephalum*. Material from Tabasco, Campeche, and Quintana Roo not seen by me but reported as *F. pycnocephala* (e.g., Cowan, 1983, Martínez et al., 2001, Sousa y Cabrera, 1983, and Turner, 1997), is possibly *F. pratensis*.


Branching perennial herbs to 0.5 m; stems minutely stipitate-glandular, glabrate proximally, internodes mostly 1.5-2 cm. Leaves opposite, axillary fasciculate; blade mostly 2-3.2 × 1.4-2.3 cm, deltoid, trinervate from base, surfaces sparsely to densely stipitate-glandular, adaxial surface also sparsely pilosulous, base broadly subtruncate, margins 5-8-crenate in distal half, apex short-acute; petiole 3-6 mm. Capitulescence terminal, 1-5-capitulate, subtended by sparse narrow bracteoles 3-7 mm; peduncles 0.6-1 mm, minute-stipitate glandular. Capitula 6-7 mm; phyllaries c. 60, 1.5-4 × 0.4-0.8 mm, lanceolate, scarcely scarious, green, strongly subimbricate, graduate, c. 4-seriate, apex narrowly acute to slightly acuminate, densely and minutely stipitate-glandular. Florets c. 60; corolla c. 3 mm, purple, lobes c. 0.4 mm, sparsely setulose or glabrous; style branches not broadened distally. Cypselae c. 1.5 mm, black with black ribs at maturity, ribs scabrid; pappus bristles c. 20, 2.5-3.8 mm, slightly non-contiguous at base. *Common on rocky slopes along litoral road*. ES (*Molina et al. 16685*, US). 30 m. (Endemic.)


*Eupatorium schiedeanum* Schrad.
Erect perennial herbs 1-2 m; stems yellowish to brownish, puberulent to hirsute. Leaves opposite; blade mostly 2.5-7 × 1.3-4 cm, ovate, strongly trinervate from base, usually from slight acumination, surfaces eglandular, adaxial surface sparsely pilosulose, abaxial surface pilosulose mostly on veins, base obtuse to shallowly subcordate, margins closely crenate or serrate above widest part, apex narrowly acute to slightly acuminate; petiole 0.7-3 cm. Capitulescence laxly thyrsoid with ascending branches of dense corymbiform clusters of capitula; peduncles 1-4 mm, pilosulose to hispidulous, sometimes with stipitate glands. Capitula 5-6 mm; phyllaries c. 25, 1-5 × 0.6-1.3 mm, subimbricate, ovate to oblong, margins broadly scarious, most apex rounded, surface glabrous to sparsely puberulent, outer phyllaries several, closely inserted at base, abruptly differentiated from peduncular bracteoles. Florets 20-25; corolla 2-3 mm, lavender or white, lobes c. 0.3 mm, surface without trichomes; style branches linear or scarcely broadened at apex. Cypselae 1.5-2 mm, with minute setulae mostly on ribs, faces blackening, ribs persistently yellow; pappus bristles 25-30, 2-3 mm, distinctly non-contiguous at base, sometimes some peripheral cypselae lacking setulae and pappus. 2n = 40, 60, c. 80. Open forest of oak and pine, cloud forest, scrubby hillside, in forest clearing, damp thicket, in llanos. T (Peréz, A. et al., 2005: 84); Ch (Purpus 7184, US); G (Heyde y Lux 4229, US); H (Croat y Hannon 63775, MO); ES (Molina y Montalvo 21499, US). 800-2600 m. (C. Mexico to El Salvador.)

I have been unable to verify the identity of vouchers that are the basis of the reports of this species in Campeche (Turner, 1997), Quintana Roo (Turner, 1997), Belize (Balick et al., 2000), Nicaragua (Dillon et al., 2001), and Costa Rica. The identities of these vouchers are in doubt and likely represent material I would refer to *F. pratensis*. The citation by Williams (1976a) of this taxon in Belize and Panamá possibly refers to material I would determine as *F. pratensis*, as do reports from South America. Williams (1976a) treated *F. anisopoda* and Turner (1997) treated *F. pratensis* as a synonyms of *F. pycnocephala*. Turner (1997) described the leaves of *F. pycnocephala* as "nearly always to some extent glandular-punctate," this presumably in reference to material I would determine as *F. pratensis*.

Eupatorium rojasianum Standl. et Steyerm.

Erect perennial herbs 1-2 m, stems, petioles, leaf blades, branches of capitulescence, and phyllaries often short-stipitate glandular; stems greenish to reddish, finely puberulent to sparsely pilose, often becoming glabrous on internodes, not fistulose. Leaves opposite; blade mostly (2.5-)4-10 × 1.5-7 cm, ovate to ovate-deltoid, adaxial surface pilosulose, more densely pilosulose abaxially, hirsutulous on veins, with few or no glandular dots abaxially, base broadly rounded to shallowly subcordate, margins crenate to serrate above widest part, strongly trinervate from base, sometimes marginal in basal acumination, apex narrowly acute to slightly acuminate; petiole 0.5-4 cm. Capitulescence laxly corymbiform to pyramidal, with branches bearing rather dense corymbiform clusters of capitula, lateral branches spreading, not or scarcely overtopping terminal capitula; peduncles 1-5 mm, hirtellous. Capitula 5-7 mm; phyllaries c. 25, 1.5-7 × c. 1 mm, subimbricate, graduate, ovate or lanceolate to narrowly oblong, margins broadly scarious, apex obtuse to acuminate, surface densely puberulent to hirtellous at least on outer phyllaries, outer phyllaries abruptly differentiated from peduncular bracteoles. Florets c. 20; corolla 3.5-4.3 mm, lavender, essentially glabrous, lobes c. 0.3 mm; style branches usually distinctly broadened distally. Cypselae 1.5-2 mm, with few minute setulae distally, faces blackening, ribs persistently yellow; pappus bristles 3.3-3.8 mm, bristles slender, not contiguous at base. 2n = 60, c. 100. Montane cloud forest, bosque de pino-encino, oak-pine forest, Cupressus forest. Ch (Croat y Hannon 64851, MO); G (Williams et al. 25623, F); H (Williams 17461, F); ES (Tucker 611, US); N (Araquistain y Sandino 1376, US). 1000-3300 m. (Endemic.)


Eupatorium antiquorum Standl. et Steyerm., Fleischmannia antiquorum (Standl. et Steyerm.) R.M. King et H. Rob.

Erect perennial herbs 1-1.3 m; stems greenish to reddish tinged, densely hirsute. Leaves opposite, petiole and blade hirsutulous; blade mostly 3.5-7 × 2.5-4.5 cm, gradually reduced in capitulescence, triangular-ovate, strongly trinervate from base with veins marginal in basal acumination, without either punctate glands or stipitate-glands, abaxial surface with numerous trichomes on and between veins, base truncate to shallowly subcordate, margins closely crenate below widest part, apex narrowly
acuminate; petiole mostly 1.5-3 cm. Capitulescence lax, short-thyrsoïd with spreading branches bearing loosely corymbiform to subcymose groups of capitula; peduncles 4-10 mm, pilosulose. Capitula c. 5 mm; phyllaries c. 20, 1.5-4 × to 1 mm, subimbricate, mostly oblong, margins broadly scarious, surface glabrous, inner phyllaries apically obtuse. Florets 20-25; corolla 2.2-2.8 mm, white, glabrous, lobes c. 0.4 mm; style branches linear. Cypselae 1.3-1.5 mm, with numerous minute setulae on faces and ribs, faces blackening, ribs usually yellow at maturity; pappus of c. 25 bristles, 2-2.5 mm, fragile, distinctly non-contiguous at base. Canyons, Cupressus groves. Ch (Pruski et al. 4198, MO); G (Standley 60304, US); ?H (Nelson Sutherland, 2008: 171 sub Eupatorium antiquorum). 1300-1800 m. (E. Mexico to Mesoamerica.)

Turner (1997) placed both Fleischmannia deborabellae and F. yucatanensis in the synonymy of this species. Williams (1976a) recognized Eupatorium antiquorum.


Erect to decumbent perennial herbs to 0.6 m, rarely branching above base; stems greenish-brown to reddish, minutely puberulent. Leaves opposite; blade 2.5-7.5 × 0.5-1 cm, narrowly elliptical, broadest near middle, strongly sublongitudinally trinervate from near base, extending beyond midleaf, sparsely puberulent adaxially, abaxially distinctly glandular-dotted, minutely puberulent on veins, base and apex narrowly acute, margins with 3-6 remote serrations in distal half; petiole indistinct, 0.2-1 cm. Capitulescence diffuse, a lax corymbiform to subcymose panicle, capitula on loosely cymose ascending branches; peduncles (2-)5-15 mm, minutely puberulent. Capitula c. 5 mm; phyllaries c. 20, 1-4 × c. 0.6 mm, subimbricate, graduate, ovate to oblong, margins narrowly scarious, inner phyllaries apically acute to long-acuminate, surface glabrous to finely puberulent. Florets 20-25; corolla c. 2.3 mm, lavender, lobes c. 0.3 mm, usually short-setulose; style branches broadly linear. Cypselae c. 1.2 mm, numerous small-setulose, faces black, ribs often persistently yellow; pappus bristles c. 25, c. 2 mm, contiguous at base. Distributed primary forest along river, rocks along river. ?H (Clewell, 1975: 192); CR (Liesner 14296, MO); P (Croat y Folsom 34086, US). 0-1500 m. (Mesoamerica, Colombia, Ecuador.)
Perez et al. (2005) reported this species in Tabasco and Turner (1997) reported it in Chiapas and Tabasco, but I have been unable to verify these reports.


Erect annual herbs to 1 m; stems yellowish green to brown, minutely puberulent, sometimes narrowly fistulose. Leaves opposite; blade mostly 1.7-5 × 1.2-3 cm, broadly ovate to rhomboidal, strongly trinervate from base, papyraceous, sparsely pilosulous adaxially, abaxial surface sparsely puberulent and gland-dotted, base obtuse to shallowly subtruncate, margins closely crenulate above widest part, apex broadly acute to slightly acuminate; petiole 0.5-2 cm. Capitulescence a diffuse lax panicle with loosely cymose branches; peduncles 3-13 mm, minutely puberulent. Capitula 3-4 mm; phyllaries c. 25, 1.5-3.5 × c. 0.7 mm, subimbricate, graduate, narrowly ovate to lanceolate, margins narrowly scarious, apex narrowly acute to attenuate, surface minutely puberulent to subglabrous. Florets c. 25; corolla c. 2.3 mm, lavender to white, lobes c. 0.3 mm, short-setulose; style branches narrowly linear. Cypselae c. 1.2 mm, black, short-setulose mostly on ribs, ribs as dark as faces; pappus bristles c. 25, c. 2 mm, only slightly broadened basally, scarcely contiguous at base. 2n = 20. *Open grassy and brushy slopes, moist woods and thickets, sabanas, opening in secondary tropical forest, near roadside.* Ch (Croat y Hannon 63335, MO); G (King 7172, US); H (Molina, 1975: 111 sub *Eupatorium sinclairii*); ES (Tucker 970, US); N (Dillon et al., 2001: 329 sub *Eupatorium sinclairii*); CR (Liesner 14259, US); P (Pittier 2147, US). 0-1800 m. (Mesoamerica.)


Weak perennial herbs 0.5-1 m; stems greenish to yellowish, laxly hirsute. Leaves opposite; blade 3.5 × 3.4 cm, broadly ovate, membranaceous, strongest veins distinctly trinervate from apex of basal narrow sinus, veins of trinervation diverging distally from basal margins, surfaces eglandular, sparsely pilose adaxially, pilose to subtomentellous with long pale trichomes on veins abaxially, base symmetrically cordate with narrow sinus, margins closely crenate or crenate-serrate from near base, apex short-acuminate;
petiole 1.5-4.5 cm. Capitulescence terminal, small, dense corymbiform; peduncles 1-3 mm, densely pilosulose. Capitula c. 5 mm; phyllaries c. 25, 1.5-2.5 × c. 0.8 mm, subimbricate, graduate, ovate to oblong-lanceolate, margins scarcely scarious, apex short-acute with small darkened mucronation, surface glabrous. Florets c. 22; corolla c. 3.5 mm, white?, lobes c. 0.3 mm, puberulent; style branches narrowly linear. Cypselae c. 1.2 mm, glabrous, ribs often persistently yellowish; pappus bristles c. 30, c. 2.8 mm, contiguous at base. G (Warszewicz 164, US); ?CR (Warszewicz s.n., P). 1-150 m. (Endemic.)

Holotype: Guatemala, Blake 7576 (US!). Illustr.: no se encontró. N.v.: none.

Perennial herbs c. 0.4 m; stems pale brownish, short-puberulent. Leaves opposite; blade mostly 2.3-3.3 × 0.6-1.4 cm, oblong-ovate, strongly trinervate from base, without stipitate-glands, minutely puberulent adaxially, abaxial surface glabrous or subglabrous, veins with only minute appressed trichomes, not or obscurely glandular-dotted abaxially, base short-acute, margins with few crenulate-serrulations above widest part, apex narrowly rounded; petiole 0.3-0.6 cm. Capitulescence small, flat-topped, bearing dense corymbiform clusters of capitula; peduncles 1-4 mm, puberulent. Capitula 4-5 mm; phyllaries c. 22, 1-3.5 × 0.5-0.7 mm, subimbricate, narrowly oblong, margins narrowly scarious, apically obtuse, surface with few minute trichomes, outer phyllaries abruptly differentiated peduncular bracteoles. Florets c. 30; corolla c. 2 mm, lavender, lobes c. 0.3 mm, short-puberulent; style branches narrowly linear. Cypselae c. 1.3 mm, with few trichomes distally on ribs, faces blackening, ribs persistently yellowish; pappus bristles c. 22, c. 2 mm, contiguous at base. **Dryish ditch along railroad. G (Blake 7576, US).** 50-1000 m. (Endemic.)

Holotype: Panamá, Tyson y Loftin 6116 (US!). Illustr.: no se encontró. N.v.: none.

Erect perennial subshrubs to 2 m; stems greenish to brown, densely puberulent hirsutulous with brownish or reddish trichomes. Leaves opposite; blade 4-9 × 2-7 cm, ovate, strongest veins distinctly trinervate from distinctly above base to up to 4 mm above base, diverging distally from basal margins, surfaces eglandular, adaxial surface densely puberulent to subvelutinous, abaxially densely pilosulous. subtomentellous with long pale trichomes on veins, base broadly rounded to cordate with shallow to acute
sinus, margins closely crenate or doubly crenate below widest part, apex acute; petiole mostly 1.5-2.5 cm. Capitulescence terminal, small, rather dense corymbiform; peduncles 2-4 mm, densely pilosulous. Capitula 5-6 mm; phyllaries c. 25, 1.5-5 × c. 1 mm, subimbricate, graduate, ovate to oblong, margins broadly scarious, apex mostly rounded, surface sparsely puberulent. Florets 20-25; corolla c. 3.3 mm, lavender, lobes c. 0.3 mm, with few minute trichomes; style branches narrowly linear. Cypselae 1.3-1.7 mm, typically scabridulous with small setulae on ribs and apex, blackening, without persistently yellow ribs; pappus bristles 22-25, c. 2.3 mm, slightly to distinctly non-contiguous at base, some peripheral cypselae glabrous. West slope of mountain, weedy thickets. CR (Grayum y Affolter 8153, US); P (Tyson y Loftin 6117, MO). 2000-3000 m. (Endemic.)


Holotype: Guatemala, Heyde y Lux 3397 (GH!). Illustr.: no se encontró. N.v.: none.
Perennial herbs c. 1 m; stems brownish, sparsely appressed-puberulent. Leaves opposite; blade mostly 1.5-5 × 0.8-3.5 cm, ovate to triangular-ovate, subcarnose, strongly trinervate from base, surfaces densely glandular-dotted, densely puberulent adaxially, abaxial surface paler, nearly glabrous, base shallowly subtruncate, margins closely serrulate in median 3/4, apex narrowly acuminate; petiole 0.2-0.7 cm. Capitulescence lax with diverging branchlets; peduncles 5-12 mm, with numerous scale-like sessile glands, becoming viscid, often minutely bracteolate. Capitula 5-6 mm; phyllaries c. 27-30, 1-5 × c. 1 mm, subimbricate, graduate, ovate to oblong, margins broadly scarious, apex narrowly obtuse to broadly rounded, surface gland-dotted, outer phyllaries appressed and forming funnelform base. Florets c. 20; corolla 2.8-3 mm, lavender, glabrous, lobes c. 0.6 mm; style branches broadened distally. Cypselae c. 1.5 mm, black, faces and ribs minutely setulose, ribs as dark as faces; pappus bristles c. 30, c. 2.5 mm, slightly broadened basally, contiguous at base, some outer cypselae glabrous and epappose. 2n = 20. Roadsides. G (King 7282, US). 1200-2600(?-2900) m. (Endemic.)

I have been unable to verify the upper elevational limit of 2900 m as listed by Williams (1976a).


Holotype: Mexico, Yucatán, Gaumer 23501 (US!). Illustr.: no se encontró. N.v.: none.
Erect perennial herbs to 0.8 m; stems yellowish, minutely puberulent. Leaves opposite; blade mostly 1.8-2.5 × 0.8-1.4 cm, ovate, gradually reduced in capitulescence, strongly trinervate from base, surfaces without stipitate-glands, rather evenly finely puberulent adaxially and abaxially with numerous trichomes on and between veins, not or obscurely glandular-dotted abaxially, base short-obtuse, margins crenulate in median 3/4, apex acute; petiole 0.5-0.7 cm. Capitulescence lax, thyrsoid with widely spreading branches bearing subcymose groups of capitula; peduncles 3-7 mm, minutely puberulent. Capitula 4-5 mm; phyllaries 1.5-4.5 × c. 0.8 mm, margins broadly scarious, surface subglabrous, inner phyllaries obtuse. Florets c. 18; corolla c. 2.5 mm, white, glabrous, lobes c. 0.3 mm; style branches broadened distally. Cypselae c. 1.8 mm, faces blackening, ribs persistently pale, ribs and faces with setulae distally; pappus bristles c. 30, c. 2.5 mm, contiguous at base. Y (Gaumer 2350, US). C. 100 m. (Endemic.)

Turner (1997) placed this species in the synonymy of Eupatorium selerianum.

**22. Fleischmanniopsis** R.M. King et H. Rob.

Por H. Robinson.

Erect perennial herbs; stems terete to subhexagonal, glabrous or puberulent only at nodes, pith solid. Leaves opposite; blade ovate-lanceolate, trinervate or subpinnate, eglandular, serrate; petiole distinct, slender. Capitulescence a rather diffuse ovoid to pyramidal panicle with dense corymbiform branches; peduncles short. Capitula short-cylindrical, discoid, 5-9-flowered; phyllaries c. 15-20, subimbricate in strongly unequal graduated series; phyllaries often white, sometimes brownish at maturity, persistent, glabrous; clinanthium flat or slightly convex, epaleate, with sclerified surface, glabrous. Corolla narrowly funnelform without strong demarcation at base of limb, white, veins of corollas terminating at sinuses, not extending into lobes, nearly glabrous, rarely with few trichomes inside, lobes triangular, about as long as wide, without glands, smooth with oblong cells on both surfaces; anther collar slender, with subquadrate cells proximally, cell walls usually with distinct annular thickenings, thecae often reddish, visible through pale corolla, appendage half as long as wide, sometimes retuse apically; style base without node, glabrous, appendage constricted and short-papillose proximally, apex distinctly broadened, flattened, mamillose. Cypselae prismatic, 5-ribbed, ribs with few scabrae or many setulae, carpopodium stopper-shaped with distinct distal rim, cells subquadrate with thick walls; pappus of 30-40, scabrid, persistent, base mostly non-
contiguous, not broadened at apex or with contorted, tenuous, erectly or retrorsely barbellate apex. 5 spp. C. Mexico to N. Central America.

An additional described species from Mexico, *F. paneroi* B.L. Turner, as described is not a *Fleischmanniopsis*.


1. Capitulescences broadly pyramidal or pyramidally paniculate; leaf blades trinervate from well above bases or subpinnate, secondary veins parallel to basal margins.

2. Phyllaries whitish; leaf blades chartaceous, green when dry, apical acuminations 1/4 as long as blade; pappus bristles c. 2 mm; corolla throats with a few trichomes inside near bases of filaments. ☐ 2. *F. langmaniae*

3. Capitular c. 7 mm; phyllaries greenish at maturity; leaf blade bases rounded, trinervate from bases, apices abruptly acuminate. ☐ 4. *F. mendax*

4. Capitula c. 4 mm; apices of pappus bristles contorted and irregularly barbellate; cypselae scabrous throughout; primary leaves usually lacking at anthesis

5. *F. anomalochaeta*

6. Capitula mostly 5-6 mm; apices of pappus bristles straight and antrorsely scabrid; cypselae usually glabrous proximally; primary leaves persistent at anthesis

3. *F. leucocephala*
petiole 0.5-2.5 cm. Capitulescence thyrsoid-paniculate, elongate, cylindrical; branches sparsely to densely puberulent, bearing short-pedunculate capitula in dense corymbiform clusters. Capitula c. 4 mm; phyllaries c. 15, 1-3 mm, ovate to oblong, white, apex minutely apiculate to obtuse or rounded. Florets 7-9; corolla 2-2.2 mm, white, lobes c. 0.3 × c. 0.25 mm. Cypselae 1.1-1.5 mm, sparsely and short-setulose throughout; pappus bristles 18-20, 2-2.5 mm, non-contiguous, apex tenuous, contorted, irregularly barbellate, barbs spreading or retrorse. Dry secondary forest, dry thickets. G (Smith 2843, US); ES (Standley 20160, US). 600-1300 m. (Endemic.)


Laxly branched shrubs to 1 m; stems brown. Primary leaves present at anthesis; blade mostly 4.5-10 × 1.5-3.5 cm, ovate, chartaceous, green when dry, trinervate from well above base, secondary veins parallel to basal margins, surfaces sparsely puberulent, base acute, margins sharply 5-9-serrate, apical acumination 1/4 as long as blade; petiole 0.5-1.5 cm. Capitulescence broadly pyramidal paniculate; branches sparsely to densely puberulent, bearing numerous short-pedunculate capitula in densely subcorymbiform clusters. Capitula c. 5 mm; phyllaries c. 18, 0.7-3.7 mm, orbicular to oblong, whitish, apex rounded. Florets 7-9; corolla c. 2.5 mm, white with purplish nerves, throat with a few trichomes inside near base of filaments, lobes c. 0.35 × c. 0.3 mm, sometimes with 1-2 minute trichomes. Cypselae 1.5-1.7 mm, glabrous or with few setulae distally; pappus bristles 25-35, c. 2 mm, contiguous, of equal width and equal scabrosity to apex. Dry barranca. Ch (Langman 3914, US). 500-1000 m. (Endemic.)

This name was treated by Turner (1997) as a synonym of Eupatorium leucocephalum.


Eupatorium leucocephalum var. anodonta (B.L. Rob.) R.M. King et H. Rob.

Laxly branched shrubs 1-3 m; stems yellowish brown. Primary leaves present at anthesis; blade mostly 7-14 × 2-6 cm, ovate to broadly lanceolate, trinervate from near base, secondary veins divergent from basal margin, surfaces sparsely pilose, base short-
acute, margins strongly 7-12-serrate, apex narrowly, gradually acuminate; petiole mostly 1-3 cm. Capitulescence thyrsoid-paniculate, elongate, cylindrical; branches densely puberulent to pilosulose, bearing short-pedunculate capitula in dense corymbiform clusters. Capitula 5-6 mm; phyllaries c. 15, 1-3 mm, ovate to oblong, white, apex minutely apiculate to obtuse or rounded. Florets 6-9; corolla c. 2.5 mm, white, lobes c. 0.3 × c. 0.3 mm. Cypselae c. 1.5 mm, ribs pale, sparsely minutely setulose on ribs, rarely so on distal surfaces, appearing subglabrous; pappus bristles c. 30, 2-2.5 mm, non-contiguous, slender and sparsely antorsely scabridulous to apex. 2n = 10. Moist forest, bosque mixto, along river, damp shady places in dry region. Ch (Matuda 2944, US); G (Kellerman 6113, US); H (Molina 11851, US); ES (Standley 21519, US). 400-2300 m. (C. Mexico to Mesoamerica.)

Williams (1976a) treated \textit{F. mendax} as a synonym of \textit{E. leucocephalum}.


Subscandent perennial herbs or subshrubs c. 1 m, branches slender; stems greenish. Primary leaves present at anthesis; blade 5-7 × 2-4 cm, ovate to elliptic-ovate, trinervate from base, secondary veins diverging from basal margin, adaxial surface glabrous, with few trichomes on veins abaxially, base rounded, margins remotely serrate-dentate, apex abruptly narrowly acuminate; petiole mostly 1.5-2.5 cm. Capitulescence thyrsoid-paniculate, elongate, cylindrical; branches densely yellowish tomentellous, bearing capitula in dense corymbiform clusters, peduncles c. 5 mm. Capitula c. 7 mm; phyllaries c. 17, 2-6 mm, ovate to oblong, greenish at maturity, apex obtuse or rounded. Florets c. 5; corolla c. 4 mm, white, lobes c. 0.35 × c. 0.35 mm. Cypselae c. 2 mm, glabrous; pappus bristles c. 40, c. 3.5 mm, contiguous, slender, sparsely antorsely scabridulous to apex. Bosque mesófilo de montaña, slopes of barrancos. G (Steyermark 36341, F). 2500-3000 m. (Mexico [Oaxaca], Mesoamerica.)

Williams (1976a) treated \textit{F. mendax} as a synonym of \textit{E. leucocephalum}.

Moderately branched subshrubs 1-1.5 m; stems brown. Main leaves present at anthesis; blade mostly 7-12 × 1.5-3.5 cm, ovate to elliptic-ovate, membranaceous, dark when dry, subpinnate with strongest secondary veins from well (1-2 cm) above base, secondary veins parallel to basal margins, surfaces glabrous, base acute, margins 5-9-serrate with acuminate teeth, apical acumination less than 1/5 as long as blade; petiole 1.5-6.5 cm. Capitulescence pyramidally paniculate; branches densely puberulent, bearing numerous short-pedunculate capitula in densely subcorymbiform clusters. Capitula c. 5 mm; phyllaries c. 20, 0.7-4 mm, orbicular to oblong, pale yellow to pale brown, apex rounded. Florets 7-9; corolla c. 3.5 mm, white, glabrous inside, lobes c. 0.35 × c. 0.3 mm. Cypselae c. 1.5 mm, glabrous; pappus bristles 35-40, c. 3 mm, contiguous, of equal width and equal scabrosity from base to apex. Moist forest. G (Lundell y Contreras 20970, US). 500-1100 m. (Endemic.)

**23. Gongrostylus** R.M. King et H. Rob.

Por H. Robinson.

Slender rather woody vines, sparingly branched; stems terete. Leaves opposite; blade ovate, trinervate from near base, margin serrate; petiole distinct, short. Capitulescence mostly of axillary corymbiform clusters of capitula; peduncles slender. Capitula discoid, c. 20-flowered; involucre campanulate; phyllaries c. 25, subimbricate, graduated, 3-4-seriate ovate-lanceolate to linear, persistent, spreading with age; clinanthium slightly convex, epaneate, surface sclerified, glabrous. Corolla very narrowly funnelform, white, glabrous proximally, lobes triangular, smooth on both surfaces, glands on outer surface; anther collar cylindrical with short oblong to elongate cells, cell walls with transverse annular thickenings, appendage short, truncate, half as long as wide; style base with enlarged densely hirsute node, appendages fusiform and slightly mamilllose proximally, apex greatly broadened and thickened, smooth. Cypselae prismatic, 5-ribbed, glabrous, carpododium oblong, with distinct distal rim, basal cell row enlarged, cell walls thickened; pappus of 30-35, slender, persistent bristles, apical cells pointed. 1 sp. Mesoamerica, NW South America.


Slender scandent epiphyte, branches few; stems sparsely to coarsely hirsute. Leaves petiolate; blade mostly 5.9-5.4 × 2.4 cm, ovate, surfaces sparsely short-hirsute, base rounded with slight acumination, margins with few sharp teeth, apex short- to rather long-acuminate; petiole 0.3-0.8 cm. Capitulescences laxly corymbiform; peduncles 5-20 mm, puberulent. Capitula 8-10 mm; phyllaries 2.5-10 mm, sharply acute, glabrous to slightly puberulent. Corollas 6-6.5 mm, lobes small, slightly longer than wide; enlarged portion of style apices c. 0.8 × c. 0.3 mm. Cypselae c. 2 mm; pappus bristles 4-6 mm. *Forested slopes, primary forest.* CR (*Herrera 1705*, US); P (*Mori 6681*, US). 100-1000 m. (Mesoamerica, Colombia, Ecuador.)

24. **Gymnocoronis** DC.

Por H. Robinson.

Annual or short-lived perennial herbs, erect, unbranched above base; stems angled, fistulose. Leaves opposite; sessile or petiolate; blade lanceolate to ovate or deltoid, venation trinervate to ascending subpinnate. Capitulescence strongly cymose, capitula pedunculate. Capitula discoid, 40-200-flowered; involucre campanulate; phyllaries herbaceous, not articulated at base, equal to subequal, c. 2-seriate; clinanthium convex, epaleate, surface not sclerified between scars, glabrous. Corolla with enlarged base covering apex of cypsela, white, throat cylindrical, lobes 5, triangular, shorter than wide or sometimes as long as wide, non-papillose; anther collar slightly enlarged, cells subquadrate, with transverse thickenings on walls, appendage distinctly shorter than wide; style base not enlarged, glabrous, style shaft without trichomes, appendages broadly oar-shaped, surface mamilllose. Cypselae slightly curved but never compressed, 5-ribbed, ribs sometimes with corky elaborations, glandular between ribs, carpopodium short-cylindrical, cells quadrate, thin-walled; pappus absent. 5 spp. Southern Mexico and Guatemala, South America from eastern Perú to Argentina.

 occurring in Chiapas. Villaseñor (1989) placed *G. matudae* in synonymy of *G. latifolia*, which he cited as occurring in Campeche and Tabasco. Turner placed each *G. matudae*, *G. nutans*, and *G. sessilis* into synonymy of *G. latifolia* (D. Don ex Hook et Arn.) DC., the only species (Coastal Nayarit and coastal Veracruz and southwards) in Mexico that he recognized.


1. Corollas densely glandular; capitulescences without basal opposite branches, with only alternate branching; leaves with some secondary veins near basal 1/3 of blade.

   1. *G. matudae*

   1. Corollas glabrous or subglabrous distal; capitulescences usually with some opposite branching at base; leaves with numerous secondary veins ascending from basal 1/4-1/5 of blade.

   2. *G. sessilis*


   Holotype: Mexico, Campeche, Matuda 3844 (US!). Illustr.: no se encontró. N.v.: none.

   Herb to 0.5 m; stems and leaves glabrous. Leaves narrowed to short petioliform base; blade to 13 × 4 cm, elliptical-lanceolate to oblong-lanceolate, some secondary veins present near basal 1/3 of blade, remotely subpinnate, becoming strongly ascending, base becoming more abruptly narrowed at short petioliform base, margins crenate-serrate, apex narrowly acute. Capitulescence without basal opposite branches, with only alternate branching; peduncles 7-13 mm, subglabrous. Capitula 4-6 mm; phyllaries c. 20, 3.5-4.5 mm, oblong, sparsely glandular. Florets c. 50; corolla c. 3.2 mm, densely glandular. Cypselae c. 3 mm, ribs without corky elaborations, faces densely glandular. *Habitat unknown, presumably in wet places.* C (Matuda 3844, US). C. 3 m. (Endemic.)


   Holotype: Mexico, Tabasco, Rovirosa 456 (US!). Illustr.: no se encontró. N.v.: none.

   Herb to 0.5 m; stems and leaves glabrous. Leaves narrowed to sessile or short-petioliform base; blade 7-12 × 1.5-5 cm, narrowly ovate to ovate-elliptical, secondary veins numerous, congested, subpinnate near base, strongly ascending to trinervate from basal 1/4-1/5 of blade, base short-acute to acuminate, margins closely sharply serrulate, apex narrowly acute. Capitulescence usually with some opposite branches at base; peduncles 10-15 mm, glabrous. Capitula 7-8 mm; phyllaries 20-25, c. 3 × c. 0.7-1 mm,
oblong. Florets 40-50; corolla c. 3 mm, glabrous or subglabrous distally. Cypselae 2.5-3.5 mm, ribs without corky elaborations, faces densely glandular. In lagoon, by lake, aquatic. T (Rovirosa 456, US); Ch (Matuda 2686, US); G (Contreras 7552, US). 0-10 m. (Mexico [Jalisco, Veracruz] to Mesoamerica.)

25. **Hebeclinium** DC.

Por H. Robinson.

Large erect herbs or subshrubs, with moderate branching; stems terete to slightly angled, non fistulose. Leaves opposite, usually long-petiolate; blade broadly ovate to deltoid or lanceolate, trinervate from near base or venation ascending-pinnate, sometimes with glandular punctations on abaxial surface, base acute to cordate. Capitulescence a lax cyme to pyramidaly paniculate; with widely spreading branches; peduncles short. Capitula discoid, 20-80-flowered; involucre campanulate; phyllaries 25-40, subimbricate, unequal, graduated, inner phyllaries often easily deciduous; clinanthium hemispherical, composed of highly sclerified cells, central part easily broken off, epaleate, usually sclerified throughout, glabrous to densely hirsute. Corollas narrowly funnelform to tubular, white or pink, limb without subquadrate cells below the lobes, inner surface of throat sometimes with trichomes, lobes 5, smooth on both surfaces, usually with trichomes or glands; anther collars slender, with many subquadrate cells proximally, walls rather thin without distinct thickenings, appendage large, longer than wide, not truncate; style base without node, glabrous, branches narrowly filiform, terete, mamillose. Cypselae 1.5-3 mm, prismatic, often slightly curved, 5-ribbed, sometimes setulose, without dense minute powdery-glands, carpododium not sharply demarcated, without projecting distal rim, procurent on cypselae ribs, cells with thin walls; pappus of 30-40 scabrid slender persistent bristles contiguous at base, sometimes broadened distally, apical cells acute. 20 spp. Most species northern Andean and 1 sp. throughout neotropics.


1. Leaf blades strongly trinervate from bases, bases cordate to truncate; capitula 50-80-flowered; inner phyllaries narrowly acute. 4. **H. macrophyllum**
1. Leaf blades venation ascending pinnate or subpinnate in basal 1/3, bases rounded to broadly obtuse; capitula 20-40-flowered; phyllary apices obtuse to rounded.

2. Stems sparsely to densely puberulent; petioles 0.4-1.5 cm.

3. Stems densely puberulent; leaf blades ovate, apices short-acuminate, margins closely serrulate; apices of pappus bristles distinctly broadened; cypselae sparsely glandular distally. **2. H. hygrohylaem**

3. Stems sparsely puberulent; leaf blades oblong-ovate, apices narrowly acuminate, margins remotely serrate or serrulate; apices of pappus bristles not or scarcely broadened; cypselae sparsely and finely setulose distally.

3. **H. knappiae**

2. Young stems lanate; petioles 1-5 cm.

4. Capitula c. 40-flowered; phyllaries nearly glabrous; clinanthia hispidulous to subglabrous; leaf margins with simple teeth, adaxial surfaces mostly glabrous; corolla lobes narrowly oblong-ovate. **1. H. costaricense**

4. Capitula 20-25-flowered; phyllaries densely pilosulous; clinanthia pilose; leaf margins doubly serrate or crenate, adaxial surfaces pilose or with persistent bases of trichomes; corolla lobes broadly triangular. **5. H. reedii**


Subshrubs 1-2.5 m; young stems lanate. Leaves petiolate; blade mostly 9-16 × 6-9 cm, ovate, chartaceous, venation ascending pinnate in basal 1/3, with 4 or 5 pairs of secondary veins, adaxial surface mostly glabrous, abaxial surface lanate on major veins, finely puberulent on or near veinlets, glandular dots obscure or lacking, base broadly obtuse, margins with simple teeth, apex short-acuminate to short-acuminate; petiole mostly 2-5 cm. Capitulescence a loosely spreading cyme; peduncles 1-20 mm, densely puberulent. Capitula c. 6 mm; phyllaries c. 40, narrowly oblong, apex obtuse, nearly glabrous; clinanthium hispidulous to subglabrous. Florets c. 40; corolla c. 3.4 mm, narrowly funnelform, white, without trichomes inside, lobes narrowly oblong-ovate, c. 3.5 × c. 2.5 mm, densely puberulent. Cypselae c. 1.5 mm, sparsely glandular-dotted distally; pappus bristles c. 2.5 mm, distinctly broadened at apex. *Cloud forest, premontane forest or*
montane wet forest, along quebrada above waterfall. CR (Liesner et al. 15411, MO); P (Croat 22831, US). 600-1600 m. (Endemic.)


Holotype: Costa Rica, Standley y Valerio 51933 (US!). Illustr.: no se encontró. N.v.: none.

Erect subshrubs to 1 m; stems densely puberulent. Leaves petiolate; blade mostly 5-7 × 3-5 cm, ovate, venation ascending subpinnate in basal 1/3, 3-4 pairs of secondary veins congested in basal 1/3, adaxial surface subglabrous, minutely puberulent abaxially especially on veins, with small glandular dots, base rounded, margins closely serrulate, apex short-acute; petiole 1.1-1.4 cm. Capitulescence a broadly spreading cyme; peduncles mostly 5-10 mm, minutely puberulent. Capitula 6-7 mm; phyllaries c. 40, narrowly oblong, apex obtuse, minutely puberulent; clinanthium minutely hispidulous to subglabrous. Florets c. 40; corolla 3-3.3 mm, short-funnelform, white, without trichomes inside, lobes broadly and shallowly triangular, densely puberulent. Cypselae c. 1.8 mm, sparsely glandular-dotted distally; pappus bristles c. 2.8 mm, apex distinctly broadened.

Wet forest. CR (Standley y Valerio 51933, US). 200-1500 m. (Endemic.)


Moderately branched subshrubs c. 1 m; stems slender, sparsely puberulent. Leaves petiolate; blade 7-13 × 3-4 cm, oblong-ovate, membranaceous, venation ascending pinnate in basal 1/3, with 3 or 4 well-separated pairs of secondary veins, surfaces subglabrous, nerves sparsely puberulent, base rounded, margins remotely serrate or serrulate, apex narrowly acuminate; petiole 0.4-0.7 cm. Capitulescence laxly pyramidal with corymbiform branches, peduncles 1-5 mm, sparsely puberulent; clinanthium sparsely pilose. Capitula 5-6 mm; phyllaries c. 30, narrowly oblong to lanceolate, apex obtuse, sparsely minutely puberulent. Florets c. 34; corolla c. 3 mm, narrowly funnelform, white, without trichomes inside, lobes c. 0.3 × c. 0.3 mm, triangular, densely puberulent. Cypselae c. 1.7 mm, sparsely and finely setulose distally; pappus bristles c. 3 mm, apex not or scarcely broadened. Tropical wet forest. P (D'Arcy y Sytsma 14599, MO). 200-500 m. (Endemic.)

Erect herbs and subshrubs to 2.5 m; stems densely tomentellous. Leaves petiolate; blade to 15 × 20 cm, broadly ovate, thinly chartaceous, strongly trinervate from base, adaxial surface sparsely puberulent to subglabrous, abaxial surface densely tomentellous, with numerous small glandular dots, base cordate to truncate, margins crenulate-dentate, apex usually short-acuminate; petiole to 10 cm. Capitulescence broadly and rather densely corymbiform; peduncles to 10 mm, densely puberulent. Capitula c. 4.5 mm; phyllaries green, c. 40, ovate to oblong-lanceolate, densely puberulent, inner phyllaries narrowly acute; clinanthium densely hisrute. Florets c. 50-80; corolla c. 3.5 mm, narrowly tubular, white or pink, without trichomes inside, lobes c. 0.2 mm, c. 0.1 mm, densely puberulent. Cypselae c. 1.5 mm, with some glands distally; pappus bristles c. 3.7-4 mm, with apex not or slightly broadened. 2n = 20. New clearing, weedy pasture, along stream, wet forest, wet thicket, plantations. T (Matuda 3268, US); Ch (Breedlove 10380, US); Y (Lundell 1483, US); C (Martínez et al., 2001: 24); B (Karling 33a, US); G (Bartlett 12378, US); H (Standley 55533, US); N (Nelson 5338, US); CR (Skutch 4923, US); P (Williams 717, US). 0-1500 m. (C. Mexico, Mesoamerica, Colombia, Venezuela, Ecuador, Perú, Bolivia, Brasil, Paraguay, Argentina, Uruguay, Cuba, Hispaniola, Lesser Antilles.)


Erect subshrubs 1-2 m; young stems densely lanate. Leaves petiolate; blade to 12 × 8 cm, broadly ovate, chartaceous, venation ascending pinnate in basal 1/3, with c. 4 pairs of secondary veins ascending at c. 45º, adaxial surface pilose or rough with persistent trichome bases, abaxial surface densely pilosulose to lanate on veins and veinlets, base broadly obtuse, margins doubly serrate, apex distinctly short-acuminate; petiole 3-5 cm. Capitulescence a loose cyme with widely spreading branches, capitula mostly in clusters of 3; peduncles 1-20 mm, densely pilosulose. Capitula c. 6 mm; phyllaries c. 40, narrowly oblong, apex obtuse to rounded, densely puberulent; clinanthium pilose. Florets 20-25; corolla c. 3 mm, short-funnelform, white, without trichomes inside, lobes c. 0.4 ×
c. 0.4 mm, triangular, densely pilosulous. Cypselae c. 2 mm, glabrous; pappus bristles c. 2.5 mm, distinctly broadened at apex. *Forest. P* (*McPherson 7023*, US). 500-1100 m. (Endemic.)


Por H. Robinson.

Erect or climbing herbs, subshrubs or shrubs, sparingly branched; stem pith solid. Leaves opposite or alternate; short-petiolate; blade ovate to narrowly oblong, entire to serrate. Capitulescence few- to many-branched, pyramidal paniculate to cymose. Capitula discoid, 20-80-flowered; involucre campanulate, phyllaries 15-30, imbricate to subimbricate, strongly unequal to sometimes subequal, typically graduated, 3-5-seriate, mostly persistent, spreading when mature, outer phyllaries broad, 6-10-ribbed; clinanthium convex, epaneate, surface sclerified, glabrous. Corolla narrowly funnelform, veins not thickened, limb without subquadrate cells below the lobes, lobes 5, triangular, smooth on both surfaces with oblong cells; anther collars broadly cylindrical with short cells proximally, with annulate thickenings on walls, appendage longer than wide, not truncate; style base distinctly enlarged, glabrous or hirsute, branches with appendages broadly linear, smooth to short-papillose. Cypselae long-tapered proximally, 5-ribbed, short-setulose or glandular, without dense minute powdery-glands, carpopodium stopper-shaped, with obvious projecting distal rim, about twice as long as wide, slightly asymmetrical, not procurrent on ribs, cells evenly subquadrate with thickened walls, without basal row of distinctly larger cells; pappus of 20-30 scabrid, rather persistent, basally contiguous capillary bristles, apical cells acute, not broadened. 12 spp. Mostly S. Brasil, 1 sp. in Central America and through tropical S. America.


Partially scandent woody herbs or shrubs to 6 m, branches few; stems sparsely puberulent, non-glandular. Leaves opposite; blade to $12 \times 7$ cm, elliptic-ovate to ovate-lanceolate, subcoriaceous, trinervate from base, surfaces glabrate, slightly puberulent on veins, base rounded to obtuse, margins serrate, apex sharply acute to slightly acuminate; petiole to 1.5 cm. Capitulescence a loose pyramidal panicle; peduncles mostly 10-20 mm, densely puberulent. Capitula c. 12 mm; phyllaries c. 20, subequal, outer phyllaries 5-8 mm, ovate to oblong, puberulent, apex acute, inner phyllaries to 10 mm, sometimes pink, mostly lanceolate, mostly glabrous, apex narrowly acute. Florets 60-65; corolla c. 8 mm, white to pink or purple, lobes c. $0.5 \times c. 0.4$ mm, glabrous; style base glabrous. Cypselae c. 3.5 mm, fusiform, ribs short-setulose; pappus bristles c. 7 mm, apex slightly broadened. $2n = c. 40$. Disturbed forest, secondary forest. H (Williams y Molina R. 12149, F); N (Atwood y Seymour 4080, US); CR (Wilbur 38810, US); P (van der Werff y Hardeveld 6941, US). 0-2100 m. (Mesoamerica, Colombia, Surinam, Ecuador, Perú, Bolivia, Brasil, Paraguay.)

27. Hofmeisteria Walp.

_Helogyne_ Benth., non Nutt.

Por H. Robinson.

Perennial herbs or woody subshrubs, not epiphytes in mangrove swamps, moderately to densely branched, glabrous or with small stipitate glands; stem pith solid. Leaves alternate, usually congested and appearing whorled at flowering nodes, usually distinctly long-petiolate; blade or segments broadly ovate to filiform, chartaceous, mostly trinervate, margins entire to lobed or greatly dissected into cuneate or filiform segments. Capitulescence monocephalous, capitula solitary on long erect ebracteolate peduncles, peduncles arising from pseudoverticillate clusters of leaves. Capitula discoid, (100-)150-175(-250)-flowered; involucre campanulate; phyllaries c. 50-100, subimbricate, strongly unequal, graduated, 4-6-seriate, persistent, spreading with age, apex acute to spinose; clinanthium slightly convex, epauleate, surface sclerified, glabrous. Corolla very narrowly funnelform, nearly tubular, white, pink, or lavender, glabrous outside and inside, lobes 5, triangular to oblong, smooth on both surfaces with oblong cells; anther collar narrowly cylindrical, cells oblong with weak beaded thickenings on walls, appendage usually oblong-ovate, short in two species; style base not enlarged, glabrous, appendages slightly broadened and flattened distally, smooth or slightly mamilllose. Cypselae prismatic, 5-
ribbed, ribs setulose, carpopodium distinct, symmetrical, shortly stopper-shaped, with 7 or 8 tiers of short subquadrate cells; pappus of (3-)5-7(-15) scabrid tapering bristles, with 6-10 intervening squamellae in species with fewer bristles. 8 spp. Mexico.


**Fleischmannia langlassei** B.L. Rob., *Fleischmannia urenifolia* (Hook. et Arn.) Benth. et Hook. f. ex Hemsl.

Perennial herbs 25-30 cm, few-branched; stems glabrous. Leaf blade trifid or with 3-7 ovate to oblong or trifid segments, mostly 2.5-4.5 × 1.5-4.5 cm, margins serrate to crenate-serrate. Capitulescences many, erect; peduncles to 50 mm, densely minutely stipitate-glandular. Capitula 9-10 × 8-11 mm; phyllaries c. 50. Florets 150-175; corolla 4.5-5 mm, white or pink; anther appendages longer than wide, obtuse. Cypselae 1-1.2 mm; pappus bristles 5-7, 4-4.5 mm, maroon, scabrous, with a crown of short laciniate-margined squamellae. *Wet or dry rocky ravines, in seepage areas, stream margins in oak and pine forests.* Ch (*Purpus 218*, US). 300-2300 m. (W. Mexico to Mesoamerica.)

Turner (1997) gave the elevation as 600-1200 m.

28. **Ilitisia** S.F. Blake

Por H. Robinson.

Decumbent, annual or short-lived perennial minute herbs, not or sparingly branching proximally, rooting at proximal nodes; stems pilosulose. Leaves opposite, crowded on procumbent parts, more remote on erect parts, short-petiolate; blade orbicular to broadly ovate, trinervate from base, surfaces glandular-dotted, base obtuse to subtruncate, margins crenate-serrate with 1-3 coarse blunt teeth, apex obtuse to rounded. Capitulescence cymose with ascending branches, with 2-7 pedunculate capitula. Capitula 25-30-flowered, discoid; involucre campanulate; phyllaries eximbricate, subequal, 2-seriate, persistent; clinianthium slightly convex, epaleate, surface sclerified, glabrous. Corolla 4-lobed, white or partly purple, tube narrow, limb broadly campanulate, lobes with or without 2 outer lobes of marginal florets enlarged, densely papillose inside,
scarcely mamilllose near apex; anther collars cylindrical, cells short with dense transverse annular thickenings on walls, appendage short, about twice as long as wide; style base not enlarged, glabrous, branches short, appendages lanceolate, densely short-papillose, apex acute. Cypselae prismatic, 4-costate, glabrous or subglabrous, carpopodium a distinct symmetrical rim, cells oblong in 1 series with thickened walls; pappus absent. 2 spp. Mesoamerica.

Turner (1987) treated both of our species as Microspermum repens (S.F. Blake) L.O. Williams.


1. Corollas of peripheral florets usually asymmetric with 2 enlarged outer lobes, all lobes longer than wide; phyllaries evenly greenish, apices short-acute.

1. I. echandiensis
1. Corollas of all florets symmetrical with 4 equal lobes, lobes as wide as long; phyllaries with pale base and purple apex, apices obtuse. 2. I. repens


Herbs with erect branches to 16 cm; stems sparsely pilosulose. Leaves: petiole 1-2 mm; blade mostly 6-7 × 5-6 mm, subcarnose. Capitulescence with 2-6 ascending mostly alternate branches; peduncles 3-13 mm, densely sordid-puberulent. Capitula c. 4 × c. 5 mm, c. 30-flowered; phyllaries 8-12, c. 3 × 1.3-1.5 mm, elliptical, herbaceous, rather evenly greenish, apex short-acute. Corollas of peripheral florets usually asymmetric with 2 enlarged outer lobes to 2 × 1 mm, smaller inner lobes 0.6-0.8 × 0.5-0.6 mm, less commonly all corollas symmetrical with 4 equal lobes, all lobes of all florets always longer than wide and all short-acute. Cypselae c. 1.5 mm, costae with few minute setulae distally. Páramo. CR (Davidse y Herrera 29305, US); P (Davidse et al. 23854, US). 2900-3500 m. (Endemic.)

*Microspermum repens* (S.F. Blake) L.O. Williams.

Herbs with erect branches 5-9 cm; stems sparsely to densely pilosulose. Leaves: petiole c. 1 mm; blade mostly 3-6 × 3-6 mm, carnose. Capitulescence with 3-7 ascending often opposite branches; peduncles 2-12 mm, densely white-puberulent. Capitula c. 3 × 4-5 mm, c. 25-flowered; phyllaries 8-10, 2.7-3 × 1-1.2 mm, elliptical, subcarnose, with pale base and purple apex, apex obtuse. Corollas of all florets symmetrical with 4 equal lobes, lobes c. 0.4 × c. 0.4 mm, triangular, as wide as long, apex obtuse to subacute. Cypselae c. 1.3 mm, glabrous. *Subshrub páramo*. CR (*Weston 5820*, US). 3000-3500 m. (Endemic.)

29. *Isocarpha* R. Br.

Por H. Robinson.

Erect annual or perennial herbs, branching mostly from base; stems terete to slightly hexagonal, pith solid. Leaves opposite or alternate, sessile or with narrowly winged petioliform base; blade narrowly to broadly elliptical, slightly to strongly trinervate, leaves with glandular punctations, without long-stipitate glands, margins entire to serrulate. Capitulescence a lax elongate panicle, sometimes leafy, branches with capitula single or in small clusters. Capitula discoid, 60-200-flowered, becoming elongate; involucre oblong to elliptical; phyllaries c. 10-15, eximbricate, subequal, persistent, sometimes all phyllaries fertile (*Isocarpha oppositifolia*) and each subtending an individual floret; clinanthium elongate-columnar, surface sclerified, densely paleate; paleae bracteolate. Corolla usually narrowly funnelform with distinct short tube, white to pink, glands mostly on tube and lobes, lobes 5, triangular, usually smooth on both surfaces; anther collars cylindrical, cells mostly short-oblong with distinct annular thickenings, appendage slightly longer than wide; style base usually enlarged, glabrous or papillose, appendages rather short, widely diverging, sometimes curled, densely long-papillose. Cypselae prismatic, 5-ribbed, glabrous or faces setulose, carpopodium short, stopper-shaped, with small cells in 8-18 rows, basal row not enlarged, walls moderately thickened; pappus absent. 5 spp. United States [Texas] to S. Mexico, Ecuador, N. Perú, E. Brasil, Caribbean.

1. Leaves narrowly petioliform, bases auriculate; cypselae setulose.


Calydermos atriplicifolius (L.) Spreng., Isocarpha alternifolia Cass., Spilanthes atriplicifolius (L.) L., Isocarpha billbergiana Less., Isocarpha atriplicifolia subsp. billbergiana (Less.) Borhidi.

Erect or decumbent annual or short-lived perennial herbs 0.1-1.2 m; roots fibrous; stems puberulent or pilosulose. Leaves opposite proximally, narrowly winged and petioliform near base, base auriculate; petioliform base 0.5-5 cm; blade mostly 1.5-6 × 0.7-2.5 cm, broadly elliptical or rhomboidal, trinervation from near base, surfaces puberulent to pilosulose, glandular-dotted abaxially, base and apex acute to short-acuminate, margins closely serrulate to dentate. Capitulescence rather diffuse, branching mostly alternate, with decrescent bracts throughout; peduncles 4-15 mm, densely pilosulose. Capitula 5-8 mm, ovoid, rounded proximally, pointed distally; 2-7 sterile proximal phyllaries, fertile phyllaries, and paleae greenish to yellowish, 2-3.5 × 0.5-1 mm, oblong to ovate, apex obtuse to acuminate, puberulent or pilosulose to subglabrous, glandular-dotted, inner paleae stramineous to hyaline proximally. Florets 125-175; corolla 1.4-2.5 mm, white, lobes 0.2-0.7 × 0.2-0.7 mm, triangular; style base sometimes papillose. Cypselae 0.9-1.5 mm, setulose, base abruptly narrowed, substipitate, carpopodium large, borne at an angle. 2n = 20. Edge of inundated swamp, wet roadside ditch, xerophytic forest on plain. Ch (Matuda 2705, MICH); G (King 7376, US); H (Molina, 1975: 115); ES (Berendsohn et al., 1989: 290 - 7); N (Wright s.n., US); CR (Pittier s.n., US). 0-1100 m. (S. Mexico, Mesoamerica, Colombia, Venezuela, NE. Brasil, Cuba, Hispaniola.)

Keil y Stuessy (1981) recognized three varieties of this species, but I treat the species here in the broad sense.

Calea oppositifolia (L.) L.

Erect to decumbent annual or short-lived perennial herbs or subshrubs 0.3-1.5 m; roots fibrous; stems glabrous to densely hirtellous. Leaves opposite proximally or in dense axillary fascicles, sessile or indistinctly petiolate; petioliform bases 1-10 mm; blade 1-15 × 0.2-4 cm, mostly narrowly elliptical to lanceolate or ovate, trinervate above base, surfaces glabrous to densely puberulent, glandular-dotted abaxially, base acute or acuminate, without basal auricles, margins entire to remotely crenulate or denticulate, apex acute or obtuse. Capitulescence lax, elongate, branching mostly opposite, branches bearing single capitula or dense clusters of 2-7 capitula; peduncles hirtellous. Capitula 5-19 mm, ovoid to cylindrical with conical bases and rounded apex; phyllaries and paleae 3.5-5 × 0.7-1.2 mm, all fertile, oblong, with two ribs fused into excurrent stiff mucro, green or stramineous, margins thin, glabrous to densely pilosulose and glandular-dotted. Florets 60-200; corolla 2-3 mm, white, lobes 0.3-0.5 × 0.3-0.4 mm, triangular; style base glabrous. Cypselae 1.2-2.2 mm, glabrous, gradually narrowed proximally, carpopodium sessile, slightly oblique. 2n = 20. Dry riverbed, dry tropical forest, ravines and xerophytic bush along highway, savanna and scrub forest. Ch (Laughlin 2817, US); Y (Steere 1121, US); C (Martínez et al., 2001: 24); G (Kellerman 5316, US); H (Molina 3889, US); ES (Barclay 2662, BM); N (Molina 27233, F); CR (Williams et al., 26383, F); P (Pittier 4830, US). 3-1300 m. (United States [Texas], E. Mexico, Mesoamerica, Colombia, Venezuela, Cuba, Jamaica, Hispaniola, Lesser Antilles, Trinidad and Tobago.)

30. Koanophyllon Arruda

Por H. Robinson.

Shrubs or small trees, rarely vines, moderately to densely branched. Leaves usually simple, rarely trifoliolate, usually opposite, distinctly petiolate; blade broadly lanceolate to elliptical, venation pinnate or trinervate, abaxial surface usually with glandular punctations, base acute to cordate, margins entire to serrate, rarely lobed. Capitulescence pyramidal to corymbiform; peduncles usually short. Capitula campanulate, discoid, 5-20-flowered; phyllaries 7-16, eximbricate to strongly subimbricate, mostly spreading at
maturity, chartaceous, neither white nor stramineous, articulated at base, inner phyllaries not linear, sometimes deciduous; clinanthium slightly convex, epaleate, surface sclerified, glabrous. Corolla funnelform with broadly cylindrical tube, usually whitish to greenish-yellow, rarely violet, veins extending into lobes, lobes 5, broadly triangular, smooth on both surfaces with oblong cells, with numerous clustered glands on outer surface; anther collar cylindrical with numerous subquadrate cells proximally, walls not or weakly ornamented with thickenings, thecae pale, not reddish, appendage typically shorter than wide, often half as short as wide, sometimes as long as wide, apex mostly truncate, sometimes longitudinally grooved; style base not enlarged, glabrous, branch appendage apex flattened, usually distinctly broadened, smooth. Cypselae prismatic, 5-ribbed, usually setulose on ribs and adaxial surfaces, glandular or eglandular, carpopodium distinct, shortly stopper-shaped or cylindrical, with slight distal rim, small subquadrate cells with slightly thickened walls; pappus of 30-35 persistent, scabrid, contiguous at base, often stout bristles, rarely short or lacking. 114 spp. S. Florida and SW United States south to Argentina.

_Neohintonia_ R.M. King et H. Rob. was reduced to synonymy by Ayers y Turner (1987), but is here excluded from the synonymy of _Koanophyllum_. The report of _K. celtidifolium_ (Lam.) R.M. King & H. Rob. in Honduras by Nelson Sutherland (2008) may be based on a misdetermination.


1. Leaves trifoliolate or venation trinervate.
   2. Anther appendages oblong-ovate, as long as wide; capitulescences broadly corymbiform.

   **15. K. villosum**

   2. Anther appendages short, half as long as wide; capitulescences pyramidal to broadly thyrsoid with corymbiform to racemiform or spiciform-cylindrical to glomerulous branches.

   3. Trinervations from 3-10 mm above bases of blades; bases of blades rounded to acute.

   4. Leaf blades narrowly ovate to elliptical, apices slightly to narrowly acuminate, trinervation reaching 2/3 length of blades, subparallel to margins; stems whitish or grayish.

   **1. K. albicaule**
4. Leaf blades broadly ovate, with short-acute apices, trinervations not parallel to margins; stems mostly brown.  

K. hondurense

3. Trinervate at bases of blades or trifoliate; bases of blades in simple leaves usually truncate to cordate.

5. Branching of capitulescences corymbiform, not with crowded capitula; corollas c. 3.5 mm; pappus bristles 3-3.5 mm.

K. coulteri

2. Leaves predominantly trifoliolate; phyllaries obtuse or truncate.

K. tripartitum

6. Leaves simple; phyllaries usually acute.

7. Pappus of capillary bristles 2-2.8 mm; capitulescences often rather loose, peduncles often over 5 mm.  

K. solidaginoides

7. Pappus of very short bristles or lacking; capitulescences densely glomerulous.

8. Pappus of numerous very short bristles; capitula c. 12-flowered.

K. ravenii

8. Pappus absent; capitula c. 7-flowered.  

K. standleyi

1. Leaves simple, venation pinnate.

9. Abaxial leaf surfaces minutely whitish tomentellous, adaxial and abaxial surfaces with c. 15 or more glandular dots per mm²; leaf apices narrowly acute to slightly acuminate; 3-4 proximal nodes of capitulescences with large foliar bracts.

K. sorensenii

9. Leaf surfaces mostly glabrous or nearly so, adaxial surfaces often eglandular; leaf apices distinctly short to narrowly acuminate; usually only 1-2 proximal nodes of capitulescences with large foliar bracts;

K. panamense

10. Stems and petioles hirtellous, hirsute or pilosulous to sublanate with long or spreading trichomes.

11. Weak proximal secondary veins nearly submarginal near bases of leaf blades; apical acuminations usually less than 1 cm.

K. panamense
12. Leaf margins subentire, with indistinct minute serrulations; leaf surfaces with numerous erect trichomes; stems sublanate with curved or compressed trichomes.

6. K. hypomalacum

12. Leaf margins bluntly to sharply serrate; leaf surfaces with erect trichomes only on or near veins; stems pilosulous with spreading trichomes.

7. K. jinotegense

10. Stems and petioles puberulent with short or minute appressed trichomes.

13. Leaves abaxially with c. 25-50 glandular dots per mm²

14. Capitula 4-5 mm, 10-11-flowered; phyllaries obtuse; pappus bristles 2-2.5 mm, of even width throughout; capitulescences densely pyramidal or ovoid.

5. K. hylonomum

14. Capitula 5-6 mm, 12-23-flowered; phyllaries acute; pappus bristles c. 3 mm, apices slender; capitulescences pyramidal with spreading branches.

16. K. wetmorei

13. Leaves abaxially with 5-20 glandular dots per mm².

15. Involucres c. 3/4+ as long as capitula, some or all phyllaries ovate to oblong-lanceolate with acute apices; pappus bristles to c. 3 mm, slender, slender distally with apices of longer bristles slightly broadened.

3. K. galeottii

15. Involucres 1/2-2/3 as long as capitula, phyllaries oblong with broadly rounded apices; pappus bristles c. 2.5-2.8 mm, of even width throughout.

9. K. pittieri


Eupatorium drepanophyllum Klatt, E. leucoderme B.L. Rob., E. ymalense B.L. Rob.

Shrubs or lianas 1-3 m; stems terete, whitish or grayish, with evanescent fine puberulence. Leaves petiolate; blade mostly 4-12 × 2-5 cm, narrowly ovate to elliptical, chartaceous, trinervate from 5-10 mm above base, with lateral veins reaching 2/3 length of blade, subparallel to margin, surfaces with 5-10 glandular dots per mm², paler abaxially, base rounded to acute, margins bluntly serrate, apex slightly to narrowly
acuminate; petiole 0.5-1.5 cm. Capitulecence pyramidal or broadly thyrsoid with densely corymbiform branches, large foliar bracts at proximal 2-4 nodes. Capitula c. 7 mm; phyllaries c. 15, 3-4 × c. 0.8 mm, narrowly oblong, obtuse. Florets c. 15; corolla c. 4 mm, white; anther appendage short, half as long as wide. Cypselae c. 2 mm, with numerous small setulae on distal surfaces; pappus bristles c. 3.5 mm, equally slender throughout. 2n = 20. Roadsides, around fields, secondary growth, high forest, thicket, limestone area. T (Cowan, 1983: 25 sub Eupatorium albicaule); Ch (King 3037, US); Y (Gaumer 23893, US); C (Martínez et al., 2001: 24); QR (Sauwne 122, B); B (Gentry 7622, US); G (Lundell 4016, US); H (Johansen 47, US); N (Garnier 1013, US); CR (Liesner y Lockwood 2413, US). 0-800 m. (C. y SW. Mexico, Mesoamerica.)

Holotype: Guatemala, Türckheim 52 (GH!). Illust.: no se encontró. N.v.: Sanjoncillo, G.
Climbing shrubs 1-2 m; stems terete, stems and petioles densely curved-puberulent to hirtellous. Leaves petiolate; blade mostly 3-8 × 1.5-4 cm, triangular-ovate, chartaceous, trinervate from at or near base, with lateral veins divergent, reaching 1/2 to 2/3 length of blade, adaxial surface subglabrous to sparsely pilose except on main veins, abaxially with 20-50 glandular dots per mm², puberulent on veins, base obtuse to truncate, sometimes with median acumination, margins serrulate to dentate, apex acute to short-acuminate; petiole 0.5-1.2 cm. Capitulecence narrowly pyramidal with large foliar bracts at proximal 2-5 nodes; branches spreading, corymbiform to pyramidal. Capitula 7-8 mm; involucre 2/3 as long as capitula; phyllaries c. 16, 2-5 × 0.5-0.8 mm, narrowly oblong to linear-lanceolate, inner phyllaries mostly obtuse to short-acute, often toothed or erose distally. Florets 10-12; corolla 3-4 mm, white or greenish; anther appendage short, half as long as wide. Cypselae 2-2.5 mm, with numerous short spreading setulae on ribs and surfaces; pappus bristles 3-4 mm, slender, scarcely broader at some apices. Open forest, forest, roadsides, steep wooded slopes, damp thickets. Ch (Breedlove 58500, US); G (Türckheim II 1664, US); H (Molina, 1975: 114 sub Eupatorium coulteri); ES (Molina y Montalvo 21665, F). 400-2900 m. (Endemic.)

Shrubs or small trees 2-8 m; stems terete, stems and petioles puberulent with short appressed trichomes. Leaves petiolate; blade mostly 10-20 × 3-7 cm, elliptical, chartaceous, venation pinnate with 5-7 veins on each side, proximal pairs moderately to strongly convergent with margin, surfaces glabrous or subglabrous on and between veins, adaxial surface eglandular, abaxially with 5-20 glandular dots per mm², base acute, margins remotely serrulate to serrate, apex shortly to narrowly acuminate; petiole 0.7-3 cm. Capitulescence pyramidal with spreading pyramidal branches, rarely with large foliar bracts above basal node. Capitula c. 6 mm; involucre c. 3/4+ as long as capitula, phyllaries c. 20, 1-4 × 1-1.2 mm, ovate to lanceolate with acute apices. Florets c. 20; corolla to c. 3 mm, white or greenish; anther appendage short. Cypselae 2-2.5 mm, with numerous short spreading setulae distally; pappus bristles c. 3 mm, slender distally with apex of longer bristles slightly broadened. *In ramonal covering ruins, in botanal, in corozal, in acahual, high forest, wet tropical forest.* T (*Croat y Hannon 65366*, US); Ch (*Lundell 17873*, US); B (*Schipp 3*, US); G (*Contreras 1921*, US); H (*Molina 6181*, F); N (*Stevens 10813*, US). 50-900 m. (C. Mexico to Nicaragua.)

Turner (1997) placed this name in synonym of *Koanophyllon pittieri*.


Weak shrubs 1-3 m; stems terete, mostly brown, stems and petioles densely short-hirtellous. Leaves petiolate; blade mostly 3-9 × 1.5-5 cm, broadly ovate, chartaceous, trinervate from 3-10 mm above base, lateral veins reaching 2/3 or less of blade length, trinervation not parallel to margin, surfaces with 10-25 glandular dots per mm², glabrous adaxially, puberulent on veins abaxially, base obtuse to rounded, margins serrulate to serrate, apex short-acute; petiole 0.5-1 cm. Capitulescence narrowly pyramidal, with large foliar bracts at proximal 1-3 nodes; branches moderately to widely spreading, densely branching at apex. Capitula c. 6 mm; phyllaries 12-14, mostly 3-4.5 × 0.8-1 mm, narrowly ovate to lanceolate, apex acute to apiculate. Florets 10-12; corolla c. 3.5 mm, greenish to reddish, with many glands; anther appendage short, half as long as wide.
Cypselae c. 2.5 mm, faces short-setulose; pappus bristles c. 3 mm, with attenuate apex. *Bushy slope, pine forest, mixed pine-oak forest.* H (Standley 14839, US); N (Dillon et al., 2001: 325 sub *Eupatorium hondurense*). 600-1400 m. (Endemic.)


Shrubs 1-6 m; stems terete, stems and petioles puberulent with short appressed trichomes. Leaves petiolate; blade 8-17 × 2-7 cm, narrowly to broadly elliptical, chartaceous, venation pinnate with 5-6 secondary veins on each side, proximal lateral veins moderately to strongly convergent with margin, surfaces mostly glabrous with puberulent veins, adaxial surface eglandular, abaxially with 25-50 glandular dots per mm², base acute, margins remotely serrulate to serrate, apex shortly to sharply acuminate; petiole mostly 1-2.5 cm. Capitulescence broadly pyramidal or ovoid with profusely branched pyramidal branches with foliar bracts only at proximal 1 or 2 nodes. Capitula 4-5 mm; involucre c. half as long as capitula, phyllaries c. 16, 1-2 × 0.8-1 mm, broadly ovate to oblong, obtuse. Florets 10-11; corolla c. 2.5 mm, white to light green; anther appendage short. Cypselae 1.7-2 mm, puberulent with minute setulae on sides; pappus bristles 2-2.5 mm, of even width throughout. 2n = c. 20. *Primary forest, cloud forest, forest edge, in understory, moist thicket.* ?H (Nelson Sutherland, 2008: 167); CR (Hammel 11194, US); P (McPherson 10562, MO). 100-1600 m. (Endemic.)

The citation of this species in Honduras by Molina (1975) is based on misidentified material.


Shrubs 2-3 m; stems subhexagonal, whitish, stems and petioles densely pilose to sublanate with long or spreading trichomes. Leaves petiolate; blade mostly 7-18 × 1.8-4.5 cm, narrowly elliptical-lanceolate, chartaceous, venation pinnate with 6-7 veins on each side, proximal pair of secondary veins moderately convergent with basal leaf margin, surfaces whitish puberulent on lamina and veins, with numerous erect trichomes, adaxial

Weak shrubs to trees 3-8 m; stems terete, stems and petioles densely pilosulous to hirtellous with spreading trichomes. Leaves petiolate; blade mostly 10-17 × 2.5-4.5 cm, elliptical, chartaceous, venation pinnate with 4-5 veins on each side, proximal pair of secondary veins moderately convergent with basal leaf margin, surfaces mostly glabrous, adaxial surface eglandular, finely puberulent with erect trichomes only on or near veins, sometimes more puberulent near veins abaxially, abaxial surface with 10-12 glandular dots per mm² base short acuminate, margins bluntly to sharply serrate, apex acuminate, apical acumination usually more than 1 cm; petiole 0.5-2.5 cm, hirtellous. Capitulescence broadly pyramidal with spreading densely branching pyramidal branches, with foliar bracts at lowest 1 or 2 nodes. Capitula 5-5.5 mm; involucre nearly as long as capitula, phyllaries c. 15, mostly 2.5-5 mm, lanceolate to oblong-lanceolate, sharply acute. Florets 12-15; corolla 2.7-3 mm, whitish or greenish; anther appendage short. Cypselae 2.5-3 mm, pilosulous with small setulae distally; pappus bristles c. 2.5 mm, of even width throughout. Hábitat desconocido. G (Heyde y Lux 6157, US). C. 1100 m. (Endemic.)


*Koanophyllon dukei* R.M. King et H. Rob.

Shrubs or small trees 1.5-6 m; stems terete, stems and petioles densely pilosulous to sublanate, with spreading trichomes. Leaves petiolate; blade mostly 12-22 × 5-9 cm,
broadly to narrowly elliptical, chartaceous, venation pinnate with 4-6 veins on each side, lowest weak secondary veins nearly submarginal near base of blade, adaxial surface glabrous, eglandular, abaxially puberulent to pilosulose on veins or sometimes on lamina, 5-20 glandular dots per mm², base narrowly acute, margins serrate to serrulate, apex with short acumination usually less than 1 cm; petiole often stout, 1-3 cm. Capitulescence broadly pyramidal, often broader than long, with spreading densely branching pyramidal branches, with foliar bracts only at proximal 1 or 2 nodes. Capitula 5-6 mm; involucre 2/3 as high as capitula, phyllaries c. 20, 2-4 × 0.8-1.1 mm, ovate to oblong-lanceolate, short-acute. Florets 8-30; corolla c. 3 mm, white; anther appendage short. Cypselae 2-3 mm, with many setulae mostly on ribs; pappus bristles 2.5-2.8 mm, of even width throughout. *Tropical wet forest (cloud forest), disturbed forest. P (Hammel 4029, US). 200-2700 m. (Endemic.)


Subscandent shrubs to small trees 1.5-7 m; stems terete, stems and petioles puberulent with minute appressed trichomes. Leaves petiolate; blade mostly 9-27 × 3-10 cm, elliptical to broadly elliptical, chartaceous, venation pinnate with 4-6 veins on each side, lowest weak lateral veins near and weakly convergent with margin, surfaces glabrous, adaxial surface eglandular, abaxially with 5-20 glandular dots per mm², base narrowly acute, margins remotely serrulate to serrate, apex shortly to narrowly acuminate; petiole 0.6-2.5 cm. Capitulescence broadly pyramidal with widely spreading densely branched pyramidal branches, with foliar bracts only at proximal 1 or 2 nodes. Capitula 5-6 mm; involucre 1/2-2/3 as long as capitula, phyllaries c. 17, mostly 1.5-3.5 × 1-1.8 mm, oblong, with broadly rounded apex. Florets 12-20; corolla 2.5-2.8 mm, white to greenish; anther appendages short. Cypselae c. 2.2 mm, with setulae mostly on ribs, sometimes on distal surfaces; pappus bristles 2.5-2.8 mm, of even width throughout. 2n = c. 60. *Wet forest, disturbed primary forest along stream, lower montane rain forest, second growth. CR (Standley y Valerio 46120, US); P (McDaniel 5066, US??). (0-)200-2400 m. (Endemic.)

The citations of this species in Mexico, Belize, Guatemala, Honduras, El Salvador, and Nicaragua are based on misidentified materials, most often of *K. galeottii*, and the common names used by Nelson Sutherland (2008) cannot be applied.

Holotype: Mexico, Chiapas, Breedlove y Raven 13472 (MICH!). Illustr.: no se encontró.
N.v.: none.

_Eupatorium ravenii_ (R.M. King y H. Rob.) B.L. Turner.

Arching shrubs 1.4-2 m; stems terete, with dense short curved often reddish puberulence. Leaves simple, petiolate; petiole 0.5-1.5 cm; blade 3.5-6.5 × 2-4 cm, triangular-ovate, chartaceous, trinervate from base, lateral veins reaching half length of blade, adaxial surface sparsely puberulent, densely puberulent on veins abaxially, both surfaces with 25-50 glandular dots per mm², base subcordate to truncate, margins crenate-serrate to dentate, apex narrowly acuminate. Capitulescence pyramidal with spreading branches; capitula in glomerate and cylindrical clusters. Capitula c. 6 mm; involucre c. 2/3 as high as capitula, phyllaries 15-17, mostly 1.5-3.5 × c. 0.7 mm, sharply acute. Florets c. 12; corolla c. 2 mm, white, densely glandular; anther appendages short, half as long as wide. Cypselae 1.7-2.2 mm, puberulent with small setulae; pappus bristles numerous, c. 0.2-0.3 mm, very short, densely scabrid. 2n = c. 20. Habitat not known. Ch (Miranda 6688, US). 800-1000 m. (Endemic.)


_Eupatorium filicaule_ Sch. Bip. ex A. Gray, _Eupatorium scoparioiides_ L.O.Williams, _Ophryosporus solidaginoides_ (Kunth) Hieron.

Erect, arching or subscandent shrubs or subshrubs 1-2 m; stems and petioles with dense curved short puberulence or pilosulosity. Leaves simple, petiolate; petiole 1-3.5 cm, slender; blade 3-12 × 2-6 cm, deltoid to triangular ovate, chartaceous to rather membranaceous, trinervate from base, adaxial surface sparsely pilose or pilosulose, puberulent to subtomentellous on veins abaxially, both surfaces with 25-50 glandular dots per mm², more obvious abaxially, base truncate to subcordate, margins serrate-crenate, often with angles at widest part, apex narrowly acuminate. Capitulescence broadly pyramidal; spreading branches racemiform or spiciform-cylindrical with dense to often rather loose cylindrical clusters of capitula; peduncles often over 5 mm. Capitula 4-6 mm; involucre c. 2/3 as high as capitula; phyllaries c. 15, 1.5-3 × 0.8-1 mm, ovate to oblong-
lanceolate, apex rounded to apiculate or short-acute. Florets 8-15; corolla 2-2.5 mm, white, sparsely to densely scattered glandular; anther appendages short, half as long as wide. Cypselae 2-2.5 mm, pilosulose with many setulae on ribs and surfaces, rarely without setulae on sides; pappus bristles 2-2.8 mm, apex not or scarcely broadened.

*Lower montane rain forest, pine ridge, selva mediana subperennifolia, tropical deciduous forest, second-growth thicket, moist brushy hillside.*

T (Peréz et al., 2005: 85); Ch (Breedlove y Almeda 47607, US); B (Liesner y Dwyer 1629, US); G (Lundell 15361, US); H (Edwards P-739, US); ES (Berendsohn et al., 1989: 290 - 7); N (Stevens 16441, US); CR (Skutch 2425, US); P (Pittier 5294, US). 5-1600 m. (C. Mexico, Mesoamerica, Colombia, Venezuela, Ecuador, Perú, Brasil, Galapagos.)


Holotype: Belice, Sorenson 7129 (US!). Illustr.: no se encontró. N.v.: none.

*Eupatorium sorensenii* (R.M. King et H. Rob.) L.O. Williams.

Low shrubs 0.5 m; stems terete, stems and petioles densely brownish hirtellous.

Leaves petiolate; blade 6-10.5 × 1.8-3.5 cm, ovate-elliptical, chartaceous, venation pinnate with 7-8 scarcely arching veins on each side, proximal lateral veins moderately convergent with margin, adaxial surface whitish pilosulose, densely whitish puberulent abaxially, adaxial surface with c. 15 glandular dots per mm², abaxially with 25-50 glandular dots per mm², base short-acute, margins remotely subserrulate, apex narrowly acute to slightly acuminate; petiole c. 1 cm. Capitulescence narrowly pyramidal, 3-4 proximal nodes with large foliar bracts, erect spreading branches pyramidal with ultimate branching rather densely corymbose. Capitula c. 8 mm; involucre 2/3 as high as capitula, phyllaries c. 15, 1.5-4.5 × 1-1.3 mm, broadly oblong-lanceolate to ovate, apex shortly and sharply acute. Florets c. 10; corolla c. 3 mm, greenish-white, with scattered glands; anther appendage short, Cypselae c. 3 mm, sparsely puberulent with fine setulae, with scattered small glandular dots distally; pappus bristles c. 3 mm, with slender apex.

*Zone of pine and melastastomaceous scrub and scattered oaks.* B (Sorenson 7129, US). 500-1000 m. (Endemic.)

Eupatorium sodalis L.O. Williams.

Weak to arching shrubs 1-2 m; stems terete, stems and petioles antorsely puberulent. Leaves simple, petiolate; blade mostly 4-12 × 2.5-8 cm, deltoid to triangular-ovate, chartaceous, trinervate from small acumination at base, adaxial surface sparsely pilosulous, puberulent abaxially mostly on veins, obscurely glandular-dotted adaxially, with 40-50 glandular dots per mm², base truncate to subcordate, margins subserulate to dentate, sometimes with angles at widest part, apex narrowly acuminate; petiole 1-3.5 cm. Capitulescence narrowly pyramidal with short spreading branches; branches spiciform-cylindrical with capitula in series of dense glomerules. Capitula c. 4 mm; involucre 2/3 as high as capitula; phyllaries 10-12, 1.5-3 × 0.6-0.8 mm, oblong-lanceolate, sharply acute. Florets c. 7; corolla c. 2 mm, white, with scattered glands; anther appendages short, half as long as wide. Cypselae 1.5-1.8 mm, puberulent with setulae on ribs and distal sides; pappus absent. 2n = 20. Bushy rocky slope, damp thicket, roadsides, along stream. G (King 7173, US); H (Molina, 1975: 116 sub Piqueria standleyi); ES (Standley 21798, US). 200-1100 m. (Endemic.)


Arching shrubs to 1.5 m; stems terete, densely purplish puberulent. Leaves predominantly trifoliolate, blade sometimes simple and deltoid, trinervate, petiolate; blade 5-9 × 3-7 cm, blade or leaflet ovate, densely glandular-punctate abaxially, bases rather truncate or with petiolules 0-8 mm, irregularly dentate, apex acute; petiole 1-1.5 cm. Capitulescence pyramidal to broadly thyrsoid with spiciform cylindrical branches, with terminal or axillary interrupted globose clusters of capitula; peduncles 2-5 mm. Capitula c. 4 mm; involucre c. 3/4 as high as capitula, phyllaries c. 10, 2.5-3.5 mm, 2-3-seriate, oblong, apex truncate-lacerate or obtuse-lacerate. Florets c. 10; corolla c. 2 mm, white; anther appendages short, half as long as wide. Cypselae 2.5-3 mm, setulose; pappus bristles 30-40, 2-3 mm. Lower montane rain forest. Ch (Breedlove 53093, TEX). 800-1500 m. (Endemic.)

Eupatorium villosum Sw., Prodr. 111 (1788). Holotype: Jamaica, Swartz s.n. (S). Illustr.:
Shrubs 0.5-2 m; stems terete, stems and petioles densely hirtellous. Leaves petiolate; blade mostly 3-7 × 1.5-4 cm, ovate to oblong-ovate, chartaceous, trinervate from or near base, adaxial surface sparsely pilosulose to densely puberulent and sparsely gland-dotted, densely whitish puberulent abaxially with c. 50 glandular dots per mm², base abruptly and broadly rounded, margins suberrulate to entire, apex short-acute to obtuse; petiole 0.5-1 cm. Capitulescence broadly corymbiform, with dense branches. Capitula 4-4.5 mm; involucre c. 2/3 as high as capitula; phyllaries c. 10, 1.5-3 × 0.7-0.8 mm, obleng-elliptical, apex obtuse. Florets 8-10; corolla c. 2.5 mm, white; anther appendages oblong-ovate, as long as wide. Cypselae c. 1.5 mm, densely glandular or setulose; pappus bristles c. 2 mm, slender above base. 2n = 20. Savanna, tropical pine island, hammocks, roadsides, edge of coppice. H (Nelson 43, US). 0-14 m. (United States [S. Florida], Mesoamerica, Cuba, Jamaica, Puerto Rico.)

Specimens from Islas del Cisne (Swan Island, the only Mesoamerican locality) represent a variant with more densely puberulent adaxial leaf surfaces and with glandular rather than setulose cypselae.


Shrubs or small trees 2-3 m; stems terete, stems and petioles puberulent with appressed short trichomes. Leaves petiolate; blade mostly 11-20 × 3.5-6.5 cm, narrowly elliptical, chartaceous, venation pinnate with 5-7 veins on each side, proximal lateral veins moderately convergent with margin, surfaces glabrous to subglabrous with sparsely puberulent veins, adaxial surface eglandular, abaxially with 35-50 glandular dots per mm², base narrowly acute, margins serrulate to subentire, apex narrowly acuminate, acumination mostly 1-3 cm; petiole 1-3.5 cm. Capitulescence broadly pyramidal with widely spreading narrowly pyramidal branches, with foliar bracts only at proximal 1 or 2 nodes; ultimate branches rather densely corymbiform. Capitula 5-6 mm; involucre c. 2/3 as high as capitula, phyllaries c. 20, 1.5-3.5 × 1-1.3 mm, ovate to oblong, sharply acute. Florets 12-23; corolla 3-3.5 mm, white; anther appendages short. Cypselae c. 2.5 mm, pilosulose with fine setulæ on ribs and distal sides; pappus bristles c. 3 mm, apices
31. Macvaughiella R.M. King et H. Rob.

*Schaetzellia* Sch. Bip., non Klotzsch

Por H. Robinson.

Erect perennial herbs or small shrubs, sparingly branched. Stems terete, densely hirtellous. Leaves opposite, short- to long-petiolate; blade rhomboidal to broadly ovate, venation trinervate, both surfaces glandular dotted, base acute to cordate, margins slightly crenulate to crenate or dentate, apex acute to acuminate. Capitulescence broadly corymbiform; peduncles short. Capitula narrowly campanulate, discoid, 12-25-flowered; phyllaries c. 10, eximbricate, persistent; clinanthium convex, epaleate, surface sclerified, glabrous. Corolla with narrow tube and narrow campanulate or funnelform limb, with numerous glands, lobes oblong-ovate, densely papillose inside, nearly smooth outside; anther collar elongate, cells mostly elongate weakly annulate on walls, appendage ovate, about as long as wide; style base not enlarged, glabrous, appendages filiform, densely papillose. Cypselae laterally flattened (compressed), with 2 ribs or 2 pairs of 2 ribs, setulose, carpopodium slightly asymmetrical, with slight distal rim, small quadrate cells with firm thin walls; pappus of (1-)2(-4) capillary scabrid bristles. 4 spp. S. Mexico to Honduras.


1. Plants 0.3-0.6 m; stems slender and flexuous, mostly less than 2 mm diam., becoming reddish brown, sparsely hispid, trichomes scattered short erect; leaf blades mostly 0.7-2 cm diam.

2. *M. mexicana*

1. Plants 0.5-2 m; stems stiff, mostly c. 2 mm thick or thicker, becoming dark brown, densely puberulent or becoming tomentellous distally; leaf blades mostly more than 2 cm diam.

2. Leaf blades mostly 5-9.5 cm, with distinctly acuminate apices; branches of capitulescences and distal stems tomentellous with crisped trichomes; capitula 20-25-flowered.

1. *M. chiapensis*
2. Leaf blades mostly 2-5 cm, apices acute or scarcely acuminate; branches of capitulescence and distal stems densely puberulent, trichomes curved or slightly so; capitula c. 14-flowered.

3. **M. standleyi**


   Plants 0.5-2 m; stems stiff, mostly c. 2 mm thick or wider, becoming dark brown, puberulent with rather dense short curved trichomes, becoming tomentellous distally. Leaves petiolate; blade mostly 5-9.5 × 3-6 cm, ovate to rhombic-ovate, trinervate from 0.2-2 mm above base, often with smaller lateral veins abaxially trinervation, surfaces rather densely puberulent, abaxially sometimes tomentellous on veins, base obtuse, becoming short-acuminate at petiole, margins crenate, apex usually with distinct acumination 1-2.5 cm; petiole mostly 1.5-5 cm. Capitulescence a group of broad dense or moderately dense clusters of capitula; branches tomentellous with crisped white trichomes. Capitula c. 6 mm; phyllaries 4-5 × 1-1.2 mm, apex acute. Florets 20-25; corolla 3-3.5 mm, white. Cypselae c. 1.8 mm, sparsely short-setulose; pappus bristles 2, 2-2.5 mm. 2n = c. 26. *Tropical deciduous forest, cliff-crevices in granitoid rocks, dry steep slopes along litoral highway.* Ch (Breedlove 42873, US); ES (Molina 21449, F).

   Turner (1997) treated *M. oaxacensis* R.M. King et H. Rob. in synonymy of *M. chiapensis*, which thus Turner (1997) reported in Oaxaca, a synonymy and distribution not accepted here.


   Plants 0.3-0.6 m; stems slender and flexuous, mostly less than 2 mm diam., becoming reddish brown, sparsely hispid, trichomes scattered erect short. Leaves petiolate; blade mostly 2-4 × 0.7-2 cm, rhomboid, trinervate from 1-5 mm above base, surfaces finely puberulent, base short-acute, distal margins serrulate to dentate, apex acute to short-acuminate; petiole mostly c. 1 cm, slender. Capitulescence of 1 to many small compact clusters of capitula; branches sparsely puberulent or hispid. Capitula 5.5-6 mm; phyllaries 4-5 × 0.6-0.8 mm, oblong to linear, apices short-acute and often reddish. Florets 12-14;


*M. mexicana* var. *standleyi* (Steyerm.) R.M. King et H. Rob.

Plants 0.5-1 m; main stems stiff, 2 or more mm diam., brownish, very densely short-puberulent, trichomes curved. Leaves petiolate; blade mostly 2-5 × (1.5-)2-3.5 cm, deltoid to rhomboidal, trinervate from 1-2 mm above base, surfaces sparsely to densely puberulent, base truncate to subacute, distal margins crenate-serrate to dentate, apex acute or scarcely acuminated; petiole mostly 1-2 cm. Capitulescence a group of broad dense clusters of capitula; branches densely puberulent, trichomes slightly curved. Capitula 5-6 mm; phyllaries 3.5-4 × 0.8-1 mm, oblong, apex short-acute to apiculate. Florets c. 14; corolla 2.8-3 mm, white. Cypselae 1.5-1.8 mm, sparsely short-setulose; pappus bristles 2, c. 2.8 mm. *Brushy rocky hillside, pine forest.* G (*Molina y Molina 25298*, US); H (*Molina 25946*, US); ES (*Calderón 1936*, US). 500-1400 m. (Endemic.)

The material cited by Breedlove (1986) as *M. standleyi* is now referred to *M. chiapensis*.

32. **Matudina** R.M. King et H. Rob.

Por H. Robinson.

Coarse sprawling to erect shrubs, sparingly branched; roots clustered, fleshy; stems terete, fistulose, stems and capitulescence with dense cover of minute stipitate glands. Leaves opposite, long-petiolate; blade broadly ovate to suborbicular, aceriform with cordate base, chartaceous, veins palmate from base, abaxial surface gland-dotted, margins denticulate with broad angles. Capitulescence subcymose, central capitulum maturing distinctly before others; peduncles moderately long. Capitula broadly campanulate, discoid, c. 200-flowered, with numerous multiseriate subphyllaries; subphyllaries and phyllaries 75-125, linear-lanceolate, 5-6-seriate, persistent on aged clinanthium, outer subphyllaries with reflexed apex; clinanthium broadly convex, paleate, surface sclerified;
paleae narrowly linear, glabrous. Corolla narrowly funnelform, nearly cylindrical, lobes small triangular, smooth on both surfaces with oblong cells; anther collar slender, cells subquadrate proximally, walls inornate, appendages oblong, slightly longer than wide; style base not enlarged, glabrous, appendages narrowly linear, submamillose. Cypselae slender, 5-ribbed, short-setulose, carpopodium shortly stopper-shaped with prominent distal rim, cells subquadrate, walls moderately thickened; pappus of 15-22 slender somewhat deciduous bristles, apex broadened and more densely scabrid. 1 sp. Mexico (Chiapas).


*Eupatoriastrum corvi* (McVaugh) B.L. Turner.

Subshrubs 0.7-2 m; stems pale brownish. Leaves petiolate; blade mostly 10-35 × 10-35 cm, surfaces pilosulose with small trichomes, mostly on veins abaxially, base broadly cordate with narrow sinus, margins with numerous small denticulations and lobate with 4-7 broad obtuse to short acute angles on each side, point at apex slightly longer; petiole 2-8 cm. Capitulescence with peduncles mostly 1-4 cm. Capitula c. 15 × c. 15 mm; subphyllaries and phyllaries 9-11 × 1-2 mm, apex slender; paleae 11-12 × 0.1-0.2 mm. Florets c. 200; corolla c. 7 mm, white. Cypselae 3-3.5 mm, setulae mostly on ribs; pappus bristles c. 6 mm. 2n = 32. Selva alta perennifolia, steep walled canyon, along base of cliff, on rock face. Ch (Ton [aka Mendez] 3252, US). 400-1200 m. (Endemic.)

33. **Microspermum** Lag.

Por J.F. Pruski y H Robinson.

Erect or decumbent small annual or perennial herbs; stems simple or few-branched, leafy proximally. Leaves opposite or alternate distally, petiolate; blade lanceolate to ovate, 3-5-nervate from base, surfaces glandular, margins entire to dissected, apex obtuse to rounded. Capitulescence monocephalous to open-corymbiform or paniculate, 1-15-
capitulate. Capitula 8-85-flowered, discoid (psuedoradiate); involucre turbinate to subhemispherical; phyllaries 6-18, eximbricate, subequal, 1-2-seriate, glandular, persistent; clinanthium epleate. Corolla 5(-6)lobed, usually white or in inner florets pale yellow, heteromorphic, tubes short, limb campanulate, lobes sometimes glandular, marginal florets with corolla zygomorphic and pseudoradiate with outer 3 lobes expanded, exserted from involucre, densely papillose inside, inner 2 lobes small and included, central florets actinomorphic with lobes triangular; anther collars cylindrical, cells transverse-annulate, appendages as wide as long, trilobed to crenulate; style base not enlarged, glabrous, branches short, appendages subulate. Cypselae prismatic, 4-8-costate, often setulose and glandular, carpopodium subsymmetrical, cells subquadrate 8-10-seriate; pappus of (0-)1-4 bristles often nearly as long as corollas of central florets, sometimes coroniform. \( x = 12.8 \text{ spp.} \) Mexico.

Traditionally, *Microspermum* has been treated as a member of Helenieae (Blake, 1957; Rzedowski, 1970). Williams (1961) and Turner (1987) treated *Iltisia* as a synonym of *Microspermum*, but *Iltisia* differs by its 4-lobed corollas and always epappose cypselae, and was maintained as distinct by Rzedowski (1970) and King y Robinson (1987).


Perennial rhizomatous herbs to 50 cm; stems densely pilose-hirsute, trichomes to c. 1.2 mm, sometimes stipitate-glandular especially distally. Leaves: blade 1-2.5(-3.5) \( \times \) 0.5-2(-2.5) cm, lanceolate to suborbicular, base cuneate to truncate, margins crenate to serrate; petiole 0.2-1.2 cm. Capitulescence 1-3-capitulate; peduncles 2-10(-15) cm. Capitula 5-10 mm, 25-85-flowered; involucre campanulate to subhemispherical; phyllaries 9-18, (3.5-)4-5(-7) \( \times \) 1-2 mm, lanceolate to oblanceolate, thinly herbaceous. Marginal florets with corolla usually 6-12 mm, lobes usually 3-7 \( \times \) 1-1.5 mm, lanceolate, sometimes pinkish abaxially, the central lobe typically the longest; central florets with corolla 2-3 mm, yellow or often maturing white. Cypselae 1.3-2 mm, when mature 2-3.5×
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long as wide, 4-6(-7)-costate, glabrous to usually setose and glandular; pappus reduced, usually exaristate, epappose or minutely coroniform. $2n = 24$. Flowering Jun-Dec. Pine-oak forests. Ch (Breedlove 46256, NY). 2700-3000 m. (Mexico, Mesoamerica.)

34. Mikania Willd., nom. cons.

Carelia Juss. ex Cav., non Fabr., Corynanthemum Kunze, Kanimia Gardner, Willoughbya Neck. ex Kuntze

Por H. Robinson.

Usually scandent vines or reclining weak shrubs, sometimes erect perennial herbs or shrubs, branches few to many; stems terete to hexagonal, rarely evidently winged on angles. Leaves usually opposite, rarely alternate or in verticels of 3-4, sessile to long-petiolate; blade narrowly linear to broadly ovate or deltoid, sometimes dissected, venation trinervate to pinnate, abaxial surface with or without sessile glands. Capitulescence paniculate with diffuse, thyrsoid, racemose, spicete (racemose or spicate portions bearing 10 or more capitula), corymbiform, subcymose or glomerulate branches. Capitula narrowly campanulate, discoid, 4-flowered, with single small to large subinvolucral bract at or well below involucre; principal phyllaries 4, eximbricate, persistent; clinanthium flat, epalaeate, surface sclerified, glabrous. Florets usually perfect, rarely functionally unisexual and plants dioecious in some Antillean species; corolla funnelform or with narrow tube and funnelform to broadly campanulate limb, glabrous inside, lobes 5, short-triangular to narrowly oblong, mostly smooth, inner surface smooth to slightly papillose, cells oblong to laxly subquadrate; anthers emergent at maturity; anther collars broad, with many subquadrate cells without ornate thickenings on walls, filaments without papillae, appendage distinct, ovate to oblong, 1-2 times as long as wide; style base often stout, without node, smooth or papillose, appendages narrowly linear, apex not enlarged, densely short-papillose to hirsutulous. Cypselae prismatic, 5-10-ribbed, walls densely punctate internally, carpopodium short-cylindrical without projecting upper rim, cells subquadrate with moderately thickened walls; pappus present, of many persistent capillary bristles, often somewhat broadened distally. Aprox. 415 spp. Pantropical N to E. United States.

1. Capitulescences with long racemose or spicate branches, with mostly unbranched racemose or spicate portions bearing 10 or more capitula.

2. Leaf blades usually narrowly to broadly deltoid, bases truncate or broadly rounded to cordate; nodes with transverse fringes of small lobules on sides.

3. Leaf blades usually deltoid with angles at broadest part; phyllaries 3-3.5 mm, 2/3 or less as long as mature capitula.  \[25. \textit{M. riparia}\]

3. Leaf blades triangular ovate to narrowly deltoid with margins usually rounded at broadest part; phyllaries 5-6 mm, 3/4 or more as long as mature capitula.

4. \textit{M. bogotensis}

2. Leaf blades ovate to oblong-ovate or oblong-elliptical, usually with rounded bases or sometimes slightly acuminate, obtuse, or slightly cordate; nodes not fringed on sides.

4. Stems with distinct narrow wings on angles.  \[23. \textit{M. pterocaula}\]

4. Stems without evident wings along angles.

5. Leaf blades abaxial surfaces distinctly puberulent and prominently glandular; capitula 7-9 mm; stems never fistulose. \[22. \textit{M. psilostachya}\]

5. Leaf blades glabrous throughout or short-puberulent abaxially, not or obscurely glandular abaxially; capitula 4-6 mm; stems often fistulose.


6. Capitula sessile.  \[17. \textit{M. leiostachya}\]

1. Capitulescences with thyrsoid, corymbiform or glomerulate branches.

7. Stems and leaves densely villous or sericeous; stems never fistulose.

8. Leaf blades ovate to ovate-lanceolate, without large angulate tooth on margins, with lowest of two pairs of secondary veins near but distinctly above bases of blades; corolla lobes as long as corolla throats or longer.

3. \textit{M. banisteriae}

8. Leaf blades ovate to broadly ovate, often with large angulate tooth on margins at widest part of blades; lowest secondary veins forming trinervation essentially at
bases of blades; corolla lobes as long as or shorter than corolla throats.

24. M. pyramidata

7. Stems and leaves mostly hirtellous or puberulent coarsely pilose or densely pilosulous to glabrous; larger stems sometimes fistulose.

9. Capitula mostly sessile or evenly subsessile.

10. Branches of capitulescences mostly broadly corymbiform to subcymose; style appendages densely hisrutulous with long papillae, style bases papillose.

11. Leaves thinly papyraceous, bases of blades short-acute to distinctly acuminate, reticulate veinlets not prominulous abaxially.

11. M. guaco

11. Leaves subcoriaceous, bases of blades short-obtuse to broadly rounded, without distinct long acuminations, reticulate veinlets prominulous abaxially.

19. M. parviflora


12. Capitula usually 10 or more in glomerate clusters; corollas slender below but tube indistinctly delimited distally.

13. Phyllary apices broadly truncate, margins broadly scarious, 1/2-2/3 as wide as long; cypselae glabrous. 9. M. globosa

13. Phyllary apices rounded, margins not broadly scarious, 1/2 or less as wide as long; cypselae often with spreading or retrorse trichomes near apices.

28. M. tonduzii

12. Capitula usually in pairs or in clusters of 3-5; corolla limbs abruptly ampliate or with sharp delimitation at juncture of tubes and limbs.

14. Leaf blades elliptical to oblong-lanceolate, tertiary veins closely and regularly transverse; capitula c. 5 mm.

27. M. sylvatica

14. Leaf blades ovate to broadly so, tertiary veins not in a regular transverse pattern; capitula 7-9 mm.

15. Stems not fistulose; adaxial surfaces of leaves coarsely pilose; phyllary bases scarcely swollen; corolla lobes without fringe of hair-like papillae.

16. M. iltisii
15. Stems often fistulose; adaxial surfaces of leaves glabrous or sparsely puberulent; phyllary bases distinctly swollen; corolla lobes with fringe of papillae on margins.

16. Leaves caudate-acuminated, glabrous; leaf areoles with prominent included branched vein endings.

21. M. pittieri

16. Leaf apices short-acute to slightly acuminate, puberulent to glabrous; leaf areoles with included vein endings not prominent.

13. M. hookeriana

9. Individual capitula usually with short or long peduncles.

17. Bases of leaf blades acute to narrowly rounded, with one or two pairs of secondary veins above bases subparallel to basal margins.

18. Capitulescences short and broad, as broad as long; leaf blades obovate with short-obtuse apices, abaxial surface glands slightly sunken; corolla lobes narrowly oblong, longer than throats.

29. M. tysonii

18. Capitulescences distinctly longer than broad; leaf blades ovate to elliptical, with subacute to acuminate apices, abaxial surface glands emergent; corolla lobes triangular to triangular-ovate, shorter than throats.

19. Leaf apices narrowly acuminate; peduncles mostly 1-3 mm; involucral bracts and cypselae with pubescence mostly at apices, glabrous or subglabrous proximally.

2. M. aschersonii

19. Leaf apices subacute to short-acuminate; peduncles mostly 3-5 mm; phyllaries and cypselae puberulent to pubescent and glandular throughout.

32. M. wedelii

17. Bases of leaf blades cordate to subtruncate or broadly rounded, with trinervation from at or near bases, pairs of secondary veins diverging from margins.

20. Capitulescences pyramidally thyrsoid, with spreading thyrsoid branches, with usually straight internodes of progressively shorter lengths.

21. Leaf blades ovate to broadly ovate, bases broadly rounded, abaxial surfaces sordid-tomentose, glands usually obscured by tomentum; corollas with salverform limbs. 12. M. holwayana
21. Leaf blades triangular-ovate, lateral margins usually strongly angled or acutely pointed at widest part, surfaces obviously glandular, abaxial surfaces without tomentum; corolla limbs campanulate.

31. *M. vitifolia*

20. Capitulescences indefinitely elongate, branches corymbiform, usually with often flexuous internodes.

22. Corolla lobes about as wide as long, triangular, distinctly shorter than throats.

23. Leaves, phyllaries, and corollas with prominent reddish glands; corolla limbs narrowly campanulate, longer than basal tubes; style bases densely papillose. **1. M. amblyolepis**

23. Leaves, involucral bracts, and corollas with pale glands; corolla limbs broadly campanulate, not longer than basal tubes; style bases glabrous. **18. M. micrantha**

22. Corolla lobes oblong to linear, at least as long as the throats or throats sometimes lacking.

24. Corolla lobes linear, arising directly from tubes, throats lacking.

25. Stems, leaves, and phyllaries puberulent or densely hirtellous, abaxial surfaces of leaf blades with distinct glands. **8. M. cristata**

25. Stems, leaves, and phyllaries mostly glabrous, abaxial surfaces of leaf blades without evident glands.

26. Nodes of stems with transverse dentate crests on sides; leaf blades with acute or scarcely acuminate apices. **15. M. huitzensis**

26. Nodes of stems without or with only partial transverse crests of minute lobulae on sides; leaf blades with narrowly acuminate apices. **5. M. castroi**

24. Corolla lobes narrowly oblong to oblong-ovate, not separated to bases of limbs, short throats present.

27. Nodes of stems with large stipuliform lobes on sides. **26. M. stipulifera**

27. Nodes of stems without large stipuliform lobes on sides, sometimes with narrow denticulate crest.
28. Leaf blades less than 1.5 times as long as wide, apices obtuse or acute to scarcely acuminate, margins usually subentire, undulate, coarsely and bluntly dentate, sometimes mucronate-denticulate.

29. Stems and leaf blades mostly glabrous, blades subcoriaceous; pappus bristles not broadened at apices; petioles 1-2.5 cm.

6. **M. concinna**

29. Stems and leaf blades sparsely to densely puberulent, blades herbaceous; pappus bristles gradually but distinctly broadened at apices; petioles 2-5.5 cm.

7. **M. cordifolia**

28. Leaf blades more than 1.5 times as long as wide, apices usually narrowly acuminate, margins sometimes remotely denticulate.

30. Stems and leaves very sparsely puberulent.

10. **M. gonzalezii**

30. Stems and leaf abaxial surfaces hirsute or pilose.

31. Capitula c. 12 mm; phyllaries c. 2.5 mm diam., outer pair puberulent to hirtellous; pappus bristles distinctly broadened and densely roughened at apices; corolla limbs narrowly campanulate.

20. **M. petrina**

31. Capitula c. 9 mm; phyllaries c. 1.5 mm diam., glabrous; pappus bristles scarcely broadened or roughened at apices; corolla limbs becoming abruptly salverform.

30. **M. verapazensis**


**Mikania panamensis** B.L. Rob.

Slender, sparingly branched vines with numerous prominent reddish glands on leaves and phyllaries; stems mostly terete, slightly puberulent, usually fistulose. Leaves petiolate; blade to 6 × 4.5 cm, broadly ovate, strong trinervation basal, pairs of secondary
veins diverging from margins, surface glabrous except for reddish glands, basecordate, margins with few to many blunt dentations, apex bluntly acute to narrowly acuminate; petiole 1-3.5 cm. Capitulescence indefinitely elongate, internodes flexuous, with corymbiform branches; capitula often in clusters of 3; peduncles to 2 mm. Capitula 4.5-5 mm; subinvolucral bract c. 2 mm, narrowly elliptical to lanceolate; phyllaries c. 4 × c. 1 mm, oblong, apex rounded. Corollas 2-2.5 mm, white, with prominent reddish glands, tube 0.5-0.8 mm, limb narrowly campanulate, longer than tube, lobes triangular, about as wide as long, distinctly shorter than throat; style bases densely papillose, style appendages short-papillose. Cypselae c. 1.5 mm, with scattered yellowish glands; pappus bristles c. 2.5 mm, bristles scarcely broadened or roughened distally. Weedy field, gallery forest, secondary forest in swamps and hillsides. Ch (Matuda 2704, US); G (Turner 1997: 158); P (Standley 30879, US). 0-300 m. (Mesoamerica, Colombia.)


Mikania eupatorioides S.F. Blake.

Slender, sparingly branched vines with sparse pale glands on leaves and phyllaries; stems mostly terete, puberulent with short rather spreading trichomes, usually narrowly fistulose. Leaves petiolate; blade mostly 6-12 × 2-4 cm, narrowly ovate, tri-nervation 7-15 mm above base, ascending pair of veins subparallel to basal margin, tri-nervation reaching distal 1/5 of blade, surfaces sparsely puberulent, glands emergent abaxially, base rounded-obtuse to acute, margins entire to remotely sub serrulate, apex narrowly acuminate; petiole 0.5-2 cm. Capitulescence thyrsoid, narrowly pyramidal, longer than broad, with straight internodes of decreasing lengths, branches usually spreading at 90º, ending in rather dense corymbiform clusters, individual capitula pedunculate, capitula mostly on short peduncles mostly 1-3 mm. Capitula 7-8 mm; subinvolucral bract c. 1.5 mm, narrowly elliptical, apex obtuse; phyllaries c. 5 × c. 1 mm, narrowly oblong, with few glands and minute trichomes mostly at apex, subglabrous proximally. Corollas 4-4.5 mm, white, tube c. 2-4 mm, throat narrowly funnelform, lobes triangular, about as broad as long, shorter than throat, with few glands; style base glabrous, style appendages short-papillose. Cypselae 2.5-3 mm, with few glands and slender trichomes at apex, subglabrous proximally; pappus bristles c. 4 mm, bristles slightly broadened distally. 2n...

Moderately coarse vines with few branches, with densely villous or sericeous stems and leaves, trichomes yellowish; stems terete, never fistulose. Leaves petiolate; blade mostly 6-18 × 2.5-10 cm, broadly ovate to ovate-lanceolate, pair of strong ascending secondary veins near but above base and trinervation near basal 1/4, surfaces densely villous and eglandular, base rounded to weakly cordate, margins entire to remotely denticulate, without large angulate tooth on margins, apex acute to narrowly short-acuminate; petiole to 2 cm. Capitulescence thyrsoid, broadly oval to pyramidal with rather straight internodes of decreasing lengths, branches at 45-90°, thyrsoid with ultimate small corymbiform clusters of capitula; peduncles 1-4 mm, densely hirtellous. Capitula 7-9 mm; subinvolucral bract 2.5-4 mm, ovate to obovate; phyllaries 3-5 × c. 1 mm, broadly oblong, apex rounded, with few or no small trichomes; corolla 4.5-5 mm, whitish or pinkish, tube c. 2 mm, limb abruptly broadly campanulate, lobes 1-1.5 mm, as long as throat or longer, triangular, with few subapical trichomes; style base glabrous, style appendages short-papillose. Cypselae 3-4 mm, with few setulae along ribs; pappus bristles 3-4 mm, whitish, bristles slightly broadened at apex. Moist forest, dry oak forest, bushy ridge, cloud forest on slopes, second growth. G (Tuerckheim 1106, US); H (Evans 1367, US); CR (Wilbur et al. 15526, US); P (Croat 13095, MO). (300-)700-2200 m. (Mesoamerica south to Bolivia and Brazil.)

Material from Chiapas cited by Breedlove (1986) as Mikania banisteriae is referred here to M. pyramidata.


Slender, sparingly branched vines with numerous yellowish glands on leaves and involucres; stems brownish, mostly terete, minutely sparsely puberulent, usually
fistulose, nodes with transverse fringes of small lobules on sides. Leaves petiolate; blade mostly 6-9 × 2.5-7 cm, triangular ovate to narrowly deltoid, margins usually rounded at broadest part, trinervation from base, sometimes in basal acumination, reaching midblade, surfaces minutely puberulent to subglabrous, base truncate or broadly rounded, margins entire to minutely denticulate, apex narrowly acuminate; petiole 2-4 cm. 

Capitulescence pyramidal, internodes straight, branches diverging at 70-90°, branches mostly unbranched and elongate, spicate parts with numerous sessile capitula. Capitula 7-8 mm; subinvolucral bract c. 2 mm, narrowly subulate; phyllaries 5-6 × c. 1.2 mm, oblong, 3/4 or more as long as mature capitula, apex rounded. Corollas c. 5 mm, greenish or white, tube c. 3 mm, limb abruptly salverform, throat c. 0.7 mm, lobes c. 1.3 mm, oblong-ovate, papillose inside; style bases glabrous, style appendages with short papillae. Cypselae c. 3 mm, ribs pale at maturity, with minute trichomes distally; pappus bristles c. 4 mm, bristles slightly broadened distally. Steep slope near road, cloud forest. CR Standley, 1938: 1495). 2100-3000 m. (Mesoamerica, Colombia, Venezuela, Ecuador, Peru.)

Pittier 12030 cited by Standley (1938) has not been seen.


Moderately coarse, sparingly branched vines with glabrous stems and leaves; stems subterete, fistulose, nodes without or with only partial transverse crest of minute lobulae on sides. Leaves petiolate; blade 4.5-15 × 1.5-9 cm, ovate, more than 1.5 times as long as wide, trinervation from at or near base, reaching 3/4 blade length, pairs of secondary veins diverging from margins, surfaces eglandular, base broadly rounded, margins entire to remotely denticulate, apex narrowly acuminate; petiole 2-7 cm. Capitulescence indefinitely elongate, internodes often flexuous, branches corymbiform, individual capitula pedunculate; peduncles 2-7 mm. Capitula 8-9 mm; subinvolucral bract 3-5 mm, elliptical; phyllaries 6-7 × 1-1.5 mm, oblong, apex short-acute, glabrous or sparsely minutely puberulent. Corollas 4.5-5 mm, whitish, tube 2.5-3 mm, throat lacking, lobes c. 2 mm, linear, arising directly from tube, densely papillose inside near base; style base glabrous, style appendages short-papillose. Cypselae c. 3.5 mm, glabrous; pappus bristles 4.5-5 mm, bristles not or scarcely broadened apically. Disturbed area in forest, wet thicket, edge of forest, secondary forest, mixed oak forest along river. CR (Standley y Valerio 50093, US). 1500-2600 m. (Endemic.)

Moderately coarse, sparingly branched vines without evident glands; stems hexagonal, reddish, mostly glabrous, narrowly fistulose, nodes often minutely fringed on sides, without large stipuliform lobes on sides. Leaves petiolate; blade mostly 3.5-6 × 2.5-4.5 cm, less than 1.5 times as long as wide, broadly ovate, subcoriaceous, strong trinervation from base, pairs of secondary veins diverging from margins, reaching to distal 1/3, surfaces mostly glabrous, shiny green adaxially, paler abaxially, base cordate, margins remotely denticulate, apex slightly short-acuminate; petiole 1-2.5 cm. Capitulescence indefinitely elongate, internodes rather flexuous, branches corymbiform, with capitula in ultimate clusters of 3-4; peduncles 0-3 mm. Capitula c. 12 mm; subinvolucral bract 5-6 mm, elliptical; phyllaries c. 8 × c. 2 mm, oblong, apex obtuse; corolla c. 5 mm, white, tube c. 3 mm, limb salverform, throat c. 0.5 mm, lobes c. 1.5 mm, narrowly oblong, not separated to base of limb, longer than throat; style base glabrous, style appendages short-papillose. Cypselae c. 4.5 mm, narrow ribs pale; pappus bristles c. 6.5 mm, sordid, bristles not broadened at apex. *South facing mountain slope*. G (*Steyermark 43292*, F). C. 3000 m. (Endemic.)


Moderately coarse, sparingly branched vines with numerous yellowish to reddish glands; stems slightly to distinctly hexagonal, yellowish green to brownish, glabrate or sparsely to densely puberulent, usually non-fistulose, nodes rarely fringed on sides, without large stipuliform lobes on sides. Leaves petiolate; blade 5-15 × 3-12 cm, broadly ovate to triangular-ovate, less than 1.5 times as long as wide, strong herbaceous, trinervation from base, pairs of secondary veins diverging from margins, surfaces sparsely to densely puberulent, base cordate to deeply cordate, margins subentire to coarsely and bluntly dentate, sometimes angled at broadest part, apex acute to short-acuminate; petiole 2-5.5 cm. Capitulescence indefinitely elongate, internodes rather
fl exuous, branches corymbiform with capitula often in ultimate clusters of 3; peduncles to 3 mm. Capitula 8-9 mm; subinvolucral bract 3-4.5 mm, broadly elliptical to obovate; phyllaries 6-7 × c. 1 mm, oblong-lanceolate, apex short- to long-acute, outer pair usually distinctly puberulent; corolla c. 4 mm, white, tube 1.5-2 mm, limb narrowly campanulate, not separated to base of limb, short throat present, lobes c. 1.5 mm, longer than throat, narrowly oblong, with scattered glands, few to many papillae below inside; style base glabrous, style appendages short-papillose. Cypselae 3-3.5 mm, narrow ribs pale, sides sparsely puberulent; pappus bristles 4.5-5 mm, scabridulous, bristles gradually but distinctly broadened at apex. 2n = 38. Disturbed primary forest, second growth, pineland, mixed wet forest, coastal thicket, open slope in ravine. T (Holmes, 1990: 11); Ch (Ton [aka Mendez] 3556, US); Y (Holmes, 1990: 11); C (Lundell 1002, US); QR (Holmes, 1990: 11); B (Balick et al. 2000: 151); G (King 7254, US); H (Standley 56392, US); ES (Standley 22168, US); N (Dillon et al., 2001: 344); CR (Smith 4855, US); P (Fendler 151, US). 0-2700 m. (SE. United States, Mexico Mesoamerica, West Indies, south to Argentina.)


Moderately coarse, sparingly branched vines with numerous yellowish glands on stems, leaves, and phyllaries; stems terete, densely hirtellous or puberulent, usually non-fistulose, nodes with distinct fimbriate disk on sides. Leaves petiolate blade 5-14 × 3-9.5 cm, broadly ovate, mostly trinervation from at or near base, reaching distal 1/5 of blade, pairs of secondary veins diverging from margins, adaxial surface densely pilose, adaxially densely pilosulous, and glandular, base cordate to broadly rounded, margins serrulate to dentate, apex acute to short-acuminate; petiole 1.5-5 cm. Capitulescence moderately but indefinitely elongate, internodes somewhat flexuous, branches corymbiform, capitula often in clusters of 3, individual capitula pedunculate; peduncles 0-4 mm. Capitula 7-9 mm; subinvolucral bract c. 3 mm diam., broadly elliptical; phyllaries 5-7 × 1.3-1.5 mm, narrowly elliptic-oblong, apex short-acute puberulent or hirtellous. Corollas c. 6 mm, greenish white, tube 3-3.5 mm, throat lacking, lobes 2-2.5 mm, linear, arising directly from tube, with numerous glands distally, densely papillose inside near base; style base glabrous, style appendages short-papillose. Cypselae 3.5-4 mm, ribs pale at maturity, sparsely puberulent on sides; pappus bristles 5-6 mm, bristles nearly smooth, bristles not or scarcely broadened distally. Dense cloud forest, forest edge,
lower montane rain forest. N (Dillon et al., 2001: 344); CR (King 5379, US); P (Croat 26000, MO). 600-3000 m. (Endemic.)

The report by Breedlove (1986) of this species in Chiapas is based on misidentifications.


Moderately coarse, sparingly branched vines without evident glands on stems, leaves or involucres; stems hexagonal, reddish brown, glabrous, narrowly fistulose. Leaves petiolar; blade 6-11 × 3-8.5 cm, ovate, 5-nervate with 2 pairs of secondary veins from near base, inner secondaries reaching distal 1/4, tertiary veins rather regularly transverse, surfaces glabrous or subglabrous, base broadly rounded, margins remotely subserulate, apex shortly to narrowly acuminate; petiole 2-4 cm. Capitulescence thyrsoid, elongate-pyramidal, internodes straight, of progressively shorter lengths, branches usually spreading at c. 90°, thyrsoid with ultimate small subglobose glomerate clusters of 10 or more sessile capitula, not exclusively in groups of 3 or 5. Capitula c. 7 mm; subinvolucral bracts not obvious, minutely subulate; phyllaries c. 3 × c. 2.5 mm, oblong, 1/2-2/3 as wide as long, margins broadly scarious, apex broadly truncate, minutely puberulent distally. Corollas c. 4.5 mm, narrowly funnelform, whitish, slender below but tube indistinctly delimitied distally, lobes c. 0.5 mm, short-triangular, glandular; style base glabrous, style appendages short-papillose, papillae not trichome-like. Cypselae c. 2 mm, glabrous; pappus bristles 3-4 mm, whitish, bristles not or slightly broadened distally.

*Lower cloud forest. Ch (Matuda 4149, US); G (Heyde y Lux 3430, US); H (Morton 7271a, US); ES (King y Robinson, 1987: 424). 1300-2000 m. (Endemic.)*


Moderately coarse, sparingly branched vines with few or no glands on stems, leaves or phyllaries; stems terete to slightly hexagonal, pale greenish, very sparsely appressed puberulent, fistulose to non-fistulose, without large stipuliform lobes on sides. Leaves petiolar; blade 5-11 × 2-5 cm, ovate, more than 1.5 times as long as wide, trinervation
from near base, pairs of secondary veins diverging from margins, reaching 2/3 length of blade, surfaces very sparsely appressed-puberulent, base broadly rounded, margins remotely denticulate to subentire, apex narrowly acuminate; petiole mostly 2-6 cm. Capitulescence indefinitely elongate, internodes often flexuous, with laxly corymbiform branches; peduncles 3-7 mm. Capitula 9-10 mm; subinvolucral bract c. 5 mm. narrowly elliptical; phyllaries 7-8 × c. 1.8 mm, narrowly oblong, apex short-acute, subglabrous. Corollas 4-4.5 mm, whitish to pink, tube c. 2.2 mm, throat c. 0.8 mm, lobes c. 1.5 mm, longer than throat, oblong-ovate, not separated to base of limb, veins distinctly set in from margins; style base glabrous, style appendages densely short-papillose. Cypselae c. 4 mm, sparse slender setulae; pappus bristles 4.5-5.5 mm, bristles broadened distally.

Cloud forest, forest edge, swamp. Ch (Breedlove 15426, MICH); G (Matuda 2986, US); N (Dillon et al., 2001: 344); CR (Austin-Smith P2167, US); P (Croat 13579, MO). 1-1900 m. (E. Mexico, Mesoamerica, Colombia.)

The citation by Cowan (1983) of this species in Tabasco appears to be in error as it was not cited from there by either Holmes (1990) or Turner (1997).


Mikania amara var. guaco (Bonpl.) Baker, Mikania olivacea Klatt, Mikania zonensis R.M. King et H. Rob. (excluding leaves mounted on same sheets), Willoughbya guaco (Bonpl.) Kuntze, Willoughbya parviflora var. guaco (Bonpl.) Kuntze.

Moderately coarse, sparingly branched vines with yellowish glands; stems terete, mostly brownish, glabrous, usually fistulose. Leaves petiolate; blade mostly 8-25 × 4-15 cm, broadly ovate, thinly papyraceous, veins mostly ascending pinnate, reticulate veinlets not prominulous abaxially, adaxial surface sparsely puberulent and minutely spiculiferous, densely short-puberulent and with numerous glands abaxially y, base short-acute to distinctly acuminate, margins entire, apex broadly to narrowly short-acuminate; petiole to 4.5 cm. Capitulescence corymbiform with rather densely corymbiform branches, capitula in clusters of 3, sessile or evenly subtessile. Capitula 8-10 mm; subinvolucral bract to 2 mm, linear-lanceolate; phyllaries 5-6 × c. 1 mm, oblong, apex rounded, outer pair puberulent. Corollas c. 6 mm, whitish, tube 2.5-3 mm, limb narrowly funnelform, lobes short-triangular, with scattered trichomes; style base sparsely papillose, style appendages densely hirsutulous with long papillae. Cypselae c. 4
mm, thickly corticated on surface, sides sparsely puberulent; pappus bristles c. 6 mm, more or less sordid or rusty, bristles not or scarcely broadened at apex. *Moist forest, forest edge, secondary growth, shady thickets, stream bank.* Ch (Turner, 1997: 159); B (Schipp 739, US); G (Williams 1976a: 109); H (Standley 54769, US); N (Stevens 12002, US); CR (Skutch 2363, US); P (Fendler 153, US). 0-1500 m. (Mexico, Mesoamerica, south to Bolivia, Brazil, Paraguay.)


*Mikania standleyi* B.L. Rob.

Moderately coarse, sparingly branched vines without obvious glands; stems weakly hexagonal, brownish, puberulent, usually fistulose. Leaves petiolate; blade 6-13 × 4-8 cm, ovate to broadly ovate, strong trinervation from base, pairs of secondary veins diverging from margins, reaching distal 1/4 of blade, minutely pilosulous adaxially, sordid-tomentose abaxially, glands usually obscured by tomentum, base broadly rounded, margins subserulate to minutely denticulate, apex narrowly acuminate; petiole 2-6 cm. Capitulescence pyramidal thyrsoid, with rather straight internodes of progressively shorter lengths, branches spreading at c. 90°, ultimate corymbiform clusters of capitula loose; peduncles mostly 2-4 mm. Capitula 9-10 mm; subinvolucral bract c. 3 mm, linear; phyllaries c. 6 × c. 1.5 mm, elliptic-oblong, apex rounded, sparsely minutely puberulent. Corollas c. 4.5 mm, whitish, tube c. 3 mm, limb abruptly salverform, throat c. 0.5 mm, lobes c. 1 mm, oblong-ovate, veins distinctly set in from margin; style base glabrous, style appendages short-papillose. Cypselae c. 4 mm; pappus bristles c. 5.5 mm, whitish, bristles slightly broadened distally. *Moist forest, forest edge, dense thickets.* CR (Wilbur 24983, US). 900-1600 m. (Mesoamerica, Colombia, Ecuador.)


Moderately coarse, sparingly branched vines with obscure dark glands; stems terete, pale to dark brownish, slightly puberulent to sparsely hirsute, usually fistulose. Leaves petiolate; blade 7-15 × 5-10 cm, ovate to broadly ovate, rarely with slight angles, 2 pairs of large secondary veins from basal 1/4 of blade, distal pair forming trinervation reaching distal 1/5, tertiary veins not in a regular transverse pattern, areoles with included vein endings not prominent, adaxial surface sparsely puberulent to glabrous, brownish puberulent and obscurely glandular abaxially, base broadly rounded, margins entire, apex short-acute to slightly acuminate; petiole 1-5 cm. Capitulescence pyramidal thyrsoid, with rather straight internodes of decreasing lengths, branches spreading at c. 90°, thyrsoid, capitula sessile in pairs or groups of 3 or 5. Capitula 8-9 mm; subinvolucral bract 1.5-2 mm, small, oblong; phyllaries c. 4 × c. 1 mm, oblong, base distinctly swollen, apex rounded, somewhat puberulent and glandular. Corollas 4.5-5.5 mm, whitish, tube 1-1.5 mm, sharply delimited distally, limb narrowly campanulate, lobes c. 1 mm, short, oblong-ovate, with few glands and short trichomes near apex, with fringe of papillae on margins; style base glabrous, style appendages short-papillose. Cypselae c. 3.5 mm, sides with few short trichomes and glands; pappus bristles 5-6 mm, whitish, bristles not or scarcely broadened at apex. Cloud forest, evergreen montane forest, tropical wet forest, edge of forest, in canopy. Ch (Matuda 2898, US); G (Holmes, 1990: 19); N (Dillon et al., 2001: 345); CR (Hammel 9710, MO); P (Croat 12055, MO). 10-1700 m. (Mexico, Mesoamerica and south to Bolivia and Brazil, Lesser Antilles.)


Moderately coarse, sparingly branched vines with obscure glands; stems terete to subhexagonal, yellowish to brown, glabrous to sparsely hirtellous, fistulose, nodes not fringed on sides. Leaves petiolate; blade mostly 7-13 × 6-10 cm, ovate, 2 pairs of secondary veins spreading from basal 1/10 of blade, distal pair reaching distal 1/4, surfaces glabrous, obscurely glandular abaxially, base broadly rounded or slightly acuminate, margins entire, apex with short or long narrow acumination; petiole 1-4 cm,
narrow at base. Capitulescence pyramidal with rather straight internodes of progressively shorter lengths, with many long racemiform branches with unbranched portion bearing 10 or more pedunculate capitula; peduncles 1-3 mm. Capitula 4.5-6 mm; subinvolucral bract 1.5-2 mm, at base of peduncle, ovate-lanceolate; phyllaries 3-4.5 × c. 0.8 mm, oblong, apex rounded, outer pair minutely puberulent. Corollas 2.5-3 mm, whitish, tube c. 1.5 mm, abruptly delimited distally, limb narrowly campanulate, lobes only as long as wide, with few glands; style base glabrous, style appendages short-papillose. Cypselae c. 2 mm, glabrous or with few minute glands; pappus bristles c. 3 mm, whitish to sordid, bristles slightly broadened apically. Cloud forest, wet thicket. T (Holmes, 1990: 21); Ch (Lundell 17829, US); B (Gentle 1786, US); G (Lundell 16839, US); H (Thieme 5299, US); N (Dillon et al., 2001: 345); CR (Tonduz 9316, US); P (Dunlap 168, US). 10-2000(-2500) m. (Mexico, Mesoamerica, Colombia, Venezuela, Ecuador, Peru, Bolivia.)


Moderately coarse, sparingly branched vine without evident glands on stems, leaves, phyllaries, and corollas; stems subhexagonal, pale brown, glabrous, sometimes fistulose, nodes with transverse dentate crests on sides. Leaves petiolate; blade 3-9 × 2-7 cm, ovate to broadly ovate, 3-5-nerved from base of blade, long secondary veins reaching distal 1/5 of blade, pairs of secondary veins diverging from margins, surfaces glabrous, eglandular, base broadly rounded to cordate, margins remotely denticulate, apex acute to scarcely acuminate; petiole 1.5-6.5 cm. Capitulescence indefinitely elongate, internodes rather flexuous, branches corymbose, capitula in rather dense clusters of 3-7, individual capitula pedunculate; peduncles 1-3 mm. Capitula 9-11 mm; subinvolucral bract 7-10 mm, obovate, from narrow base; phyllaries 7-8 × 1.5-1.8 mm, elliptic-oblong, apex acute to apiculate, glabrous. Corollas 6-7 mm, whitish, tube c. 3 mm, throat lacking, lobes 3-4 mm, oblong to linear, arising directly from tube, short papillate below inside; style base glabrous, style appendages short-papillose. Cypselae 3.2-4 mm, sparsely setulose; pappus bristles c. 6 mm, sordid, bristles not or scarcely broadened at apex. Mountain slopes. Ch (Matuda 2986, US); G (Steyermark 48662, F). 1500-2800 m. (Endemic.)

Moderately coarse, sparingly branched vines without obvious glands on leaves or phyllaries; stems terete, brownish, densely scabrid or hirtellous, not fistulose. Leaves petiolate; blade 7.5-7.5 × 2-5 cm, ovate, 2 pairs of secondary veins arising from within basal 1/5 parallel to basal margin, tertiary veins not in a regular transverse pattern, adaxial surface coarsely pilose, hirtellous abaxially on large veins, base obtuse to broadly rounded, margins entire to remotely denticulate, short-acute distally, apex narrowly rounded; petiole 1-1.5 cm. Capitulescence thyrsoid, broadly pyramidal with straight internodes of decreasing lengths, branches spreading at c. 90º, thyrsoid, capitula mostly sessile in clusters of 3. Capitula c. 9 mm; subinvolucral bract c. 2.5 mm, oblong; phyllaries c. 5 × 1-1.5 mm, narrowly oblong, base scarcely swollen, apex narrowly rounded, sparsely puberulent. Corollas 4-4.5 mm, whitish, tube c. 1.5 mm, sharply delimited distally, limb narrowly campanulate to cylindrical, lobes c. 0.5 × c. 0.4 mm, without fringe of trichome-like papillae, with minute trichomes and few glands; style base glabrous, style appendages short-papillose, papillae not trichome-like. Cypselae 4-4.5 mm, with few glands and short setulae; pappus bristles c. 5 mm, sordid, bristles slightly but distinctly broadened apically. Edge of páramo and oak forest, mixed oak forest on ridge, with bamboo in cloud forest, remnant montane forest trees, elfin forest edge. CR (Davidse y Herrera 29242, MO); P (Croat 66451, MO). 1900-3100 m. (Endemic.)


Willoughbya leiostachya (Benth.) Kuntze.

Moderately coarse, sparingly branched vines without evident glands; stems terete, yellowish to brownish, glabrate to puberulent, often fistulose, nodes not fringed on sides. Leaves petiolate; blade 8-18 × 3.5-11 cm, mostly ovate to oblong-elliptical, 2-3 pairs of large secondary veins arising from within basal 1/5 of blade mostly subparallel to basal margin, distal pair of secondaries reaching distal 1/5, tertiary veins often rather closely and regularly transverse, surfaces without evident glands, adaxial surface glabrous, short-puberulent abaxially, base rounded to slightly cordate, margins entire and slightly recurved, apex abruptly shortly caudate-acuminate; petiole 1-3 cm, not broadened at base.
Capitulescence broadly pyramidal with rather straight internodes of progressively shorter lengths, with many long spicate branches, ultimate unbranched portions bearing 10 or more capitula, capitula sessile. Capitula 5-6 mm; subinvolutral bract c. 1.5 mm, ovate; phyllaries 3-3.5 × c. 0.8 mm, oblong, apex rounded, outer pair minutely puberulent. Corollas 2.5-3.5 mm, whitish, tube 1-1.5 mm, abruptly delimited distally, limb narrowly campanulate, short lobes 1-2 times as long as wide, with few glands; style base glabrous, style appendages short-papillose. Cypselae 1.5-2 mm, glabrous or with few minute glands; pappus bristles 3-3.5 mm, whitish to sordid, bristles slightly to distinctly broadened apically. Tropical wet forest and pasture edges, low forest, wet thicket. Ch (Holmes, 1990: 24); B (Gentle 8532, US); G (Contreras 7355, US); H (Carleton 403, US); N (Shanky Molina 4775, US); CR (Davidse et al. 28283, US); P (Foster 2176, US). 0-1100(-2400) m. (S. Mexico, Mesoamerica, Colombia, Venezuela, Ecuador, Peru, Bolivia.)


Holotype: Venezuela, Humboldt y Bonpland s.n. (P-HBK). Illstr.: Holmes y McDaniel, Fieldiana, Bot., n.s. 9: 37, t. 6 (1982). N.v.: bejuco illovizna, Name de raton, G; crespillo, patastillo, kūnisisil, H.

Eupatorium orinocense (Kunth) M. Gomez, Mikania orinocensis Kunth, Willoughbya micrantha (Kunth) Rusby, Willoughbya scandens var. orinocensis (Kunth) Kuntze.

Slender, sparingly branched vines with yellowish glands on leaves and phyllaries; stems terete to slightly 4-angled, yellowish to brown, glabrate to sparsely puberulent, usually fistulose. Leaves petiolate; blade 3-13 × 2-10 cm, broadly ovate, strong trinervation from base, pairs of secondary veins diverging from margins, surfaces glabrate, with pale glands abaxially, base cordate to deeply cordate, margins subentire to coarsely dentate, apex narrowly short-acuminate; petiole 1-6 cm. Capitulescence indefinately elongate, internodes rather flexuous, with corymbiform branches; capitula often in clusters of 3; peduncles to 2 mm. Capitula 4-5 mm; subinvolutral bract c. 2 mm, narrowly elliptical to narrowly ovate; phyllaries c. 3.5 × c. 1 mm, oblong, apex short-acuminate, glabrous to short-puberulent, with pale glandular dots. Corollas 2.5-3 mm, whitish, with few pale glands, tube 1-1.3 mm, abruptly delimited distally, limb broadly campanulate, not longer than basal tube, with partially to fully developed rows of papillae inside, lobes triangular, about as wide as long, distinctly shorter than throat; style base glabrous, style appendages short-papillose. Cypselae 1.5-2 mm, with scattered pale
glands; pappus bristles c. 2.5 mm, whitish, bristles usually slightly broadened at apex. 2n = 38. Humid mixed forest, tropical forest, dry subtropical forest, wet thicket, brushy slope, secondary vegetation, by streams, lake shore. T (Holmes, 1990: 26); Ch (Lundell 17806, US); Y (Gaumer 443, US); C (Holmes, 1990: 25); B (Bartlett 11420, US); G (Heyde y Lux 3434, US); H (Croat y Hannon 64093, MO); ES (Calderón 1915, US); N (Molina 22895, US); CR (Tonduz 12895, US); P (Pittier 2457, US). 0-1600 m. (Mexico, Mesoamerica, South America, West Indies; widely introduced in Asia, Australia, Pacific Islands.)

Mesoamerican material is occasionally misdetermined as *M. congesta* DC., which is apparently unknown in Flora Area.


Moderately coarse, sparingly branched vines without obvious glands on leaves or phyllaries; stems terete, brownish, densely pilosulous, only larger stems fistulose. Leaves petiolate; blade mostly 6-15 × 3-8.5 cm, oblong-ovate, subcoriaceous, subpinnate with 2 arching secondaries from basal 1/5, subparallel to basal margin, veinlets forming prominulous reticulum abaxially, surfaces sparsely puberulent to pilosulous adaxially, with numerous small trichomes and glands abaxially, base short-obtuse to broadly rounded, without distinct long acumination, margins entire, apex short-acute to slightly short-acuminate; petiole mostly 0.5-1.5 cm. Capitulescence diffusely elongate along long leafy stem, with corymbiform to subcymose branches spreading at c. 90°, with capitula sessile in regular clusters of 3 or 5. Capitula c. 10 mm; subinvolucral bract 3-4 × to 3 mm, broadly obovate; phyllaries 7-8 × 1-1.5 mm, narrowly oblong, apex rounded. Corollas 4-4.5 mm, whitish, tube c. 1.5 mm, limb abruptly narrowly campanulate, lobes c. 0.5 mm, short; style base papillose, style appendages densely hirsutulous with long papillae. Cypselae c. 4 mm, surfaces becoming slightly corticated; pappus bristles c. 5 mm, sordid whitish, bristles scabrid, not or scarcely broadened at apex. *High forest along creek, campina with rock, forest in terra firme, restinga alta.* P (Croat 27163, MO). 0-400 m. (Mesoamerica, N. South America to Bolivia and Brazil.)

Moderately slender, sparingly branched vines; stems hexagonal, brownish, hirsute, often fistulose, nodes with narrow denticulate crest on sides, without large stipuliform lobes on sides. Leaves petiolate; blade 4-6.5 × 2-3.5 cm, more than 1.5 times as long as wide, ovate, trinervation from at or near base, pairs of secondary veins diverging from margins, reaching distal 1/3, adaxial surface short-pilose, hirsute abaxially, base broadly rounded to subcordate, margins serrate, apex sharply acute to narrowly short-acuminate; petiole 1.8-3 cm. Capitulescence indefinitely elongate, internodes rather flexuous, with spreading corymbiform branches, capitula mostly in dense clusters of 3-5; peduncles to 6 mm, hirtellous. Capitula c. 12 mm; subinvolucral bract 6-7 mm, elliptical; phyllaries c. 7 × c. 2.5 mm, oblong, apex short-acute to apiculate, outer pair puberulent to hirtellous. Corollas c. 5 mm, tube c. 2.5 mm, sharply delimited distally, limb narrowly campanulate, throat c. 0.5 mm, short, lobes c. 2 mm, longer than throat, narrowly oblong, not separated to base of limb; style base glabrous, style appendages short-papillose. Cypselae 4.5-5 mm, glabrous; pappus bristles c. 7 mm, sordid, bristles scabrid, not or scarcely broadened at apex. *Damp cloud forest.* G (*Steyermark 47257*, F). 1800-3200 m. (Endemic.)


*Mikania hylibates* B.L. Rob., *Mikania nubigena* B.L. Rob.

Moderately coarse, sparingly branched vines without evident glands; stems terete, greenish to brownish, glabrous, often fistulose. Leaves petiolate; blade 5-10 × 2-4.5 cm, ovate, 2 pairs of strongly ascending secondary veins arising from within basal 1/5, reticulum of veinlets with prominent included branched vein endings, tertiary veins not in a regular transverse pattern, surfaces glabrous, base rounded, margins entire to subentire, apex caudate-acuminate; petiole 1-2 cm. Capitulescence thyrsoid, narrowly pyramidal with rather straight internodes of decreasing lengths, branches thyrsoid, puberulent, with sessile or evenly subsessile capitula in groups of 3 or 5. Capitula 7-8 mm; subinvolucral bract 1.5-2 mm, ovate-lanceolate; phyllaries c. 5 × c. 1 mm, narrowly oblong, base distinctly swollen, apex rounded, glabrous above swollen base. Corollas c. 3 mm, whitish, tube 1.2-1.5 mm, sharply delimited distally, limb narrowly campanulate, short
lobes nearly as long as wide, with fringe of papillae on margins; style base glabrous, style appendages short-papillose, papillae not trichome-like. Cypselae c. 4 mm, glabrous or minutely glandular; pappus bristles 5-6 mm, whitish, bristle apex distinctly broadened. 

Rain forest, edge of forest, secondary woods, overgrown pasture. H (Nelson 8009, EAP); CR (McDowell 208, US); P (Davidson 167, MO). 100-2200 m. (Endemic.)


Mikania psilostachya var. racemulosa (Benth.) Baker, Mikania psilostachya var. scabra (DC.) Baker, Mikania racemulosa Bent., Mikania scabra DC., Willoughbya scabra (DC.) Kuntze.

Moderately coarse, sparingly branched vines with prominent yellowish glands on leaves and involucres; stems terete to subquadrangular, brownish to slightly reddish, densely short-puberulent, hirtellous or hirsute, never fistulose, nodes not fringed on sides. Leaves petiolate; blade mostly 7-15 × 4-8 cm, ovate to oblong-elliptical, 2-3 pairs of strongly ascending secondary veins arising from within basal 1/2 of blade, reticulum of veinlets prominent, adaxial surface scabrid, distinctly short-puberulent and prominently glandular abaxially, base narrowly rounded to obtuse, margins usually remotely subserrulate, apex sharply acute to slightly acuminate; petiole c. 1 cm. Capitulescence broadly pyramidal, internodes of progressively shorter lengths, branches elongate, spreading at 80-90°, mostly unbranched, spicate to racemiform with numerous capitula; peduncles 1-6 mm. Capitula 7-9 mm; subinvolucral bract 1.5-2 mm, at base of peduncle, linear-lanceolate; phyllaries c. 5 × c. 1 mm, oblong-lanceolate apex short-acute, brownish puberulent. Corollas 4-5 mm, whitish, tube 1-1.5 mm, limb narrowly campanulate to cylindrical, cleft 1/5-1/3 of length into short or long triangular lobes, few to many glands and trichomes; style base glabrous, style appendages short-papillose. Cypselae 2.5-3 mm, with many glands and scattered setulae; pappus bristles 5-7 mm, whitish, bristles slightly broadened toward apex. Forest edge, secondary forest along streams, sabana, tidal mud flats surrounded by freshwater rivers, edge of quebrada, in thicket, swamp. P (Croat 11952, MO). 0-1400 m. (Mesoamerica, Colombia, Venezuela, Guyanas, Ecuador, Peru, Bolivia, Brazil.)

Stout herbaceous vines; stems striate, six-angulate (also reported as four-angulate), glabrous, fistulose, the angles narrowly winged, distinct narrow wings on angles, subglabrous, the wings to 2 mm diam., often fistulose, nodes not transversely fringed with lobules on sides, internodes to 15 cm or more long. Leaves petiolate; blade 6-11 × 3.5-8.5 cm, ovate, 2 pairs of large secondary veins spreading from within basal 1/10 of blade, distal pair reaching distal 1/4, surfaces glabrous, glandular abaxially, base broadly rounded with small acumination, margins remotely minutely denticulate, apex short-acuminate; petiole 2-6 cm, pseudostipulate basally. Capitulescence broadly pyramidal with rather straight internodes of progressively shorter lengths, with many spicate ultimate elongate branches bearing 10 or more capitula, capitula sessile or subsessile. Capitula 6-7 mm; subinvolucral bract c. 2.5 mm, oblong-elliptical; phyllaries c. 4 × c. 0.8 mm, narrowly oblong, apex obtuse, subglabrous. Corollas c. 4 mm, whitish, tube c. 1.5 mm, weakly delimited distally, limb narrowly campanulate or funnelform, lobes c. 1 mm, short; style base glabrous, style appendages short-papillose. Cypselae 1.5-2 mm, glabrous or with few trichomes at apex; pappus bristles c. 3.5 mm, sordid, bristles not broadened apically. Dense mixed forests or thickets. Ch (Holmes, 1990: 30); G (*Türckheim II* 1734, US); H (*Nelson y Andino* 15289, TEFH). 900-2500 m. (Mexico [Oaxaca, Veracruz], Mesoamerica.)


Coarse vines with few branches, with densely villous stems and leaves, trichomes yellowish; stems terete, never fistulose. Leaves petiolate; blade mostly 6-19 × 3-15 cm, triangular-ovate to broadly ovate, strongly trinervate usually from at or near base, surfaces densely villous, eglandular, base cordate to broadly rounded, margins subentire to denticulate or dentate, often with large angulate tooth on margins at widest part of blade, apex narrowly short-acuminate; petiole mostly 1.5-11 cm. Capitulescence thyrsoid, broadly oval to pyramidal with rather straight internodes of decreasing lengths, branches
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at 45-90º, thyrsoïd with ultimate small corymbiform clusters of capitula; peduncles 1-6 mm, densely hirtellous. Capitula 8-10 mm; subinvolucral bract c. 3 mm, elliptical to oblong; phyllaries e. 4 × c. 1 mm, oblong, apex rounded, with few or no small trichomes. Corollas c. 4.5 mm, whitish, tube c. 2 mm, limbs broadly campanulate, lobes 1-1.2 mm, as long as or somewhat shorter than throat, triangular, with few short subapical trichomes; style base glabrous, style appendages short-papillose. Cypselae 3-3.5 mm; pappus bristles c. 4 mm, whitish, bristles slightly broadened toward apex. Montane cloud forest, disturbed virgin forest. Ch (Ton [aka Mendez] 592, US); G (Türckheim II 1666, US); H (Morton 7483, US); ES (Molina et al. 16758, US). 1200-2400 m. (C. Mexico to Mesoamerica.)


Slender, sparingly branched vines with numerous yellowish glands on leaves and involucres; stems terete, reddish brown, minutely sparsely puberulent, usually fistulose, nodes with transverse fringes of small lobules on sides. Leaves petiolate; blade mostly 5-11 × 4-7 cm, usually deltoid, angled at broadest part, strong trinervation from base, reaching distal 1/4, adaxial surface minutely puberulent, with many glands abaxially, base slightly to strongly cordate, margins remotely denticulate to undulate-dentate, apex narrowly acuminate; petiole mostly 3-8 cm. Capitulescence pyramidal with straight internodes, branches diverging at 70-90º, branches mostly unbranched and elongate, spicate with numerous sessile capitula. Capitula 6-8 mm; subinvolucral bract c. 1 mm, small, subulate; phyllaries 3-3.5 × 0.8-1 mm, 2/3 or less as long as mature capitula, oblong, apex rounded or obtuse. Corollas c. 4 mm, whitish, scattered glandular, tube c. 2.5 mm, limb abruptly salverform, throat c. 0.5 mm, lobes c. 1 mm, oblong-ovate, papillose inside; style base glabrous, style appendages short-papillose. Cypselae 2-2.5 mm, ribs pale at maturity, often with minute trichomes distally; pappus bristles 3-4 mm, sordid, bristles scarcely broadened apically. Moist forest, second growth woods, wet thicket. CR (Skutch 2512, US). 400-1800 m. (Endemic.)


Moderately slender, sparingly branched vines with dark glands; stems terete to subhexagonal, brownish, glabrous to sparsely puberulent, narrowly fistulose, nodes with
large sometimes toothed stipuliform lobes on sides. Leaves petiolate; blade mostly 4-10 × 2-7 cm, ovate, trinervation from base, pairs of secondary veins diverging from margins, reaching distal 1/3, adaxial surface pilose, abaxially with trichomes mostly on veins and with obscure glands, base slightly cordate to broadly rounded, margins remotely denticulate to dentate, apex narrowly short-acuminate; petiole 1.5-4.5 cm. Capitulescence indefinitely elongate, internodes flexuous, stems and broadly corymbiform branches, capitula clustered in many groups of 3; peduncles to 4 mm. Capitula 9-13 mm; subinvolucral bract 3-7 mm, broadly linear; phyllaries 7-9 × 2-2.3 mm, elliptic-oblong, apex short-acute, outer bracts puberulent at least near apex. Corollas 4-8 mm, tube 2.5-4 mm, weakly to sharply delimited distally, limb broadly to narrowly campanulate, throat 0.5-1.5 mm, lobes 1-2.5 mm, shortly to narrowly oblong, not separated to base of limb, longer than throat, with veins distinctly set in from margins, with minute trichomes near apex; style base glabrous, style appendages short-papillose. Cypselae 3.5-4 mm, with few slender setulae on sides; pappus bristles 5-9 mm, sordid, bristles with slightly but distinctly broadened apex. *Cloud forest.* H (*Williams 17475*, US); ES (*Tucker 1059*, US). 1800-2400 m. (Endemic.)

The El Salvador specimen differs from the type by the much longer corollas with longer and narrower throats and lobes.


*Mikania miconioides* B.L. Rob.

Slender to moderately coarse, sparingly branched vines with small sometimes obscure glands on leaves and phyllaries; stems terete to subhexagonal, yellowish to brown, puberulent to hirsute, often fistulose. Leaves petiolate; blade mostly 8-19 × 2.5-8 cm, elliptical to oblong-lanceolate, with 2 pairs of arching, strongly ascending, subparallel secondary veins, proximal pair near base, distal pair from basal 1/5-1/2, reaching to base of acumination, tertiary veins usually rather closely and regularly transverse, surfaces often subglabrous with numerous glands, sometimes sparsely villous adaxially and densely hirsutulous or villous on veins abaxially, base rounded to short-acute, margins entire to remotely serrulate, apex shortly and often caudately acuminate; petiole 1-3 cm. Capitulescence thyrsoid, elongate-pyramidal with straight internodes of decreasing lengths, branches broadly pyramidally thyrsoid, bearing sessile capitula in opposite pairs and terminal groups of 3. Capitula c. 5 mm; subinvolucral bract c. 0.5 mm, minute;
phyllaries 3-3.5 × c. 1 mm, oblong, base swollen, apex broadly rounded, puberulent. Corollas 3-3.5 mm, whitish, tube 1-1.3 mm, strongly appressed-puberulent, limb abruptly narrowly campanulate or cylindrical, cleft 1/4-2/5 into narrowly oblong-triangular lobes, lobes twice as long as wide, with small trichomes, margins fringed with papillae; style base glabrous, style appendages short-papillose. Cypselae 1.5-2 mm, with groups of setulae at apex and base; pappus bristles 3-4 mm, sordid-white, bristles distinctly broadened and flattened distally. Montane cloud forest, premontane rain forest, woods along stream, thickets. CR (King 5382, US); P (Allen 4926, MO). 1000-2700 m. (Mesoamerica, Colombia, Venezuela, Ecuador, Peru.)


Moderately coarse, sparingly branched vines with minute glands on leaves and involucres; stems terete to subhexagonal, brownish, minutely puberulent, usually fistulose. Leaves petiolate; blade mostly 8-15 × 4-8 cm, broadly ovate, 2-3 pairs of large secondary veins arching outward and upward from within basal 1/5, distal pair reaching distal 1/10, tertiary veins rather regularly transverse, surfaces slightly puberulent to glabrous with small glands, base broadly rounded, margins entire, apex abruptly narrowly acuminate, sometimes apiculate; petiole mostly 2-6 cm. Capitulescence pyramidal thyrsoid with thyrsoid branches, bearing dense glomerules of 10 or more sessile or evenly subsessile capitula on secondary and tertiary branches, not exclusively in groups of 3 or 5. Capitula 7-8 mm; subinvolucral bract 0.3-0.8 mm, minute, linear-lanceolate; phyllaries 2-2.5 × c. 0.8 mm, short-oblong, 1/2 or less as wide as long, base fused and swollen, margins not broadly scarious, apex rounded, whitish puberulent. Corollas c. 4.5 mm, whitish, narrowly funnelform, slender below but tube indistinctly delimited distally, lobes short, half again as long as wide; style base glabrous, style appendages short-papillose, papillae not trichome-like. Cypselae c. 2 mm, often with spreading or retrorse trichomes near apex; pappus bristles c. 4 mm, whitish, bristles slightly to distinctly broadened apically. Wet forest, edge of forest, Pine and Oak forest. Ch (Holmes, 1990: 37); B (Gentle 8667, US); G (Jones y Facey 3374, US); H (Williams 18118, US); N (Dillon et al., 2001: 346); CR (Skutch 4007, US); P (Croat 7972, MO). 0-2000 m. (C. Mexico to Mesoamerica.)
Plants called *M. aromatica* by Williams (1975a) and Clewell (1975) were referred to *M. tonduzii* by Holmes (1990).


Slender, sparingly to much branched vines or subshrubs with large reddish brown glands on leaves and phyllaries; stems terete to subhexagonal, brown, glabrous, sometimes narrowly fistulose. Leaves petiolate; blade mostly 2-5 × 1.5-3 cm, obovate, 2 pairs of ascending secondary veins arising from within basal 1/4, subparallel with proximal margin, reaching distal 1/6, subcarnose, surfaces glabrous, with slightly sunken glands, base short-acute, margins entire, apex short-obtuse; petiole 0.5-0.8 cm. Capitulescence broadly thyrsoid, short and broad, as broad as long, internodes short, of decreasing lengths, branches corymbiform, individual capitula pedunculate; peduncles 1-4 mm. Capitula c. 6 mm; subinvolucral bract c. 1.5 mm, c. 0.5-2 below involure, narrowly elliptical; phyllaries c. 3.5 × c. 1 mm, oblong, apex rounded, sparsely puberulent. Corollas 4-5 mm, whitish, with glands on tube and lobe apex, tube c. 1 mm, lobes c. 1.2 × c. 0.4 mm, longer than throat, narrowly oblong; style base glabrous, style appendages short-papillose. Cypselae c. 2 mm, with scattered glands; pappus bristles c. 4 mm, whitish, bristles distinctly broadened toward apex. *Forested slopes, epiphyte and on ground.* P (*McPherson 7130*, MO). 700-1000 m. (Endemic.)


Moderately coarse, sparingly branched vines with few of no glands on stems, leaves or phyllaries; stems subterete, pale greenish, pilose, partially fistulose, without large stipuliform lobes on sides. Leaves petiolate; blade 6-9 × 3-6 cm, ovate, more than 1.5 times as long as wide, mostly trinervate from near (1-2 mm above) base, pairs of secondary veins diverging from margins, reaching 4/5 length of blade, abaxial surface sparsely pilose, base broadly rounded, margins remotely mucrono-denticulate, apex narrowly acuminate; petiole mostly 1-2 cm. Capitulescence indefinitely elongate, internodes often flexuous, with laxly corymbiform branches; peduncles 2-4 mm. Capitula c. 9 mm; subinvolucral bract 3-5 mm, elliptical; phyllaries c. 7 × c. 1.5 mm, narrowly oblong, apex acute, glabrous. Corollas whitish?, tube c. 3.5 mm, limb becoming abruptly salverform, throat c. 0.5 mm, lobes c. 1.5 mm, longer than throat, oblong-ovate, with
veins distinctly set in from margins, not separated to base of limb; style base glabrous, style appendages densely short-papillose. Cypselae c. 3.5 mm, densely spinose-papillose on ribs, sparsely puberulent between; pappus bristles c. 5 mm, bristles scarcely broadened or roughened at apex. Dense wet forest. G (Standley 71313, F). 1500-1700 m. (Endemic.)


Moderately coarse, sparingly branched vines with small yellowish glands; stems terete, usually brown, strongly striated, puberulent to hirsute, often fistulose. Leaves petiolate; blade mostly 5-19 × 5-19 cm, broadly triangular-ovate, lateral margins usually strongly angled or acutely pointed at widest part, trinervation from at or near base, often from basal acumination, pairs of secondary veins diverging from margins, reaching distal 1/5, surfaces obviously glandular, pilose adaxially, abaxial surface puberulent to sparsely hirsutulous, densely puberulent to hirsute in major veins, without tomentum, base subtruncate to deeply cordate, margins subentire to minutely denticulate, apex narrowly acuminate; petiole 2-11 cm. Capitulescence pyramidal thyrsoid, with rather straight internodes of progressively shorter lengths, branches thyrsoid and spreading with subcorymbiform ultimate clusters; peduncles 1-3 mm. Capitula 7-9 mm; subinvolucral bract 1.5-2.5 mm, linear; phyllaries c. 5 × c. 1 mm, narrowly oblong, apex rounded, sparsely puberulent. Corollas c. 4.8-4.9 mm, whitish, tube c. 2.5 mm, limb abruptly broadly campanulate, throat and lobes c. 1.2 mm, glands clustered at apex; style base glabrous, style appendages short-papillose. Cypselae 3-3.5 mm, sparsely glandular; pappus bristles c. 5 mm, whitish, bristles not or scarcely broadened toward apex. Thick low forest, residuos de selva higrófila, Pine ridge, low second growth, wet thicket, selva alta perennifolia. Ch (Nelson 3805, US); B (Gentle 1839, US); G (Lundell 15748, US); H (Wilson 107, US); N (Stevens 12869, MO); CR (King 6430, US); P (Peterson y Annable 7209, US). 0-1800 m. (Mexico, Mesoamerica, South America to Bolivia and Brazil.)


Slender, sparingly branched vine with reddish glands on stems, leaves and phyllaries; stems terete, brownish, glabrous, often fistulose. Leaves petiolate; blade mostly 4-8 × 1.5-3.2 cm, elliptical, 2 pairs of ascending secondary veins arising from within basal 1/5,
subparallel to proximal margin, reaching 1/7, surfaces glabrous with scattered emergent glands, base short-acute, margins entire, apex short-acute to short-acuminate; petiole mostly 1-2.5 cm. Capitulescence thyrsoid, longer than broad, pyramidal, with mostly straight internodes of decreasing lengths, branches laxly thyrsoid, individual capitula pedunculate; peduncles mostly 3-5 mm. Capitula c. 5 mm; subinvolucral bract c. 2.5 mm, 0.5-2 mm below involucre, linear; phyllaries c. 3 × c. 0.8 mm, oblong, apex rounded, puberulent and glandular throughout. Corollas c. 4.5 mm, whitish, with scattered glands mostly on tube and lobes, tube c. 1.5 mm, lobes c. 1 mm, triangular-ovate, shorter than throat; style base glabrous, style appendages short-papillose. Cypselae 2-3 mm, pubescent and glandular throughout; pappus bristles c. 5 mm, whitish, bristles distinctly broadened toward apex. Mangrove swamp, moist tropical swamp, forest and forest remnants. P (Peterson y Annable 6749, US). 0-900 m. (Endemic.)

35. Neomirandea R.M. King et H. Rob.

Por H. Robinson.

Small shrubs or small trees sparsely to densely branched, in deep humus or epiphytic; stems and leaves usually somewhat fleshy. Leaves opposite or much less commonly ternate, short- to long-petiolate; blade narrowly elliptical to orbicular, rather fleshy or coriaceous, venation trinervate to pinnate, surfaces glandular or eglandular, base acute to cordate. Capitulescence broadly corymbiform-paniculate. Capitula narrowly campanulate, discoid, 1-28-flowered; phyllaries c. 9-28, subimbricate, weakly to distinctly graduated, outer persistent, inner sometimes deciduous; clinanthium flat, epaleate, surface sclerified, glabrous or pilose. Corolla funnelform with usually indistinct narrow tube, with or without trichomes inside, lobes 5, short-triangular to narrowly-oblong, surfaces smooth, cells usually large, oblong to laxly subquadrate, with non-sinuous walls; anther collars with many subquadrate cells, without ornate thickenings on walls, appendage ovate to oblong, 1-2 times as long as wide, not truncate; style base glabrous, with or without prominent node, branches with appendages linear, smooth, scarcely broadened distally. Cypselae prismatic, 5-ribbed, rarely stipitate, carpopodium short with subquadrate rather thin-walled cells; pappus of 30-57 scabrid bristles, sometimes broadened distally. Aprox. 28 spp. Wet tropical America from Jalisco to Ecuador.
1. Leaf margins lobed to slightly to coarsely sharply serrate or closely denticulate, blades broadly ovate to oblong-ovate to deltoid or suborbicular or aceriform, mostly 8 cm or more wide; plants usually terrestrial in deep humus.

2. Leaf blades broadly ovate to oblong-ovate, margins coarsely serrate to dentate or denticulate, venation pinnate.

3. Capitula with phyllaries up to 10 × 2.5 mm; leaf margins doubly dentate.

14. N. guevarae

3. Capitula with phyllaries 2-6 × 1-1.5 mm; leaf margins evenly slightly to coarsely serrate or denticulate.

4. Outer phyllaries ovate to suborbicular; capitula 14-21-flowered; corolla tubes as long as limbs or longer.

15. N. homogama

4. Outer phyllaries oblong to elliptical; capitula 5-12-flowered; corolla tubes usually shorter than limb.

21. N. standleyi

2. Leaf blades broadly ovate or deltoid or suborbicular; margins with large lobes, venations palmate or trinervate.

5. Clinanthia and inner surfaces of corollas glabrous; petioles with stipuliform lobes at bases, usually with teeth near blades.

6. N. burgeri

5. Clinanthia and inner surfaces of corollas pilosulous; petioles without stipuliform lobes at bases, without teeth near blades.

6. Plants grayish pubescent, pubescence along veinlets of leaf abaxial surfaces forming distinct reticulate pattern; stems and petioles puberulent; adaxial leaf surfaces minutely tuberculate.

2. N. angularis

6. Plants yellowish pubescent, puberulence rather evenly distributed on and between veins abaxially; stems and petioles hirsute or tomentose; adaxial leaf surfaces densely pilose or pilosulous. 12. N. folsomiana

1. Leaf margins entire to remotely and usually bluntly serrulate or dentate, blades ovate or obovate to elliptical, mostly less than 8 cm wide; plants epiphytic with roots sometimes reaching ground, infrequently terrestrial shrubs.
7. Outer phyllaries orbicular, 2-3 mm wide, inner phyllaries prominently striate.
8. Capitula c. 12-flowered; corolla lobes eglandular; petioles mostly 2-3.5 cm.

4. *N. arthrodes*

8. Capitula 20-25-flowered; corolla lobes glandular; petioles mostly 0.5-1 cm.

7. *N. carnosa*

7. Outer phyllaries ovate to oblong, mostly 1-1.5 mm wide, inner phyllaries smooth or scarcely striate.

9. Corollas hirsutulous inside; style bases with enlarged node; petioles 1-6 cm.

3. *N. araliifolia*

10. Capitula 2-6-flowered.

11. Corolla lobes triangular, less than twice as long as wide, shorter than throat; inner phyllaries with nearly entire apical margins; capitula 5-6-flowered.

20. *N. psoralea*

11. Corolla lobes narrowly oblong, about three times as long as wide, longer than throat; inner phyllaries with laciniate apical margins; capitula 1-6-flowered, often with less than 5.

5. *N. biflora*

9. Corollas glabrous inside; style bases slender, not enlarged; petioles 0.1-1.5(-9.5) cm.
12. Leaves regularly verticillate, 3 or 4 at a node.
13. Capitulescences pendulous; petioles 4-9.5 cm; capitula 11-16-flowered.

18. *N. pendulissima*

13. Capitulescences not pendulous; petioles 0.4-0.9 cm; capitula 5-6-flowered.
14. Leaves 1.5-4.5 cm; capitula 6-7 mm; peduncles 3-10 mm.

9. *N. costaricensis*

14. Leaves mostly 4-10 cm; capitula c. 8 mm; peduncles often 10-15 mm.

23. *N. ternata*

12. Leaves opposite, two at a node, rarely ternate.
15. Capitula broad, c. 22-flowered; phyllaries 18-20; apices of pappus bristles broadened by minutely serrulate wings.

19. *N. pithecobia*

15. Capitula narrowly campanulate, 5-10-flowered; phyllaries 15 or fewer; apices of pappus bristles nearly smooth.
16. Capitula 5-6-flowered.
17. Leaf blades pilose at least on midrib near bases, with coarse trichomes on petioles and stems.  

10. **N. croatii**

17. Leaf blades glabrous but densely glandular; petioles and stems glabrous or puberulous.  

17. **N. parasitica**


18. Leaves subsessile; petioles 0.1-0.5 cm.

19. Peduncles mostly 8-30 mm, in subumbellate clusters; cypselae distinctly stipitate.  

22. **N. tenuipes**

19. Peduncles 1.5-6 mm, in densely branching capitulescences; cypselae sessile, not stipitate.

20. Leaf blades with remotely serrulate margins, abaxial surfaces sparsely puberulent; petioles narrow.  

13. **N. gracilis**

20. Leaf blades with entire margins, abaxial surfaces without trichomes; petioles greatly thickened.  

1. **N. allenii**

18. Leaves distinctly petiolate, petioles 0.5-1.2 cm.

21. Leaf blades ovate, subcarnose, drying chartaceous, veinlets prominulous; cypselae with numerous short setulae on ribs and distal surfaces.  

16. **N. ovandensis**

21. Leaf blades elliptical to obovate, fleshy to coriaceous, without prominulous veinlets; cypselae with few or no setulae.

22. Leaf apices rounded to short-obtuse; corollas narrowly tubular with lobes c. half again as long as wide.  

8. **N. chiriquensis**

22. Leaf apices acute to acuminate; corollas funnelform with lobes about as long as wide.  

11. **N. eximia**


Epiphytic shrubs to 1.5 m; stems minutely puberulent. Leaves subsessile; blade mostly 5-9 × 3-6 cm, broadly elliptical to obovate, fleshy, secondary veins pinnate, prominent, surfaces without trichomes, gland-dotted, base obtuse to rounded, margins entire, rarely subserrulate, apex short-acute to narrowly rounded; petiole 0.3-0.5 cm, greatly thickened.
Capitulescence broadly corymbiform, to 10 × 10 cm, densely branched; peduncles c. 5 mm. Capitula 8-9 mm, narrowly campanulate; phyllaries c. 12, mostly 2-3 × c. 0.5 mm, 2-3-seriate, persistent; clinanthium glabrous. Florets c. 10; corolla c. 5 mm, pink or purple, glabrous inside, lobes c. 0.7 × c. 0.7 mm, triangular, with numerous glands; style base slender, not enlarged. Cypselae 2.5-3 mm, with few long-stalked glands and uniseriate trichomes; pappus bristles c. 5 mm, longer bristles with enlarged blunt nearly smooth apices. 2n = 34-40. Tropical wet forest, rain forest, cloud forest. CR (Herrera 3285, US); P (Allen 3643, NY). 300-1400 m. (Mesoamerica to N. Colombia.)


Eupatorium fistulosum B.L. Rob., non Barratt.

Coarse terrestrial herbs to small trees 2-4 m, growing in deep humus, base erect with prop roots; stems grayish puberulent. Leaves petiolate; blade 10-27 × 10-27 cm, broadly ovate to suborbicular, chartaceous, venation 5-9-palmate from base, with little or no enlargement at vein juncture, adaxial surface sparsely minutely pilosulose and minutely tuberculate, abaxially glandular-dotted and grayish pilose on veins and veinlets, trichomes forming distinct reticulate pattern, base truncate to shallowly cordate, margins sharply serrate, with 10-15 large dentate lobes including apical lobe; petiole 5-20 cm, without stipuliform lobes at base, without teeth near blade, puberulent. Capitulescence broadly corymbiform to 25 × 30 cm; peduncles 3-8 mm. Capitula c. 9 mm; phyllaries c. 12, 2.5-6 × to 1.5 mm, c. 3-seriate, inner deciduous; clinanthium pilosulose. Florets 8-10; corolla c. 5 mm, lavender, pilosulose inside, lobes c. 1 mm, short-triangular, glandular-dotted; style base enlarged. Cypselae c. 3 mm, glabrous; pappus bristles c. 4.5 mm, bristles not or scarcely broadened apically. 2n = c. 50. Wet forest, pasture of cleared cloud forest, by stream, roadside and old clearings in oak forest. CR (Wilbur y Stone 10489, US). 400-3000 m. (Endemic.)


Epiphytic shrubs to 4 m; roots developing as in strangler figs; stems glabrous. Leaves petiolate; blade mostly 10-23 × 3.5-9 cm, elliptical to elliptic-ovate, fleshy, venation pinnate, surfaces glabrous, eglandular, base obtuse to short-acute, margins entire, apex sharply acute; petiole to 6 cm. Capitulescence to 12 × 12 cm, broadly corymbiform; peduncles c. 5 mm. Capitula c. 10 mm; phyllaries c. 25-28, 3-4-seriate, outer mostly 2-4 × 1-1.5 mm, ovate to oblong, inner to 7 × 1.2 mm, deciduous, smooth or scarcely striate, apically often laciniate; clinanthium puberulent. Florets 18-28; corolla c. 5 mm, white, hirsutulous inside, lobes c. 1 mm, short-triangular, eglandular; style base enlarged.

Cypselae c. 3 mm, densely minutely puberulent; pappus bristles 5-5.5 mm, bristle slightly broadened apically. *Wet and dense forest, cutover forest, montane rain forest*. T (Peréz et al., 2005: 85); Ch (Breedlove 24059, US); B (Gentle 5234, US); G (Skutch 2122, US); H (Standley 56785, US); ?ES (Berendsohn et al., 1989: 290 - 9); N (Molina 20405, US); CR (Standley y Valerio 46370, US); P (Allen 1361, US). 20-2800 m. (Mexico [Jalisco] to Mesoamerica.)

The reports of this species in Tabasco and El Salvador were not verified.


Epiphytic shrubs to 3 m; roots sometimes reaching ground; stems glabrous. Leaves petiolate; blade mostly 6-12 × 3-5 cm, broadly elliptical, fleshy, venation pinnate, surfaces glabrous, eglandular, base short-acute, margins slightly to distinctly serrulate, apex short-acuminate; petiole 2-3.5 cm. Capitulescence broadly corymbiform to 10 × 25 cm; peduncles c. 5 mm. Capitula c. 10 mm; phyllaries c. 20, 1-7 × 2-3 mm, c. 4-seriate, apices broadly rounded, outer phyllaries orbicular, inner phyllaries prominently striate; clinanthium minutely sparsely puberulent. Florets c. 12; corolla c. 6 mm, lavender, glabrous inside, lobes c. 0.5 mm, short-triangular, eglandular; style base slender, not enlarged. Cypselae c. 2.8 mm, minutely scabrid on base and ribs; pappus bristles c. 5 mm, bristles slightly broadened apically. 2n = 34. *Cloud forest, montane rain forest, riverside thicket, heavily wooded areas with occasional clearings*. CR (Grayum y Sleeper 3828, US); P (Sytsma y Andersson 4687, US). 400-2000 m. (Endemic.)


Epiphytic shrubs or vines 1-15 m, with roots often reaching ground; stems sparsely puberulent to glabrous. Leaves petiolate; blade 5-14 × 2-6 cm, elliptical to ovate, mostly fleshy, venation pinnate, surfaces glabrous, eglandular, base obtuse to short-acute, margins entire, apex slightly acuminate; petiole 1-2 cm. Capitulescence broadly pyramidal to rounded, to 30 × 30 cm, capitula sessile or subsessile in clusters of 2-3; peduncles 0-1 mm. Capitula 10-12 mm; phyllaries c. 20, 1-5 × 1-1.3 mm, c. 4-5-seriate, outer phyllaries ovate to oblong, inner phyllaries mostly deciduous, smooth or scarcely striate, laciniate apically; clinanthium with few minute trichomes. Florets 1-6, often less than 5; corolla c. 5.5 mm, pale lavender, hirsutulous inside, lobes c. 2.5 × 0.8 mm, about three times as long as wide, longer than throat, narrowly oblong, glabrous; style base enlarged. Cypselae c. 3.5 mm, scarcely and remotely scabrid on ribs; pappus bristles c. 6 mm, bristles slightly broadened at apex. 2n = c. 50. *Subtropical zone, cloud forest, subparamó*. CR (*King 6835*, US); P (*Croat y Porter 16056*, MO). 1100-3200 m. (Endemic.)


*Neomirandea grosvenorii* R.M. King et H. Rob., *Neomirandea panamensis* R.M. King et H. Rob.

Erect coarse herbs to small trees to 13 m, terrestrial in deep humus, with creeping rhizome or prop-roots; stems subglabrous to densely granular-puberulent. Leaves petiolate; blade to 25 × 25-29 cm, orbicular to broadly deltoid or aceriform, chartaceous, venation 5-7-palmate, with or without enlarged node at juncture of veins, surfaces with small glandular dots, adaxially sparsely puberulent, abaxially puberulent to tomentose on veins and veinlets, base shallowly cordate, margin very jagged with 7-10 or more acute to narrowly acuminate large lobes, coarsely serrate and denticulate, apex acuminate; petiole 10-30 cm, with stipuliform lobes at base, usually with strongly toothed wing near blade. Capitulescence broadly corymbose, 15-30 × 22-38 cm; peduncles 1-4 mm. Capitula 7-10 mm; phyllaries c. 15, 1.5-7 × 1-1.5 mm, 4-5-seriate, papyraceous, innermost somewhat deciduous; clinanthium glabrous. Florets 5-6; corolla 4.5-7 mm, white to pale
lavender, glabrous inside, lobes 1.2-1.5 × 0.4-0.5 mm, oblong, with few glandular dots and short trichomes distally; style base enlarged. Cypselae 2.5-4 mm, glabrous to sparsely setulose or glandular distally; pappus bristles 4-5 mm, bristles not broadened at apex. 2n = c. 40. Montane forest, elfin forest, in light gap along quebrada, forested slopes. CR (King 6823, US); P (Allen 4954, MO). 2100-2800 m. (Endemic.)


Epiphytic shrubs or vines to 1 m; roots sometimes reaching ground; stems glabrous. Leaves petiolate; blade mostly 7-11 × 2.5-4 cm, narrowly ovate to elliptical, somewhat fleshy, venation pinnate, surfaces hairless, minutely glandular-dotted, base obtuse to short-acute, margins remotely sub serrulate, apex short-acuminate; petiole mostly 0.5-1 cm. Capitulescence broadly corymbiform, to 5 × 8 cm; peduncles 2-22 mm. Capitula 9-11 mm; phyllaries 20-25, 2-8 × 2-3 mm, c. 5-seriate, apices broadly rounded, outer phyllaries orbicular, inner phyllaries prominently striate, somewhat deciduous; clinanthium glabrous. Florets 20-25; corolla c. 6 mm, lavender, glabrous inside, lobes c. 0.5 mm, short-triangular, glandular; style base slender, not enlarged. Cypselae c. 2.8 mm, glabrous with scabridulous base; pappus bristles c. 6 mm, bristles slightly broadened at apex. En los paredones. CR (Lobo E. 435, US); P (Rodriguez, 2005: 205). 700-1700 m. (Endemic.)


Epiphytic shrubs to 1.5 m; stems glabrous. Leaves distinctly petiolate; blade 6-11 × 2.5-6.5 cm, broadly elliptical to obovate, fleshy to coriaceous, without prominulous veinlets, venation ascending-pinnate, surfaces hairless, sparsely glandular, base obtuse to short-acute, margins entire, apex rounded to short-obtuse; petiole 0.5-1 cm. Capitulescence broadly corymbiform, to 10 × 10 cm; peduncles 5-10 mm. Capitula c. 7 mm, narrowly campanulate; phyllaries c. 15, 1.5-5 × 0.7-1 mm, c. 3-seriate, persistent; clinanthium glabrous or minutely spiculiferous. Florets 8-10; corolla c. 4 mm, narrowly tubular, white, becoming red-violet, glabrous inside, lobes c. 0.8 mm, half again as long as wide, glabrous; style base slender, not enlarged. Cypselae c. 2.5 mm, mostly glabrous, few spicules distally; pappus bristles mostly c. 3.5 mm, bristle apex somewhat broadened,
nearly smooth. Montane forest. P (Schmalzel y Todzia 2023, MO). 1400-2500 m. (Endemic.)

Holotype: Costa Rica, King 5389 (US!). Illustr.: no se encontró. N.v.: none.
Epiphytic or terrestrial shrubs 0.5-0.7 m; stems glabrous. Leaves ternate; blade 1.5-4.5 × 0.7-1.7 cm, elliptical to obovate, fleshy, venation obscure, ascending pinnate, surfaces hairless, with small glandular dots, base acute, margins entire or distally subserulate, apex obtuse to short-acute; petiole 0.4-0.5 cm. Capitulescence not pendulous, to 9 × 14 cm, broadly corymbiform; peduncles 3-10 mm. Capitula 6-7 mm, narrowly campanulate; phyllaries c. 9, 2-3.5 × 1-1.2 mm, 2-3-seriate, persistent; clinanthium glabrous. Florets 5-6; corolla 5-5.5 mm, lavender, glabrous inside, lobes c. 0.7 mm, short-triangular, glandular; style base slender, not enlarged. Cypselae c. 3 mm, glabrous; pappus bristles c. 5 mm, bristle apex slightly broadened, nearly smooth. 2n = 34. Partial shade and open areas on side of mountain. N (Rodriguez, 2005: 205). CR (King 6791, US). 1500-2900 m. (Endemic.)

Holotype: Panamá, Croat 26452 (US!). Illustr.: no se encontró. N.v.: none.
Epiphytic shrubs to 1 m; stems densely hirsute, trichomes coarse, base persistent. Leaves petiolate; blade mostly 5.5-9.5 × 3-6.5 cm, broadly elliptical to obovate, slightly fleshy to coriaceous, secondary veins pinnate, distinct, adaxial surface sparsely hispidulous, abaxial surface pilose at least on midrib near base, base obtuse, margins entire, apex slightly short-acuminate; petiole mostly 0.5-1 cm, trichomes coarse. Capitulescence broadly corymbiform, to 12 × 15 cm; peduncles 2-9 mm. Capitula c. 9 mm, narrowly campanulate; phyllaries 8-9, 3-6 × 0.8-1 mm, c. 3-seriate, persistent; clinanthium minutely puberulent. Florets 5; corolla 5-6 mm, lavender, glabrous inside, lobes c. 0.8 × c. 0.8 mm, sparsely glandular dotted and minutely puberulent; style base slender, not enlarged. Cypselae 2.5-3 mm, mostly glabrous, short-setulose near base and apex; pappus bristles 5-6 mm, bristle apex slightly broadened, nearly smooth. Cloud forest and elfin forest. CR (Croat 36108, MO); P (Sytsma et al. 4870, US). 900-2100 m. (Endemic.)

Small epiphytic shrubs 1-2 m; stems glabrous. Leaves distinctly petiolate; blade mostly 3.5-8 × 1.5-3 cm, elliptical, fleshy, without prominulous veinlets, venation ascending-pinnate, surfaces glabrous, eglandular, base acute, margins entire to remotely sub serrulate, apex short-acuminate; petiole 0.7-1.2 cm. Capitulescence broadly corymbiform, to 11 × 20 cm; peduncles 9-14 mm. Capitula c. 10 mm, narrowly campanulate; phyllaries c. 15, 1.5-5 × c. 1 mm, c. 3-seriate, persistent; clinanthium glabrous. Florets 7-10; corolla 4-5 mm, funnelform, purple, glabrous inside, lobes c. 0.6 mm, about as long as wide long, glabrous or with few minute trichomes; style base slender, not enlarged. Cypselae 2.5-3 mm, glabrous or with few setulae; pappus bristles 4-5 mm, bristle apex slightly broadened, nearly smooth. 2n = 34. *Primary forest, cut-over cloud forest, oak forest on lower slopes, low shrubby vegetation on wind-swept peak.* CR (Davidse et al. 28854, US); P (Churchill y Churchill 6052, US). 900-3100 m. (Endemic.)


Erect terrestrial herbs to small trees, growing in deep humus, base erect with proproots; stems and petioles densely and coarsely yellowish hirsute or tomentose. Leaves petiolate; blade mostly 15-23 × 13-24 cm, generally broadly ovate to deltoid, chartaceous, venation 3-5-palmate from near base, without enlarged node at vein juncture, adaxial surface densely yellowish pilose or pilosulose, denser abaxially, trichomes rather evenly distributed on and between veins, base subtruncate to shallowly cordate, margin with 5-9 acuminate large lobes including apex and densely closely serrate; petiole 6-16 cm, without stipuliform lobes at base, without teeth near blade. Capitulescence broadly corymbiform, to 17 × 30 cm; peduncles 1-5 mm. Capitula 6-8 mm; phyllaries c. 20, 3-6 × 1.5-2 mm, c. 4-seriate, inner deciduous, apex obtuse; clinanthium pilosulose. Florets 10-13; corolla c. 6 mm, purple, pilosulose inside, lobes c. 0.8 × c. 0.5 mm, with trichomes and glands; style base enlarged. Cypselae c. 3 mm, glabrous; pappus bristles c. 5 mm, bristles not or scarcely broadened at apex. *Forested slopes, cloud forest, weedy areas.* P (Mori y Dressler 7828, US). 700-2100 m. (Endemic.)
Holotype: Panamá, Croat 27701 (US!). Illustr.: no se encontró. N.v.: none.

Epiphytic shrubs to 1 m; stems puberulent, becoming glabrous proximally. Leaves subsessile; blade mostly 4-8 × 1.5-3 cm, oblong-elliptical, chartaceous, secondary veins pinnate, obscure, surfaces glandular dotted, sparsely puberulent, base and apex obtuse to short-acute, margins remotely serrulate; petiole 0.1-0.2 cm, narrow. Capitulescence a small corymbiform panicle, c. 3.5 × c. 4.5 cm, densely branching; peduncles 1.5-6 mm. Capitula c. 6 mm, narrowly campanulate; phyllaries c. 12, 1.5-2.5 × c. 0.4 mm, c. 2-seriate, persistent, narrowly oblong; clinanthium glabrous. Florets 8-9; corolla c. 4 mm, lavender, glabrous inside, lobes c. 0.45 × c. 0.45 mm, triangular, numerous glands; style base slender, not enlarged. Cypselae c. 1.7 mm, puberulent and glandular; pappus bristles c. 4 mm, bristle apex slightly broadened, smooth. Mossy forest. P (Croat 27701, US). 400-600 m. (Endemic.)


Erect herbs or subshrubs to 4 m, terrestrial in deep humus, bases with prop-roots; stems glabrous. Leaves petiolate; blade mostly 10-18 × 6-12 cm, broadly ovate to oblong-ovate, chartaceous, venation pinnate, surfaces mostly glabrous with coarse trichomes abaxially beside large veins, base short-obtuse to shallowly cordate, margins doubly dentate with many large and small teeth, apex narrowly short-acuminate; petiole mostly 6-10 cm, without lobes or teeth. Capitulescence broadly corymbiform, to 23 × 35 cm; peduncles 3-9 mm, subglabrous with puberulent lines. Capitula c. 10 mm; phyllaries, c. 15, 2.5-10 × 2-2.5 mm, 3-4-seriate, inner deciduous, apex broadly rounded; clinanthium glabrous. Florets 6-10; corolla 10-12 mm, lavender, with trichomes inside, lobes c. 1 × c. 0.75 mm, triangular, with few glands; style base enlarged. Cypselae c. 4 mm, glabrous or minutely setulose distally; pappus bristles 5-6 mm, bristles not or scarcely broadened apically. 2n = c. 50. Montane forest, wet forest on steep mountain slopes, open forest with many epiphytes. CR (Burger y J. L. Gentry 8513, US). 900-2100 m. (Endemic.)


Eupatorium hitchcockii B.L. Rob.
Coarse herbs, subshrubs or sprawling vines to 5 m, terrestrial in deep humus or sometimes epiphytic, base with prop-roots; stems subglabrous. Leaves petiolate; blade mostly 10-30 × 5-24 cm, broadly ovate to oblong-ovate, chartaceous to slightly carnose, venation pinnate, surfaces glabrous, eglandular, base obtuse to subcordate, margins evenly serrate to denticate, apex sharply acute to slightly short-acuminate; petiole 4-14 cm, without lobes or teeth. Capitulescence broadly corymbiform, to 20 × 20 cm; peduncles 3-12 mm. Capitula 9-11 mm; phyllaries 20-25, 2-6 × 1-1.5 mm, 3-4-seriate, outer ovate to suborbicular, inner deciduous, short-acute to narrowly rounded; clinanthium puberulent. Florets 14-21; corolla 5-7 mm, lavender to purple, with trichomes inside, tube as long as limb or longer, lobes 0.8-0.9 × 0.6 mm, triangular, with few glands and short trichomes; style base enlarged. Cypselae 3-4 mm, glabrous; pappus bristles mostly 5-7 mm, bristles not or scarcely broadened apically. *Bosques higrófilos, cloud forest, primary forest, forest remnants, thickets*. P (McPherson 10691, US). 500-1300 m. (Panamá, Colombia, Ecuador.)


*Eupatorium molinae* L.O. Williams.

Small epiphytic shrubs c. 1 m; stems glabrous to sparsely puberulent. Leaves distinctly petiolate; blade 10-12 × 3.5-5 cm, ovate, secondary veins ascending-pinnate, veinlet reticulum prominulous, subcarnose, chartaceous when dry, surfaces glabrous, base obtuse to rounded, margins entire to remotely sub serrulate, apex narrowly acute; petiole 0.5-1.2 cm. Capitulescence broadly corymbiform, 5-8 × 8-13 cm; peduncles 3-8 mm. Capitula c. 11 mm, narrowly campanulate; phyllaries c. 9, 2.5-5 × 0.8-1 mm, c. 3-seriate, narrowly lanceolate, persistent. Florets 9-10; corolla 10-12 mm, lavender, glabrous inside, lobes c. 1 × c. 0.8 mm, triangular, with few minute glands and trichomes; style base slender, not enlarged. Cypselae c. 4 mm, with numerous short setulae on ribs and distal surfaces; pappus bristles 5-5.5 mm, bristle apex not broadened, nearly smooth. *Mixed forest, on ridge*. Ch (Breedlove 41626, CAS); G (Williams, 1976a: 86). 2000-2500 m. (Endemic.)

Williams (1976a) and Turner (1997) treated this taxon as *Eupatorium molinae* L.O. Williams. Williams (1976a) reported this taxon from Guatemala based on Williams et al. 26863 (F), but I an unable to verify this report.


*Eupatorium oрогenes* L.O.Williams.

Epiphytic shrubs to 1 m; stems sparsely puberulent and glandular dotted. Leaves petiolate; blade mostly 4.5-11 × 1.5-4.5 cm, elliptical, fleshy, secondary veins pinnate, scarcely prominulous, surfaces glabrous, densely glandular, base short-acute, margins subentire to remotely sub serrulate, apex short-acute with slight short acumination; petiole 0.2-1 cm, glabrous or scarcely puberulent. Capitulescence broadly corymbiform, 5-10 × 6-16 cm; peduncles 2-7 mm. Capitula 6-8 mm, narrowly campanulate; phyllaries c. 10, 1.5-3 × 0.5-0.7 mm, c. 3-seriate, persistent; clinanthium glabrous. Florets 5-6; corolla c. 4 mm, purple, glabrous inside, lobes c. 0.5 × c. 0.5 mm, triangular, with numerous glands; style base slender. Cypselae c. 3 mm, minutely setulose distally and near base; pappus bristles 4-4.5 mm, bristle apex slightly broadened, nearly smooth. 2n = c. 34. *Montane wet forest, primary cloud forest, on forest-edge tree, on fallen tree.* ?H (Nelson Sutherland, 2008: 169 sub *Eupatorium parasticum*); ?N (Dillon et al., 2001: 327 sub *Eupatorium parasticum*); CR (*Standley y Valerio 49988*, US); P (*Croat 59947*, US). 500-2300 m. (Endemic.)

The citation of this species in Honduras (Nelson Sutherland, 2008) and in Nicaragua by Dillon et al. (2001) were not verified.


N.v.: none.

Epiphytic shrubs to c. 1 m; stems terete, striate, glabrous, pith with series of lenticular chambers. Leaves verticillate, 3 or 4 at a node, petiolate; blade 12-21 × 4-9 cm, elliptical to ovate-elliptical, venation pinnate, 8-12 evident pairs of secondary veins, surfaces glabrescent to sparsely puberulent, eglandular, base obtuse to cuneate, margins entire to subcrenate or dentate, apex acute to acuminate; petiole 4-9. 5 cm. Capitulescence a pendulous thyrsoid panicle, 30-50, c. 8 × 10-20 cm, densely branching; peduncles 1-5 mm. Capitula c. 8 × 5 mm, narrowly campanulate; phyllaries c. 30, 1.25-6 × 0.5-1 mm, 3-4 series, oblong to oblong-lanceolate, narrowly obtuse, puberulent near margins, innermost phyllaries somewhat deciduous; clinanthium short-puberulent. Florets 11-16; corolla 6.5-7.5 mm, lavender, glabrous inside, lobes 0.35-0.5 mm, short-triangular,
glabrous, eglandular; style base enlarged. Cypselae 2-2.5 mm, with small setulae mostly on ribs; pappus bristles 5.5-6.5 mm, tips not broadened. *Rain forest*. CR (*Morales 10206, MO*). 1000 m. (Endemic).


Epiphytic shrubs to 1.3 m; stems sparsely puberulent. Leaves petiolate; blade 5-12 × 2-5 cm, elliptical to ovate-elliptical, subcarnose, drying chartaceous, secondary veins ascending-pinnate, not or scarcely prominulous, surfaces with many glandular dots, sparsely puberulent adaxially, puberulent on midrib abaxially, base and apex acute to short-acuminate, margins remotely serrulate; petiole 1-1.5 cm. Capitulescence broadly and openly corymbiform, to 8 × 9 cm; peduncles 10-25 mm. Capitula 9-11 mm, broad; phyllaries c. 18-20, 2-5 × 1-1.3 mm, c. 4-seriate, persistent; clinanthium glabrous. Florets c. 22; corolla c. 5.5 mm, lavender, glabrous inside, lobes c. 0.6 × c. 0.6 mm, triangular, shorter than throat, with small glands; style base slender. Cypselae c. 3.5 mm, densely scabridulous; pappus bristles c. 5 mm, apex of bristles broadened by minutely serrulate wings. *Wet forest*. CR (*Standley 42727, US*). 2100-2400 m. (Endemic.)


Epiphytic shrubs c. 1 m; stems glabrous. Leaves petiolate; blade 4-11 × 1.5-3.5 cm, elliptical to ovate-elliptical, fleshy, secondary veins ascending-pinnate, obscure, surfaces glabrous, eglandular, base and apex acute to slightly short-acuminate, margins entire; petiole 1-2.5 cm. Capitulescence broadly pyramidal, 8-12 × 10-20 cm; peduncles 2-5 mm. Capitula 7-8 mm; phyllaries 18-20, 1-5 × 1-1.5 mm, c. 4-5-seriate, outer phyllaries ovate to oblong, inner deciduous, smooth or scarcely striate apex rounded, nearly entire; clinanthium with few minute trichomes. Florets 5-6; corolla c. 5 mm, lavender, hirsutulous inside, lobes c. 1 × c. 0.5 mm, triangular to oblong triangular, less than twice as long as wide, shorter than throat, glabrous; style base enlarged. Cypselae 2-2.5 mm, scarcely scabrid on ribs; pappus bristles c. 5 mm, bristles slightly broadened apically. \(2n = c. 34b\). *Remnant cloud forest trees in pasture*. CR (*Stevens 14134, US*). 1100-3000 m. (Endemic.)

*Eupatorium brenesii* Standl.

Coarse herbs, vines or shrubs to 3 m, terrestrial in deep humus, sometimes epiphytic; stems essentially glabrous. Leaves petiolate; blade mostly 10-17 × 7-15 cm, broadly ovate to oblong-ovate, chartaceous to slightly carnos, venation pinnate, proximal secondary veins closer and more spreading, surfaces glabrous or sparsely minutely puberulent abaxially, eglandular, base short-acute to subtruncate, margins slightly to coarsely serrate, apex sharply acute to short-acuminate; petiole 2.5-7 cm. Capitulescence a loose sometimes elongate panicle with corymbiform branches, to 40 × 30 cm; peduncles mostly 2-5 mm. Capitula c. 7 mm; phyllaries 18-20, 2-5 × 1-1.3 mm, c. 3-seriate, outer phyllaries oblong to elliptical, inner phyllaries somewhat deciduous; clinanthium with few minute trichomes. Florets 5-12; corolla 4.5-5 mm, lavender, with trichomes inside, tube usually shorter than limb, lobes 0.7-0.8 × c. 0.7 mm, triangular, with few short trichomes and glandular dots; style base enlarged. Cypselae c. 2 mm, minutely setulose to partly glabrous; pappus bristles 4-5 mm, bristles not or slightly broadened apically. 2n = c. 50 *Steep wet slopes, near creek in primary forest, wet forest.*


Epiphytic shrubs c. 0.5 m; stems verrucose, with fine evanescent puberulence. Leaves subsessile; blade mostly 1.7-2.8 × 0.4-0.8 cm, narrowly elliptical, chartaceous, secondary veins 2-3 on each side, weak, strongly ascending pinnate, surfaces hairless, densely glandular dotted, base narrowly acute, margins remotely 2-4-serrulate distally, apex short-acute; petiole 0.1-0.3 cm. Capitulescence a subumbellate cluster to 3 × 5 cm, with many unbranched or once-branched peduncles from base; peduncles mostly 8-20 mm. Capitula c. 8 mm, narrowly campanulate; outer phyllaries 8-10, 2-4 × 1-1.5 mm, erect-spreading, oblong to ovate, apex rounded; inner phyllaries persistent 9-10, 6-7 × 0.7-0.8 mm, linear; clinanthium glabrous. Florets 9-10; corolla 3.5-4 mm, purplish, whitish in
shaded plants, glabrous inside, lobes 0.5-0.6 × 0.5-0.6 mm, ovate, glandular dotted distally; style base slender, not enlarged. Cypselae c. 2 mm, distinctly stipitate, subglabrous, with few minute spicules distally; pappus bristles 3-3.5 mm, bristle apex slightly but distinctly broadened, nearly smooth. Cloud forest on ridge, virgin forest along highway. P (Croat 66861, US). 1000-1700 m. (Endemic.)


Holotype: Panamá, *Churchill et al. 4734* (US!). Illustr.: no se encontró. N.v.: none.

Epiphytic or terrestrial shrubs in deep humus to 1 m; stems with evanescent puberulence. Leaves ternate; blade mostly 4-10 × 1.5-4.5 cm, obovate, somewhat fleshy, subcoriaceous when dry, secondary veins pinnate, scarcely prominulous, surfaces hairless, densely glandular, base acute, margins remotely sub serrulate distally, apex short-acute to slightly short-acuminate; petiole 0.7-0.9 cm. Capitulescence not pendulous, broadly corymbiform, to 25 × 25 cm; peduncles often 10-15 mm. Capitula c. 8 mm, narrowly cympanulate; phyllaries 9-10, 2.5-4.5 × c. 1 mm, c. 3-seriate, persistent; clinanthium glabrous. Florets 5; corolla c. 5.3 mm, lavender, glabrous inside, lobes c. 0.6 × c. 0.5 mm, triangular, with short trichomes and few glands; style base slender. Cypselae 3-3.3 mm, with distinct trichomes near base and apex; pappus bristles c. 5 mm, bristle apex not or scarcely broadened apically, nearly smooth. Wet forest. P (*Churchill et al. 4734*, US). C. 1100 m. (Endemic.)

36. **Nesomia** B.L. Turner

Por H. Robinson.

Erect perennial herbs, sparingly branched; stems terete, with small trichomes, fistulose. Leaves opposite, narrowly petiolate; blade large, ovate, serrate, sparsely pilose, without glandular dots, strongly 3-5-nervate from base. Capitulescence terminal, densely corymbiform, with alternate branching. Capitula broadly cympanulate, discoid, 12-14-flowered; phyllaries 6-8?, eximbricate, c. 2-seriate, rather persistent; clinanthium highly conical to columnar, paleate, surface sclerified, without trichomes. Corolla with narrow tube and abruptly widely cympanulate limb, lobes broadly triangular, weakly prorulose inside and on margins, nearly smooth; anther collars longer than filament base, with weak annular thickenings on cell walls, appendages very short, wider than long; style base without node, glabrous, branches linear, weakly papillose, with small internal vesicle at
tip. Cypselae fusiform, 5-ribbed, glabrous, walls with numerous internal punctations, carpopodium short, annuliform, cells subquadrate in 1-2 rows, with thick, non-porose walls; with short, barrel-shaped, apical calulus of narrow vertical cells, pappus absent. 1 sp. Chiapas, Mexico.


Short-lived perennial herbs to 1.5 m; stems puberulent to glabrescent. Leaves petiolate; blade 4-7 × 3-5 cm, ovate to broadly ovate, membranous, sparsely pilose adaxially, sparsely pilose mostly on veins abaxially, base obtuse from short acumination, margins coarsely serrate, apex shortly narrowly acuminate; petiole 3-5 cm.

Capitulescence to 7 cm diam.; peduncles mostly 1-3 mm, puberulent. Capitula c. 5 mm; phyllaries 7-9, 2.5-3.5 mm, c. 2-seriate, oblanceolate, c. 2-ribbed, margins ciliate with blunt trichomes, acute, glabrous; clinanthium 1.5-2 × c. 0.75 mm, with lanceolate bracteate paleae mostly 1.7-2 mm. Florets 12-14; corolla c. 2 mm, light purple, tube c. 0.75 mm, with small, blunt non-glandular trichomes at base, small gland-tipped trichomes above base, throat c. 0.75 mm, lobes 0.5-0.6 mm, equal to slightly unequal, glabrous; anther thecae c. 0.6 mm. Cypselae c. 1.5 mm, glabrous; pappus absent. In moist shaded areas, along southern slopes of sierra. Ch (Hernandez Xolocotzi y Sharp X-366, NY). C. 1300 m. (Endemic.)

37. Oxylobus (DC.) Moc. ex A. Gray

Phania sect. Oxylobus DC.

Por H. Robinson.

Decumbent perennial herbs or low sometimes matted shrubs, not epiphytes in mangrove swamps, moderately to densely branched; stems, leaves, and involucres often shortly stipitate-glandular. Leaves opposite, sessile to short-petiolate; blade small, ovate or oblong to lanceolate, venation weakly trinervate from above base, surfaces without glandular dots. Capitulescence diffuse alternately branching, laxly to densely corymbiform to subcymose. Capitula discoid, 20-75-flowered, narrowly campanulate; phyllaries 10-15, eximbricate, 2-3-seriate, persistent; clinanthium slightly convex,
epaleate, surface sclerified, glabrous. Corolla tube narrow, limb abruptly campanulate, lobes 5, long-triangular, papillose inside, smooth outside; anther collars with many subquadrate cells proximally, without ornate thickenings on walls, appendages ovate, longer than wide; style base enlarged, glabrous, branches linear, densely papillose. Cypselae fusiform, 5-ribbed, short-setulose, carpopodium often stipitate, without distinct distal rim, cells subquadrate in many rows with thin beaded walls; pappus a fimbriate crown or of 5 short laciniate persistent squamellae. 6 spp. C. Mexico to Venezuela and Colombia.


1. Capitulescences on erect scapose stems from creeping or subrosulate bases; erect stems with few leaves, internodes mostly 5-14 cm. **1. O. adscendens**

1. Capitulescences on erect branching stems without creeping or subrosulate bases; stems densely leafy, internodes often less than 3 cm.

2. Vegetative stems with non-glandular trichomes; phyllaries 3-4 mm; adaxial and abaxial leaf surfaces usually without glandular trichomes, often glabrous. **4. O. oaxacanus**

2. Stems with glandular trichomes; phyllaries 4.5-8 mm; leaf surfaces with sparse to dense glandular trichomes.

3. Involucres mostly c. 4 mm diam.; capitula usually 20-40-flowered; leaf blades usually 1-3 × 0.5-1.2 cm, margins and surfaces subglabrous or sparsely to densely stipitate-glandular. **2. O. arbutifolius**

3. Involucres mostly 5 or more mm diam.; capitula usually 50-75-flowered; leaf blades 1.5-4 × 0.8-2.5 cm, margins and surfaces densely stipitate-glandular. **3. O. glandulifer**


*Carelia adscendens* (Sch. Bip. ex Hemsl.) Kuntze.
Herbs 0.2-0.5 m, bearing slender stipitate glands on stems, leaves, and involucre; leafy stems basal, mostly creeping or subrosulate, sparingly branched; erect stems scapose, with few leaves, internodes mostly 5-14 cm. Leaves petiolate; blade 2-4 × 1-1.5 cm, ovate to obovate, surfaces with or without slender stipitate glands, base narrowly acute to acuminate, margins crenulate distally, apex rounded to short-obtuse; petiole 1-12 mm. Capitulescence on erect scapose stems from creeping or subrosulate bases, with one to few dense corymbiform clusters of capitula; peduncles mostly 1-5 mm. Capitula 7-9 mm; involucre 4-6 mm diam.; phyllaries 10-15, 5-6 × 1-1.3 mm, narrowly oblong. Florets 30-35; corolla c. 4.5 mm, white, lobes c. 1 mm. Cypselae 2.5-3 mm; pappus scales 5, 0.5-1.2 mm. 2n = 32. Wet meadows, open meadow and rocks in forest, thickets at edge of pasture. G (Beaman 3085, US). 3000-4200 m. (C. Mexico to Mesoamerica.)


Shrubs 0.2-1 m; stems, involucres, and parts of most leaves shortly erect stipitate-glandular; stems erect, branching, densely leafy, internodes mostly 0.5-2 cm. Leaves petiolate; blade usually 1-3 × 0.5-1.2 cm, ovate to elliptical or obovate, margins and surfaces subglabrous or sparsely to densely stipitate-glandular, base obtuse to short-acute, margins subentire to crenulate, apex narrowly rounded to obtuse; petiole mostly 1-2 mm. Capitulescence on erect branching stems without creeping or subrosulate bases, with few to many small rather dense corymbiform clusters of capitula; peduncles mostly 3-25 mm. Capitula 6-7 mm; involucre mostly c. 4 mm diam.; phyllaries 12-15, 4.5-5 × 1-1.5 mm, narrowly oblong to obovate. Florets usually 20-40; corolla 4-4.5 mm, white to pale pinkish, lobes 1-1.5 mm. Cypselae c. 3 mm; pappus scales 5, 0.2-0.5 mm. 2n = 32. Rock outcrop, tussock grassland and alpine meadows with scattered Pinus. ?G (?misidentified). 3000-4200 m. (C. Mexico.)

The species has been credited to the Flora Mesoamericana area by various botanists (see Turner y Kerr 1985) on the basis of *Beaman 3042 and Steyermark 50161* from Huehuetenango, Guatemala. The specimens have the involucral form, floret number, and
large slender stipitate gland form of *O. glandulifer* and are assigned to that species in this treatment. True *O. arbutifolius* may not occur in the flora area.


*Ageratum sordidum* S.F. Blake.

Shrubs 0.2-1 m; stems, leaves, and involucres slenderly erect or flexuous stipitate-glandular; stems erect, branching, densely leafy, internodes mostly 0.5-3 cm. Leaves petiolate; blade 1.5-4 × 0.8-2.5 cm, ovate to elliptical or lanceolate, margins and surfaces densely stipitate-glandular, base rounded to short-acute, margins crenulate to crenate, apex obtuse; petiole 0.4-1.4 mm. Capitulescence on erect branching stems without creeping or subrosulate bases, with one to many small rather densely corymbiform clusters of capitula; peduncles mostly 5-30 mm. Capitula 6-9 mm; involucre 5-6 mm diam.; phyllaries 16-20, 5-8 × 1.5-2.5 mm, oblong. Florets usually 50-75; corolla 3.5-4 mm, white or purplish, lobes c. 1.5 mm. Cypselae 3-3.5 mm; pappus scales 5, 0.5-0.7 mm. \(2n=32\). Disturbed meadow above timberline, open area in Pine forest, small limestone ridge with Juniper, near small stream in Pine forest. Ch (*Matuda* 2320, US); G (*Williams* 14279, F). 2700-4200 m. (Mexico [Oaxaca], Mesoamerica, Colombia, Venezuela.)


Shrubs 0.2-1 m, minutely stipitate-glandular in or near capitulescence; stems erect, branching, densely leafy, internodes mostly 0.5-1.5 cm, densely puberulent in longitudinal lines above leaf axils, vegetative stems with non-glandular trichomes. Leaves petiolate; blade 1.5-2.5 × 0.4-0.9 cm, ovate to elliptical, adaxial and abaxial surfaces usually without glandular trichomes, usually glabrous or subglabrous, base cuneate, margins crenulate distally, apex rounded; petiole 0.1-1 mm. Capitulescence on erect branching stems without creeping or subrosulate bases, with one to many small rather densely corymbiform clusters of capitula; peduncles mostly 2-12 mm. Capitula c. 5
mm; involucre c. 2.5 mm diam.; phyllaries 6-8, 3-4 × 1-1.3 mm, elliptical to narrowly elliptical, with sparse minute glandular or non-glandular trichomes. Florets usually 8-15; corolla c. 3 mm, white, lobes c. 1 mm. Cypselae 1.7-2 mm; pappus a fimbriate crown, crown 0.1-0.2 mm. 2n = 32. Steep wooded slope, windswept cool ridge above cloud forest, sand-clay soil under pine needle duff. Pine-oak arbutus woods. Ch (Breedlove 9587, US). 2300-3000 m. (Mexico [Oaxaca], Chiapas.)

38. Pachythamnus (R.M. King et H. Rob.) R.M. King et H. Rob.

Ageratina subg. Pachythamnus R.M. King et H. Rob.

Por H. Robinson.

Erect shrubs or small trees with few branches mostly below old capitulescences; stems thickened, leafless at anthesis, with large somewhat chambered pith. Leaves opposite, dehisced at anthesis, narrowly long-petiolate; blade broadly ovate to deltoid, subtrinervate from above base, surfaces without glandular dots. Capitulescences terminal, rather densely corymbiform. Capitula narrowly campanulate, discoid, c. 15-flowered; phyllaries weakly subimbricate to 2-3-seriate, persistent; clinanthium slightly convex, epaneate, surface sclerified, with minute scattered trichomes. Corolla funnelform with cylindrical bases, glabrous inside, lobes 5, narrowly-triangular, densely papillose inside, smooth proximally and roughened distally; anther collars with many subquadrate cells proximally, with few or no ornate thickenings on walls, appendage ovate, slightly longer than wide; style base not enlarged, glabrous, appendages linear, densely papillose. Cypselae prismatic, 5-ribbed, carpodopodium short, without distal rim, with c. 5 tiers of subquadrate cells, walls thin with beaded thickenings; pappus of c. 25 scabrid rather deciduous bristles, not broadened distally. 1 sp. SW Mexico to Nicaragua.


Ageratina crassiramea (B.L. Rob.) R.M. King et H. Rob.
Xeric shrubs 2-5 m, sparingly branched; stems, leaves, peduncles and involucre glabrous. Leaves petiolate; blade 7-17 × 7-15 cm, base broadly rounded to obtuse with central acumination, margins sometimes sharply angled at widest part, remotely denticulate or dentate; petiole mostly 2-4 cm. Capitulescence mostly 5-10 × 5-14 cm. Capitula c. 7 mm; phyllaries c. 15, mostly 2-3 × c. 1 mm, oblong to narrowly oblong, mostly bicostate, apex obtuse. Florets c. 15; corolla c. 4.5 mm, white to lavender, lobes c. 0.7 × c. 0.5 mm. Cypselae 2-2.5 mm, ribs pale, setulae mostly on ribs; pappus bristles 3-4 mm. Dry slopes, lava flows, steep dry mountain sides with north-facing limestone rocks. Ch (Breedlove 9573, US); G (Kellerman 1905, US); H (Liesner 26712, MO); ES (Allen 6861, US); N (Williams y Williams 24623, US). 100-1400 m. (Mexico, Mesoamerica.)

Turner (1997) treated Pachythamnus as a synonym of Ageratina and used the name Ageratina crassiramea for this taxon.


Por H. Robinson.

Erect coarse herbs or subshrubs, moderately branched; stems hispid to lanate with glandular or non-glandular trichomes, pith solid. Leaves opposite, usually long-petiolate; blade elliptic to deltoid or suborbicular, trinervate to pinnate, with or without minute often stipitate glands abaxially, base acute to cordate. Capitulescence rounded to pyramidal, sometimes laxly branched; peduncles sparsely to densely stipitate-glandular. Capitula discoid, 18-75-flowered; involucre campanulate; phyllaries c. 25, subimbricate, strongly unequal, graduated, c. 5-seriate, persistent, often showy white or reddish, usually 4-6 dark-striate; clinanthium broadly convex, epaleate, glabrous, surface sclerified. Corolla narrowly funnelform, glabrous inside, limb without subquadrate cells below the lobes, lobes 5, triangular, as long as wide or longer, both surfaces smooth; anther collars with numerous subquadrate cells proximally, with beaded thickenings on walls, appendage oblong-ovate, longer than wide, not truncate; style base not enlarged, glabrous, branches linear, not or slightly broadened near tip, mostly mamilllose. Cypselae prismatic, 5-ribbed, sometimes stipitate proximally, carpopodium sharply delimited distally, short, with 3-7 tiers of thin-walled cells; pappus of c. 30 scabrous bristles, bristles easily deciduous at fragile bases, slender, non-contiguous or scarcely contiguous basally, apex distinctly broadened. 5 spp. Mexico to Costa Rica.

1. Leaf blades ovate-oblong to elliptical, venation pinnate, bases short-acute to rounded; capitula 15-18 × 15-18 mm, 60-75-flowered; cypselae glabrous.

**1. P. cyrilli-nelsonii**

1. Leaf blades ovate to suborbicular with usually cordate bases, trinervate from base; capitula 8-10 × 8-10 mm, 18-50-flowered; cypselae setulose.

2. Stems and petioles with numerous long non-glandular trichomes mixed with stipitate glands; petioles of distal vegetative leaves 0.5 cm or less long; most phyllaries with apices sparsely to densely minutely stipitate-glandular; capitula 40-50-flowered.

**2. P. grisea**

2. Stems and petioles with only short trichomes or stipitate-glands; petioles of distal vegetative leaves c. 1 cm or longer; inner phyllaries glabrous, only outermost phyllaries glandular; capitula 18-42-flowered.

3. Capitula 18-25-flowered; phyllaries often violet, apices of inner phyllaries obtuse to short-acute; leaf blades ovate.

**3. P. phoenicolepis**

3. Capitula 35-42-flowered; phyllaries whitish to pale pink, apices of inner phyllaries rounded to subtruncate; leaf blades ovate to broadly ovate or suborbicular.

**4. P. schultzii**


Plants c. 2 m; stems and petioles densely whitish lanate. Leaves: petiole 2-5 cm; blade 12-24 × 5.5-10.5 cm, ovate-oblong to elliptical, venation pinnate, surfaces long-pilose, densely spreading pilose abaxially on midvein, base short-acute to rounded, margins serrulate to serrate, apex short-acuminate. Capitulescence with peduncles 1.5-3 cm, hirsute with white trichomes, with smaller slenderly stipitate glands. Capitula 15-18 × 15-18 mm; phyllaries 50-60, 2-13 × 1.5-2.5 mm, greenish to brownish, apex obtuse to short-acute, perminutely puberulent. Florets 60-75; corolla c. 7 mm, lobes c. 0.5 × c. 0.5 mm. Cypselae c. 6 mm, base stipitate, glabrous; pappus bristles c. 7 mm. *Lluvioso tropical.* H (Nelson 3912, US). 500-600 m. (Endemic.)


Plants 0.5-1.5 m; stems and petioles with numerous long non-glandular trichomes mixed with stipitate glands. Leaves: blade 4-10 × 3-9 cm, broadly ovate, trinervate from base, surfaces with numerous stipitate glands, with non-glandular trichomes on veins abaxially, base strongly cordate, margins closely serrulate to dentate, apex short-acuminate; petiole to 4.5 cm, those of distal vegetative leaves 0.5 cm or less long. Capitulescence with peduncles mostly 1-2.5 cm, densely stipitate-glandular. Capitula c.10 × 8-10 mm; phyllaries 40-50, 1.5-9 × 1-2 mm, greenish to purplish, apex obtuse to short-acute, most with apex sparsely to densely minutely stipitate-glandular. Florets 40-50; corolla 5.5-6 mm, lobes 0.3-0.5 × 0.2-0.3 mm. Cypselae c. 2.8 mm, base not stipitate, setulose mostly on ribs; pappus bristles c. 5 mm. *Pine forest, mixed forest.*

(G (*Pittier 1809*, US); H (*Williams y Molina 11506*, F); N (*Miller y Griscom 98*, US). 700-1900 m. (Endemic.)


Plants 1.5-4 m; stems and petioles densely hirtellous with only short glandular and non-glandular trichomes. Leaves with petiole mostly 1-6 cm, those of distal vegetative leaves c. 1 cm or longer; blade mostly 6-9 × 3.5-7 cm, ovate, trinervate from base, adaxial surface minutely puberulent and glandular, gland-dotted abaxially and hirtellous on veins, base rounded to shallowly cordate, serrulate to serrate, apex narrowly acute to slightly acuminate. Capitulescence with peduncles 0.5-1.5 cm, densely short-stipitate glandular, with few non-glandular trichomes. Capitula c. 10 × 8-10 mm; phyllaries 20-30, 1.5-7 × 1-1.5 mm, often violet, apex of inner ones obtuse to short-acute, only outermost phyllaries glandular, inner phyllaries glabrous. Florets 18-25; corolla c. 4.5 mm, lobes c. 0.6 × 0.3 mm. Cypselae c. 2.8 mm, base not stipitate, minute-setulose on ribs and usually on faces; pappus bristles c. 4.5 mm. 2n = 20. *Pine forest, steep slope with Quercus and Pinus, in oak-woodland on limestone knoll.*

Ch (*Breedlove 14024*, US); G (*Skutch 1925*, US); H (*Molina 23391*, US); ES (*Standley 21550*, US). 1000-2500 m. (Endemic.)

Syntype: Mexico, Veracruz, *Sartorius s.n.* (B, destroyed). Illustr.: no se encontró. N.v.: Chichinguaste, H.


Plants 0.5-4 m; stems, petioles, leaf surfaces, and peduncles densely puberulent or hispidulous with only short non-glandular or stipitate-glandular trichomes. Leaves: blade mostly 6-20 × 6-20 cm, ovate to broadly ovate or suborbicular, trinervate from base, base broadly rounded to cordate, margins closely serrulate to dentate, apex short-acuminate; petiole 2-13 cm, those of distal vegetative leaves c. 1 cm or longer. Capitulescence with peduncles 2-12 mm. Capitula c. 10 × 8-10 mm; phyllaries 30-40, 1-7 × 1-1.5 mm, whitish to pale pink, apex of inner ones rounded to subtruncate, often erose, only outermost phyllaries glandular, inner phyllaries glabrous. Florets 35-42; corolla c. 4 mm, lobes c. 0.3 × 0.2-0.3 mm. Cypselae c. 2.8 mm, base short-stipitate, minute-setulose on ribs and usually on faces; pappus bristles 3.5-4 mm. 2n = 20. *Bosque húmedo y mixto, oak-pine forest above highway and weedy vegetation along road, tropical deciduous forest, montane rain forest on steep slope, seasonal evergreen forest, low deciduous forest, cut over cloud forest, brushy slope, disturbed cloud forest in coffee plantation.*

40. **Piptothrix** A. Gray

Por H. Robinson.

Perennial herbs or weak shrubs, moderately branched; stems terete, glabrous to tomentellous, often narrowly fistulose. Leaves opposite, not dissected, subsessile to short-petiolate; blade ovate, trinervate from at or near base, reticulum of veinlets prominulous, with or without glandular dots. Capitulescence thyrsoid-paniculate, branches rather dense and corymbiform. Capitula discoid; involucre narrowly campanulate; phyllaries eximbricate, subequal, persistent; clinanthium slightly convex, e paleate, surface sclerified, glabrous, sometimes spinose. Florets 7-18; corolla white, tube narrow, limb
funnelform to narrowly campanulate, glabrous, lobes 5, narrowly triangular, smooth, inner surfaces of corolla lobes with short cells mamilllose to nearly smooth; anther collar with many subquadrate cells proximally, with few or no ornate thickenings on walls, appendages longer than wide; style base with enlarged node, glabrous, branches linear, densely papillose. Cypselae prismatic, 5-ribbed, setulose, carpopodium vestigial or lacking; pappus often somewhat short, of 15-25 scabrid extremely fragile and deciduous bristles, slightly broadened distally. 5 spp. S. y W. Mexico to Guatemala; 1 sp. in Mesoamerica.


Plants 1-4 m; stems puberulent to tomentellous. Leaves: petiole 1-1.5 cm; blade mostly 6-14 × 2.5-6.5 cm, trinervate from base, adaxial surface sparsely pilosulose, abaxial surface puberulent to tomentellous and glandular dotted, base rounded to subcordate, margins serrulate to serrate, apex narrowly acuminate. Capitulescence an elongate thyrsoid panicle with corymbiform branches in distal leaf axils, terminally pyramidal at apex; peduncles 2-7 mm. Capitula 6-8 mm; phyllaries 11-15, mostly 5-7 × 0.5-0.7 mm, apex acute, puberulent and glandular dotted; clinanthium spinulose. Florets 12-18; corolla 5-5.5 mm, lobes c. 0.7 mm. Cypselae 1.5-2 mm; pappus bristles 1.5-3.5 mm. Grassy slope with *Quercus*, plains, open oak-forest in calcareous hills, tropical forest in ravines, pine forest on steep slopes, cloud forest of firs and broad-leaved trees. Ch (*Ton [aka Mendez] 1512*, US); G (*Skutch 716*, US). 800-2700 m. (W. Mexico to Guatemala.)

41. *Piqueria* Cav.

Por H. Robinson.
Erect annual to perennial herbs or subshrubs, sparsely branched; stems sometimes with decurrent lines of pubescence, often narrowly fistulose. Leaves mostly opposite, short-petiolate to sessile; blade ovate to lanceolate, trinervate from base, margins serrulate to serrate. Capitulescence laxly thyrsoid-paniculate, branches subcymose; peduncles short to moderately long. Capitula discoid; involucre narrowly campanulate; phyllaries 3-5, same in number as florets, eximbricate, equal, persistent; clinanthium flat, epaleate, surface sclerified, glabrous. Florets 3-5; corolla white to slightly lavender, tube narrow densely pubescent, limb short-campanulate, throat nearly smooth or papillose inside, lobes 5, narrowly triangular, densely papillose inside, slightly papillose on margins and tip; filaments with small to large papillae, collars broad with subquadrate cells proximally, walls with strong annular thickenings, appendages vestigial or lacking; style base not enlarged, glabrous, branches with slightly to strongly broadened tip, apex densely papillose proximally. Cypselae prismatic, 5-ribbed, glabrous, walls sparsely punctate internally, carpopodium symmetrical or mostly asymmetrical, cells small, subquadrate, with thin or beaded walls; pappus absent. 7 spp. Mexico, Mesoamerica, West Indies; 1 sp. in Mesoamerica.


   **Mikania anomala** M.E. Jones, **Piqueria ovata** G. Don, **Piqueria trinervia** var. **luxurians** Kuntze.

   Erect short-lived perennial herbs to 1.5 m; stems glabrous except for narrow puberulent bands above leaf axils. Leaves: petiole 2-10 mm; blade mostly 1.8-8 × 0.7-3.5 cm, ovate to broadly lanceolate, trinervate from base, surfaces glabrous to sparsely puberulent mostly on veins, base rounded, margins coarsely serrate, apex acute to slightly acuminate. Capitulescence a lax leafy thyrsoid panicle, with rather densely cymose or subcymose branches; peduncles 1-4 mm. Capitula 3.5-4 mm; phyllaries 3-4, 2.5-3 × 1-1.5 mm, broadly oblong-elliptical, apex truncate to emarginate with distinct mucro, margins scarious, glabrous. Florets 3-4; corolla c. 2 mm, lobes c. 1 × c. 0.6 mm, with few glands, inner surface of limb and bases of filaments short-papillose. Cypselae c. 2 mm, glabrous, carpopodium asymmetric with sigmoid trace. 2n = 22. *Slope with Quercus, open places,*
matorral calcicola, en ladera seca et bosque clara, evergreen cloud forest, en ladera húmeda en bosque mixto, grassy ridge, sunny grassy thickets. Ch (Laughlin 708, US); G (King 7305, US); CR (Almeda y Flowers 2388, US); P (Davidson 1016, US). 60-3200 m. (C. Mexico to Panamá, Hispaniola.)

The cited Chiapas specimen, Laughlin 708, was cited by Breedlove (1986) as and distributed as Piqueria pilosa Kunth, but it lacks the longer often glandular trichomes on most of the stem surface found in the latter species.

42. Polyanthina R.M. King et H. Rob.

Por H. Robinson.

Erect perennial herbs, sparingly branched; stems with glandular and non-glandular trichomes, pith solid. Leaves opposite, with winged petiole; blade ovate to lanceolate, margins serrate, with sessile or stipitate glands abaxially, venation pinnate. Capitulescence a lax thyrsoid or pyramidal panicle with cymose branches. Capitula broadly campanulate, discoid, 200-300-flowered; phyllaries 40-50, subimbricate, strongly graduated, c. 3-seriate, persistent, spreading with age, shortly to narrowly acute, distinctly striate, outer phyllaries only 2- or 4-ribbed; clinanthium slightly convex, epaleate, surface sclerified, minutely puberulent with fine trichomes. Corollas narrowly tubular, white, glabrous on both surfaces, veins not thickened, limb without subquadrate cells below the lobes, throats slender with staggered insertions of anther filaments, lobes triangular, slightly longer than wide, smooth on both surfaces; filaments inserted at staggered levels inside corolla; anther collars slender, with transverse thickenings on cell walls, appendages slightly longer than wide, not truncate; style base enlarged, glabrous, branches filiform, not tapered, mamilllose. Cypsela prismatic, 5-ribbed, mostly glabrous, with few setulae near top, without dense minute powdery-glands, carpopodium oblong, shorter than wide, with obvious projecting distal rims, not procurrent on ribs, with enlarged basal cell row, cell walls thickened; pappus of c. 25 scabrid persistent bristles with pointed not broadened apical cells. 1 sp. Costa Rica to Bolivia.


Perennial herbs 1-2.5 m; stems greenish or brownish, sometimes reddish tinged, stems leaves, branches of capitulescence, and outer phyllaries pilosulose to densely hirtellous or shortly stipitate-glandular. Leaves petiolate; blade mostly 5-22 × 2.5-12 cm, ovate to lanceolate, base acute to truncate, margins closely serrulate to dentate, apex narrowly acute to acuminate; petiole 1.5-8 cm, winged, often with basal auricles. Capitulescence 12-40 × 8-24 cm; peduncles 3-15 mm. Capitula 8-10 × 8-10 mm; phyllaries 40-50, 3-7 × 1-1.5 mm, narrowly oblong to lanceolate. Florets 200-300; corolla 4.5-5 mm, lobes c. 0.2 mm. Cypselae 1.6-2 mm; pappus bristles 4.5-5 mm. 2n = 20-24. Disturbed primary cloud forest, edge of forest, pasture and secondary montane forest, edge of thicket, open ground along stream near road. CR (Lellinger y White 1353, US); P (Croat 67757, MO). 600-2000 m. (Mesoamerica, Colombia, Venezuela, Ecuador, Perú, Bolivia.)

43. Pseudokyrsteniopsis R.M. King et H. Rob.

Erect or arching subshrubs or shrubs, moderately branched; stems terete, hirsute and minutely stipitate-glandular, pith solid. Leaves opposite; blade deltoid to hastate, trinervate from base, with minute mostly stipitate glands on surfaces; petiole slender, base often broadened and clasping; bases encircling node. Capitulescence a lax pyramidal panicle with widely spreading densely corymbiform branches, peduncles short. Capitula campanulate, discoid, 13-18-flowered; phyllaries c. 20, greenish to reddish-tinged, subimbricate, persistent, lanceolate, striate; clinanthium flat, epaleate, surface sclerified, glabrous. Corolla tubular, constricted near mouth, narrower than base, scarcely broader than thickened style branches, white, mostly glabrous, a few minute glands on lobes, lobes small, cells oblong, smooth on both surfaces; anther collars with few subquadrate cells proximally, walls with weak annular thickenings, appendages longer than wide, not truncate; style base not enlarged, glabrous, branches narrowly clavate, scarcely mamillose. Cypselae prismatic, 5-ribbed, with numerous setulae, base narrow, carpopodium short, cells subquadrate with thickened walls; pappus of c. 30 scabrid subpersistent bristles, not smooth on outer surface, apex not or scarcely broadened, not or scarcely contiguous at base. 1 sp. Chiapas, Guatemala.


Subshrubs or shrubs to 2 m; stems greenish or yellowish. Leaves petiolate; blade 2-6 × 1-5 cm, broadly deltoid, trinervation marginal in basal acumination, glands on surfaces sparse to dense, veins hirtellous, base broadly obtuse to hastate, margins denticulate, apex short-acute; petiole 1-3 cm. Capitulescence to 50 × 35 cm, with branches spreading at 80-90°; peduncles 1-5 mm. Capitula 7-9 mm; phyllaries c. 20, 3-9 × 1-1.5 mm, outer phyllaries hirsute, inner phyllaries glabrous. Florets 13-18; corolla 3.5-4 mm, lobes c. 0.3 × c. 0.25 mm. Cypselae c. 2.5 mm; base sometimes attenuate; pappus bristles 3.5-4 mm. 2n = 20. *Seasonal evergreen forest, side of hill*. Ch (Breedlove 56869, US); G (King 7319, US). 500-1400 m. (Endemic.)

**44. Sciadocephala** Mattf.

Por H. Robinson.

Perennial rather succulent herbs with decumbent or erect bases; stems terete, puberulent, fistulose. Leaves opposite, distinctly petiolate; blade broadly ovate to slightly obovate, venation trinervate to pinnate, margins entire to serrate. Capitulescence unbranched or cymose with lax alternate branching. Capitula pedunculate, discoid, 9-15-flowered; phyllaries 6-14, herbaceous, not articulated or fused at base, eximbricate, subequal, persistent, reflexed with age; clinanthium scarcely convex, becoming more convex with age, epaleate, not sclerified between scars, glabrous. Corolla narrowly funnelform to tubular, white or greenish, puberulent, lobes 5, short, triangular, surfaces smooth, cells oblong; anther collars stout, not or slightly broadened proximally, cell walls with prominent transverse thickenings, appendages as long as wide or longer, truncate; style base not enlarged, glabrous, branches long and narrow, scarcely mamilllose. Cypselae narrowly prismatic, nearly terete, carpopodium only slightly asymmetric, not enlarged or sharply demarcated, with subquadrature thin-walled cells; pappus of 5 slender clavate
knobs, these spherically glandular in discrete apical clusters. 5 spp. Wet tropical America
(1 sp. in Mesoamerica) from Panamá to Guyana and Ecuador.


Perennial herbs to 0.5 m, with decumbent bases, branches few or none; stems reddish
puberulent. Leaves petiolate; blade mostly 8-12 × 3.5-8 cm, elliptical to slightly obovate,
broadest at or above middle, trinervate from 5-8 mm above base, surfaces mostly
glabrous, base obtuse to short-acute, margins remotely subserulate, apex obtuse to
narrowly rounded; petiole 0.7-2.5 cm. Capitulescence laxly cymose; branches hirtellous
with short reddish blunt-tipped trichomes; peduncles 10-30 mm. Capitula 8-10 mm;
phyllaries 7-8, mostly 2.5-3.5 × 0.7-1 mm, narrowly oblong, surfaces and margins
densely coarsely puberulent. Florets c. 9; corolla 5-5.5 mm, pale green, lobes c. 0.7 × c.
0.5 mm. Cypselae to 6 mm, sparsely minutely puberulent; pappus prongs mostly c. 2 mm.
*Disturbed tropical rain forest, near stream in forest. P (de Nevers et al. 3744, MO). 300
m. (Panamá to N. Ecuador.)

45. **Standleyanthus** R.M. King et H. Rob.

Por H. Robinson.

Large flaccid shrub, with few branches, glabrous to minutely puberulent; stems rather
fleshy, terete, fistulose. Leaves opposite, trifoliate; blade divided into 3 petiolulate
leaflets; leaflets oblong-ovate, apex narrowly acute to acuminate, eglandular, venation
pinnate; petiole long. Capitulescence broadly pyramidal paniculate, with densely
corymbiform opposite branches; peduncles slender, short to moderately long. Capitula
narrowly campanulate, discoid, c. 12-flowered; phyllaries eximbricate, subequal,
persistent, scarcely bicostate; clinanthium slightly convex, epauleate, surface sclerified,
glabrous. Corolla narrowly funnelform grading into cylindrical base, glabrous on both
surfaces, lobes triangular, slightly longer than wide, with dense mammillae inside,
smooth outside except at margins and tip; anther collars cylindrical, with numerous
subquadrat cells proximally, walls without ornate thickenings, appendage longer than
wide, not truncate; style base scarcely thickened, glabrous, branches with appendages
narrowly linear, slightly mamilllose. Cypselae prismatic, 5-ribbed; ribs prominent,
concolorous, setulose, enlarged at base, carpopodium indistinct, with 1-2 rows of
subquadrato cells, carpopodium cell walls thin; pappus of c. 20 mostly persistent scabrid
bristles, apex not broadened. 1 sp. Endemic to Costa Rica.

446-448 (1987).

1. Standleyanthus triptychus (B.L. Rob.) R.M. King et H. Rob., Phytologia 22: 42
Costa Rica, Standley 33458 (US!). Illust.: King y Robinson, Monogr. Syst. Bot. Missouri

Shrubs 1-2? m, sparsely branched; stems glabrous, internodes to 13 cm. Leaves
petiolate; leaflet blade mostly 5-11 × 1.5-4 cm, oblong-ovate, 5-7 secondary veins on
each side, surfaces sparsely minutely puberulent, base obtuse to short-acute, margins
ergulate, apex narrowly acute to acuminate; petiole 4-8 cm, petiolules 0.7-1.5 cm.
Capitulescence c. 15 × 18 cm; peduncles 30-110 mm, sparsely puberulent. Capitula c. 10
mm; phyllaries c. 12, mostly 3-4.5 × 0.8-1 mm, narrowly oblong, apex rounded to obtuse.
Florets c. 12; corolla 5-5.5 mm, lobes c. 0.7 × 0.6 mm. Cypselae c. 2.5 mm, body black,
ribs yellow; pappus bristles 4.5-5 mm. Wet forest. CR (Standley 33458, US). C. 1400 m.
(Endemic.)

The species is known from only the one collection, and the species may now be
extinct.

46. Stevia Cav.

Carelia Juss. ex Cav.

Por H. Robinson.

Mostly erect, annual or perennial herbs or shrubs, sparsingly to densely branched; stems
mostly erect, terete to hexagonal or narrowly winged, pith solid. Leaves opposite or
alternate, rarely whorled, sessile to distinctively petiolate, typically cauline or less
commonly clustered at the base; blade linear to orbicular, surfaces puberulent, glandular
dotted or stipitate-glandular, entire to serrate or dentate, rarely deeply lobed; petiole often
partly to completely winged. Capitulescence diffuse with long peduncles or with dense
corymbiform clusters of capitula. Capitula discoid, 5-flowered, narrowly campanulate or cylindrical; involucre of 5, eximbricate, subequal, linear to elliptical phyllaries, persistent but easily torn from clinanthium; clinanthium flat, surface sclerified, epaleate, glabrous. Corolla actinomorphic or rarely zygomorphic, narrowly funnelform with spreading lobes, with trichomes inside, lobes usually equal, unequal in one species group, shorter than throat and tube, triangular or oblong-ovate, densely papillose inside, smooth; anther collar cylindrical with subquadrate to short-oblong cells proximally, with annular thickenings on walls, filaments without papillae, appendage distinct, as long as wide, mostly obovate, crenulate distally; style base often slightly enlarged, glabrous or sometimes papillose, style branches filiform, densely long-papillose. Cypselae narrow with mostly straight sides, 5-ribbed, faces concave, walls densely punctate internally, sparsely to densely glandular or setulose, carpopodium short and slightly asymmetric, with slightly projecting distal rim, cells small with weakly to strongly thickened walls; pappus present, with at least a crown of free or united scales on most cypselae, often with 1-30 bristle-like awns, 1-2 cypselae of each capitulum often with more reduced pappus. 243 spp. SW. United States to West Indies and Argentina.

The report by Breedlove (1986) of *S. tomentosa* Kunth was based on a misdetermination of *Matuda 1908* (MEXU), earlier determined by Grashoff (1972: 432) as *S. tephrophylla*. Similarly, two of the three vouchers reported by Breedlove (1986) as *S. monardifolia* Kunth were determined by Grashoff as *S. caracasana*, thus I exclude *S. monardifolia* from Chiapas. Turner (1997) did not attribute either *S. tomentosa* or *S. monardifolia* to Chiapas.


1. Leaves of main stems alternate, often crowded, with linear, narrow-based blades; usually with reduced axillary shoots or clusters of leaves.

2. Capitulescences dense corymbiform with subsessile capitula; peduncles and phyllaries without stipitate-glands; corollas actinomorphic, usually white; one cypselae usually exaristate.  

16. *S. serrata*

2. Capitulescences lax with peduncles often half as long as involucres or longer; peduncles and phyllaries stipitate glandular; corollas zygomorphic, usually purplish; cypselae all with 3-6 awns.  

21. *S. viscida*
1. Leaves of main stems, opposite, usually with ovate to lanceolate or oblanceolate blades, leaves rarely linear with connate bases; usually without prominent axillary clusters of leaves.

3. Capitulescences lax with peduncles mostly as long as or longer than phyllaries; corollas zygomorphic.

4. Plants with long-petioliform leaves clustered at bases, with only remote bracteolate leaves distally; corollas whitish.

1. *S. alatipes*

4. Plants with short-petiolate or sessile leaves dispersed along stems; corolla tubes and throats often pinkish or purple.

5. Leaves with stipitate glands, not villous or tomentose abaxially; most cypselae with 1-5 awns.

6. *S. elatior*

5. Leaves without stipitate glands, villous or tomentose abaxially; cypselae usually exaristate.

9. *S. lehmannii*

3. Capitulescences with capitula in compact clusters, with peduncles mostly much shorter than phyllaries; corollas mostly actinomorphic.

6. Phyllaries with stipitate glands.

7. Capitulescences elongate in overall shape, with elongate branches spreading regularly at c. 45° angles or more, often with many sessile elliptical bracts; pappus often aristate.

2. *S. caracasana*

7. Capitulescences rather compact, with short branches mostly spreading at 45° or less, without elliptical bracts; pappus not aristate.

7. *S. incognita*

6. Phyllaries with only sessile glands or non-glandular trichomes.

8. Leaves in basal rosette or mostly restricted to proximal 1/3 of plant.

9. Leaves densely pilose mostly on veins abaxially, green or with reddish tinges, serrate, apices obtusely pointed.

5. *S. deltoidea*

9. Leaves sparsely pilosulose, reddish abaxially, crenate to entire, apices rounded.

15. *S. seemannii*

8. Leaves rather evenly distributed along stems, sometimes persisting only distally.

10. Shrubs; leaves pinnately veined or with few ascending veins forming weak trinervation.
11. Capitula to 6.5 mm; leaves mostly narrowly ovate or elliptical to oblong-elliptical or spatulate, whitish or grayish abaxially with dense tomentellum.

19. \textit{S. tephrophylla}

11. Capitula over 8 mm; leaves mostly ovate-lanceolate to lanceolate, green not totally obscured by white or grey pubescence abaxially.

12. Corolla lobes glabrous.

13. Leaves arachnoid tomentose abaxially on veins and in vein axils, not glutinous; cypselae with minute awns.

3. \textit{S. chiapensis}

13. Leaves glabrous, glutinous; cypselae exaristate.

10. \textit{S. lucida}

12. Corolla lobes puberulent with coarse trichomes.

14. Pappus usually an incomplete crown of separate laciniate scales, 0.5-1.5 mm; cypselae sides glabrous to sparsely setulose distally.

11. \textit{S. microchaeta}

14. Pappus a complete crown of basally united, entire to minutely dentate or fimbriate scales; cypselae sides always setulose.

15. Venation distinctly pinnate; basal veins not closer together, convergent with proximal margins; stems with leaves persisting only near apices, primary leaves early deciduous.

13. \textit{S. polycephala}

15. Venation weakly pinnate to subtrinervate; basal veins often closer together and stronger, subparallel with basal margins; stems leafy, with rather persistent primary leaves.

18. \textit{S. subpubescens}

10. Herbs; leaves trinervate.

16. Corollas pale pink to purplish.

17. Plants minute, decumbent, 2-5 cm; capitula c. 12 mm; cypselae isomorphic, with 5 awns.  

22. \textit{S. westonii}

17. Plants erect, 0.7-1 m; capitula 6-10 mm; cypselae heteromorphic, with 0-3 awns, some or all cypselae with no awns.

18. Leaves glabrous to puberulent abaxially, blades usually ovate or elliptical; cypselae all exaristate.

8. \textit{S. jorullensis}
18. Leaves densely tomentose or subtomentose abaxially, blades ovate to ovate-lanceolate; some cypselae of capitula 1-3-aristate.

17. *S. suaveolens*

16. Corollas white or rarely slightly pink.

19. Leaves sessile and often connate at bases, blades oblong or linear.

4. *S. connata*

19. Leaves petiolate, blades ovate or oblong-elliptical.

20. Leaves with dense, white tomentum abaxially; cypselae somewhat obcompressed.

14. *S. pratheri*

20. Leaves brownish subtomentose to only puberulent on veins abaxially; cypselae not obcompressed.

21. Leaves puberulent only on veins abaxially; phyllaries usually short-acute, often broadly scarious at apices; usually with some cypselae bearing 1-2 awns.

12. *S. ovata*

21. Leaves puberulent to subtomentose abaxially; phyllaries narrowly acute to slightly acuminate, scarcely scarious at apices; cypselae exaristate.

20. *S. triflora*


*Stevia liebmannii* var. *chiapensis* B.L. Rob.

Perennial herbs mostly 0.3-0.6 m; stems sparsely to densely pilose. Leaves opposite, mostly in subbasal rosette or cluster, only remote bracteolate leaves distally; proximal leaves with narrowed long-petioliform bases 1-3 cm, winged distally; blade 3-10 × 1.5-7 cm, oblanceolate to orbicular, adaxial surface short-pilose, abaxially paler, gland-dotted, pilose at least along veins; weakly to strongly trinervate from above base, base short- to long-acute or acuminate, margins crenate to crenate-dentate, apex obtuse to rounded. Capitulescence diffuse or lax, with major branches usually opposite; peduncles mostly 5-20 mm. Capitula 8-11 mm; phyllaries 4.5-7 × 0.7-1 mm, pilosulate or stipitate-glandular, apex acuminate. Corollas 5-7 mm, zygomorphic, with slightly unequal lobes, whitish, throat glandular-dotted, lobes 1.5-2.5 mm, puberulent and glandular-dotted. Cypselae c. 3

Perennial herbs 0.45-1.50 m; stems densely puberulent. Leaves opposite, weakly decrescent distally; blade 3-10 × 2-5 cm, ovate, trinervate near base, surfaces glandular-dotted, glabrous to sparsely pilosulose adaxially, sparsely puberulent to pilose along veins abaxially, glabrous to subglabrous between veins, base obtuse to acute, margins serrulate to serrate, apex obtuse to short-acute; petiole 0.5-1 cm, winged distally. Capitulescence with capitula in compact clusters, a lax elongate panicle, with elongate branches spreading at 45º or more, often with many sessile elliptical bracts; peduncles 0-3 mm. Capitula 7-10 mm; phyllaries c. 6 × c.1.2 mm, gland-dotted and sparsely to densely stipitate-glandular, apex sharply acute. Corollas 5-6 mm, pinkish, limb distally puberulent, lobes c. 1 mm. Cypselae 3.5-4 mm, setulose; pappus 0.1-0.3 mm, a low serrate crown of united scales 4 cypselae per capitulum often aristate with 3 awns. 2n = 66. Woods, pastures, rocky dry slopes, brushy places on thin soil, on sloping limestone rocks. Ch (Collins y Doyle 125, US); G (Croat y Hannon 63594, MO); H (Croat 63817, MO); ES (Standley 18688, US); CR (Grashoff, 1972: 249); P (Pittier 5073, US). 300-1600 m. (C. Mexico through Mesoamerica, Colombia, Venezuela, Ecuador.)


Shrubs 1-2? m; stems glabrous. Leaves opposite, evenly distributed along stems; blade 5-10 × 2-5 cm, lanceolate to ovate-lanceolate, venation of few ascending pinnate to scarcely trinervate veins, surfaces glandular-dotted, glabrous with obscure puberulence on veins adaxially, arachnoid-tomentose abaxially in basal vein axils, base acute to acuminate, margins crenate to crenate-dentate, apex acute to slightly acuminate; petiole 2-4.5 cm, winged distally. Capitulescence with capitula in compact clusters, rather densely corymbiform; peduncles 1-2 mm. Capitula c. 8 mm; phyllaries c. 5 × 0.6-0.8 mm, glabrous, apex long-acuminate. Corollas c. 4 mm, white, glabrous, lobes c. 0.8 mm. Cypselae c. 4 mm, setulose; pappus of several scales (c. 0.3 mm) and 1-3 alternating
short awns (0.8-1.2 mm). Montane forest? Ch (Matuda 16268, US). 1700-1900 m. (Endemic.)


Stevia viminea Schrad. ex DC.
Perennial herbs mostly 0.5-1 m; stems glabrous to sparsely puberulent. Leaves opposite to subopposite, sessile, broadly inserted, sometimes connate, evenly distributed along stems; blade 4.5-11 × 0.35-1.5 cm, oblong to linear, rarely narrowly lanceolate, often conduplicate, longitudinally trinervate from base, surfaces glabrous, glandular punctate abaxially, margins shallowly crenate-serrate, apex narrowly acute.
Capitulescence corymbiform, compact; peduncles 1-4 mm. Capitula 8-10 mm; phyllaries 4.5-6 × 0.8-1 mm, glabrous to minutely puberulent and sometimes glandular-dotted, apex acute. Corollas 4-5.5 mm, white, glandular, lobes 1.3-1.7 mm. Cypselae 2.5-3.7 mm, setulose; 4 cypselae per capitulum with 3 pappus awns 4-5 mm, 1 cypsela with only scales 0.3-0.7 mm. 2n = 44. En ladera seca rocosa, en ladera húmeda, bosque mixto alto de encinos y pinos, grassy glades. Ch (Purpus 9123, US); G (Steyermark 29656, US); H (Molina 1160, F); N (Garnier 2036 en parte, GH). 600-2500 m. (C. Mexico to Nicaragua.)


Stevia hirsuta DC., non Hook. et Arn., Stevia chortiana Standl. et Steyerm., Stevia hirsuta var. chortiana (Standl. et Steyerm.) Grashoff.
Perennial herbs 0.5-1 m; stems pilose proximally, becoming puberulent distally. Leaves opposite, mostly in proximal third of plant; blade 2.5-4.5 × 1.5-4 cm, ovate, trinervate from near base, adaxial surface sparsely pilose, paler and densely pilose mostly on veins abaxially, glandular punctate at least abaxially, sometimes with reddish tinges, base and apex obtuse, margins serrate; petiole mostly 1-2.5 cm, with broadened wings distally. Capitulescence with capitula in dense corymbiform clusters, terminal and on long, ascending lateral branches; peduncles 0-2 mm. Capitula 7-9 mm; phyllaries 4.5 × 0.8-1 mm, puberulent, apex obtuse, often substerrate near tip. Corollas 4-5 mm, purple or pink, puberulent and glandular-dotted, lobes 1-1.2 mm. Cypselae 3-3.3 mm, setulose; 4 cypselae per capitulum with 3 awns 4-5 mm, 1 cypsela with only united scales 0.5 mm.
2n = 44 + 6B Pine forest, pine-oak forest, moist banks and thickets. G (Molina y Molina 2661, F); H (Standley 14158, US). 1500-2600 m. (W. Mexico to Honduras.)

Turner (1997) treated this species as a synonym of S. hirsuta DC., an illegitimate later homonym.


Perennial herbs 0.7-1.5 m; stems pilose and stipitate-glandular. Leaves opposite, mostly sessile or subsessile above base, to 0-3 cm, distally winged only in proximal leaves; blade 2-6 × 1.5-4 cm, ovate, rarely elliptic, trinerved from near base, both surfaces with stipitate and punctate glands, base obtuse to subcordate, margins crenate, apex rounded to acute. Capitulescence laxly paniculate; peduncles to 22 mm. Capitula 10-12 mm; phyllaries 5-6 × c. 1 mm, with stipitate glands, apex acute to acuminate. Corollas 5.5-7 mm, zygomorphic with slightly unequal lobes, purplish with white to pale pink lobes, puberulent and sessile glandular, lobes 1.5-2.5 mm. Cypselae 4-4.5 mm, rather densely setulose; 4 cypselae per capitulum with 1-5 awns c. 5 mm, 1 cypsela exaristate, with united or separate scales 0.3-0.6 mm. 2n = 66, 68, c. 92. Disturbed secondary montane forest, rocky pine forest, moist bank in mixed forest. Ch (Matuda 4747, MEXU); G (King y Renner 7050, US); H (Standley 26612, US); N (Stevens 10325, US); CR (Lellinger y White 1658 US). 900-2700 m. (E. y C. Mexico to Mesoamerica, Colombia, Venezuela, Ecuador.)

Turner (1997) described each capitulum as having either no or one aristate cypsela. King y Robinson (1987) give Ageratum viscosum Sessé et Moc. (non Ortega) as either a synonym of S. elatior or of S. pilosa Lag.


Perennial herbs 0.5-1.5 m; stems puberulent, sometimes stipitate-glandular distally. Leaves opposite; blade 3-5 × 1.7-3 cm, ovate, surfaces gland-dotted, sparsely pilosulose
adaxially, paler and puberulent to pilosulose mostly on veins abaxially, base obtuse to acute, rarely truncate, margins serrate to dentate, apex acute; petiole 0.5-3 cm, winged distally. Capitulescence with capitula in dense corymbiform clusters, terminal or on long, ascending lateral branches, without numerous elliptical bracts; peduncles 0-2 mm. Capitula 9-12 mm; phyllaries 6.5-8.5 × 1-1.5 mm, stipitate-glandular, apex acute. Corollas 5-6.5 mm, pink to purple with paler lobes, lobes 1.5-2 mm, sparsely puberulent to hirtellous. Cypselae 3.5-4.5 mm, setulose; pappus c. 0.5 mm, exaristate, with separate or united scales. Wet mountain forest, mixed wet forest, on rocky bank, limestone area, damp thicket, ravine in cypress forest, scrub forest area. Ch (Ton [aka Mendez] 1703, NY); G (Standley 59996, US); H (Molina, 1975: 117). 1600-3400 m. (E. Mexico to Mesoamerica, Colombia, Venezuela.)


Erect perennial herbs 0.3-1 m; stems puberulent to pilosulose. Leaves opposite, evenly distributed along stems; blade mostly 1.5-5 × 1-3 cm, narrowly to broadly ovate, trinervate from near base, surfaces gland-dotted, glabrous to puberulent adaxially, paler and glabrous or pilosulose on veins abaxially, base obtuse to acute, margins serrate or dentate, apex acute; petiole 0-1.5 cm, winged distally. Capitulescence with capitula in compact corymbiform clusters, terminal and solitary or on long, ascending branches; peduncles 0-3 mm. Capitula 6-11 mm; phyllaries 5-8 × c. 1 mm, puberulent, apex acute to acuminate. Corollas 3-5 mm, pink to purple, sparsely puberulent and gland-dotted, lobes c. 1 mm. Cypselae 3-4 mm, setulose distally; pappus 0.4-0.8 mm, exaristate, with united or separate scales. 2n = 68. Pine and oak forest, rocky andesitic pineland canyon, open summit pastures. Ch (Breedlove y Raven 13732, US); G (Molina 21434, US); H (Nelson Sutherland, 2008: 197). 1000-3200 m. (E. Mexico to Mesoamerica.)


Perennial herbs 0.5-0.8 m; stems puberulent to pilose and with stipitate glands. Leaves opposite; blade 1.5-5 × 1-3 cm, ovate to ovate-lanceolate or elliptical, trinervate from
near base, surfaces with obscure glandular dots, sparsely to moderately pilose adaxially, subtomentose to tomentose abaxially, base short-acute to truncate or subcordate, margins crenate, apex rounded to obtuse; petiole 0.6-2.5 cm, narrowly to widely winged distally. Capitulescence diffuse, laxly paniculate; peduncles to 30 mm. Capitula 6-9 mm; phyllaries 4.5-6 × c. 0.8 mm, with stipitate glands, apex obtuse to acute. Corollas 3.5-4 mm, zygomorphic, with slightly unequal lobes, pinkish or greenish with whitish lobes, puberulent, lobes 0.8-1.3 mm. Cypselae 2.5-3 mm, with numerous short appressed setulae; pappus 0.2-0.7 mm, of united scales rarely with short awn-like projection or a single awn. Oak-pine woods, under shrubs. G (Steyermark 29714, F); H (Standley 15539, F). 1000-1500 m. (C. Mexico, Mesoamerica, Colombia, Venezuela.)


Shrubs 1-2 m; stems, leaves, branches of capitulescence and phyllaries vernicose; stems glabrous. Leaves opposite, evenly distributed along stems; blade 4-12 × 1.2-4 cm, oblong-ovate to lanceolate, more carnose abaxially, venation pinnate, surfaces glutinous, densely glandular-dotted, glabrous, base short-acute to rarely subtruncate, margins regularly serrate or crenate to remotely dentate, apex shortly to narrowly acute; petiole mostly 1-2 cm, not winged. Capitulescence compact, of densely corymbiform clusters of capitula; peduncles 0-2 mm. Capitula mostly 9-11 mm; phyllaries 5-6 × 0.7-1.5 mm, gland-dotted, apex usually acute. Corollas 5-6 mm, pink with paler lobes, glabrous, lobes 1-1.2 mm. Cypselae 3.5-5.5 mm, with numerous short setulae, rarely with some glandular dots; pappus to 0.2 mm, with united or separate scales exaristate. $2n = 24$. Bosque de coniferas y de encino, in open scrub vegetation, grassy slopes on lava flow, ladera riolítica con vegetación de encinar chaparro, rocky igneous sanstone summit, heavily wooded slopes with pine, oak and numerous shrubs. Ch (Laughlin 414, US); G (Molina y Molina 25035, F); CR (Pittier 14073, US); P (Wilbur et al. 10978, US). 1000-3500 m. (W. Mexico, Mesoamerica, Colombia, Venezuela.)

Stevia vulcanicola Standl. et Steyerm. Shrubs 1-4 m; stems glabrous to puberulent. Leaves opposite, evenly distributed along stems; blade 10-20 × 3.5-9 cm ovate-lanceolate to lanceolate, mostly, venation widely spreading and often closely pinnate, surfaces gland-dotted, glabrous adaxially with puberulent veins, subglabrous with minute fine trichomes mostly near veins abaxially, base short-acute to acuminate, margins crenate to dentate, apex slightly short-acuminate; petiole 3-6(-9) cm, narrowly winged distally. Capitulescence with capitula in compact corymbiform clusters, 8-45 cm diam.; peduncles 0-3 mm, arachnoid-pilosulose. Capitula c. 12 mm; phyllaries 7-8 × 0.7-1 mm, glabrous and gland-dotted, apex acute to acuminate. Corollas 4.5-5 mm, lavender, tube and throat glandular, lobes c. 1 mm, puberulent. Cypselae c. 6.2 mm, glabrous or with few setulae distally; pappus to 1.5 mm, of 1-3? irregularly spaced separate incised to lacinate scales. 2n = 24. Bosque húmido de pino y encino, roadside through dry pine-oak forest, steep forested slopes. Ch (Matuda 2848, US); G (Steyermark 34757, F). 2300-3300 m. (E. Mexico to Mesoamerica.)


Perennial herbs 1-2 m; stems densely puberulent. Leaves opposite or rarely whorled, evenly distributed along stems; blade 3-9 × 1.5-5 cm, ovate to rhomboid or elliptical, mostly trinervate from near base, surfaces gland-dotted, subglabrous with puberulent veins adaxially, glabrous to scarcely pilosulose with puberulent veins abaxially, base obtuse to acute, margins subentire or crenate to dentate or serrate, apex shortly to sharply acute; petiole 0.2-2.2 cm, winged distally. Capitulescence with capitula in compact corymbiform clusters, terminal or on long ascending lateral branches; peduncles 0-2 mm, puberulent to subtomentellous. Capitula 6-8 mm; phyllaries 4-6 × 0.7-1 mm, puberulent gland-dotted, apex short-acute and often broadly scarious. Corollas 4.5-5.5 mm, white or rarely slightly pink, gland-dotted and few trichomes on tube or throat, lobes 0.7-1.2 mm,
puberulent. Cypselae 3-4 mm, with sparse short setulae; pappus of separate or united scales (0.3-1 mm), exaristate or usually 1 to 4 cypselae per capitulum with 1-2 awns (c. 4 mm). 2n = 64-68, 72, c. 120. Montane cloud forest, mixed wet forest, open pine-oak woodland, moist pasture, bushy hillside, weedy field. Ch (Ton [aka Mendez] 1626, US); G (Pruski y MacVean 4495, MO); H (Portillo 29, US); ES (Renson 16, US); N (Garnier 2036, F); CR (Brenes s.n., NY); P (Terry 1275, US). (500-)900-2800 m. (SW. United States, Mexico, Mesoamerica, Colombia, Venezuela, Ecuador.)

This herb typically with white corollas is one of the more common and variable species of Stevia in Mesoamerica, and exaristate forms, less common in the northern portion of flora area, become increasing frequent and confused with S. triflora from Nicaragua southwards into Panamá.


Stevia arachnoidea B.L. Rob.

Shrubs 1-2 m; stems puberulent to pilose. Leaves opposite, evenly distributed along stems, primary leaves early deciduous; blade mostly 7-18 × 1.7-5.3 cm, ovate-lanceolate to lanceolate, venation pinnate with many spreading veins, with basal pairs not closer, convergent with basal margin, gland-dotted, at least adaxial surface shiny, subglabrous to puberulent adaxially, subglabrous to loosely tomentose abaxially, with arachnoid tomentum along veins, base acute, margins entire to serrate, apex acuminate; petiole 0.5-3 cm. Capitulescence compact with dense corymbiform clusters of capitula, terminal; peduncles 0-3 mm, puberulent. Capitula c. 12 mm; phyllaries c. 6.5 × c. 0.9 mm, apex obtuse to acute, arachnoid-puberulent and with numerous glandular dots. Corollas c. 6 mm, white or pinkish, tube sessile-glandular, often puberulent, throat usually glabrous, lobes c. 1 mm, puberulent. Cypselae c. 5.5 mm, with sparse minute setulae, sometimes vernicose; pappus of short united non-lacinate scales (c. 0.2 mm), occasional separate scales (to 1 mm). 2n = 24. Montane cloud forest, slope with Pinus and Quercus, common on ruins, bushy clearing. Ch (Laughlin 1796, US); G (Pruski y Ortiz 4267A, MO); H (Nelson Sutherland, 2008: 197). 1700-3600 m. (Mexico [Guerrero, Oaxaca], Mesoamerica.)

Perennial herbs 30-40 cm; stems white-tomentose. Leaves opposite throughout, evenly distributed along stems; blade mostly 2.5-3.5 × 0.6-1.2 cm, ovate, trinervate from near base, surfaces bicolored, sparsely tomentose adaxially, abaxially with dense white felt-like tomentum, margins crenulo-dentate; petiole 0.8-1.2 cm. Capitulescence terminal, compact, an obpyramidal corymbiform cluster, branches c. 20 cm, rather glabrous, with 3 or 4 pairs of reduced leaves; peduncles 1-3 mm, tomentose. Capitula mostly 7-9 mm; phyllaries 5-7 mm, linear-lanceolate, tomentulose, apex acute. Corollas c. 5 mm, white, sparsely puberulent and glandular dotted, lobes c. 0.8 mm. Cypselae rather obcompressed, sparsely setulose; pappus a fimbriate crown, 1 cypsela with a pair of weak bristles 1-2 mm. *On rocky creek bank in full sun.* Ch (*Prather 1144*, TEX). 1100-1200 m. (Endemic.)


Perennial herbs to 0.5 m; stems tomentose basally, sparsely pilosulose and ultimately densely puberulent distally in capitulescence. Leaves opposite, mostly basal; blade 1.5-4.5 × 1.2-3.5 cm, ovate or orbicular to rather spatulate, distal leaves smaller, elliptical to oblanceolate, trinervate from near base, surfaces sparsely pilosulose and gland-dotted, usually reddish abaxially, base acuminate to subtruncate, margins subentire to crenate, apex rounded to obtuse; petiole 1.5-4.5 cm, narrowly winged distally. Capitulescence subscapose, with dense subcymose to corymbiform clusters of capitula; peduncles 0-4 mm. Capitula 10-11 mm; phyllaries 7-7.3 × c. 1.3 mm, puberulent, apex acuminate. Corollas 6-6.5 mm, purple, lobes c. 1.3 mm, puberulent. Cypselae c. 4 mm, short-setulose; all cypselae with 3-5 awns c. 7 mm and 3 scales 0.8-1 mm. *On moist slopes in pine forest, mixed forest, barranco in oak forest, rocky slopes.* G (*Molina y Molina 25010*, US). 1900-2500 m. (Mexico, Mesoamerica.)

The type locality is near the border of Durango, Nayarit, and Sinaloa (Turner, 1997); Seemann not being known to have collected in Oaxaca. The species appears not to have been recollected, however, near the type locality. *Stevia seemannii* var. *selerorum* B.L. Rob. was treated by Turner (1997) as a synonym of *S. liebmannii* Sch. Bip. ex Klatt.


Erect perennial herbs to 0.6-1 m; stems puberulent to densely pilose. Leaves alternate, scattered or often crowded, sessile to subsessile, with axillary clusters of small leaves; blade 2.5-6.5 × mostly 0.2-1.5 cm, linear-spatulate to oblanceolate, rarely lanceolate or elliptical, sometimes conduplicate, secondary veins weak, sublongitudinally ascending, subtrinervate, surfaces gland-dotted, glabrous to puberulent adaxially, subglabrous to pilosulose abaxially, base narrowly tapered, margins subentire and usually serrate toward tip, apex rounded to acute. Capitulescence densely corymbiform; peduncles 0-2 mm, sessile-glandular, pubescent. Capitula 5-9 mm; phyllaries 3.5-6 × 0.7-1 mm, puberulent and with numerous glandular dots, apex obtuse to short-acuminate. Corollas 3-5 mm, usually white, often gland-dotted, lobes 1-1.5 mm, puberulent. Cypselae 2.2-4.2 mm, with numerous minute setulae; 4 (rarely 5 or 0) cypselae per capitulum usually with 3-5 awns, awns 3-5 mm, usually 1 cypsela with only separate or united scales 0.3-0.7 mm. 2n = 22, 33, 34, 33-44, 42-48, or c. 54. *Sand of pine woods, steep rock outcrops in Quercus-Acacia grasslands, pastured slope.* Ch (Breedlove, 1986: 56); G (*Breedlove 11451*, US); H (*Paz 22*, US). 900-2800 m. (SW. United States [Arizona, New Mexico, Texas], Mexico, Mesoamerica, Colombia, Venezuela, Ecuador.


*Stevia nepetifolia* Kunth.

Erect, perennial herbs 0.5-1 m; stems puberulent to subtomentose. Leaves opposite, evenly distributed along stems; blade 2.5-6 × 1.3-3.5 cm, ovate to ovate-lanceolate, trinervate from near base, surfaces gland-dotted, appressed puberulent adaxially, grayish to greenish or brownish tomentose or subtomentose abaxially, base obtuse to acute, margins serrate to rarely crenate, apex usually acute; petiole 0.5-2 cm, winged distally. Capitulescence compact, with dense corymbiform clusters of capitula terminal and on ascending lateral branches; peduncles 0-2 mm. Capitula 8-9 mm; phyllaries 4.5-7.5 × 1-1.5 mm, subtomentose and gland-dotted, apex rounded to obtuse. Corollas 4-5 mm, pale
pinkish, puberulent, typically also sessile-glandular, lobes 1-1.5 mm. Cypselae 3-4 mm, minutely setulose mostly on ribs; cypselae 4 per capitulum, c. 4.5 mm, 1-3-aristate, 1 cypsela with only separate or united scales 0.3-0.7 mm. \(2n = 68, 70\). Bosque nebuloso, pine forest, grassy slope with Quercus, pine-oak woods. Ch (Ton [aka Mendez] 1523, US); G (Molina 21251, F); CR (Grashoff, 1972: 283); P (Scherzer s.n., P). 1800-3300 m. (W. Mexico, Mesoamerica, Colombia, Ecuador.)


Shrubs 1-2 m; stems minutely densely puberulent. Leaves opposite, evenly distributed along stems, primary leaves rather persistent; blade 3.5-11 × c. 1.5-4 cm, ovate-lanceolate to lanceolate, venation weakly pinnate to subtrinervate with proximal veins often stronger and closer together, subparallel to basal margin, surfaces gland-dotted, sparsely to densely minutely puberulent adaxially, paler and puberulent abaxially, often tomentose on veins, base acute, usually attenuate, margins entire to crenate, apex obtuse to acute; petiole mostly 0.5-2 cm. Capitulescence with capitula in compact corymbiform clusters; peduncles 0-2 mm, tomentose. Capitula c. 9 mm; phyllaries c. 6 × c. 0.8 mm, sparsely puberulent to pilose and often gland-dotted, apex acute. Corollas c. 4.5 mm, white to pale pink, throat and tube sparsely puberulent and sessile-glandular (in Mesoamerica), lobes 0.5-0.8 mm, puberulent (in Mesoamerica). Cypselae 4-4.5 mm, with minute setulae distally; pappus c. 0.3 mm, a crown of united subfimbrillate scales. \(2n = 24\). Cloud forest, oak-pine forest, rocky places, in cultivated field. Ch (Breedlove 7995, US). 2000-3200 m. (C. Mexico to Mesoamerica.)

Turner (1997) recognizes three varities, the typical one in our Flora Area as well as the extra Flora Area *S. subpubescens* vars. *opaca* (Sch. Bip.) B.L. Rob. (with corollas glabrous throughout) and *S. subpubescens* var. *intermedia* Grashoff, here excluded.


*Stevia williamsii* Standl.

Shrubs 0.3-0.6 m; stems densely pale tomentose, becoming bare and corticated proximally. Leaves opposite, evenly distributed along stems or becoming more remote distally; blade 2-5 × 0.5-2 cm, elliptical to oblanceolate or spatulate, whitish or grayish or
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subpinnate to weakly trinervate from near base, adaxial surface with slight or evanescent tomentum, also sessile-glandular, with dense persistent pale tomentum abaxially, base acute, margins subentire to crenate, apex rounded; petiole 0.2-1 cm, winged and merging with blade distally. Capitulescence weakly subscapose, with capitula in a rather small dense corymbiform cluster, 2-5 cm diam.; peduncles 0-2 mm. Capitula 6-6.5 mm; phyllaries 4-5 × 0.7-0.8 mm, pale-tomentose and glandular dotted, apex acute. Corollas 3-4 mm, white, glandular throughout, sparsely puberulent distally, lobes c. 0.8 mm. Cypselae 1.7-2 mm, with minute setulae distally mostly on ribs; pappus of crown of united scales (c. 0.3 mm), sometimes 1 or more cypselae per capitulum with 1-3 awns (c. 3.5 mm). 2n = 24. On disturbed rocky slopes in pine zone, steep heavily wooded slope. Ch (Breedlove y Raven 13643, US); G (Turner, 1997: 195); H (Williams 13591, US).

On 800-1600 m. (Mexico [Oaxaca], Mesoamerica.) Grashoff (1976) gave this taxon as to be expected in Guatemala. Turner (1997) cited this species as occurring in Guatemala and in Oaxaca. Although, I could not verify either distributional report, it seems possible that the species occurs in Oaxaca.

20. Stevia triflora DC., Prodr. 5: 115 (1836). Holotype: Mexico, Oaxaca, Karwinski s.n. (M). Illustr.: no se encontró. N.v.: Hinojo de San Antonio, H. Perennial herbs 0.5-1 m; stems densely puberulent. Leaves opposite, evenly distributed along stems; blade 4-8 × 2-5 cm, ovate to narrowly ovate, trinervate from near base, surfaces gland-dotted, puberulent adaxially, puberulent to subtomentose abaxially on and between veins, base acute and acuminate, margins slightly to closely serrulate or serrate, apex acute; petiole usually 0.5 cm. Capitulescence with capitula in compact corymbiform clusters, terminal and on ascending lateral branches; peduncles 0-2 mm. Capitula 6-7 mm; phyllaries 4.5-5.5 × c. 0.7 mm, puberulent and gland-dotted, apex narrowly acute to acuminate, scarcely scarious. Corollas c. 4.5 mm, white, often gland-dotted, lobes c. 1.2 mm, sparsely puberulent. Cypselae 2.5-3 mm, with sparse minute setulae; pappus c. 0.3 mm, a fimbriate to subentire crown of united scales, awns lacking. 2n = 68-72. Matorrales y bosque mixto, dry oak forest, brushy slope, grassy slope with Quercus. Ch (Ton [aka Mendez] 1524, US); G (Heyde y Lux 6175, US); H (Diaz 223, US); ES (Padilla 313, US); N (Molina 23087, MO); CR (Pruski et al. 3951, US); P (Pittier 5297, US). 400-3200 m. (C. Mexico, Mesoamerica, Colombia, Venezuela, Ecuador.)


Perennial herbs to c. 1 m; stems puberulent to pilose, also sparsely to densely short-stipitate-glandular. Leaves alternate and often crowded, usually with axillary clusters of small leaves or with short branchlets, sessile to subsessile; blade mostly 2-8 × 0.3-1 cm, linear to oblanceolate, weakly sublongitudinally trinerved from near base, surfaces sparsely pilosulous and gland-dotted, sometimes with short stipitate glands abaxially, base tapering, margins entire to crenulate to serrulate, apex usually rounded to obtuse. Capitulescence a large, lax rather diffuse rounded to broadly cylindrical panicle, often to 30 × 20 cm, with loosely corymbiform branches; peduncles 2-10 mm, often half as long as involucres or longer, stipitate-glandular. Capitula 12-15 mm; phyllaries 7-10 × 1-1.2 mm, puberulent and with numerous sessile and short-stipitate glands, apex acute to acuminate. Corollas 6-9 mm, zygomorphic, with slightly unequal lobes, purple, rarely white, hirtellous, sparsely sessile-glandular, lobes 1-2.5 mm. Cypselae c. 5 mm, with numerous minute setulae; pappus of all cypselae with 3-6 awns (7-9 mm) alternating with separate scales (0.2-0.5 mm). 2n = 22. *Open places in pine-oak forest, Grama grassland, pastured grasslands, steep rock outcrops in Quercus-Acacia grasslands. G (Steyermark 52044, F). 1100-2600 m. (SW. United States [Arizona, Texas], Mexico, Mesoamerica.)*

This species remains known in Mesoamerica from the single specimen cited by Grashoff (1972).


Small decumbent perennial herbs 2-5 cm; stems white-puberulent. Leaves opposite, sessile, evenly distributed along stems; blade mostly 0.6-1.2 × 0.15-0.3 cm, narrowly elliptical to oblong, weakly ascending-trinerved from near base, surface puberulent on veins adaxially, sparsely pilosulous on veins and gland-dotted abaxially, base acute, margins entire to subentire, apex narrowly rounded. Capitulescence with capitula in small compact small corymbiform terminal cluster; peduncles 0-1 mm. Capitula c. 12 mm; phyllaries c. 7 × c. 1.5 mm, white-pilose, also minutely glandular-dotted, apex acute.
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Corollas c. 8 mm, red-purple with pale lobes, throat sparsely sessile-glandular, lobes c. 2 mm, white-puberulent, also glandular-dotted. Cypselae c. 4 mm, glabrous or with minute setulae distally; all cypselae with 5 awns (c. 7 mm) and alternating scales (c. 0.15 mm).

Dry cliff face at high elevation. CR (Weston 10077, US). 3300-3400 m. (Endemica.)

47. **Tuberostylis** Steetz

Por H. Robinson.

Creeping to scandent or epiphytic small shrubs in mangrove swamps, moderately branched, often rooting at nodes; stems terete, narrowly fistulose. Leaves opposite, distinctly petiolate; blade slightly succulent, obovate to elliptical, trinervate from near base, base acute to acuminate, margins entire to crenulate. Capitulescence terminal on lateral branches or sessile at nodes, corymbiform or in subglobose clusters of capitula. Capitula narrowly campanulate to cylindrical, discoid, 10-20-flowered; phyllaries 25-35, subimbricate, unequal, 4-5-seriate, striate, apex broadly rounded; outer phyllaries persistent, inner deciduous;clinicanthium flat, epaleate, surface sclerified, glabrous.

Corolla narrowly tubular with broader base, lobes 5, smooth with oblong cells on both surfaces; anther collars with mostly short-oblong cells, walls with weak annular thickenings, appendages as long as wide; style base not enlarged, glabrous, appendages linear, slightly mamilllose. Cypselae prismatic to cylindrical, 5-veined or 5-ribbed, covered with thick rind of hyaline cells when mature, glabrous, carpododium short, indistinct; pappus absent. 2 spp. Pacific coast from Panamá (1 sp. in Mesoamerica) to Ecuador.


Creeping, much branched, often epiphytic small shrubs to 0.5 m; stems dark brown. Leaves petiolate; blade mostly 1.2-2.5 × 0.7-1.8 cm, obovate to rhomboid, base acute to acuminate, margins remotely crenulate, apex rounded to short-obtuse; petiole 1-2.5 cm, broadened distally. Capitulescence terminal on lateral branches, sparingly thyrsoid.

Capitula 8-9 × c. 3 mm, campanulate, sessile in clusters of 2-4; phyllaries 25-30, 1-7 × 1-
1.5 mm, strongly subimbricate, short-orbicular to oblong, apex rounded. Florets 10-12; corolla c. 3.5 mm, white, lobes c. 0.3 × c. 0.3 mm, triangular. Cypselae c. 3 mm. 

*Mangrove swamps.* P (*Duke 10556, MO*) 0-5 m. (Mesoamerica, W. Colombia, NW. Ecuador.)

### 48. *Zyzyura* H. Rob. et Pruski

Por H. Robinson

Decumbent perennial herbs with erect flowering branches; stems terete, prostate leafy stems with short internodes, narrowly fistulose. Leaves opposite; blade deltoid in outline, 5-7-lobed with sinuses 1/3-1/2 to midvein, with triplinervate veins, sparsely pilose adaxially, paler and hairless with crowded glandular dots abaxially, basal margin truncate to subtruncate; petiole short, slender. Capitulescence terminal on ascending laxly cymose branches, with elongate basal internodes, unbranched below, distally loosely branched, with few minute bracteoles; peduncles 0.5-1.8 cm. Capitula broadly campanulate, discoid, phyllaries (12-)16(-18), eximbricate, not obviously gradated, mostly in c. 2 subequal series, with few shorter outer phyllaries; clinanthium high-conical, higher than wide, fistulose, epaleate, with sclerified surface, glabrous. Corolla broadly campanulate white, basal tube slender, closely investing style, veins thickened in base, limb obviously ampliate, lobes broadly triangular, as wide as long, moderately spreading, prorulose by projecting distal ends of broad cells on both surfaces; anther collars slender, cells oblong, not totally obscured by dense transverse annular thickenings on walls, appendage slightly broader than long, not truncate; style base without enlarged node, glabrous, branches linear, the slightly clavate distal portion densely papillose. Cypselae somewhat fusiform, 3-5-ribbed, with few scabrae on ribs, without glands, carpopodium enlarged with distinct projecting distal rim, cells narrowly oblong with thickened periclinal walls; pappus of c. 10, persistent, non-contiguous scabridulous bristles, slightly broadened at base, narrowed to slender tips. 1 sp. Belize.


*Fleischmannia mayana* Pruski, *Phytoneuron* 2012-32: 6 (2012). Holotype: Belize,
Procumbent perennial herbs to 30 cm; stems subglabrous. Leaves opposite; blade 4-7 × 5-9 mm, pedate, deltate in outline, 3-7-lobed about 1/3-1/2 of the distance to midrib, adaxial surface sparsely hirsute-pilose, abaxial surface glandular; petiole 0.3-0.7 cm. Capitulescence 3-10-capitulate; peduncles 7-20(-35) mm, sparsely hirsutulous-pilosulose. Capitula 5-6 mm; phyllaries 12-18, mostly 2-3 × 1.5-2 mm, apex obtuse to rounded. Florets 20-23; corolla 2.2-2.3 mm, campanulate, white, lobes 0.4-0.5 mm. glabrous or sparsely glandular; style branches slightly clavellate. Cypselae 1.2-1.3 mm, faces and ribs concolorous, black at maturity, glabrous or sometimes sparsely glandular; pappus bristles 1.4-1.7 mm. *Steep rock faces*. B (*Brewer y Pau* 3349, MO). 1000-1100 m (Endemic.)

Known only from Victoria Peak in the Cockscomb range of the Maya Mountains in Belize.

Ignotae:

*Eupatorium guatemalense* Regel.

**X. Tribus Gnaphalieae** Cass. ex Lecoq et Juillet (Treatment incomplete, in progress)

*Gnaphaliinae* Dumort.

Por J.F. Pruski.

Annual herbs to shrubs, usually not stoloniferous, rarely dioecious; stems winged or exalate. Leaves basal and/or cauline, simple, alternate (Mesoamerica) or rarely opposite; blade generally chartaceous, margins usually entire, surfaces sometimes sessile-glandular or stipitate-glandular, at least abaxial surface typically arachnoid-floccose to tomentose. Capitulescence typically terminal, mostly cymose or corymbiform to thyrsoid-paniculate, sometimes glomerulate, sometimes spiciform, rarely monocephalous. Capitula usually small and disciform (rarely pseudoradiate), infrequently discoid; involucre ecalyculate; phyllaries several to many (few or vestigial in Filaginae where typically bracts subtend the glomerules of exinvolute or poorly involucrate capitula), usually imbricate and graduate, (1-)3-10+-seriate, free, usually persistent, the base (stereome) often cartilaginous, usually undivided (non-fenistrate) or sometimes divided with interspersed distal thinner translucent areas (fenistrate), the distal lamina thinner and usually obviously scarious or thinly papery, often brownish and transparent, or sometimes lamina especially of inner phyllaries white or yellowish to purplish and somewhat opaque; receptacle
mostly flat to convex (infrequently concave, rarely conical), epaleate (Mesoamerica) or in Cassinia and Filaginae at least partly paleate. Marginal florets 0 or 1-pluriseriate, pistillate, usually more numerous than disk florets; corolla usually filiform (rarely pseudoradiate), apex 2-5-fid. Disk florets usually few to several, bisexual or sometimes functionally staminate; corolla often tubular(-funneliform), shortly (3-)5-lobed, lobes usually deltate; anthers caudate, endothecial tissue polarized (Mesoamerica), rarely radial, apical appendage usually ovate to elliptic-ovate, usually flat; style bifid or infrequently undivided, exappendiculate, branches truncate to sometimes conical, stigmatic surface 2-banded, apically papilllose, infrequently also abaxially papillose, papillae obtuse. Cypsela usually small, usually ellipsoidal or ovoid to obovoid, (2-)5-nerved, typically erostrate, not obviously rugulose-tuberculate abaxially, glabrous to surface with oblong or globular trichomes or papillae, trichomes and papillae sometimes myxogenic, carpopodium usually thin and annular; pappus usually present and often fragile (absent in extra-Mesoamerican Filaginae), usually of scabridulous to barbellate(-plumose, infrequently subclavellate with short terminal cells with rounded apices) bristles, sometimes of bristles and scales, or rarely only of scales. Aprox. 190 genera and 1250 spp., cosmopolitan but mostly in the southern hemisphere of the Old World.

By tailed anthers and mostly disciform capitula, Gnaphalieae have traditionally (e.g., Bentham y Hooker, 1873) been included within tribe Inuleae. Important studies in the 1900s of the group as Inuleae subtribe Gnaphaliinae include those of Cabrera (1961), Dillon y Sagástegui (1991a), Drury (1970), and Hilliard y Burtt (1981). The most significant recent study was the generic overview by Anderberg (1991), who reinstated Gnaphalieae at the tribal level. Generic boundaries and features stressed herein are often adapted from these aforementioned important works. Gnaphalieae subtribe Filaginae, characterized by epappose cypsela, partly paleate receptacles, and bracteate glomerules of poorly involucrate capitula, have usually been recognized as a distinct gnaphalioid group, but otherwise subtribal circumscription seems unsettled.

1. Capitula to c. 20(-30) mm; involucres 20-50 mm diam.; marginal florets fewer in number than disk florets.

6. Xerochrysum

1. Capitula usually < 10 mm; involucres < 8 mm diam.; marginal florets usually more numerous than disk florets.

2. Disk florets functionally staminate; inner phyllaries commonly spreading or reflexed.

2. Chionolaenae

2. Disk florets bisexual; phyllaries appressed.

3. Pappus bristles connate basally and deciduous as a ring.
3. Chionolaenae

3. Pappus bristles usually individually caducous

4. Capitula 4-8-flowered.


5. Basal stereome of phyllary usually undivided (distally thinner and translucent, fenistrate).

4. Gnanaphalium

5. Basal stereome of phyllary usually divided (distally thinner and translucent, fenistrate).

5. Pseudognaphalium

1. Achyrocline

Gnanaphalium subgen. Achyrocline Less.

Por J.F. Pruski.

Perennial herbs to subshrubs; stems usually erect, often few-branched, infrequently winged by decurrent leaves; herbage often lanate-tomentose or rarely glabrate, trichomes typically elongate-filiform distally with broader bases. Leaves sessile or petiolate; blade linear to ovate, chartaceous to firmly so, venation obscure or 3-veined, surfaces eglandular or sessile-glandular (ours abaxially glandular), adaxial surface often arachnoid, sometimes falsely seeming heterotrichous by large diameter differences in the flagelliform trichome bases and apices, abaxial surface often lanate-tomentose, margins entire to crenulate. Capitulescence many-capitulate, corymbiform-paniculate with ultimate capitula often glomerulate. Capitula disciform, few-flowered, ours 4-8-flowered, small, usually < 10 mm; involucere usually < 5 mm diam., cylindrical to sometimes compressed; phyllaries graduate or rarely subequal, 3-4-seriate, appressed, lanceolate to oblanceolate, or the outer ones sometimes ovate, golden to white, glabrous or arachnoid proximally, sometimes also sessile-glandular proximally (on stereome), stereome divided, sometimes greenish, margins typically hyaline. Marginal florets 3-6(-11); corolla filiform, mostly yellow, often minutely trifid apically. Disk florets 1-3, bisexual (ours) or infrequently
functionally staminate; corolla mostly tubular, basally slightly broadened, very narrowly ampliate distally, 5-lobed, yellowish, lobes minutely papillose-glandular; style bases broadened, branches linear, truncate at apex, stigmatic surfaces 2-banded. Cypselae more or less obovoid, sometimes subcompressed, glabrous or sometimes appearing papillose at high magnification due to imbricate nature of cells; pappus of many capillary bristles, bristles isomorphic, free, scabrous to barbellate, white, caducous, terminal cells obtuse. $x = 14$. Aprox. 32 spp.; México, Central America, South America; c. 30 in the Neotropics.

*Achyrocline* is similar to *Gnaphalium*, but may be distinguished by its cylindrical or compressed (vs. usually campanulate) capitula with 1-3 (vs. $\geq 5$) disk florets. The African taxa with a sometimes irregularly squamulose receptacle, referred to *Achyrocline* in Pruski (1997a), are now mostly referred to *Helichrysum* as in Beentje (2002). Although most vegetative and floral features and measurements of our two species overlap, they appear to be distinguished by leaf shape. I have seen no material of Mexican *Achyrocline ventosa* Klatt, which could be an earlier name for *Achyrocline deflexa*.

The characters of shape of corolla base (broadened or not so) and eglandular or glandular phyllary bases used by Nesom (1990b) to diagnosis species partly conflict with the genus circumscription of Badillo y González (1999), vary within individual capitula, with capitula position within glomerules, and also with age of florets; they do not appear to be very useful in delineating species. The two isotypes of *Achyrocline deflexa* examined by me have glandular leaves, but Nesom (1990a) characterized this species as having eglandular leaves, and indeed occasional individuals do sometimes seem eglandular.


1. Leaves spatulate or distal ones lanceolate, base often petiolariform and abruptly narrowly attenuate, abaxial surfaces and glands typically obscured, often lanate-tomentose.

1. **A. deflexa**

1. Leaves lanceolate, base always gradually attenuate to stem, abaxial surface and glands sometimes slightly visible, griseous-lanate.

2. **A. vargasiana**

Achyrocline yunckeri S.F. Blake.

Erect herbs 0.5-1.2 m, sometimes woody-based; stems simple or branched, leafy throughout, densely white lanate-tomentose, surface obscured, leaves commonly longer than internodes. Leaves 3-9(-13.5) × (0.6-)1-2(-3) cm, spatulate or distal ones lanceolate, trinerved from above base, surfaces moderately to obviously discolorous, adaxial surface pale-green, surface slightly visible, loosely arachnoid with flagelliform trichomes, abaxial surface often white-tan, glands typically obscured, rarely absent, often lanate-tomentose, base often petiolariform and abruptly narrowly attenuate, margins occasionally weakly revolute, apex narrowly acute to acuminate; petiolariform base usually c. 0.5-1.2 cm in mid-stem leaves. Capitulescence to c. 15 cm diam., more or less rounded on top, from axillary bracteate branches 3-10 cm in the distal-most few nodes, dense or open, glomerules several-capitulate, glomerule stalk to 1 cm; peduncles 0(-5) mm. Capitula 4-4.5 mm; involucre c. 1.3 mm diam., base immersed in stem tomentum; phyllaries 8-11, (2-)2.5-3.8 × c. 1.1(-1.5) mm, conduplicate, base stramineous-brown grading distally to white or to pale yellow, typically proximally minutely glandular, glands fragile, also white-arachnoid, otherwise subglabrous, the arachnoid indumentum with trichomes few-septate, apex acute to obtuse. Marginal florets 3-4; corolla 3-3.3 mm. Disk florets 1(-3); corolla c. 3.3 mm, broadened basally, lobes 0.1-0.2 mm, minutely glandular; style base swollen. Cypselae c. 0.5 mm; pappus bristles c. 3.2 mm. Flowering Jan-Jul. Rocky areas, disturbed areas, mixed forests, pine-oak forests, thickets, infrequent in cloud forest. Ch (Croat y Hannon 65217, MO); G (Steyermark 43028, NY); H (Yuncker 5872, US); N (Williams et al. 27955, NY). 1000-3000 m. (S. México, Mesoamérica.)

Nesom (1990a) stated that the leaves were eglandular, leaf trichomes "filiform to the very base," mature phyllaries eglandular, and corollas eglandular, whereas I find both type and nontypical materials to have glandular (rarely seemingly eglandular) leaves, leaf trichomes slightly broad-based, phyllaries proximally minutely glandular with fragile glands, and corolla lobes glandular. In these regards, *A. deflexa* is not consistently distinguished from *A. vargasiana*.


Erect herbs, 0.4-1.2 m; stems few-branched, leafy throughout, white-lanate or arachnoid, surface somewhat visible, leaves of main axis commonly longer than internodes, distal leaves
often shorter than internodes. Leaves 4-11 × 0.6-1.7 cm, lanceolate, sessile, trinerved from above base, surfaces slightly to moderately discolorous, adaxial surface pale-green, visible through indument, loosely arachnoid, trichomes flagelliform, typically also sparsely glandular, abaxial surface griseous-lanate, glandular, glands sometimes slightly visible, base always gradually attenuate to stem, margins often revolute, apex acuminate. Capitulescence to c. 7 cm diam., branches often with c. 5 closely spaced glomerules in terminal 2 cm, each glomerule 20+-capitulate; peduncles essentially absent. Capitula c. 5 mm, involucre c. 1.5 mm diam., held above stem tomentum, phyllaries pale yellow with very base slightly darker, proximally glandular, glands fragile, otherwise subglabrous or sometimes base very sparsely arachnoid. Marginal florets 3-5; corolla 2.5-3 mm. Disk florets (1-)2-3; corolla 3-3.6 mm, slightly broadened basally, lobes 0.2-0.3 mm, sparsely minutely glandular; anther collar elongate, about as long as tails; style base slightly swollen. Cypselae c. 0.5-0.6 mm; pappus bristles c. 3.5 mm. Flowering Feb-Aug, Dec. Mixed deciduous forests, pine-oak forests. Ch (Pérez G. 164, HEM); G (Contreras 11271, MO); H (Croat y Hannon 64237, MO); N (Moreno 7073, MO). 1000-2400 m. (Mesoamérica, Colombia, Venezuela, Guyana, Bolivia, Brasil, Uruguay, Paraguay, Argentina.)

Achyrocline vargasianum and narrow-leaved A. saturioides (Lam.) DC. are similar, but were treated by Pruski (1997a) and Badillo (1999) as distinct species. Each was considered widespread South American endemics in Pruski (1997a) and Badillo (1999), but A. vargasiana is now known to extend into Central America and southern México. It is of interest to note that the species is seemingly absent from the geologically recent isthmus of Costa Rica and Panamá. Nesom (1990b) noted that this species is often misidentified as Gnaphalium attenuatum.

2. Chionolaena DC.

Gnaphaliothamnus Kirp., Leucophilis Gardner, Parachionolaena M.O. Dillon et Sagást.,
Pseudoligandra M.O. Dillon et Sagást.
Por S.E. Freire.

Arbustos o subarbustos bajos; tallos erectos o ascendentes, dicotómicamente ramificados, densamente lanosos y hojosos cuando jóvenes, glabros y áfilos con cicatrices foliares marcadas en la parte inferior a la madurez. Hojas sésiles, erectas en la parte superior y comúnmente reflexas en el resto (muy raramente adpressas), stiffly chartaceous, revolutas en el margen, mucronadas en el ápice, con trichomes glandulares y no glandulares, glabras o tomentosas en el haz, densamente albo-lanosas en el envés. Capitulescencia monocephalous o más comúnmente corimbiaformes o umbeliformes (a veces sustentadas a la madurez por un largo pedúnculo laxamente hojoso);
capítulos cortamente pedunculados o sésiles. Capítulos discóides o disciformes, small, usually < 10 mm; involucro < 8 mm diam., cilíndrico o acampanado; filarios scarious, glabras, esteroma entero, lámina opaca de color blanco, las externas ovadas o linear-ovadas y pubescentes en el dorso, las internas lineares o linear-obovadas, comúnmente spreading or reflexa. Flósculos 5-c. 100; corola de color blanco-crema, frecuentemente rojizas en el ápice, flósculos marginales pistiladas, cuando existen, en número menor, en igual número o más numerosas que los flósculos del disco. Flósculos marginales pistiladas; corola filiforme, brevemente bidentata y con pelos glandulares en el ápice. Flósculos del disco funcionally estaminadas (a veces funcionalmente pistiladas, neutras o bisexual); corola tubulosa, apenas dilatada en la parte superior, 5-lobada, lóbulos papilosos y con pelos glandulares; anteras sagitadas en la base, con apéndice conectival ovado; estilo cortamente bifido o a veces no dividido; ramas truncadas o agudas en el ápice; dorsalmente pubecentes, con pelos colectores obtusos hasta más allá del punto de bifurcación, ovario comprimido con embrión no desarrollado. Cipselas glabros o pubescentes, con pelos cortos y obtusos o con pelos largos y agudos en el ápice; papus formado por cerdas barbeladas, unidas en un anillo basal, apenas connadas, o bien libres y ciliadas o enteras en la base, dimórfico (flósculos marginales con células terminales apenas ensanchadas y flósculos del disco con las células terminales del papus claviforme) o subdimórfico (flósculos marginales con células terminales apenas ensanchadas y flósculos del disco con las células terminales del papus agudas o subclaviformes). x = 14. Aprox 20 spp. de las regiones montañosas del centro de México, Mesoamerica, norte de Colombia, sur de Venezuela y sudeste del Brasil.

En un trabajo anterior he revisado las especies de *Chionolaena* (Freire, 1993). En esa oportunidad acepté a *Gnaphaliothamnus* Kirp. como el género más afín. Así, el género monotípico *Gnaphaliothamnus* fue reconocido por las cerdas del papus libres, ciliadas en la base y con células apicales lineares (vs. cerdas del papus unidas en un anillo basal y con células apicales claviformes). Igual criterio fue seguido por Anderberg (1991) en su tratamiento de la tribu Gnaphalieae. Más recientemente, Nesom (2001) consideró a *Gnaphaliothamnus* como un sinónimo de *Chionolaena*. La reexaminación de las cerdas del papus (en prep.) en las especies de *Chionolaena y Gnaphaliothamnus*, reveló la presencia de estados intermedios entre las formas más extremas de papus, lo cual dificulta en este momento, el reconocimiento de *Gnaphaliothamnus* en un género diferente.

*Chionolaena aecidiocephala* (Grierson) Anderb. et Freire y *C. eleagnoides* Klatt occur in central Oaxaca and should be looked for in Mesoamerica.

1. Hojas 5-13(-18) × 1.5-2.5(-3.5) mm, linear-elípticas o linear-oblongas.
   2. Lámina de las filarias internas sólo blanca en el ápice.  
      1. C. cryptocephala
   2. Lámina de las filarias internas blanca.
      2. C. lavandulifolia

1. Hojas 10-50(-95) × 1-1.5(-3) mm, estrechamente lineares.
   3. Filarias externas agudas o obtusas en el ápice; hojas 20-50(-95) mm, discolores, 
      glabrescente en el haz.
   3. C. salicifolia
   3. Filarias externas acuminadas en el ápice; hojas 10-20(-30) mm, subdiscolores, tomentosa en 
      el haz.
   4. C. sartorii


Subarbustos enanos c. 30 cm. Hojas 8-13 × 1.5-2 mm, linear-elípticas o linear-oblongas, 
tomentosas en el haz, albo-lanosas en el envés, revolutas en el margen, agudas en el ápice.
Capitulescencias densas, corymbiforme en el ápice de las ramas, capítulos subsésila. Capítulos 
disciformes; involucro 4-4.5 mm, acampanado; filarias c. 17, las externas ovadas, agudo-
acuminadas en el ápice, las internas linear-elípticas, con lámina sólo blanca en el ápice. Flósculos 
marginales 18-20; corola c. 3 mm. Flósculos del disco 4-5; corola c. 2.5 mm; ramas del estilo 
truncadas. Cipselas oblongas, subglabras; papus cerdas subdimórfico, con células apicales agudas 
(apenas más ensanchadas en las flósculos del disco); cerdas del papus ligeramente connatas en la 
base, separándose fácilmente, ciliadas en la base. Flowering Mar. Pastizales con pequeños y 
esparcidos ejemplares de Pinus. Ch (Breedlove 24347, TEX). Aprox. 3800 m. (Endémica.)

Sólo conozco el ejemplar tipo de esta especie. Parece afín a Chionolaena lavandulifolia.

2. Chionolaena lavandulifolia (Kunth) Benth. et Hook. f. ex B.D. Jacks., Index Kewensis 1: 
"Elychrysum lavandulaefolium". Holotipo: México, Veracruz, Humboldt y Bonpland s.n. (P-

Chionolaena costaricensis (G.L. Nesom) G.L. Nesom, Chionolaena macdonaldii (G.L. 
Nesom) G.L. Nesom, Gnaphalium lavandulaceum DC., Chionolaena lavandulaceum (DC.)

Subarbustos cespitosos hasta enanos 10-35 cm. Hojas 4-12(-18) × 1.5-2.5 (-3.5) mm, linear-elípticas, tomentosas en el haz, albo-lanosas en el envés, revolutas en el margen, agudas en el ápice. Capitulaciones densas, corymbiforme en el ápice de las ramas, capítulos subsésiles. Capítulos disciform; involucro 5-9 mm, acampanado; filarias 24-44, las externas ovadas, obtusas el ápice, las internas linear-elípticas, con lámina blanca. Flósculos marginales 5-24; corola 3-4.5 mm. Flósculos del disco 3-18; corola 3-5 mm; ramas del estilo truncadas a obtusas. Cipselas oblongas, glabras o subglabras; papus cerdas subdimórfico o dimórfico, con células apicales agudas o subredondeadas hasta claviformes (apenas o conspicuamente más ensanchadas en las flósculos del disco); cerdas del papus ligeramente connatas en la base, separándose en grupos o completamente libres, subenteras o ciliadas en la base. Flowering Jan-Apr, Jul-Sep. Bosques de Pinus, en lugares rocosos y arenosos, páramos con Chusquea bamboo, en lugares rocosos y soleados. G (Isbele y Hüber 1575, US); CR (Davidse 25035, US). 3100-3800 m. (México, Mesoamérica.)

Esta especie presenta una gran variabilidad en lo que respecta principalmente al número de flósculos por capítulo, al número de brácteas involucrales y a la pubescencia de los cipselas. Esto ha dado lugar a que se describan otras dos especies, *Chionolaena costaricensis* y *C. macdonaldii*. Nesom (1990c) diferencia *C. costaricensis* de *C. lavandulifolia* por tener la primera de ellas, 5-10 flósculos pistiladas (vs. 21-24), 24-28 brácteas (vs. 34-56) y cipselas glabras (vs. subglabras). Sin embargo he podido observar ejemplares de *C. lavandulifolia* con cipselas glabros con un mayor número de flósculos pistiladas (17-24) y de brácteas (44). Mientras que para la segunda especie, *C. macdonaldii* (de la cual sólo conozco hasta el momento el ejemplar tipo).

Nesom (1990c) indica para los caracteres antes mencionados, valores intermedios entre *C. costaricensis* y *C. lavandulifolia*. Sobre la base del material examinado y los tipos vistos, no he hallado caracteres que permitan diferenciar con claridad estos taxones, por lo que considero que sólo existe una especie de este grupo, que debe llamarse *C. lavandulifolia*.

**Chionolaena corymbosa** Hemsl., **Chionolaena seemannii** (Sch. Bip.) S.E. Freire, **Gnaphaliothamnus salicifolium** (Bertol.) G.L. Nesom, **Gnaphalium rhodanthum** Sch. Bip., **Gnaphalium salicifolium** (Bertol.) Sch. Bip., **Gnaphalium seemannii** Sch. Bip.

Arbustos 10-100 cm. Hojas 20-50(-95) × 1-1.2(-3) mm, estrechamente lineares, discolores, glabrescentes y verde oscuras en el haz, densamente albo-lanosas en el envés, revolutas en el margen, agudas en el ápice. Capitulescencias densas, corymbiforme en el ápice de las ramas, capitulos subsésila a cortamente pedunculados. Capítulos disciform; involucro 4.5-5 mm, acampanado; filarias c. 32, las externas ovadas, agudas o obtusas en el ápice, las internas lineares, con lámina blanca. Flósculos marginales 20-24; corola c. 2.5 mm. Flósculos del disco 4-5; corola c. 3 mm; ramas del estilo truncadas. Cipselas oblongas, cortamente pilosas; papus cerdas subdimórfico, libres y ciliadas en la base células apicales agudas (apenas más ensanchadas en las flósculos del disco). Flowering Nov-May. **Bosques, sobre suelos rocosos y arenosos.** Ch (Linden 437, K); G (King 7277, US). (1600-)2200-3500(-4200) m. (México, Mesoamérica.)


Arbustos cespitosos hasta enanos 8-30 cm. Hojas 10-20(-30) × 1-1.5 mm, estrechamente lineares, subdiscolores, tomentosas en el haz, albo-lanosas en el envés, levemente revolutas en el margen, agudas en el ápice. Capitulescencias corymbiforme en el ápice de las ramas, capítulos cortamente pedunculados. Capítulos disciform; involucro 4-6 mm, acampanado; filarias 17-25, las externas ovadas, acuminadas y de color castaño en el ápice, las internas linear-elípticas, las más internas con lámina blanca en el ápice (1-1.5 mm). Flósculos marginales 14-28; corola c. 4 mm. Flósculos del disco 4-9; corola c. 4 mm; ramas del estilo truncadas. Cipselas oblongas, cortamente pilosas; papus cerdas subdimórfico, libres, ciliadas en la base, células apicales agudas (apenas más ensanchadas en las flósculos del disco). Flowering Mar. **Pastizales y laderas escarpadas con Pinus, Juniperus y Buddleja.** Ch (Breedlove 24301, MO). 3000-3600 m. (S. México, Mesoamérica.)

**3. Gamochaeta** Wedd.


Por J.F. Pruski.
Annual to perennial tap-rotted or fibrous-rooted herbs; stems often simple and erect, sometimes much branched from base and decumbent-erect, rarely much reduced or plants rosulate; herbage usually loosely lanate to vaginano-sericeous (called "closely pannose" in Nesom, 2004a; i.e., with trichomes appressed and fused sheath-like, not individually apparent); trichomes usually filiform, infrequently flagelliform with expanded glassy basal cells. Leaves sessile or sometimes long-tapered into petioliform base, all cauline or sometimes also with basal leaves persistent at anthesis in rosettes; blade often oblanceolate or spatulate, mostly chartaceous, the pinnate secondary veins arching or obscure by tomentum, surfaces concolorous or bicolorous, eglandular, usually adaxially glabrous to loosely lanate, abaxially loosely lanate or tomentose to vaginano-sericeous, margins entire or crenulate. Capitulescence terminal, usually spicate to corymbiform-paniculate, usually with glomerate capitula (ours), rarely individually pedunculate, when spicate either dense and uninterrupted or leafy and interrupted by elongated internodes. Capitula disciform, small, usually < 7 mm; involucre usually < 4 mm diam., cylindrical to campanulate; phyllaries 3-5-seriate, appressed, triangular to lanceolate, papery-scarious, mostly glabrous, sometimes seemingly floccose and imbedded in stem tomentum, stereome undivided, lamina usually brown to stramineous or sometimes pinkish or purplish, translucent, margins commonly hyaline; receptacle concave post-fruit. Florets with corolla usually yellowish or sometimes apex purple. Marginal florets usually numerous and pluriseriate, pistillate; corolla filiform. Disk florets 1-6, bisexual; corolla tubular, 5-lobed; styles shortly bifid, the branches linear, apex truncate, with 2-banded stigmatic surfaces. Cypselae oblong or ellipsoid, with sessile globular (myxogenic) trichomes; pappus of 15-25 capillary bristles in a single series, bristles isomorphic, subequal, about as long as the corolla, barbellate to scabridulous, connate basally and deciduous as a ring, apical cells acute, not clavate. Aprox. 50 spp. Native to the Americas, but several species cosmopolitan; Aprox. 24 spp. in the Neotropics.

*Gamochaeta* has been treated traditionally as a section of *Gnaphalium* (e.g., Hilliard y Burtt, 1981; Drury, 1971), but Cabrera's (1961) resurrection of *Gamochaeta* is now commonly followed (e.g., Anderberg, 1991; Freire y Iharlegui, 1997; Pruski, 1997). Species of *Gamochaeta* differ from those of *Gnaphalium* most notably by having a pappus deciduous as a ring.

Species identifications in many widespread variable weedy species of *Gamochaeta* are often difficult. The first lead in many species keys (e.g., Drury, 1971) stresses plant duration and basal rosette features, features hard to discern from incomplete specimens. Apex shape of outer and/or inner phyllaries are often useful taxonomically, and comparative figures of the phyllaries of several common species were provided by Drury (1971) and Nesom (2004a). For example, although outer phyllaries of some species may be obscured by tomentum, and in budding material
the midseries phyllaries may obscure the tardily elongating inner phyllaries, the obtuse phyllaries of *G. coarctata* are useful in distinguishing it from *G. americana* and *G. simplicicaulis*.

Often distributional reports of *G. purpurea* (L.) Cabrera are based on material of either *G. americana* and *G. pensylvanica*, both of which have at times been synonymized with *G. purpurea*, but which lack the broad-based flagelliform trichomes on the adaxial leaf surface that characterizes *G. purpurea*. Usage of the name *G. purpurea* in the Neotropics may not be consistent with usage in the United States.


1. Leaves usually moderately to obviously bicolorous.

   2. Trichomes of adaxial leaf surfaces flagelliform with glassy basal cells.

   **4. G. purpurea**

   2. Trichomes of adaxial leaf surfaces (when pubescent) filiform, trichomes lacking glassy basal cells.

      3. Stems closely vaginano-sericeous; basal rosettes conspicuous and present at anthesis; leaves often spatulate, surfaces obviously bicolorous, adaxially bright green, margins often undulate or crenulate; inner phyllaries obtuse to rounded.

   **2. G. coarctata**

   3. Stems loosely lanate to closely vaginano-sericeous; basal leaves usually withered at anthesis; leaves linear-oblanceolate to obovate-oblanceolate, adaxially dull green, margins infrequently undulate or crenulate; inner phyllaries commonly acuminate to broadly acute.

      4. Stems loosely lanate, abaxial leaf surfaces lanate-tomentose to vaginano-sericeous; bases in mid-stem leaves often distinctly subclasping; capitulescence uninterrupted to sometimes proximally interrupted; phyllaries often with lamina brownish, the outer phyllaries with apices acute to obtuse.

   **1. G. americana**

   4. Stems and abaxial leaf surfaces and closely vaginano-sericeous; bases in mid-stem leaves not subclasping, capitulescence interrupted throughout; phyllaries not apically
brownish, apices of outer phyllaries long-acuminate.

5. **G. simplicicaulis**

1. Leaves concolorous to weakly bicolorous.

5. Plants subacaulescent or sometimes mat-forming, 2-10 cm. 7. **G. standleyi**

5. Plants caulescent or subscapose, 5-50 cm.

6. Subrosulate subscapose herbs with scapes sparsely bracteate-leaved; leaves at anthesis mostly in basal rosette. 8. **G. sp. 1**

6. Caulescent leafy-stemmed herbs, basal leaves at anthesis few or withered.

7. Cauline leaves gradually but greatly descrescent; distal leaves oblanceolate-spatulate.

3. **G. pensylvanica**

7. Cauline leaves subequal, weakly descrescent; distal leaves oblanceolate.

6. **G. stagnalis**

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Annual to short-lived perennial caulescent leafy-stemmed herbs 8-45(-65) cm, leaves basal and cauline, basal leaves usually withered at anthesis; stems 1(-3) from the base, erect to ascending, less commonly decumbent-ascending or flexuous, commonly unbranched, loosely lanate; basal and proximal cauline internodes relatively congested, internodes commonly shorter than leaves. Leaves 1.5-12 × 0.3-1.6 cm, usually gradually and moderately descrescent distally, oblanceolate to obovate-oblanceolate, infrequently lanceolate to linear-oblanceolate, 2° and often 3° venation visible adaxially, surfaces usually moderately bicolorous (infrequently indistinctly bicolorous in small-leaved páramo forms), adaxially dull green (infrequently gray-green), glabrous to persistently pilosulose, trichomes filiform, trichomes lacking glassy basal cells, abaxial leaf surfaces lanate-tomentose to vaginano-sericeous, base in mid-stem leaves often distinctly subclasping, margins infrequently undulate or crenulate, apex commonly obtuse,
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apiculate. Capitulecence an uninterrupted dense spike 1-6 cm or sometimes 10-30 cm and proximally interrupted, rarely corymbiform-paniculate; peduncles generally absent, rarely to 8 mm. Capitula (3.5-)4-4.5 mm; involucre 2-2.5 mm diam., cylindrical-campanulate, not embedded in stem tomentum; phyllaries 4-5-seriate, nitidous, glabrous, lamina brownish or less commonly stramineous; the outer phyllaries 1.1-1.5 × c. 1 mm, elliptic-ovate, apex acute to obtuse, grading to innermost series; the inner phyllaries (3.5-)4-4.5 × c. 1 mm, lanceolate or oblanceolate, stereome often greenish and 2/3 length of phyllaries, lamina-stereome juncture occasionally purplish, apex usually broadly acute (infrequently obtuse to rounded); receptacle c. 1.5 mm diam. Corollas 2-3 mm, yellowish throughout. Marginal florets numerous in several to many series. Disks florets 3-6. Cypselae 0.5-0.8 mm, oblong, tan, with globular trichomes; pappus bristles c. 2.5-3 mm, white. 2n = 28. Flowering year-round. Burned areas, corn fields, disturbed areas, mountain sides, open forests, mixed forest, oak forests, pine forests, cloud forests, pastures, sandy banks, secondary forests, slopes of volcanoes, steep slopes, roadsides, streamsides, thickets, trail sides. Ch (Breedlove 25893, NY); G (Pruski y Ortiz 4255, MO); H (Molina 12802, NY); ES (Standley 22792, MO); N (Moreno y Lopez 7118, MO); CR (Pruski et al. 3878, MO); P (Hammel 6650, MO). 400-3800 m. (Mexico, Mesoamerica, Colombia, Venezuela, Ecuador, Galapagos, Peru, Bolivia, Brazil, Paraguay, Uruguay, Argentina, Chile, Cuba, Jamaica, Hispaniola, Puerto Rico; introduced into New Zealand.)

Gamochaeta americana is the most common species of Gamochaeta in Mesoamerica, and was noted as considerably variable by Nesom (2004a). For example several strongly localized noteworthy variants occur: on limestone and volcanic slopes it may have paniculate capitulences with peduncles to 8 mm; in alpine areas of Guatemala, Costa Rica, and Panama it may be a tufted much-branched perennial with indistinctly bicolorous lanceolate leaves about 2 cm; and on Cerro Punta in Panama it may have narrowly oblanceolate (c. 8 × 0.5 cm) leaves. The alpine form was described as G. irazuensis, but the near-continuous variation between it and low-elevational forms prompted its reduction to synonymy by Nesom (2004a). Gamochaeta americana was reported in the United States (e.g., Cabrera, 1961; Nesom, 1990, Freire y Iharlegui, 1997), but was excluded from that country by Nesom (2004a), who redetermined the material from United States as G. coarctata.

Gamochaeta spicata Cabrera, Gnaphalium purpureum var. spicatum Klatt, Gnaphalium spicatum var. interruptum DC.

Annual to biennial caulescent leafy-stemmed herbs 20-50 cm, leaves basal and cauline, basal rosette conspicuous and present at anthesis, rosette leaves much larger than the remote cauline leaves; stems 1-few from the base, ascending or decumbent-ascending, simple, closely vaginano-sericeous; basal and proximal cauline internodes relatively congested, internodes commonly shorter than leaves. Leaves 2-7(-11) × 0.6-2 cm, mid-stem and distal stem leaves usually few-remote and gradually descrescent distally, spatulate to oblanceolate-obovate, basal leaves patent and stem leaves ascending, somewhat subcarnose or distal ones chartaceous, 2° venation visible adaxially, surfaces obviously bicolorous, adaxially bright green, glabrous to arachnoid-floccose with filiform trichomes that lack glassy basal cells, abaxially pale grayish vaginano-sericeous to infrequently loosely lanate-tomentose, base gradually and evenly tapering, base in mid-stem leaves often subclasping or short-decurrent, margins often undulate or crenulate, sometimes drying purplish, apex obtuse to rounded, apiculate. Capitulescence 3-20 cm, initially uninterrupted and densely subcylindrical-spicate, with age sometimes leafy proximally and proximally interrupted by elongated internodes, with age sometimes becoming proximally leafy and interrupted by elongated internodes. Capitula 2.9-4.1 mm; involucre 1.8-2.7 mm diam., cylindrical-campanulate, not embedded in stem tomentum; phyllaries 3-4-seriate, green-stramineous proximally grading to brownish-pinkish or sometimes brownish distally, glabrous; outer phyllaries 1-1.5 × c. 1 mm, elliptic-ovate, apex generally acute to obtuse, grading innermost series; inner phyllaries 2.9-4.1 × c. 1 mm, lanceolate, apex obtuse to rounded; receptacle c. 1.5 mm diam. Corollas 1.5-2 mm, generally yellowish, sometimes purplish apically. Marginal florets numerous in several to many series. Disks florets 2-4. Cypselae c. 0.5 mm, oblong, light brown, with globular trichomes; pappus bristles 1.5-2 mm, white. 2n = 28, 40. Flowering Nov-Mar. 

Hillsides, pastures, roadsides. ES (Tucker 993, NY). P (D'Arcy et al. 12814, MO). 600-2300 m. (United States, Mexico, Mesoamerica, Colombia, Ecuador, Peru, Bolivia, Brazil, Paraguay, Uruguay, Chile, Argentina, Jamaica, Puerto Rico; introduced into Europe, Asia, Africa, Australia, New Zealand.)

Gamochaeta coarctata was recognized by Godfrey (1958) and Cabrera (1961) as distinct, but was placed in synonymy of G. americana by Nesom (1990). More recently, however, G. coarctata has again been treated as a distinct species (e.g., Freire y Iharlegui, 1997; Pruski y Nesom, 2004). The Mesoamerican material of G. coarctata is best determined by its closely vaginano-sericeous stems and persistent basal rosettes, because some of its other characters such as the sometimes adaxially pubescent leaves and capitula to 4.1 mm approach those characters as
expressed in *G. americana*. *Gnaphalium spicatum* was cited by Bentham (1853: 105) as occurring at "Chinotega" (presumably Chinandega, Nicaragua). However, that report is likely based on a misdetermination of the widespread *G. americana*, a name which was not used by Bentham (1853). The lectotypification of *Gnaphalium spicatum* by Drury (1971) was overturned by Pruski y Nesom (2004), who listed the rejected lectotype as a "possible isotype."

N.v.: none.  
Annual caulescent leafy-stemmed herbs 20-50 cm, leaves mostly cauline, basal leaves few or withered at anthesis; stems erect to decumbent-ascending, 1(-few) from the base, rarely branched distally except sometimes in capitulescence, loosely villous-lanate, internodes commonly shorter than leaves. Leaves 1.5-8 × 0.5-1.8 cm, proximal leaves large, cauline leaves gradually but greatly descrescent distally, basal and proximal-stem leaves spatulate, distal cauline leaves oblanceolate-spatulate, spreading, proximal pair of secondary veins strongly arching and nearly paralleling blade margins, distal secondaries 2-3 per side, spreading at c. 45°, surfaces more or less green-gray-concolorous to weakly bicolorous, usually loosely villous-lanate, base often gradually long-tapered and petiolariform, sometimes narrowly subclasping, margins flat to sinuous, apex obtuse to rounded, apiculate. Capitulescence leafy, continuous or more commonly interrupted, a subcylindrical spike 2-15 cm, proximal glomerules axillary and usually sessile, infrequently stalked on axillary branchlets. Capitula 3-4 mm; involucre 1.7-2.6 mm diam., cylindrical-campanulate, loosely immersed in stem tomentum; phyllaries c. 3-seriate, mostly stramineous to brownish, sparsely arachnoid proximally but otherwise glabrous or nearly so; the outer phyllaries c. 1.5 × 0.5(-1) mm, triangular, often greenish proximally, grading to innermost; inner phyllaries 2.5-3.5 × c. 0.8 mm, lanceolate, usually apically obtuse; receptacle 1.4-1.9 mm diam. Corollas 2-2.5 mm, generally yellowish with purplish tips. Marginal florets numerous in several to many series. Disks florets 3-4. Cypselae 0.4-0.5 mm, oblong, tan, with globular trichomes; pappus bristles c. 2 mm, white. 2n = 28. Flowering Sep-May. *Cultivated areas, roadsides, open ground, along streams, oak slopes, rocky areas, urban areas. G (Pruski y Ortiz 4299, MO); H (Nelson, 2008: 174); ES (Villacorta 523, MO); N (Nesom, 1990: 194); P (Hammel

Gamochaeta rosacea (I.M. Johnst.) Anderb., Gnaphalium rosaceum I.M. Johnst.

Annual or biennial caulescent leafy-stemmed herbs 10-30(-50) cm, leaves mostly cauline, at anthesis basal leaves usually few or withered; stems 1(-6) from the base, usually stiffly erect and infrequently flexuous, sometimes decumbent-ascending, simple below the capitulecence, loosely lanate; basal and proximal cauline internodes relatively congested, distal internodes often longer than leaves. Leaves 0.8-4.5(-6) × 0.3-0.8(-1.4) cm, only slightly descrescent distally, mid-stem and distal leaves usually 5-15, oblanceolate to spatulate, patent or ascending, surfaces usually moderately bicolorous (occasionally weakly bicolorous), adaxially green to gray-green, arachnoid-lanate, trichomes flagelliform with glassy basal cells, abaxial surface lanate-tomentose, base in mid-stem leaves not subclasping, margins infrequently undulate, apex commonly obtuse, apiculate. Capitulecence a terminal uninterrupted and dense spike 1-2 cm (or a single spherical glomerule in reduced plants) to sometimes 5-10(-20) cm and proximally interrupted and corymbiform-paniculate, in unusually robust extra-Mesoamerican forms the bracteate proximal glomerules may be on branchlets 1-2 cm. Capitula 3.5-4.5 mm; involucre 2-3 mm diam., cylindrical-campanulate, base obviously embedded in stem tomentum; phyllaries 3-5-seriate, with stereome often arachnoid, lamina usually pinkish; the outer phyllaries with apex acuminate, grading to innermost series; the inner phyllaries 3.5-4.5 mm, lanceolate, apex acute to acuminate; receptacle c. 1.5 mm diam. Corollas 2.5-3 mm, apex usually purplish. Marginal florets numerous in several to many series. Disks florets 3-4. Cypselae 0.6-0.7 mm, oblong, tan, with globular trichomes; pappus bristles c. 3 mm, white. 2n = 28. Flowering: Nov-Mar, May. Cultivated areas, fields, oak forests, pine forests, on rocks. Ch (Breedlove, 1986: 49 sub Gnaphalium purpureum); ES (Standley et Calderón, 1941: 281 sub Gnaphalium purpureum); N (Barkley et al. 2006: 19: 433). 1000-2500 m. (Canadá, Estados Unidos, Mexico, Mesoamerica, Colombia, Venezuela, Ecuador, Peru, Bolivia, Brazil, Uruguay, Paraguay; introduced to ?Africa, Asia, New Zealand, Pacific Islands [Hawaii].)
In many floras (e.g., Cronquist, 1980) *Gamochaeta purpurea* includes *G. pensylvanica* and *G. coarctata* in synonymy. One average, the plants and capitula in Mesoamerican material tends to be shorter than in material from the United States. As such, *Gamochaeta purpurea* in Mesoamerican approaches *G. stagnalis* in gestalt, but *G. purpurea* may be diagnosed by its often acuminate phyllaries and glassy based flagelliform trichomes on the adaxial leaf surfaces.


*Gnaphalium purpureum* var. *simplicicaule* (Willd. ex Spreng.) Klatt.

Annual to short-lived perennial caulescent leafy-stemmed herbs, 40-80 cm, leaves mostly cauline, basal leaves usually withered yet persisting at anthesis; stems typically 1(-3) from base, simple, rarely few-branched mid-stem, erect, closely vaginano-sericeous, basal and proximal cauline internodes usually distinct and moderately well-spaced although commonly much shorter than leaves, axial clusters of small leaves sometimes present. Leaves 2.5-6(-8) × 0.3-1(-1.8) cm, gradually descrescent, narrowly oblanceolate grading distally to linear-oblanceolate, sessile, commonly stiffly chartaceous, surfaces usually moderately bicolorous (infrequently indistinctly bicolorous), adaxially dull green, glabrous to infrequently loosely lanate with filiform trichomes that lack glassy basal cells, abaxially closely vaginano-sericeous, base gradually and evenly tapered, base in mid-stem leaves not subclasping, margins infrequently undulate, apex acute to obtuse, apiculate. Capitulescence 5-20 cm, a leafy, interrupted throughout, subcylindrical spike in distal c. 1/3 of stem, glomerules axillary, sessile or rarely on branchlets, 5-10-capitulate, often subtended by reduced patent linear-oblanceolate leaves. Capitula 3.2-4 mm; involucre 1-2 mm diam., cylindrical-campanulate, not embedded in stem tomentum; phyllaries 4-5-seriate, glabrous, stramineous, sometimes proximally greenish, not apically brownish; the outer phyllaries c. 2 mm, elliptic-lanceolate, apex long-acuminate, grading to innermost series; inner phyllaries 3.2-4 × c. 1 mm, lanceolate, apically acuminate; receptacle c. 1.2 mm diam. Corollas 2.5-3 mm, generally yellowish throughout. Marginal florets numerous in several to many series. Disks florets 2-4. Cypselae 0.5-0.6 mm, oblong, tan, with globular trichomes; pappus bristles c. 3 mm, white. Flowering Mar, Jun. *Roadsides, disturbed areas, near waterways.* P (*Croat y Zhu 76509*, MO). 1100-1200 m (SE United States, Mesoamerica, Colombia, Venezuela, Guyana, Bolivia, Brazil, Uruguay, Paraguay, Argentina, Chile; introduced into Australia, New Zealand, Pacific Islands [Java].)

Annual caulescent leafy-stemmed herbs, 7-25(-35) cm; leaves mostly cauline, at anthesis basal leaves not in well-defined rosette but sometimes a few withered basal leaves present; stems erect to decumbent-ascending, simple or more commonly with age few-branched from the base and often thence again in the capitulescence, loosely arachnoid-villous, internodes usually shorter than leaves proximally to distally longer than leaves. Cauline leaves 1-3 × 0.2-0.7 cm, subequal and weakly descrescent apically, oblanceolate to oblong-oblanceolate, distal stem leaves oblanceolate, surfaces concolorous or sometimes weakly concolorous, adaxially loosely villous-lanate to infrequently glabrate, trichomes slightly broadened basally but not obviously flagelliform, abaxially loosely villous-lanate, base usually evenly and gradually tapered, sometimes subclasping, margins sometimes undulate, apex acute to rounded. Capitulescence 1-3 cm, usually spicate, uninterrupted-globose to more commonly interrupted-cylindrical, lateral or terminal, very rarely few-capitulate and open corymbiform-paniculate with capitula individually pedunculate, proximal nodes with sessile or stalked axillary glomerules, branchlets often 5-10 cm, spikes and glomerules subtended by a single, patent to ascending, oblanceolate leaf similar in size and shape to mid-cauline leaves. Capitula 2.9-3.7 mm; involucre 1.5-2 mm diam., cylindrical, base loosely immersed in stem tomentum; phyllaries 3-4(-5)-seriate, glabrous; outer phyllaries triangular, often mostly hidden by stem tomentum, apex acute, inner phyllaries lanceolate, lamina base near stipe often purplish, apex usually obtuse; receptacle c. 1 mm diam. Corollas 1.7-2 mm, generally yellowish with violet apex. Marginal florets numerous in several to many series. Disks florets (2-)3(-4). Cypselae 0.3-0.5 mm, with globular trichomes; pappus bristles 2-2.5 mm, white. Flowering Nov, Jan-Mar, May. Roadside, gravelly hillsides, sand bars. G (Standley 67322, F). 1000-2500 m. (SW United States, Mexico, Mesoamerica.)

Mesoamerican material was treated by Nash (1976c) within her concept of *Gamochaeta pensylvanica*. Espinosa (2001) treated *G. stagnalis* as a synonym of South American *G. falcata*, but *G. stagnalis* was resurrected from synonymy by Nesom (2004b). Among the usually concolorous-leaved Mexican species, *G. stagnalis* is similar in reduced plant stature and capitulum size to *G. sphacelata* (Kunth) Cabrera, which differs by a capitulescence of pluribracteate glomerules.


Annual?, subcaulescent or sometimes mat-forming, subrosulate herbs 2-10 cm, leaves mostly basal and proximal-cauline, spreading, cauline leaves few, ascending, about as long as to shorter than the nodes. Leaves 0.6-1.5 × 0.2-0.7 cm, weakly descrescent apically, oblanceolate to obleng, sessile, surfaces gray-concolorous, tomentose, base broadly cuneate, apex obtuse, apiculate. Capitulescence terminal, densely spicate-glomerate. Capitula 3-4 mm; involucre 2-2.4 mm diam., cylindrical-campanulate, base partly embedded in stem tomentum, phyllaries graduated, c. 4-seriate, lamina base near sterile often purplish, often distally brownish, apices more or less acute; outer ones ovate; the inner ones oblanceolate to linear-lanceolate. Corollas 2-2.5 mm. Marginal florets numerous in several series. Disk florets c. 3. Cypselae c. 0.8 mm, oblong-elliptic, dark brown, globular-hispidulous; pappus bristles 2-2.5 mm. Flowering Aug-Feb. *Wet alpine meadows, grassy hillsides, Juniper and Pine forests, volcano slopes.* G (*Steyermark 50221*, F).


Subrosulate subscapose herbs 5-25 cm, leaves at anthesis mostly in basal rosette, rosette leaves typically dense and persistent, scapes sparsely (usually 1-6 per scape) and remotely bracteate-leaved; scapes 1-3 from base, ascending to erect, simple, loosely tomentose, distal internodes usually longer than the bracteate scape leaves. Leaves 0.6-1.8 × 0.2-0.6 cm, greatly and abruptly descrescent distally with the scape leaves bracteate, basal leaves with blade elliptic-obviate to spatulate, sessile, surfaces gray-concolorous, adaxial surface loosely tomentose, abaxial surface densely tomentose, base cuneate to broadly so, apex rounded, mucronate. Capitulescence 1-3 cm diam., terminal, tightly to openly corymbiform, globose to flat-topped, central axis 5-25 cm, well-exserted from basal leaves. Capitula c. 3 mm; involucre 2-3 mm diam., campanulate, base weakly immersed in stem tomentum or in older capitula held above tomentum; phyllaries graduated, c. 4-seriate, brownish apically; outer phyllaries ovate, apex usually obtuse; the inner phyllaries oblanceolate to linear, apex obtuse to acute. Marginal florets 15-20; corolla 2.2-3 mm,
brownish-yellow. Disk florets 2-5; corolla 2.5-3.3 mm, brownish-yellow. Cypselae c. 0.8 mm, oblong-elliptic, dark brown, papillose; pappus bristles 3-3.5 mm. Alpine meadows. CR (Pruski et al. 3903, MO). 2900-3400 m. (Endemic.)

4. Gnaphalium L.


Annual herbs to subshrubs; stems usually exalate or when winged usually with leaves short-decurrent for less than an internode, usually woolly or tomentose. Leaves simple, alternate, often sessile, all cauline or sometimes also a few basal; blade usually somewhat narrow, chartaceous, secondary venation usually obscure, surfaces usually woolly, tomentose, or arachnoid-pubescent, occasionally stipitate-glandular, sometimes glabrescent on adaxial surface and thereby bicolorous, base often dilated. Capitulescence usually cymose-corymbiform or thyrsoid-paniculate, ultimate capitula (ours) typically subsessile and subglomerate. Capitula disciform, small, usually < 10 mm; involucre < 8 mm diam., usually campanulate, often partly embedded in stem tomentum; phyllaries slightly graduate with the outer phyllaries in ours often about 1/2 as long as the inner, usually 2-6-seriate, appressed, usually glabrous throughout, rarely arachnoid, the outer series often triangular and the innermost series typically narrow, stereome usually greenish distally with cartilaginous base, undivided (non-fenistrate, uniformly thickened) or divided (fenistrate, irregularly thickened), lamina usually brown to ochroleucous, infrequently white, margins and apex usually papery-scarious, subtransparent or less commonly opaque, obtuse to acute, infrequently rounded; receptacle mostly flat, rarely concave. Florets heterogamous; corolla actinomorphic, ochroleucous or yellow, sometimes pinkish or purple-tipped. Marginal florets usually outnumbering the disk florets; corolla filiform but usually obviously bulbous above the constricted base. Disk florets usually 5-10(-25), bisexual; corolla tubular, (3-)5-lobed, the lobes erect, sometimes puberulent; styles bifid, the branches linear, with obtuse sweeping hairs apically, apex truncate, stigmatic lines separate. Cypselae obovoid or ellipsoid, brownish, ours usually finely few-nerved, ours mainly glabrous with smooth epidermal cells, sometimes surface obviously transversely rugulose by epidermal cell walls imbricate at their poles, surfaces sometimes puberulent with globular trichomes (e.g., *G. luteoalbum*), infrequently puberulent with oblong trichomes (e.g., *G. polycaulon*); pappus of several to many capillary bristles, bristles isomorphic, free, subequal, off-white, scabridulous, these usually
individually caducous, basally often with patent cilia. \( x = 14, 17, 28. 50-80(-150) \) spp.;
cosmopolitan, with centers of diversity in Mexico, South America, and Africa.

*Gnaphalium* is circumscribed here more or less as in Nesom (1990f) and Dillon y Sagástegui-Alva (1991), thus provisionally including *Pseudognaphalium*. *Gnaphalium* usually has individually caducous pappus bristles, thus distinguished by this character from *Gamochaeta* and *Chionolaena*. While the name *Pseudognaphalium* has sometimes been adopted (e.g., Anderberg, 1991) for most of our *Gnaphalium* species, *G. polycaulon* appears to belong to the typical group of *Gnaphalium*. Klatt (1878) provided a useful early synopsis of the group in the Americas and Espinosa (2001) treated the species in central Mexico.

I basically use names from Nash (1976c) and D'Arcy (1975), with most common species typified by Mexican material, the most notable exception being the use herein of the name *G. elegans* (typified by South American material) for broad-leaved material D'Arcy (1975) called *G. domingense*. Although Nesom (2004) referred material from Chiapas to *G. canescens* DC., I provisionally excluded *G. canescens* from Mesoamerica and refer Mesoamerica material mostly to *G. roseum*.


1. Capitulescence usually densely spicate or racemiform; capitula 2-3 mm; cypselae pubescent with broadly oblong trichomes.  
   10. *G. polycaulon*  
   1. Capitulescence corymbiform-paniculate; capitula 3.1-8 mm; cypselae glabrous or with globular trichomes.
   2. All phyllaries brownish throughout.  
      7a. *G. liebmannii* var. *liebmannii*  
   2. Phyllaries at least in part white to stramineous or yellow to reddish.
   3. Leaves obviously stipitate-glandular adaxially.
      4. Phyllaries with lamina reddish.  
         11. *G. rhodarum*  
      4. Phyllaries with lamina white or stramineous to yellow.
         5. Cypselae surface obviously transversely rugulose.  
            17. *G. viscosum*  
         5. Cypselae surface with epidermal cells more or less smooth and not obviously transversely rugulose.
6. Phyllaries with lamina bright white, apices basically opaque, mid-series and inner series phyllary apices usually obtuse to rounded.

4. G. chartaceum

6. Phyllaries with lamina white to stramineous or yellowish-brown, apices subopaque to subtranslucent, mid-series and inner series phyllary apices acute to obtuse.

7. Phyllaries usually yellowish-brown throughout.

7b. G. liebmannii var. monticola

7. Phyllaries with lamina white to stramineous.

8. At least the mid-stem leaves obviously short-long-decurrent.

18. G. sp. 1-BR

8. Leaves not obviously decurrent.

9. Leaf surfaces obviously bicolorous; mid-series and inner series phyllary apices obtuse to rounded; disk florets (5-)10-18.

5. G. elegans

9. Leaf surfaces green-concolorous; mid-series and inner series phyllary apices acute; disk florets 2-9.

9. G. oxyphyllum

3. Leaves eglandular.

10. Stems winged, wings longer than internodes.

1. G. alatocaule

10. Stems exalate or sometimes short-decurrent winged with wings shorter than internodes.

11. At least inner phyllaries with lamina white and opaque to subopaque.

12. All phyllaries bright white and strongly opaque; marginal florets less numerous than the disk florets.

19. G. sp. 2-LE

12. Inner phyllaries (only) with lamina white and subopaque; marginal florets as many as or more commonly more numerous than the disk florets.

13. Leaves 1-4.2 cm, oblanceolate to spatulate, surfaces somewhat bicolorous, adaxial surfaces green or gray-green, weakly arachnoid-lanose; capitulescences with terminal glomerules 1-2 cm diam., 7-11(-20)-capitulate; capitula 5-7 mm; disk florets usually 11-25.

14. G. stolonatum

13. Leaves 2.5-10 cm, narrowly linear-lanceolate, surfaces usually obviously bicolorous, adaxial surfaces green, glabrate to weakly arachnoid-lanose; capitulescences with terminal glomerules 3-4 cm diam., c. 30+-capitulate;
capitula 4-5 mm; disk florets c. 8.

16. **G. subsericeum**

11. At least the inner phyllaries with lamina white or yellowish to infrequently reddish, subopaque to translucent.

14. Cypselae with globular trichomes.  
8. **G. luteoalbum**


15. Leaves 0.6-1.5 cm; phyllaries with lamina white to yellowish.

3. **G. brachyphyllum**

15. Leaves usually > 1 cm; phyllaries with lamina ochroleucous or stramineous to pinkish.

16. Leaf bases usually evenly narrowed, typically neither dilated nor subclasping, when dilated or subclasping the surfaces usually discolorous.

17. Leaves linear, surfaces usually slightly bicolorous or somewhat concolorous, margins revolute.  
6. **G. greenmanii**

17. Leaves linear-lanceolate to narrowly elliptic-lanceolate, usually obviously bicolorous, margins sometimes undulate.

2. **G. attenuatum**

16. Leaf bases usually dilated or subclasping.

18. Leaves linear-ob lanceolate to spatulate, usually strongly ascending throughout, surfaces concolorous; phyllary apices usually translucent, mid-series and inner series apices usually obviously obtuse to rounded; capitula c. 150+-flowered.

15. **G. stramineum**

18. Leaves linear-lanceolate to obovate, at least proximal stem leaves spreading, surfaces concolorous or bicolorous; phyllary apices subtranslucent to subopaque, mid-series and inner series apices acute to obtuse; capitula < 80(-110)-flowered.

19. Leaves usually bicolorous, bases typically obviously dilated and clasping, mid-series and inner series phyllary apices usually acute.

13. **G. semiamplexicaule**

19. Leaves usually concolorous or sometimes weakly bicolorous, bases slightly dilated and subclasping, mid-series and inner series phyllary apices usually obtuse.
20. Leaves lanceolate to oblanceolate to obovate, capitula usually 53+-flowered; involucres campanulate; Mexico to Nicaragua.  

12. G roseum
20. Leaves broadly linear; capitula 34-41-flowered; involucres narrowly campanulate; Costa Rica.

20. G. sp. 3-RZ


Slender herbs probably c. 0.5 m; stems with branching unknown, moderately to densely leafy, winged, surfaces appressed-arachnoid, eglandular, internodes much shorter than leaves, wings c. 1 mm diam., wings longer than internode and sometimes continuing for 2 internodes, green, glabrate. Leaves 2-8 × 0.2-0.4 cm, linear-lanceolate, sessile, solitary veined, surfaces usually obviously bicolorous, adaxial surface green, glabrate or thinly tomentose, eglandular, abaxial surface loosely arachnoid-tomentose, base not obviously dilated, about as broad as stem, long-decurrent, margins often revolute, apex acute. Capitulescence corymbiform-paniculate, 4-8 cm diam., round on top to cylindrical, lateral branches shorter than central flowering axis, ultimate glomerules 1-1.5 cm diam. Capitula 4-5 mm, 50-60-flowered; phyllaries 1.5-5 mm, 4-5-seriate, glabrous or stereome of inner series few-papillose, stereome divided, lamina silvery pale-stramineous, apex subtranslucent, mid-series and inner series apices acute to obtuse, not broadly rounded; receptacle post-fruit c. 1.5 mm diam. Corollas 2.5-3 mm, disk lobes sparsely glandular. Disk florets 7-10. Cypselae 0.5-0.7 mm, glabrous; pappus bristles to c. 3 mm, readily deciduous individually. Flowering Jan. Habitat unknown. G (Heyde y Lux 4217, MO). 1200-1500 m. (Endemic.)

_Gnaphalium alatocaule_ remains known only from the type collection, and is similar to central Mexican _G. bourgovii_ A. Gray. By its linear-lanceolate eglandular usually obviously bicolorous leaves it is similar among Mesoamerican taxa to _G. attenuatum_, but clearly differs by winged stems. By its usually obviously bicolorous decurrent leaves it is also similar to _G. viscosum_, but differs by non-glandular leaves, sometimes cylindrical capitulescence, smaller capitula, and glabrous cypselae with a smooth epidermis. The similar, but South American, _G. cheiranthifolium_ Lam. is a narrow-leaved and winged-stemmed. Although _G. alatocaule_ has seemingly remained un-recollected for more than a century, it does not appear to be an aberrant or teratological plant, but rather a narrow endemic.
2. **Gnaphalium attenuatum** DC., *Prodr.* 6: 228 (1837 [1838]). Holotype: Mexico, Tamaulipas-Veracruz, *Berlandier* 70 (G-DC, photo in MO!). Illustr.: none. N.v.: jom tzotzil, Ch; sanalatodo, sanalotodo, yucul Q'en, G; encensio, gordolobo, encensio, incienso, sanalotodo, H; hierba-tan, papelillo, vivavira, ES; ajenjillo, cimarrón, CR.


Annual or biennial herbs 0.5-1(-2) m; stems stiffly erect, often few-branched from base, moderately leafy, typically exalate, floccose-tomentose, eglandular, internodes about 1/4-3/4 leaf length. Leaves (3-) 6-10(-12) × 0.3-0.8(-1.5) cm, linear-lanceolate to narrowly elliptic-lanceolate, sessile, solitary veined or rarely with faint trinervation, surfaces usually obviously bicolorous, eglandular (sometimes falsely glandular by adaxial flagelliform trichomes), adaxial surface green (infrequently gray-green), glabrate to weakly arachnoid-lanate with filiform or broad-based flagelliform trichomes, c. 2-4 trichome bases per linear mm, sometimes falsely heterotrichous by flagelliform trichomes, abaxial surface loosely arachnoid-tomentose, usually evenly narrowed, at least main stem leaves typically neither dilated nor subclasping, base usually slightly narrower than stem diam., not decurrent onto stems, margins sometimes undulate, apex attenuate. Capitulescence openly corymbiform-paniculate, lateral branches usually 5-15 cm, usually 2+x longer than subtending cauline bracteate leaf, ultimate glomerules 3-10-capitulate. Capitula 3.5-5 mm, 30-50-flowered; involucre narrowly campanulate; phyllaries 2.5-5 mm, 3-6-seriate, stereome divided, lamina yellowish-tan to stramineous, apex subtranslucent or subopaque, mid-series and inner series apices acute to broadly so; receptacle 0.8-1.5(-2) mm diam. Corollas 2.5-3 mm. Marginal florets usually 25+. Disk florets usually 2-7. Cypselae 0.4-0.6 mm, glabrous; pappus bristles to c. 3 mm, readily deciduous individually. 2n = 28. Flowering Year-round. *Bosque humedo subtropical, bosque tropical caducifolia, disturbed areas, forest edges, hummocks, oak forests, pastures, open slopes, pine forests, roadways, rocky areas, selva alta perennifolia, selva baja caducifolia, volcano slopes.* T (Villaseñor, 1989: 62); Ch (Pruski et al. 4182, MO); QR (Villaseñor, 1989: 62); B (Gentle 7891, NY); G (Contreras 9549, MO); H (Croat y Hannon 64449, MO); ES (Carlson 195, MO); N (Neill 3113, MO); CR (Oersted 10576, F); P (D'Arcy y Hammel 12384, MO). 10-2200(-2800) m. (Mexico, Mesoamerica.)

*Gnaphalium attenuatum* is the most common species of *Gnaphalium* in Mesoamerica. I recognize no varieties within *G. attenuatum* and recognize extra-Mesoamerican *G. attenuatum* var. *sylvicola* McVaugh, a taxon with pinkish phyllaries, as different species most similar to *G.
purpurascens DC. I believe most of the material referred by Nash (1976c) to var. sylvicola is better referred to a broadly defined G. greenmanii.

Gnaphalium linearifolium Greenm. (but not the homotypic G. greenmanii S.F. Blake) was listed in synonymy of G. attenuatum by Conabio (2009), but I recognize G. greenmanii S.F. Blake as distinct, as did Nash (1976c) and McVaugh (1984). McVaugh (1984) described the glabrous cypselae as papillose. Gnaphalium attenuatum, when in bud where the floret number cannot be counted readily, is very similar to partly sympatric Achyrocline vargasiana DC.


Pseudognaphalium brachyphyllum (Greenm.) Anderb.

Perennial herbs to subshrubs 0.1-0.35 m; stems erect or pendant, often densely branched throughout, moderately to densely leafy, exalate, densely lanose-tomentose, eglandular, internodes usually much shorter than leaves. Leaves 0.6-1.5 × 0.2-0.5 cm, linear-oblong to oblong or very infrequently elliptic-obovate, sessile, spreading; venation usually obscure, surfaces usually concolorous (infrequently bicolorous), gray-green (infrequently adaxially green), usually densely lanose-tomentose, eglandular, base not obviously dilated, subclasping, about as wide as stem, the margins slightly revolute, slightly undulate, apex acute to obtuse, sometimes apiculate. Capitulescence narrowly corymbiform, 1-4 cm diam., lateral branches few, ultimate glomerules usually to c. 1 cm diam., usually 7-13-capitulate. Capitula 3.1-4 mm, 33-37-flowered; involucre narrowly campanulate; phyllaries 2.8-4 mm, 2-4-seriate, stereome weakly divided, lamina white to yellowish, apex subtranslucent to subopaque, mid-series and inner series apices acute to obtuse; receptacle c. 1 mm diam. Corollas 2.2-2.5 mm. Marginal florets c. 27. Disk florets 6-10. Cypselae 0.6-0.8 mm, glabrous; pappus bristles to c. 2.5 mm, readily deciduous individually. Flowering Oct-Mar. Alpine meadows, cliffs, pine forests, pine-oak forests, roadsides, rock outcrops, steep banks, volcano slopes. ?Ch (Breedlove 1986: 49); G (Standley 61665, MO). 2000-3800 m. (Endemic.)

The occurrence in Chiapas was not verified by me. I have seen only one of the two vouchers cited by Breedlove (1986) for Chiapas, but that vouchers proves to be a species of Chiononolaena, raising the possibility that similarly the second cited voucher from Chiapas is not G. brachyphyllum.

Annual to short-lived perennials 1-1.5(-2) m; stems erect or ascending, moderately leafy, basically exalate, loosely floccose-arachnoid, typically sparse stipitate-glandular, internodes much shorter than leaves. Leaves 2-10 × (0.2-)0.5-2 cm, lanceolate or oblanceolate, sessile, surfaces slightly bicolorous, adaxial surface green to gray-green, obviously short-stipitate-glandular and often also loosely floccose-arachnoid, abaxial surface grayish-green, loosely floccose-arachnoid, sometimes also short-stipitate-glandular, base dilated and subclasping to clasping, margins sometimes very short-decurrent but not otherwise winged, unevenly revolute. Capitulescence openly corymbiform-paniculate, broadly rounded, 5-30 cm diam., lateral branches usually 3-8, 7-30 cm, the longer ones often leafy. Capitula 4.5-6 mm, c. 50-flowered; phyllaries 3-6 mm, 4-6-seriate, oblong, lamina bright white, apex basically opaque, mid-series and inner series apices usually obtuse to rounded, sometimes apiculate; receptacle post-fruiting 1.5-3 mm diam. Corollas 3-4 mm. Marginal florets to c. 25. Disk florets 12-25. Cypselae 0.6-0.7 mm, glabrous, surface with epidermal cells more or less smooth and not obviously transversely rugulose; pappus bristles 3-3.5 mm, individually deciduous. 2n = 28. Flowering Dec.-Apr. *Brushy slopes, dry banks, ravines, mixed forest, oak forests, volcano slopes.* G (*Standley 61173*, NY). 1400-2100 m. (Mexico, Mesoamerica.) Here I apply the name *Gnaphalium chartaceum* for the somewhat broad-leaved material with white-opaque somewhat obtuse phyllaries that Nash (1976c) called *G. leucocephalum*. Material from El Salvador distributed as *G. leucocephalum* proves largely to be *G. attenuatum.*


Robust somewhat viscid perennial herbs 0.5-1.5(-2) m; stems erect to ascending, sometimes few-branched from base, each simple below capitulescence, thick, moderately leafy, exalate, floccose-tomentose, eglandular, internodes generally shorter than the leaves. Leaves (2-)3-7(-10) × (0.5-)1-3 cm, lanceolate to elliptic, sessile, typically spreading, a few secondary veins sometimes visible, surfaces obviously bicolorous, adaxial surface green, obviously stipitate-glandular, usually also loosely arachnoid-pubescent often with flagelliform trichomes, abaxial
surface griseous-tomentose, base broad, subclasping, not decurrent, broader than the stem, margins often undulate or crenulate, apex acute to narrowly so. Capitulescence broadly rounded corymbiform-paniculate, lateral branches usually 2-7, to 15+ cm, ultimate glomerules 2-4 cm diam., 10-20+-capitulate. Capitula 5-7 mm, usually 60-100+-flowered, involucre broadly campanulate to subhemispherical; phyllaries 3.5-7 mm, 4-6-seriate, lamina white to stramineous (rarely pinkish in bud), apex usually subopaque, mid-series and inner series apices obtuse or broadly acute; receptacle 2-3 mm diam. Corollas 2.5-3.5 mm. Marginal florets 80+. Disk florets (5-)10-18. Cypselae 0.6-0.9 mm, glabrous, surface with epidermal cells more or less smooth and not obviously transversely rugulose; pappus bristles 3-4 mm, deciduous individually. 2n = 28.

Flowering Year-round. Disturbed areas, oak forests, open forest, pastures, pine-oak forests, roadsides, secondary vegetation, volcano slopes. Ch (Breedlove 28720, MO); G (Pruski y Ortiz 4277, MO); H (Molina 11466, NY); N (Moreno 527, MO); CR (Hammel et al. 18046, MO); P (Allen 1374, NY). 800-3400 m. (Mexico, Mesoamerica, Colombia, Venezuela, Ecuador, Peru.)

Following the circumscription of Dillon y Sagástegui-Alva (1991b) and Pruski (1997), much Mesoamerican material called *Gnaphalium brachypterum* (e.g. by Nash, 1976c; Breedlove, 1986) is treated here as *G. elegans*. The Panamanian material of *G. elegans* was called *G. domingense* Lam. by D'Arcy (1975) and Correa et al. (2007), but that species appears to be a West Indian endemic. The glands on the tip of the trichomes are often destroyed when specimens are pressed in EtOH.


Annual or biennial herbs 0.2-0.5(-1) m; stems erect, sometimes few-branched from base, moderately leafy, exalate, floccose-tomentose with green stem surface often visible through indumentum, eglandular, internodes about 1/3-2/3 leaf length. Leaves 4-9 × 0.1-0.3 cm, linear, sessile, 1-3-veined, midrib sometimes impressed, surfaces usually slightly bicolored or somewhat concolorous, eglandular, adaxial surface usually gray-green, usually arachnoid, abaxial surface floccose-tomentose, base evenly narrowed, typically not dilated to rarely very slightly dilated, typically not clasping to rarely very slightly subclasping, narrower than stem to about as wide as stem, the margins revolute, apex attenuate. Capitulescence narrowly to openly corymbiform-paniculate, lateral branches few, ultimate glomerules usually 1-1.5 cm diam. Capitula 4-5 mm, c. 30-flowered; involucre narrowly campanulate; phyllaries 2-5 mm, 3-5-
seriate, stereome weakly divided, lamina ochroleucous to stramineous, infrequently pinkish, apex subtranslucent, mid-series and inner series apices acute, receptacle 1-1.5 mm diam. Corollas 2.7-3.3 mm. Marginal florets c. 20+. Disk florets 5-10. Cypselae 0.6-0.7 mm, infrequently seen mature, glabrous; pappus bristles to c. 3 mm, readily deciduous individually or infrequently a few bristles loosely adhering by interlocking basal setae. Flowering Oct-Jan. *Pine forests, pine-oak forests, roadsides. Ch (Breedlove y Strother 46169, MO); G (Contreras 11043, MO); H (Holst 1582, MO). 1100-2400 m. (México a Mesoamérica.)*  

The type of *Gnaphalium greenmanii* has non-dilated non-clasping leaves evenly narrowed to the base, but some linear-leaved Mesoamerican material has leaves very slightly dilated bases or very slightly subclasping. As such, some Mesoamerican material of *G. greenmanii* seems to pass into young narrow-leaved material elsewhere referred to *G. semiamplexicaule*, and is perhaps somewhat arbitrarily separated from it. I believe most of the material referred by Nash (1976c) to *G. attenuatum* var. *sylvicola* is better referred to a broadly defined *G. greenmanii*.


Annual to biennial or short-lived perennial herbs 0.2-1(-1.4) m, sometimes with basal rosettes; stems erect to ascending, simple or few-branched, moderately leafy, exalate or sometimes shortly decurrent-winged for less than an internode, seemingly eglandular to obviously short-stipitate-glandular, also loosely to densely floccose-arachnoid, internodes shorter than the leaves. Leaves 2-6(-8) × 0.4-0.8(-1.3) cm, lanceolate to oblanceolate, sessile, often appressed or strongly ascending, solitary veined, surfaces grey-concolorous or bicolorous, seemingly eglandular to adaxial surface obviously short-stipitate-glandular, adaxial surface also sometimes loosely floccose-arachnoid, abaxial surface usually loosely floccose-arachnoid to moderately arachnoid-tomentose (infrequently previous-year withered stem leaves present and subglabrate-green on both surfaces; young second year basal leaves densely lanate-tomentose on both surfaces), base dilated, subclasping or clasping, about as broad as stem, sometimes shortly decurrent on one side, margins sometimes revolute, apex acute to attenuate. Capitulescence typically densely corymbiform-paniculate, 3-7 cm diam., lateral branches 1-4(-10), 1-7 cm, leafless or in robust low-elevational forms sometimes leafy, ultimate glomerules 2-3 cm diam. Capitula 5-8 mm, 50-80(-150+)-flowered; phyllaries 4-8 mm, 4-5-seriate, yellowish-brown or brownish throughout, stereome divided, apex subtranslucent, mid-series and inner series apices acute; receptacle 1-2.5
mm diam. Corollas 2.5-3.7 mm. Disk florets usually 10-25. Cypselae 0.6-0.8 mm, glabrous, surface with epidermal cells more or less smooth and not obviously transversely rugulose, infrequently indistinctly transversely rugulose; pappus bristles 3-3.5 mm, readily deciduous individually.

The protologue of *Gnaphalium liebmannii* described the leaves "utrinque viridibus," which matches topotype populations that I have collected at 3925 m on Pico Orizaba (Pruski 4162, MO), plants with previously year withered stem leaves subglabrate and green on both surfaces. I believe Costa Rican material determined by Paul Standley (en schedula) as *G. roseum* was called *G. liebmannii* by Nash (1976c), Espinosa (2001), and Luteyn (1999), yet most of the Costa Rica collections seen by me that were determined as *G. liebmannii* by Dorothy Nash (en schedula) are re-determined here as either *G. rhodarum* or *G. sp. 3-RZ*. *Gnaphalium liebmannii* is thus provisionally excluded from Costa Rica.

1. Leaves oblanceolate, surfaces grey-concolorous, seemingly eglandular, apex acute; capitula usually 100+-flowered; phyllaries brownish throughout.

7a. *G. liebmannii* var. *liebmannii*

1. Leaves lanceolate, surfaces usually bicolorous, adaxial surface obviously stipitate-glandular, apex attenuate; capitula usually 50-80-flowered; phyllaries usually yellowish-brown throughout.

7b. *G. liebmannii* var. *monticola*


*Gnaphalium vulcanicum* I.M. Johnst.

Leaves oblanceolate, surfaces grey-concolorous, seemingly eglandular (infrequently previous-year stem leaves present and subglabrate), apex acute. Capitula usually 100+-flowered; phyllaries brownish throughout. Flowering Nov-Feb. *Alpine meadows, pine forests, rocky areas, volcano slopes*. G (*Veliz et al. 10544, MO*). 3500-4400 m. (México a Mesoamérica.)


pine-oak forests, pine forests, rocky areas, thickets. Ch (Seler y Seler 1928, MO); G (Pruski y Ortiz 4276, MO). 1600-4200 m. (México a Mesoamérica.)

It is possible that *G. liebmannii* var. *monticola* deserves to be recognized at the species rank, in which case it could be viewed as intermediate between *G. liebmannii* and *G. oxyphyllum*, having the larger capitula and darker phyllaries typical of *G. liebmannii*, but with the leaf shape and the dense glandular vestiture of *G. oxyphyllum*. Indeed the protologue of *G. vulcanicum* var. *monticola* alludes to the similar aspect of *G. oxyphyllum*, which supposedly differs by its fewer disk florets.


Annual herbs 0.15-0.5 m; stems erect to spreading, often few-several-branched from base, each simple below capitulescence, moderately leafy to sometimes also densely basally so, exalate, floccose-tomentose, eglandular, internodes generally shorter than the leaves. Leaves 1-4(-7) × 0.2-0.7(-1.3) cm, linear-oblanceolate to narrowly spatulate, sessile, usually strongly ascending throughout or proximal ones sometimes spreading, surfaces concolorous, eglandular, loosely griseous-tomentose, base subclasping, usually decurrent 1-2 mm and for much less than an internode, usually about as broad as stem, margins flat to revolute, sometimes undulate, apex usually obtuse. Capitulescence narrowly corymbiform-paniculate, lateral branches few, usually 1-5 cm, ultimate glomerules 1-2 cm diam. Capitula 3.1-4 mm, c. 110+-flowered; involucre broadly campanulate to subhemispherical; phyllaries 3-4 mm, 3-4-seriate, stereome divided, lamina yellowish-tan to stramineous, apex translucent, mid-series and inner series apices usually obviously obtuse to rounded; receptacle 1-1.5 mm diam. Corollas 1.4-2 mm, reddish-tipped. Marginal florets 105+. Disk florets 4-10. Cypselae 0.5-0.6 mm, with globular trichomes; pappus bristles to c. 2 mm, readily deciduous with several often loosely adhering by interlocking basal setae. 2n = 14, 28. Flowering Feb. Pine forests. Ch (Pruski et al. 4208, MO). 2200-2300 m. (United States, Mexico, Mesoamerica, Bolivia, Brazil, Chile, Argentina, Jamaica, Lesser Antilles; Europe, Africa, Asia, Australia, New Zealand, Pacific Islands.)

*Gnaphalium luteoalbum* is very similar to *G. stramineum*, but in addition to differing by cypselae with globular trichomes, it differs by red-tipped corollas and smaller capitula.

*Pseudognaphalium oxyphyllum* (DC.) Kirp.

Viscid perennial herbs 0.3-1(-2) m; stems erect to ascending, few-several-branched distally, moderately to sparsely leafy, exalate or shortly decurrent-winged for less than an internode, obviously shortly stipitate-glandular and loosely floccose-arachnoid, internodes usually about 1/2 as long as the leaves. Leaves usually 2-6(-8) × 0.4-1.5 cm, sagittate-lanceolate to oblanceolate, sessile, secondary veins sometimes visible, surfaces usually green-concolorous, usually visible through vestiture, obviously shortly stipitate-glandular and otherwise subglabrate to loosely floccose-arachnoid, base dilated, obviously subclasping or clasping, usually much broader than stem, not obviously decurrent although sometimes shortly decurrent, margins often undulate, apex acuminate to attenuate. Capitulescence broadly corymbiform-paniculate, to c. 25 cm diam., lateral branches usually 3-8, 5-30 cm, leafy, ultimate glomerules 1-3 cm diam. Capitula 3.5-4.5(-5), usually 30-60-flowered; phyllaries 2.8-4.5(-5) mm, 4-5-seriate, stereome divided, lamina white to stramineous, apex subtranslucent, mid-series and inner series apices acute; receptacle 1-1.4 mm diam. Corollas 2.2-3.2 mm. Disk florets 2-9. Cypselae 0.6-0.8 mm, glabrous, surface with epidermal cells more or less smooth and not obviously transversely rugulose; pappus bristles 2.5-3 mm, readily deciduous individually. Flowering Jul-Oct. *Pine-oak forests, pine forests.* Ch (Breedlove y Strother 46249, MO); G (Espinosa, 2001: 851). 2700-3300 m. (México a Mesoamérica.)

*Gnaphalium oxyphyllum* DC. is recognized here without infraspecies, *G. oxyphyllum* var. *nataliae* F.J. Espinosa being long-winged and treated here at the species rank. Similarly, McVaugh (1984) recognized *G. oxyphyllum* var. *semilantanum* DC. as *G. semilanatum* (DC.) McVaugh. Mesoamerican material of *G. oxyphyllum* tends to have longer phyllaries than more northerly material, thus resembling *G. liebmannii* var. *monticola*. Matuda 2950, cited by Breedlove (1986) as the sole voucher of *G. oxyphyllum* in Chiapas, is redetermined here as *G. roseum*.


*Gnaphalium niliacum* Spreng., *Gnaphalium strictum* Roxb., non Lam.
Delicate fibrous-rooted annual herbs, 0.1-0.3(-0.4) m; stems erect or decumbent, simple or basally-branched, exalate, loosely arachnoid-tomentose, internodes usually shorter than leaves. Leaves 1-5.5 × 0.2-1.3 cm, oblanceolate or spatulate, faint pinnate venation usually obscured by tomentum, surfaces concolorous, eglandular, adaxial surface grayish-green, arachnoid-tomentose, trichomes broad-based, abaxial surface densely arachnoid-tomentose, base attenuate, not dilated, margins sometimes undulate, apex rounded to obtuse, mucronate. Capitulescence leafy and usually densely spicate or racemiform, simple or with a few lateral branches, terminal spike to 2.5(-4) cm long, the central axis sometimes visible through loose tomentum. Capitula 2-3 mm, 150+-flowered; involucre campanulate to ovoid, often embedded in stem tomentum; phyllaries 2-2.7 mm, subequal or slightly graduated, 2-3-seriate, lanceolate to oblanceolate, stereome basically undivided (sometimes seemingly very weakly divided), often arachnoid-pubescent, lamina tan-brown, apex translucent, mid-series and inner series apices obtuse; receptacle 0.7-1.2 mm diam., concave. Corollas 1.1-1.5 mm, sometimes papillose. Marginal florets 150+. Disk florets 4-6. Cypselae c. 0.4 mm, pubescent with broadly oblong trichomes; pappus bristles usually 1-1.5 mm, moderately persistent but ultimately individually deciduous. 2n = 14, 16. Flowering Jan-May, Sep. Disturbed wet areas. H (Nelson 2008: 174); N (Moreno 25338, MO); CR (Pruski, 1997: 282). 0-900 m. (Mexico, Mesoamerica, Venezuela, Guyana, Bolivia, Brazil, Paraguay, Argentina, Cuba, Hispaniola, Puerto Rico; Africa, Asia, Australia.)

Frequently, species of *Gamochaeta* are misidentified as this pantropical species, which differs from *Gamochaeta* by its basally free pappus and stems with loosely arachnoid-tomentose with non-appressed trichomes (vs. sericeous with mostly appressed occasionally fused trichomes). The name *Gnaphalium indicum* L. was frequently used for this entity (e.g., Humbert, 1962 and McVaugh, 1984), but Grierson (1971) combined and applied the name *Helichrysum indicum* (L.) Grierson to a different taxon endemic to the Old World. *Gnaphalium indicum* L., which has priority, was incorrectly listed as a synonym of *G. polycaulon* by Conabio (2009), as was "*G. gracillimum* Pers. ex DC." a name that does not exist nomenclaturally.


Somewhat viscid annuals to biennial herbs 0.2-0.6 m; stems erect, few from base, moderately to densely leafy, exalate or sometimes shortly decurrent-winged, stipitate-glandular (trichomes 0.2-0.4 mm) and also sparsely (proximally) to densely (distally) floccose-tomentose, internodes much shorter than the leaves, wings (when present) shorter than internode; herbage often
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aromatic. Leaves 2-5 × 0.3-0.8 cm, linear-lanceolate to lanceolate, sessile, surfaces usually obviously bicolorous, adaxial surface green (or basal leaf clusters, when present, sometimes lanate and grey-green), obviously and densely short-stipitate-glandular, also sometimes loosely floccose-arachnoid, abaxial surface griseous-tomentose, base gradually dilated and subclasping, about as broad as stem, sometimes short-decurrent, margins slightly revolute especially proximally, apex acute. Capitulescence usually densely corymbiform-paniculate or sometimes more loosely so and then to c. 9 cm diam., becoming somewhat flat-topped, with 1-4 lateral branches, distal branchlets often appressed-bracteate, ultimate glomerules 1.5-2.5 cm diam., some capitula subtended by a bract about as long involucre. Capitula 4-5 mm, 40-50-flowered; involucre base embedded in tomentum; phyllaries 3-5 mm, broadly ovate to oblong, 3-5-seriate, glabrous or mid-zone arachnoid, stereome divided, stereome of inner phyllaries sometimes green to base, lamina reddish and sometimes unevenly so by thickened darker polar cell walls, never bright white, apex subtranslucent, mid-series and inner series apices obtuse to rounded; receptacle 1-1.5 mm diam. Corollas 2.5-2.8 mm. Disk florets c. 9. Cypselae 0.6-0.7 mm, surface minutely transverse-rugulose (slightly visible at 40x); pappus bristles to c. 3 mm, deciduous individually. Flowering Jul-Jan. Disturbed montane forests, páramo, rocky areas. CR (Pruski et al. 3905, MO). 3000-3500 m. (Endemic.)

The report by Luteyn (1999) of *Gnaphalium rhodarum* in Panama is based on misidentified material.


*Pseudognaphalium roseum* (Kunth) Anderb.

Perennial herbs 0.4-1(-2) m; stems erect to spreading, simple or few-several from base, usually moderately leafy, exalate, lanate-tomentose, eglandular, internodes shorter than to about as long as the leaves. Leaves mostly 1-7(-12) × (0.3-)0.5-1.5(-2) cm, lanceolate to oblanceolate to obovate, sessile, usually spreading, surfaces usually concolorous or sometimes weakly bicolorous, seemingly eglandular (sometimes with broad-based flagelliform trichomes or scattered stipitate-glands hidden below indumentum), adaxial surface usually griseous-lanose-tomentose, indument sometimes shedding, abaxial surface usually white-lanose-tomentose, base evenly tapered to slightly dilated, subclasping or clasping, usually not decurrent, about as wide as or wider than stem, the margins often slightly undulate, apex acute to acuminate. Capitulescence
usually narrowly corymbiform-paniculate, lateral branches few, usually 5-10 cm, glomerules 1-2 cm diam., usually 7-13-capitulate. Capitula 4-5.5 mm, usually 53-80(-110)-flowered; phyllaries 2.4-5.5 mm, 4-6-seriate, usually white to stramineous, sometimes pinkish, stereome divided, lamina usually subopaque, ecarinate, mid-series and inner series apices usually obtuse or broadly obtuse; receptacle 1.5-2 mm diam. Corollas 2.5-3.1 mm. Marginal florets usually 45-68(-98). Disk florets (3-)6-12. Cypselae 0.6-0.8 mm, glabrous; pappus bristles 2.8-3 mm, readily deciduous individually. Flowering Year-round. Brushy slopes, disturbed areas, limestone outcrops, oak forests, pine-oak forest, páramos, roadsides, rocky areas, steep slopes, volcano slopes. Ch (Pruski et al. 4224, MO); B (Spellman 1441, MO); G (Contreras 11025, MO); H (Stuessy y Gardner 4423, MO); N (Williams et al. 27927, NY). 400-2100 m. (SW United States, Mexico, Mesoamerica.)

Gnaphalium roseum is circumscribed here in the broad sense and without infrataxa. Gnaphalium roseum is excluded from Costa Rica and Panama, and the eglandular narrow-leaved material with acute inner phyllaries called G. roseum by D'Arcy (1975) has mostly been redetermined as G. semiamplexicaule. Much Costa Rican material in herbaria called G. roseum has glandular leaves, and has been redetermined as G. rhodarum.


Pseudognaphalium semiamplexicaule (DC.) Anderb.

Perennial herbs 0.3-1.5 m; stems erect or ascending, usually branched near capitulescence, usually moderately leafy, exalate or shortly decurrent-winged for much less than an internode, wings usually not present on herbarium specimens, lanate-tomentose, eglandular, internodes generally much shorter than the leaves. Leaves mostly 2-9(-12) × 0.3-1.5 cm, narrowly lanceolate to lanceolate, sessile, spreading, midrib sometimes impressed adaxially, surfaces bicolorous, eglandular, adaxial surface usually green or sometimes gray-green, loosely arachnoid-lanose to sometimes glabrate, abaxial surface usually griseous lanose-tomentose, base typically abruptly or obviously dilated, the distal leaves typically more obviously dilated, subclasping to clasping, not decurrent or shortly decurrent, about as wide as to much wider than stem, the margins undulate or sometimes smooth, apex usually acute to attenuate. Capitulescence usually diffusely corymbiform-paniculate, lateral branches few-several, usually 3-15 cm, glomerules usually 1-2.5 cm diam., 13+ -capitulate. Capitula 3.7-5.5 mm, usually 25-60-flowered; involucre narrowly
campanulate; phyllaries 3.5-5.5 mm, 4-6-seriate, usually white to stramineous, rarely pinkish, stereome divided, apex subtransparent, outer phyllaries broadly triangular, mid-series and inner series apices usually acute; receptacle when post-fruit 1-1.5 mm diam. Corollas 2.5-3.2 mm. Marginal florets usually 23-51. Disk florets 2-11. Cypselae 0.6-0.8 mm, glabrous; pappus bristles to c. 3 mm, readily deciduous. Flowering Year-round. Disturbed areas, fields, meadows, oak forests, open fields, pine-oak forest, páramos, roadsides, rocky areas, secondary vegetation, shrubby slopes, thickets, volcano slopes. Ch (Shilom Ton 2226, NY); G (Pruski y Ortiz 4292, MO); B (Nash, 1976c: 175); H (Borjas 189, MO); ES (Carballo 458, MO); N (Soza y Grijalva 315, MO); CR (Rodriguez et al. 9290, MO); P (Hammel y D’Arcy 6449, MO). 500-3600 m. (Mexico, Mesoamerica.)

Gnaphalium semiamplexicaule is interpreted broadly, more or less in the sense of Nash (1976c), and characterized as having subclasping, eglandular, bicolored leaves. As such, much material from Costa Rica and most material from Panama formerly determined as G. attenuatum and G. roseum is provisionally treated here as G. semiamplexicaule. The higher elevational materials of G. semiamplexicaule, especially those from Costa Rica and Panama, are much narrower leaved than Mexican material. Although material called as G. roseum by D’Arcy (1975) is here treated as G. semiamplexicaule, some Panamanian material has pinkish phyllaries and is similar to glandular-leaved G. rhodarum.

Mesoamerican material has eglandular leaves and conflicts with the description in Espinosa (2001), whose key lead 31B characterizes G. semiamplexicaule as glandular-leaved. Although Espinosa (2001) suggested that G. oxyphyllum var. semilantanum DC. is a synonym G. semiamplexicaule (interpreted here as eglandular-leaved), G. oxyphyllum var. semilantanum appears to differ by stipitate-glandular leaves. However, because I have not seen the type of G. semiamplexicaule the circumscription here is by necessity provisional.

Gnaphalium semiamplexicaule is very similar to G. oaxacanum Greenm., which appears to differ only by capitula 16-22-flowered. Gnaphalium imbaburense Hieron., based on material from Ecuador and known to me only from a photograph of the holotype, also appears very similar to Mesoamerican material of G. semiamplexicaule.


Small-leaved perennial stoloniferous herbs 0.1-0.3 m; stems ascending, often few-branched from woody base, 1-few leafy stolons 4-6.5 cm sometimes present, upright branchlets simple below capitulescence, somewhat densely leafy basal rosette often also present but sometimes
withered in older plants, upright stems sparsely to moderately leafy (leaves usually moderately ascending) or older plants with stems densely leafy proximally, exalate, arachnoid-lanate, eglandular, the surface often purplish and sometimes visible through indumentum, internodes about as long as leaves. Leaves 1-4.2 × 0.2-0.4 cm, oblanceolate to spatulate, sessile, surfaces somewhat bicolorous, eglandular, adaxial surface green or gray-green, weakly arachnoid-lanose, abaxial surface griseous arachnoid-lanose, base not dilated, sometimes subclasping, usually about as broad as stem, margins not obviously decurrent onto stems, narrowly revolute, apex obtuse, apiculate. Capitulescence narrowly corymbiform-paniculate with a single terminal glomerule, glomerule 1-2 cm diam., rounded, 7-11(-20)-capitulate. Capitula 5-7 mm, 50-95-flowered; involucre base embedded in tomentum; phyllaries 5-7 mm, 4-6-seriate, glabrous, mid-series and inner series apices obtuse; outer phyllaries greenish-brown, inner c. 3 series with lamina white and subopaque, apex obtuse; receptacle 1-1.5 mm diam. Corollas 2.5-3 mm, purplish distally. Marginal florets 30-70+, about as many as the disks to many more than disks. Disk florets usually 11-25. Cypselae 0.8-1 mm; pappus bristles c. 20+, to c. 3.2 mm. Flowering Jan, Mar, Aug. Alpine meadows, limestone outcrops. Ch (Breedlove 29375, NY); G (Steyermark 50275, NY). 3100-4000 m. (Endemic.)


**Gnaphalium chilense** Spreng., *Gnaphalium sprengelii* Hook. et Arn., *Pseudognaphalium stramineum* (Kunth) Anderb.

Annual or biennial herbs 0.2-0.8 m; stems erect to spreading, sometimes few-branched from base, each simple below capitulescence, usually moderately leafy, exalate, floccose-tomentose, eglandular, internodes shorter than to about as long as the leaves. Leaves 1-6(-9.5) × 0.2-0.6(-1) cm, linear-oblanceolate to narrowly spatulate, sessile, usually ascending, surfaces concolorous, eglandular, loosely griseous-tomentose, base subclasping, usually not decurrent or decurrent 1-2 mm and for much less than an internode, usually about as broad as stem, margins revolute proximally, apex acute to often obtuse. Capitulescence narrowly corymbiform-paniculate, lateral branches few, usually 1-4 cm, ultimate glomerules 1-3 cm diam. Capitula 4.1-6 mm, c. 150+-flowered; involucre broadly campanulate to subhemispherical; phyllaries 3.8-6 mm, 4-5-seriate, stercome divided, lamina yellowish-tan to stramineous, apex usually translucent, mid-series and inner series apices usually obviously obtuse to rounded; receptacle 1.5-2 mm diam. Corollas 1.6-2.5 mm, not red-tipped. Marginal florets 140+. Disk florets usually 8-16+. Cypselae 0.5-0.7 mm,
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glabrous; pappus bristles 2-2.5 mm, readily deciduous with several often loosely adhering by interlocking basal setae, infrequently deciduous as a weakly adhering basal ring. $2n = 28$.

Flowering year-round. $2n = 28$. Disturbed areas, pine forests, pine-oak forests. G (Nash, 1976c: 177); H (Nelson, 2008: 175). 1800-2400 m. (Canada, United States, Mexico, Mesoamerica, Chile.)

Although Hooker y Arnott (Bot Beechey Voy. 1833: 150) and Cronquist (1994) state that the Chamisso type collection of synonymous G. chilense was collected in California rather than in South America, Barkley et al. (2006) say the species is presumably native to Chile. The plant is not known to me to occur in Uruguay and thus it does not seem that G. chilense, typified by material from California, is a synonym of G. montividense.


Pseudognaphalium subsericeum (S.F. Blake) Anderb.

Perennial herbs 0.1-0.5 m; stems erect, simple or infrequently few-branched from base, moderately leafy, exalate, sericeous-tomentose, eglandular, internodes usually shorter than leaves. Leaves 2.5-10 × 0.3-0.7 cm, mostly uniform in size, abruptly smaller only apically, narrowly linear-lanceolate, sessile, solitary veined, surfaces usually obviously bicolorous, eglandular, adaxial surface green, glabrate to weakly arachnoid-lanose, abaxial surface closely sericeous-tomentose, the midrib linear, evident abaxially, base not dilated, not subclasping, usually about as broad as stem, margins not decurrent onto stems, narrowly revolute, apex attenuate.

Capitulescence narrowly corymbiform-paniculate with a single terminal glomerule, rarely with 1-2 lateral branches, glomerule 3-4 cm diam., rounded, c. 30+-capitulate, not held well above subtending leaves. Capitula 4-5 mm, 80-90-flowered; phyllaries 3-4.5 mm, 4-5-seriate, brownish proximally, distal c. 1.5 mm of lamina of inner few series with lamina white and subopaque, mid-series and inner series apices mostly obtuse; receptacle 1-1.5 mm diam. Corollas 2.3-2.7 mm. Marginal florets c 70+. Disk florets c. 8. Cypselae 0.6-0.8 mm, subglabrous; pappus bristles c. 18, to c. 3 mm. Flowering Feb-Apr, Jun, Sep. Meadows, oak forests, rock outcrops, rocky streams, volcano slopes. CR (Jimenez 1824, MO); P (Klitgaard et al. 809, MO). 2100-3200 m. (Mesoamerica, Colombia.)

The report by Luteyn (1999) of Gnaphalium subsericeum in Peru is based on misidentified material.


Viscid annuals to biennial herbs 0.3-1 m; stems erect to ascending, few from base, simple into capitulescence, usually densely leafy (less so or at high-elevations), sometimes only moderately leafy, exalate or sometimes with leaves decurrent-winged for less than an internode, obviously short-stipitate-glandular and also sparsely to densely floccose-arachnoid, internodes 0.1-0.5(-2) cm, much shorter than the usually crowded leaves, wings (when present) 3-10 mm, green. Leaves (2-)4-10 × 0.2-1 cm, linear-lanceolate to lanceolate, sessile, solitary veined, surfaces usually obviously bicolorous, adaxial surface green, densely short-stipitate-glandular with trichomes c. 0.2 mm (glandular trichomes of low elevational material sometimes elongated with glandular cap not obvious), also sometimes loosely floccose-arachnoid especially midrib, abaxial surface white-lanate-tomentose, base usually gradually dilated and subclasping, about as broad as stem, usually short-decurrent, margins sometimes crenulate, revolute especially proximally, apex acuminate. Capitulescence typically densely corymbiform-paniculate, to c. 10 cm diam., with 2-4 lateral branches, distal branches often appressed-bracteate, some capitula subtended by a bract about as long involucre. Capitula 4-5 mm, (100-)200+-flowered; involucre broadly campanulate to subhemispherical; phyllaries 2-5 mm, 4-6-seriate, stereome divided, lamina yellowish or silvery, never bright white, apex subtranslucent, mid-series and inner series apices acute or obtuse; receptacle 2-4 mm diam., often dark and contrasted against the spreading to reflexed inner phyllary which have paler adaxial surfaces. Corollas 2.5-3.5 mm. Disk florets (5-)15-20+. Cypselae 0.5-0.7 mm, surface obviously transversely rugulose; pappus bristles to c. 3 mm, readily deciduous individually. 2n = 28. Flowering year-round. *Grazed slopes, pastures, pine forests, pine-oak forests, roadsides, rocky areas, steep slopes*. Ch (Soule y Brunner 2310, MO); G (King y Renner 7025, MO); H (Martinez 121, MO). 800-2800 m. (United States [Texas], Mexico, Mesoamerica, Hispaniola.)

The synonymy is adapted from McVaugh (1984) and Nash (1976c), but of the four Kunth names only the protologues of *Gnaphalium viscosum* and *G. hirtum* describe either the stems or leaves as "viscoso," i.e. stipitate-glandular. *Gnaphalium gracile*, *G. leptophyllum*, and *G. tenue* are each described as having herbage variously pilose-lanate, and not as obviously glandular.
However, the photo-holotype of *G. leptophyllum* shows very broad post-fruiting receptacles, typical of stipitate-glandular *G. viscosum*, so it appears that at least the protologue of *G. leptophyllum* does not mention all diagnostic features used herein.

Nash (1976c) cited *G. viscosum* for Honduras, but all Honduran material seen by me has immature cypselae not transversely rugulose, and seems better provisionally referred to *G. sp. 1-BR*.


Robust perennial herbs 0.3-1.5(-2) m; stems erect to ascending, sometimes few-branched, slightly thickened, moderately to densely leafy, at least at mid-stem short-long-decurrent winged with wings shorter than to about as long as internodes, loosely floccose-tomentose, stipitate-glandular, internodes generally much shorter than the leaves. Leaves 3-8(-12) × 0.5-1.5(-3) cm, lanceolate or oblanceolate to oblong, sessile, typically spreading, a few strongly ascending secondary veins sometimes visible, surfaces usually obviously bicolorous, adaxial surface green, obviously stipitate-glandular, sometimes also sparsely loosely arachnoid-pubescent often with flagelliform trichomes, abaxial surface usually loosely grisaceous floccose-tomentose, sometimes merely sparsely arachnoid-floccose, base broad, as broad as to broader than the stems, subclasping or distal leaves clasping, at least mid-stem leaves obviously and more or less symmetrically short-long-decurrent, margins often undulate or crenulate, apex acute to acuminate. Capitulescence broadly rounded corymbiform-paniculate, lateral branches to c. 30 cm, leafy, ultimate glomerules grouped in clusters to 7 cm diam., 20-40+-capitulate. Capitula 5-7 mm, usually 55+-flowered, involucre broadly campanulate to subhemispherical; phyllaries 3-7 mm, 4-6-seriate, lamina usually stramineous, apex subopaque to subtranslucent, mid-series and inner series apices acute to sometimes obtuse; receptacle to c. 2 mm diam. Corollas 3-3.5 mm. Marginal florets 50+. Disk florets 5-15. Cypselae 0.6-0.8 mm, glabrous, surface with epidermal cells more or less smooth and not obviously transversely rugulose; pappus bristles 3-3.8 mm, deciduous individually. Flowering May-Feb. *Disturbed areas, limestone hills, open slopes, pastures, pine-oak forests, roadsides, rocky areas, streamside*. Ch (*Pruski et al.* 4224A, MO); G (*King y Renner 7104*, MO); H (*Molina 22580*, NY). 800-3400 m. (Mexico, Mesoamerica.)

The concept of *Gnaphalium brachypterum* DC. used by Nash (1976c) in Mesoamerica is here divided into two, with the name *G. elegans* used here for exalate-stemmed material and *Gnaphalium sp. 1-BR* encompassing the winged-stemmed material. Both aforementioned taxa are
allopatric from and differ morphologically from lanceolate, short-decurrent-leaved *G. brachypterum* DC. of northern Mexico. The citation in Nash (1976c) of *G. brachypterum* in Costa Rica and Panama is in reference to material treated here as *G. elegans*. Much of the remainder of the material Nash called *G. brachypterum* DC. is winged stemmed and here treated as *Gnaphalium sp. 1-BR*. As restructured, *Gnaphalium sp. 1-BR* is as similar to *G. oxyphyllum* var. *nataliae*, as to the phototype of *G. brachypterum*.

*Gnaphalium sp. 1-BR* differs from *G. oxyphyllum* var. *nataliae* by often oblanceolate to oblong leaves typically with undulate margins and visible arching secondary veins. Moreover, the wings of the stems in *G. oxyphyllum* var. *nataliae* are usually longer than the internodes, whereas those of *Gnaphalium sp. 1-BR* are shorter than the internodes. I believe central-Mexican *G. oxyphyllum* DC. var. *nataliae* needs to be raised to the species level. Although I have not examined material from MEXU, I suspect the material from Chiapas called *G. bourgovii* A. Gray by Espinosa (2001) would be determined by me as *Gnaphalium sp. 1-BR*.


Perennial herbs 0.3+ m; stems erect or ascending, several-branched distally, moderately to densely leafy, exalate, closely sericeous-tomentose, eglandular, internodes much shorter than leaves. Leaves 1-3 × 0.1-0.2 cm, linear, the more distal ones strongly ascending, midrib impressed adaxially, surfaces slightly bicolorous, adaxial surface green to gray-green, eglandular and arachnoid-lanate, abaxial surface grayish, closely sericeous-tomentose, base very slightly dilated and very slightly subclasping, very short-decurrent for 1-3 mm onto stem, margins revolute, apex short-apiculate. Capitulescence of c. 9 branches each terminated by a narrowly corymbiform-paniculate glomerule, branches 10-20 cm, leafy, glomerules 1-1.7 cm diam., held slightly above the evenly descrescent stem leaves, broadly rounded, each 5-13-capitulate. Capitula (immature) 4-5 × 2.5-4 mm, 41-48-flowered; involucre hemispherical or broadly campanulate; phyllaries c. 30, 4-6-seriate with the outer phyllaries about 1/2 as long as the inner, appressed, glabrous, stereome of each greenish, about 1/2 as long as lamina, lamina of each bright white and strongly opaque, outer phyllaries 1.8-2.5 × 1.5-2.2 mm, broadly triangular-ovate, apex broadly obtuse, evenly grading to mid-series and inner series; mid-series phyllaries and inner phyllaries 4-5 × 0.5-1 mm, oblanceolate to oblong, apex broadly obtuse to rounded; receptacle c. 1 mm diam. Corollas (immature) 2.5-3 mm. Marginal florets 18-23, less numerous than the disk florets. Disk florets 23-25, bisexual; corolla lobes sparsely papillose; immature styles branched within anther cylinder, branches truncate, papillose only apically. Cypselae (immature) and ovaries c. 0.5 mm, glabrous; pappus bristles c. 3 mm, individually deciduous, evenly thickened
throughout, never clavate, distal cells sometimes with rows of internal spiral or cross-shaped crystals, terminal cells obtuse. Flowering Dec. Mixed forest in ravines. G (Williams et al. 22433, NY). Aprox. 1800 m. (Endemic.)

*Gnaphalium sp. 2-LE* is anomalous in *Gnaphalium* by having fewer pistillate florets than bisexual disk florets. Among Mesoamerican species of *Gnaphalium*, it is the sole eglandular species with bright white and opaque phyllaries. *Gnaphalium sp. 2-LE* is clearly allied to *G. leucocephalum* A. Gray, known from northern Mexico and the SW United States, by its narrow leaves and white-opaque phyllaries with obtuse to rounded apices. *Gnaphalium sp. 2-LE* clearly differs from *G. leucocephalum*, however, by eglandular vestiture and in the pistillate to bisexual floret ratios, with the marginal pistillate florets less numerous than the bisexual disk florets. *Gnaphalium sp. 2-LE* is also similar in white-opaque phyllaries to *G. chartaceum* Greenm., which differs by broader, subclasping to clasping, glandular leaves. Occasionally, however, *G. chartaceum* has as many bisexual disk florets as marginal pistillate florets, thus approaching the sexual ratio condition found in *Gnaphalium sp. 2-LE*.

In this sexual ratio feature *Gnaphalium sp. 2-LE* matches *Helichrysum* Mill. as traditionally defined, but Hilliard, y Burtt (1981) showed that although useful, the sexual ratio feature alone may not be used to distinguish *Helichrysum* from *Gnaphalium* and allies. *Gnaphalium sp. 2-LE* by white-opaque phyllaries superficially resembles *Anaphalis margaritacea* (L.) Benth. et Hook. f., which one may expect to encounter planted in ruins such as those from where *Gnaphalium sp. 2-LE* is known, but *Anaphalis* DC. differs by pubescent cypselae and is not known to me to be cultivated in Mesoamerica.

**20. Gnaphalium sp. 3-RZ.** Illustr.: none. N.v.: none.

Perennial herbs 0.3-0.8 m; stems stiffly erect, simple to few-branched proximally, moderately to densely leafy, typically shortly decurrent-winged for less than an internode, lanate-tomentose, eglandular, internodes usually much shorter than leaves. Leaves 2-8 × 0.2-0.4 cm, broadly linear and basically evenly wide throughout (sometimes immature leaves linear-lanceolate at broadest at base), proximal ones spreading, distal ones usually strongly ascending, sessile, venation obscure, surfaces usually concolorous (rarely somewhat bicolorous in proximal leaves), adaxial surface gray (rarely greenish in proximal leaves), typically lanate (rarely becoming glabrate), abaxial surface lanate-tomentose, base slightly dilated, subclasping, shortly decurrent onto stem, usually about as wide as stem, margins slightly revolute, appearing slightly undulate by undulated subappressed indumentum, apex attenuate. Capitulescence narrowly corymbiform-paniculate, lateral branches few, usually 1-4 cm, ultimate glomerules 1-2.5 cm diam., 17+-capitulate.
Capitula 4.5-6 mm, 34-41-flowered; involucre narrowly campanulate; phyllaries 3.5-6 mm, 3-5-seriate, stéréome divided, lamina yellowish to pinkish, apex subtranslucent, outer phyllaries broadly triangular, mid-series obtuse, inner series acute, apiculate or mucronulate; receptacle c. 1 mm diam. Corollas 2.5-3 mm. Marginal florets 30-35. Disk florets 4-6. Cypselae c. 0.5 mm, glabrous; pappus bristles to c. 3 mm, readily deciduous. Flowering Sep-Jan. Paramos, volcano slopes. CR (Pruski et al. 3852, MO). 3100-3400 m. (Endemic.)

5. Xerochrysum Tzvelev

Bracteantha Anderb. et Haegi

Perennial herbs; stems usually simple, exalate, pubescent, leafy, without basal rosette at anthesis. Leaves simple, alternate, subsessile or narrowed into an elongate petioliform base; blade narrow, chartaceous, surfaces pubescent. Capitulescence monocephalous or open-corymbiform and 2-3-capitulate. Capitula disciform, large, many-flowered; involucres hemispherical; phyllaries graduated, 3-8-seriate, usually yellow to brownish or purplish, sometimes white or reddish, spreading or deflexed post fruit, stéréome undivided (not fenestrate). Marginal florets fewer in number than disk florets; corolla yellow. Disk florets 200+, bisexual; corolla yellow; anther tails setose, appendage concave; style branches acute, abaxially papillose. Cypselae quadrangular, brown to black, smooth, glabrous; pappus of 25-35 bristles, bristles isomorphic, stramineous, barbellate, usually individually caducous. $x = 12, 13, 14, 15$. Aprox. 6 spp. Native to Australia, but ours cultivated globally but infrequently escaping.


Bracteantha bracteata (Vent.) Anderb. et Haegi, Helichrysum bracteatum (Vent.) Haw.

Taprooted herbs 0.2-1 m; stems erect, usually simple to infrequently 1-2-branched, striate, usually arachnoid-pubescent and stipitate-glandular. Leaves 2-13 × 1-1.5(-2.5) cm, oblong-elliptic or spatulate, sometimes elliptic or lanceolate, surfaces usually concolorous, usually arachnoid-pubescent and stipitate-glandular, base cuneate to attenuate into an elongate petioliform base, margins entire and undulate. Capitula to c. 20(-30) mm; involucre 20-50 mm diam; phyllaries usually 5-20(-28) × 5-10 mm, oblong, (ours) yellow or sometimes reddish, opaque, glabrous, apex obtuse; receptacle 15-25 mm diam. Marginal florets few. Disk florets usually 25-50; corolla
usually 7-10 mm; anthers 3 mm. Cypselae 2-3 mm; pappus bristles usually 7-10 mm, about as long as corollas. $2n = 24, 26, 28, 30$. Flowering Jan-Aug. Cultivated. Ch (Breedlove 26147, MO); G (Standley 86562, MO); H (Molina y Molina 34937, MO); ES (Standley et Calderón, 1941:282 sub Helichrysum bracteatum); CR (Standley 1938: 1482 sub Helichrysum bracteatum); P (D'Arcy y D'Arcy 6285, MO). 1500-2300 m. (Native to Australia; widely cultivated in Canada, Estados Unidos, Mexico, Mesoamerica, Colombia, Venezuela, Ecuador, Peru, Bolivia, Brazil, Uruguay, Paraguay, Chile, Argentina, Cuba, Jamaica, Hispaniola, Puerto Rico; Europe, Africa, Asia, New Zealand, Pacific Islands.)

This species, generally known in horticulture as Helichrysum bracteatum, is commonly widely cultivated for its large showy capitula.

**XI. Tribus Helenieae Lindl.**


Annual or perennial herbs to infrequently shrubs, infrequently acaulescent; herbage without secretory cavities or latex. Leaves alternate or rarely opposite, unlobed to pinnatifid, sessile to petiolate. Capitulescence terminal, usually monocephalous to paucicephalous and open-cymose or corymbiform, infrequently paniculate. Capitula radiate to infrequently discoid; involucre cylindrical to hemispherical; phyllaries subequal to sometimes graduated, (1-)2-several-seriate, often herbaceous, not dry and rather scarious throughout; clinanthium flat to conical or globose, typically epaleate or less commonly outer disks partly paleate, rarely (Marshallia) paleae throughout. Ray florets (when present) 1-seriate, pistillate or sterile; corolla typically deciduous, limb with nerves equally thin, usually evenly narrowed proximally into tube, apex often trilobed. Disk florets bisexual or rarely functionally staminate; corolla mostly shortly 5-lobed, sometimes pubescent or glandular, throats without fibers embedded in nerves, without colored resin, ducts not evident, lobes erect or at least so in our spp., somewhat papillose within; anthers ecaudate, filaments glabrous, thecae usually pale-colored, endothecium pattern usually polarized, apical appendage lanceolate to ovate, carinate, eglandular or rarely (Balduina) glandular; style mostly exappendiculate with a truncate papillose apex, occasionally (e.g., *Gaillardia*) with a vascularized appendage, branches with stigmatic surfaces 2-banded. Cypselae isomorphic, mostly prismatic, not carbonized, walls (or seed coat) with raphids, apex truncate; pappus typically of several membranous-scarious obtuse-tipped to aristate scales, rarely of multiple bristles. 13 genera and approx. 120 spp. Americas, mostly SW United States and northern Mexico.
Cassini (1819a, 1819b) recognized Heliantheae in a broad sense, but Cassini (1829) in more detail enumerated five subtribes within it: Héléniées (including *Helenium* and *Bahia*, among other genera), Coreopsidées, prototypes, Rudbeckiéées, and Millériées. Cassini (1829) circumscribed Heleniiinae by membranous pappus squamellae, whereas Bentham y Hooker (1873) recognized Helenieae at the tribal level as containing basically all epaleate Helianthoids. The Bentham y Hooker (1873) tribal scheme recognizing 13 tribes of Compositae was largely followed for nearly a century, but Cronquist (1955) and Robinson (1981) recognized Helenieae in the sense of Bentham y Hooker (1873) to be polyphyletic, and each reduced Helenieae to synonymy of Heliantheae. Most of Robinson's (1981) Helenieae subtr. Gaillardiinae (which included and has priority at the subtribal rank over Heleniiinae Less.) falls within the present concept of Helenieae as now used. Karis y Ryding (1994a) recognized Helenieae at the tribal rank, but included subtribes Flaveriinae and Pectidinae, and Pertylinae within Helenieae.

The recent trend back towards recognition of Helenieae, albeit now more narrowly defined, was jump-started by Jansen y Kim (1996) who showed that Eupatorieae is nested within Heliantheae s.l., as well as by Baldwin et al. (2002), who showed that Helenieae s. str. is basal among Heliantheae s.l. A monophyletic classification with continued recognition of Eupatorieae basically dictated recognition of earlier derived Heliantheae s.l., leading not only to the recognition of one-time synonyms Helenieae, Coreopsidiae, Madieae, Millerieae, Neurolaeneae, and Tageteae, but also to description by Baldwin (in Baldwin et al. 2002) of the new tribes Bahieae, Chaenactideae, and Peritylinae. The circumscription of Helenieae as including only 13 genera that is followed here is that of Baldwin et al. (2002) and Panero (2007), who excluded Flaveriinae and Pectidinae to tribe Tageteae. Turner (2013) followed this new circumscription of Helenieae.

Most recent floras, however, pragmatically recognize Helenieae broadly as in Bentham y Hooker (1873) (e.g., Villarreal et al. 2008, who included *Achyroperm*, *Bahia*, *Espejoa*, *Flaveria*, *Florestina*, *Loxothysan*, and *Schkuhria* in Helenieae) or as Heliantheae subtribe Gaillardinae Less. (e.g., Williams, 1976b; Strother, 1999; Barkley et al., 2006). Here, a narrowly circumscribed Helenieae in the sense of Baldwin et al. (2002) and Panero (2007) is adopted.

1. Disk corolla lobes linear-lanceolate and long-attenuate; disk style appendiculate, appendage filiform; clinanthium with setiform enations as long as the disk cypselae; ray florets sterile.

1. Gaillardia

1. Disk corolla lobes more or less deltate; disk style exappendiculate, apex truncate or obtuse; clinanthium without setiform enations as long as the disk cypselae; ray florets pistillate.

2. Stems winged; cypselae obviously costate.

2. Helenium

2. Stems exalate; cypselae not at all obviously costate.

3. Hymenoxys

1. Gaillardia Foug.


Por J.F. Pruski.

Annual or perennial herbs to subshrubs mostly less than 1 m; stems typically with leaves cauline and sometimes also basal or plants rarely scapose, usually erect, branched from base or throughout, exalate. Leaves simple to pinnatifid, alternate, typically petiolate or less commonly distal ones sessile; blade mostly elliptic but ranging from linear to ovate, surfaces glandular (except in *G. suavis*), otherwise usually scabridulous to villous, rarely glabrous, margins entire to toothed or pinnately lobed. Capitulescence monocephalous to loosely-cymose, 1-several-capitulate, typically long-pedunculate. Capitula radiate with corolla limbs well-exserted or rarely discoid with outer disk florets radiating and ray-like; involucre hemispherical to broadly campanulate; phyllaries 14-30(-40), oblong to lanceolate, subequal or sometimes unequal, 2-3-seriate, imbricate, herbaceous throughout to often indurate proximally, spreading to reflexed at anthesis and in fruit, persistent, glandular and pubescent, apices often attenuate or subulate; clinanthium convex to hemispherical, e paleate, naked or less commonly (ours) with setiform enations as long as or longer than the disk cypselae. Ray florets sterile or rarely pistillate; corolla limb often bicolored, typically broadly cuneate with a deeply 3-lobed apex. Disk florets 20-100, bisexual; corolla often yellow or orange with red or purplish lobes, tube short, throat
abruptly ampliate and broad at base but thence erect and not broadening, lobes 5, ours linear-
lanceolate and long-attenuate, but more commonly broadly deltap or ovate, often setose, apex
acute to obtuse; anthers yellow or purplish, appendage lanceolate to ovate; style appendiculate,
apical appendage sterile, filiform, vascularized, typically purplish long-papillose. Cypselae
isomorphic or rarely heteromorphic, opyramidal or obconic to clavate, ± 4-angled, sparsely to
densely pubescent throughout or at least proximally; pappus of 5-10 medially thickened scales,
basal margins scarios, apex attenuate to aristate, rarely not so, typically 1-seriate and
persistent. x = 17(-18). 18-21 spp. Most species in Canada, United States y N. México, 2 spp.
in southern South America; a single species occurs in Mesoamerica as an escape from
cultivation.

Biddulph (1944) recognized 18 species, whereas Turner y Watson (2007) updated of
Biddulph's fine monograph and recognized 21 species.


y Watson, 2007): Cult. in Paris, de Louisiana (P-JU 9464, as microfiche!). Illustr.: Stones, Fl.
Louisiana 29 (1991). N.v.: Gallarda, gallardia, gallardina, G; gallardia, pompón, H; cambray,
ES; jalacate, jalacate extranjero, N.

Calonnea pulcherrima Buc'hoz, Gaillardia bicolor Lam., Gaillardia bicolor fo.

integerrima Hook., Gaillardia bicolor var. drummondii Hook., Gaillardia drummondii
(Hook.) DC., Gaillardia lobata Buckley, Gaillardia neomexicana A. Nelson, Gaillardia picta
D. Don, Gaillardia picta var. tricolor Planch., Gaillardia pulchella var. albiflora Cockrell,
Gaillardia pulchella var. australis B.L. Turner et M. Whalen, Gaillardia pulchella var.
drummondii (Hook.) B.L. Turner, Gaillardia pulchella var. picta (D. Don) A. Gray, Gaillardia
scabrosa Buckley, Gaillardia villosa Rydb., Virgilia helioides L'Hér.

Annual tap-rooted herbs or sometimes persisting as shrubs 0.25-0.5(-0.7+) m; stems pale,
spreading to erect, few-many-branched, exalate, subereter, costate or sometimes merely striate;
herbage mostly rough to the touch. Leaves sessile or proximal leaves petiolate; blade 1.5-7(-12) ×
0.4-1.2(-3.5) cm, typically oblons or spatulate, sometimes linear-lanceolate, chartaceous or
sometimes in coastal plants thickly chartaceous, tertiary venation obscure, surfaces glandular,
otherwise puberulent to hispid-pilose, bases typically somewhat clasping stem or proximal leaves
sometimes attenuate to long-attenuate and resembling a winged petiole, margins often entire,
sometimes toothed or pinnately 2-4-lobed, apex acute to obtuse: petiole 0-3 cm. Capitulescence
of 1 to more commonly (when plants branched) several long-pedunculate capitula; peduncles 4-13(-20) cm, hispidulous to subtrigillose. Capitula 6-12 mm, radiate or rarely discoid; involucre 15-20 mm diam., hemispherical; phyllaries 18-28, 6-14 mm, lanceolate to linear-lanceolate, reflexed at anthesis, stramineous-indurate basally and otherwise mostly herbaceous, glandular and pubescent distally, margins usually ciliate, trichomes often as long as phyllary diam., apex acute to attenuate or even subulate; clinanthium setiform enations 3-5, 1.5-3 mm, lanceolate, about as long as disk cypselae, stiff. Ray florets (0)7-17, sterile; corolla tube 2-3 mm, limb 12-20(-30) mm, usually bicolored, typically reddish to purplish proximally and yellow to orange distally, usually 7-nerved, abaxially glandular and setulose, lobes 2-10 mm, 3-nerved. Disk florets 40-90; corolla 5-7 mm, broadly cylindrical to campanulate, typically purplish with yellowish lobes, tube 0.5-1 mm, lobes 1-2.5 mm, deltate to ovate, purplish long-setose, apex long-attenuate; anther appendage flat; style branches c. 3 mm, reflexed. Cypselae 2-2.5 mm, broadly obconic, base and angles densely sericeous; pappus usually of 5-8 broad-based scales about as long as the disk corollas and spreading in fruit imparting a stramineous cast to the fruiting capitulum, scales elliptic-lanceolate to lanceolate, 4-7 mm, stiff, base c. 1 mm diam., ovate, midrib excurrent apically as gradually attenuate to abruptly aristate awn often 1.5-2 × as long as broad base. 2n = 34. Escaping from cultivation into cornfields and grasslands, and to be looked for as a beach strand element in the Yucatán. Ch (Breedlove 16098, CAS); G (Salquero 323, USCG); H (Molina 25792, MO); ES (Calderon y Standley 1941: 281); N (Williams, 1976b: 370). 0-1800 m. (United States, México, Mesoamérica; cultivated Brazil, Asia, Australia, Pacific Islands.)

Gaillardia pulchella is also cultivated in Honduras, El Salvador, and Nicaragua, but not known to me to have escaped there. The species, which is often used horticulturally in subtropical and temperate gardens of both hemispheres, may be recognized by its mostly annual habit, its purplish disk corollas with acuminate to attenuate lobes, and by its receptacular setae mostly longer than the cypselae. The forms typically cultivated (Williams, 1976b) have somewhat carnose leaves, resembling the common phase of beach front and beach strand plants recognized as G. pulchella var. picta by Turner y Watson (2007).

2. Helenium L.


Por J.F. Pruski.
Annual to perennial herbs, caulescent or infrequently subscapose to 1.5+ m; stems typically simple proximally to sometimes few-branched distally, erect, herbaceously winged by decurrent leaf base margins (ours) or exalate, glabrous to pubescent; herbage often of both punctate glandular trichomes and multicellular eglandular trichomes. Leaves simple to sometimes pinnately lobed to pinnatifid, alternate or proximal ones rarely opposite, sessile or less commonly petiolate, basal margins typically decurrent onto stem as wings; blade linear to elliptic-ovate or spatulate, chartaceous, venation pinnate, surfaces glandular, otherwise glabrous to pubescent, margins often entire. Capitulescence monocephalous to open-cymose with few to many capitula. Capitula often becoming globose especially post-anthesis by clinanthium inflating and displacing the numerous florets and their nearly persistent stiff, narrow, and short-lobed corollas, radiate or rarely discoid; involucre obconical to hemispherical or globose; phyllaries weakly imbricate to nearly eximbricate, subequal or less commonly unequal, 1-2-seriate, free or sometimes connate proximally, often reflexed at anthesis and in fruit, herbaceous, persistent, glandular, otherwise glabrous to pubescent; clinanthium convex or hemispherical to globose, epaleate, glabrous, without setiform enations as long as the disk cypselae, glabrous or rarely setulose. Ray florets (when present) 7-34, pistillate or less commonly sterile, spreading but often soon extremely deflexed by clinanthium enlargement; corolla yellow or orange throughout to sometimes purple-streaked or somewhat reddish proximally, limb often cuneate, well-exserted from involucre, abaxially glandular and puberulent. Disk florets numerous, bisexual; corolla 4-5-lobed, yellow or sometimes lobes purplish, tube shorter than throat, lobes more or less deltate, often setose; anthers pale, base rounded or short-sagittate, appendage ovate to deltate with margins typically revolute; style exappendiculate, branch apex truncate, papillose. Cypselae mostly obpyramidal, 4-5-angled and obviously 8-10-costate, typically brown, not carbonized, truncate at apex, glabrous to pubescent, sometimes glandular; pappus of (0-)few squamellae much shorter than the disk corollas and cypselae, apices obtuse to aristate. $x = 13$ or 17. Spp. c. 32, Canada, United States, Central America, Suramérica, Cuba, with most species in the S. United States and N. México.

The common name for *Helenium* is "sneezeweed", referring to its use as a sneeze-inducing snuff to rid bodies of evil spirits. *Helenium integrifolia* was recognized by Williams (1976b), but this species was transferred to *Hymenoxys* by Bierner (1994).

3. *H. scorzonerifolium*

1. Annual or biennial tap-rooted caulescent herbs; peduncles more or less filiform, scarcely broadened below involucre; capitula ovoid to globose; involucres 6-14 mm diam.; phyllaries linear-lanceolate, free to base; cypselae setose, sometimes glandular.

2. Pappus squamellae 0.3-0.8(-1.2) mm, apex acute to apiculate, erose or with terminal awn; stem wings 0.5-1(-1.5) mm diam.

   1. *H. mexicanum*

2. Pappus squamellae 0.1-0.3 mm, apex broadly obtuse to rounded, without terminal awn; stem wings 1-2 mm diam.

   2. *H. quadridentatum*


Annual or sometimes perhaps biennial, tap-rooted, caulescent herbs 0.3-0.9(-1.5) m, basal leaves at first forming a rosette but usually withered at anthesis; herbage glandular, otherwise sparsely puberulent to sometimes glabrate; stems few-branched from near base or simple proximally and branched distally, narrow-winged, subterete, striate, wings 0.5-1(-1.5) mm diam. Leaves more or less ascending, alternate, sessile; blade 3-12(-15) × 0.5-1.5 cm, linear-lanceolate or proximal leaves narrowly oblanceolate, secondary venation obscure, surfaces glandular, otherwise puberulent to sparsely so, base slightly narrowed or proximal leaves with base attenuate, margins entire or proximal leaves with margins occasionally few-serrulate, apex acute to acuminate or less commonly proximal leaves with apex obtuse. Capitulescence usually 4-7-capitulate on simple or forked distal branches; peduncles 3-8(-10) cm, more or less filiform, scarcely broadened below involucre, striate, pubescent. Capitula (0.5-)0.8-1.5 cm, ovoid to globose, radiate; involucre 6-14 mm diam., hemispherical; phyllaries c. 20, 4-7 × c. 0.5 mm, linear-lanceolate, free to base, subequal, 1-seriate, pubescent, apex acuminate to narrowly acute; clinanthium 3-9 mm, ovoid. Ray florets 11-17, pistillate; corolla yellow to yellow-orange, limb 7-12(-17) × (2-)4-9 mm, broadly cuneate, apex deeply 3-lobed, abaxially glandular and puberulent, lobes 1-3 mm. Disk florets to c. 200+; corolla 1.5-2.5 mm, campanulate, 4-5-lobed, yellow proximally, reddish brown distally, tube c. 0.3 mm, very short, lobes c. 0.3 mm, glandular; style branches c. 0.5 mm. Cypselae 1.2-1.5 mm, c. 10-costate, setose, glandular, angles sometime long-setose with setae nearly as long as pappus squamellae; pappus squamellae 5-8, 0.3-0.8(-1.2) mm,
deltate-lanceolate, typically longer than the corolla tube, apex acute to apiculate, erose or with terminal awn. $2n = 26$. Flowering Feb, May-Nov. Marshes, ditches, river banks, open forests, mountain slopes, moist meadows. Ch (Breedlove 25287, MO); G (Heyde y Lux 3403, NY); H (Nelson et al. 3713, MO); ES (Williams, 1976b: 372); CR (Oersted 10548, MO). 900-2200 m. (México, Mesoamérica.)

I have seen both 4-5-merous florets often occurring together in the same capitulum.


Annual or biennial, tap-rooted, caulescent herbs 0.3-0.8(-1) m, basal leaves present or withered at anthesis, not often collected however; herbage glandular, otherwise glabrous or nearly so; stems usually simple proximally and branched distally, winged, subterete, striate, wings 1-2 mm diam. Leaves somewhat spreading, alternate, unlobed or basal and proximal ones pinnately 2-6-lobed, sessile; blade 2-9(-13) × 0.5-1.5(-3) cm, oblanceolate to narrowly elliptic, venation not prominent, surfaces glandular, otherwise glabrous to sparsely puberulent, base slightly narrowed, margins or lobes entire, apex acute to obtuse. Capitulescence usually 5-15-capitulate on simple or forked distal branches; peduncles 3-8 cm, more or less filiform, scarcely broadened below involucre, striate, puberulent to pubescent. Capitula 7-12 mm, ovoid to globose, radiate; involucre 6-11 mm diam., hemispherical; phyllaries 8-15, 4.5-7 × c. 0.5 mm, linear-lanceolate, free to base, subequal, 1-seriate, puberulent, apex narrowly acute; clinanthium 5-8 mm, ovoid. Ray florets 10-15, pistillate; corolla yellow, limb 7-10(-12) × 4-8.5 mm, narrowly to broadly cuneate, apex broadly 3-lobed, abaxially glandular and puberulent, lobes 1-2.5 mm. Disk florets to c. 200+; corolla 1.3-2 mm, cylindrical, 4-lobed, yellow throughout or sometimes only proximally yellow and reddish brown distally, tube very short, c. 0.2 mm, limb glandular, lobes 0.2-0.3 mm; style branches c. 0.5 mm. Cypselae 0.7-1.1 mm, c. 10-costate, setose, slightly glandular; pappus usually of 6 squamellae, squamellae more or less ovate, 0.1-0.3 mm and typically only about as long as corolla tube, margins entire, apex broadly obtuse to rounded, without terminal awn. Flowering Jan-Jun. $2n = 26$. *Wet areas, along streams*. Y (Valdez 49, MO); B (Gentle 1468, MO). 0-100 m. (Gulf coastal United States, México, Mesoamérica, Cuba.)


Perennial subscapose herbs 0.25-0.6(-0.8) m from a thickly fibrous-rooted caudex, basal rosette leaves typically present at anthesis; stems typically simple to less commonly 2-branched near mid-stem, winged proximally between nodes, subterete, striate, glabrous to sparsely puberulent proximally. Leaves more or less ascending, alternate, sessile but sometimes appearing subpetiolate; blade (3-)10-25 × (0.3-)0.9-2.2(-4) cm, narrowly oblanceolate or distal leaves lanceolate to narrowly so, secondary venation directed apically, surfaces glandular, otherwise glabrous or distal leaves sometimes also sparsely puberulent, base long-attenuate, margins entire or distal leaves sometimes few-serrulate, apex acute to obtuse or apex of distal leaves acute to acuminate. Capitulescence monocephalous, capitula 1(-3) per plant; peduncles (7-)12-40 cm, stout, obviously broadened below involucre, 0(-2) bracteate, striate, typically distally sordid-villous with transverse cell walls of trichomes blackish to infrequently brownish-puberulent. Capitula 10-15 mm, radiate, hemispherical; involucre 13-23 mm diam., more or less hemispherical; phyllaries 14-25, often unequal and 2-seriate, connate proximally on broad peduncle apex, blackish-villosulous especially apically, also sometimes sparsely glandular, apex acute or rarely obtuse; outer series 8-11 × 2-3 mm, lanceolate; often with an inner series of bracts to c. 4 × c. 1 mm, elliptic-lanceolate; clinanthium weakly convex. Ray florets 14-25+, pistillate; corolla yellow to less commonly yellow-orange, limb 15-20 × 6-10 mm, broadly cuneate, abaxially glandular and puberulent, apex deeply 3-4-lobed, lobes 2-7 mm. Disk florets 200-300+; corolla 3-4 mm, narrowly campanulate, 5-lobed, yellow, sometimes faintly supernumerary nerved, tube c. 0.5 mm, lobes c. 0.5-0.8 mm, setose, also sparsely glandular; style branches c. 1 mm. Cypselae 2-2.5 mm, costate or angled, eglandular, typically glabrous to sometimes sparsely setulose; pappus absent or less commonly of few squamellae c. 0.4 mm. 2n = 34. Flowering Jun-Aug. *Streamsides, near lakes, grassy slopes, wet meadows, open pine-oak forests.* Ch (Ghiesbrecht 527, NY). 1800-2600 m. (W + S. México, Mesoamerica.)

*Helenium apterum* was diagnosed by Bierner (1972) as having sterile ray florets, but in the holotype they appear to be immature and perhaps were misinterpreted by Bierner. *Helenium apterum* was referred to synonymy of *H. scorzonerifolium* by Strother (1999). This species appears to occur in Mesoamérica only near San Cristóbal de Las Casas.


Por J.F. Pruski.

Annual to perennial herbs or sometimes low subshrubs to 1.5 m; stems erect to ascending, unbranched to much-branched, leafy or sometimes rosulate, green throughout to purplish proximally or less commonly purplish throughout, exalate, glabrous to densely pubescent, but usually not white-floccose; herbage often of both punctate glandular trichomes and elongate eglandular trichomes, the eglandular trichomes pale. Leaves alternate, simple to deeply 1-2-pinnatifid, sessile or subpetiolate, proximal leaves typically clasping basally; blade mostly linear or lanceolate to infrequently ovate or spatulate, venation typically pinnate, not decurrent onto stem, abaxially glandular, surfaces otherwise glabrous to densely pubescent. Capitulescence monocephalous to open-cymose or corymbiform with few to several capitula; peduncles typically stout. Capitula radiate or sometimes (in South America) discoid; involucre subcylindrical to globose; phyllaries unequal or subequal, imbricate, few-seriate, erect to slightly spreading at anthesis, never reflexed in fruit, persistent or sometimes the inner ones deciduous, more or less herbaceous or sometimes with scarious margins, typically glandular-pitted; outer phyllaries connate proximally (outside of Mesoamerica) or less commonly free, rarely connate to near mid-region; clinanthium usually convex to subconical or less commonly flat, epaleate, glabrous, without setiform enations as long as the disk cypselae, sometimes sparsely setulose or pitted. Ray florets usually (0-)8-13(-40), pistillate; corolla yellow to orange, limb oblong, well-exserted from involucre or rarely only about as long as phyllaries, apex 3-5-lobed. Disk florets bisexual or rarely functionally staminate, usually 25-150(-400+); corolla yellow or sometimes brownish proximally, 5-lobed, cylindrical to narrowly campanulate, tube shorter than throat, lobes more or less deltate, often setulose; anthers stramineous, base rounded, appendage ovate; style exappendiculate, branch apex truncate or rarely merely obtuse, papillose. Cypselae obconical or obpyramidal, indistinctly 4-angled, not at all obviously costate, glabrous to setose, walls not carbonized; pappus usually 2-11(-15) persistent aristate scales, often to about as long as cypsela body, rarely absent. $x = 15$. 25 spp. Most species in W. United States to C. México, 1 sp. in Central America, 4 spp. in S. South America.
Dugaldia, revised by Bierner (1974), was placed in synonym of Hymenoxys by Bierner (1994). Helennium integrifolia was recognized by Williams (1976b), but was transferred to Hymenoxys by Bierner (1994). Hymenoxys integrifolia clearly differs from Helennium by its unwinged stems and elongate pappus scales about as long as the cypselae. Hymenoxys chrysanthemoides (Kunth) DC. is common in southern Mexico and should be looked for in Mesoamerica.


Stout, caulescent, perennial herbs 0.2-0.7(-1) m, trichomes pale, with thick rootstocks; stems simple to sometimes few-branched distally in capitulescence, erect, subterete, striate, lanate to sometimes glabrate proximally. Leaves simple, unlobed, basal and cauline, more or less ascending, sessile; blade closely 5-9-parallel-veined from the somewhat dilated clasping base where veins are more noticeable, surfaces glandular, margins entire; basal and proximal stem leaves 15-20(-30) × 1-3(-4) cm, spatulate to oblanceolate, thickly chartaceous or with pale carnose basal midzone to c. 5 mm diam., glabrous to sparsely long-pilose, basally long-attenuate or sometimes only slightly narrowed, margins entire, apex obtuse to acute, basal and proximal stem leaves abruptly transitioning into distal capitulescence leaves; distal stem leaves and peduncular bracts 3-5 × 0.3-1.3 cm, lanceolate, chartaceous, glabrous to sparsely long-pilose, basally attenuate-decurrent, margins entire or infrequently deeply 3-toothed, apex acute to acuminate. Capitulescence corymbiform, 3-7(-13)-capitulate, very nearly flat-topped with lateral branches almost as long as central axis, much less commonly monocephalous and one per plant; peduncles 3-16(-25) cm, very stout, often to 5+ mm diam., commonly 1-4 leafy bracteate, villous-lanate especially distally. Capitula radiate, becoming hemispherical with dome-shaped disk, 1.3-2 cm; involucre 20-30(-40) mm diam., hemispherical to broadly campanulate; phyllaries 25-35, 9-15 × c. 2 mm, lanceolate, subequal or the inner ones slightly shorter, 3(-4)-seriate, basally free, 1-3-nerved, lanate-villous to sparsely so, also glandular-
pitted, apex acuminate; clinanthium often 10-20+ mm diam., weakly convex. Ray florets 25-40(-60); corolla yellow to yellow-orange, limb 15-35 × 4-8 mm, abaxially glandular and sometimes sparsely setulose, apex usually deeply 3-4-lobed, lobes 2-6(-10) mm. Disk florets usually 200-350+, bisexual; corolla 4.5-6 mm, yellow, sometimes sparsely glandular, tube 0.5-1 mm, throat much longer than tube, lobes 0.5-1 mm. Cypselae 3-4 mm, setose to densely setose-hispidulous; pappus scales 5-7, 2.6-4.5 mm, about 2/3 as long as disk corollas, lanceolate, apex attenuate. 2n = 30. Flowering Apr-Nov. *Open pine-juniper grassland, wet alpine meadows*. G (Hartweg 593, NY). 2800-3800 m. (México, Mesoamerica.)

XII. Tribus *Heliantheae* Cass.


Por J.F. Pruski.

Annual or perennial herbs to shrubs, sometimes vines or trees, infrequently acaulescent, dioecious or monoecious; herbage without secretory cavities or latex. Leaves opposite or almost as often alternate, petiolate or sometimes sessile; blade unlobed to lobed but rarely pinnatifid, commonly ovate with trinerved venation, typically chartaceous to stiffly so, margins entire to serrate with callose-tipped teeth, adaxial surface often scabrous with trichomes often tuberculate-based, abaxial surface glabrous to variously pubescent, sometimes glandular. Capitulescence usually terminal or sometimes axillary, monocephalous to corymbiform or paniculate, open to congested, pedunculate or rarely sessile. Capitula radiate or discoid to rarely disciform; involucre cylindrical to hemispherical, when appearing double theinner series; phyllaries mostly imbricate, graduate, and 2-6-seriate, free, often herbaceous and not all yellow-scarious, often persistent; clinanthium flat to conical, typically paleate or rarely epaleate; paleae usually lanceolate to ovate, mostly conduplicate, bases typically not decurrent onto clinanthium, typically not crescent to infrequently obviously crescent post-anthesis (only in subtribes Montanoinae and Rojasianthinae). Ray florets 0-21(-50+), 1(-3)-seriate, sterile or pistillate; corolla typically deciduous or rarely marcescent, usually yellow or orange but sometimes white, reddish, or purplish, tube present or much less commonly lacking and limb arising directly from abaxial face of ovary, limb with 2 calyx nerves often thicker than other nerves, apex usually (2-)3-lobed. Disk florets bisexual or sometimes functionally staminate; corolla mostly shortly 5-lobed, funnelform or campanulate to throats sometimes basally swollen and corollas then somewhat urceolate, with or without fibers associated with the nerves, resin ducts often with colorless or yellow resin, single or paired along veins in the throat; anthers with filaments glabrous or rarely long-papillose distally (in Mesoamerica only in Rojasianthinae), free or very rarely connate, thecae often black but sometimes yellow, brown, or reddish, connate or rarely free (e.g.,
Ambrosia and Xanthium), endothecium pattern typically polarized, base obtuse to rounded, ecaudate although sometimes shortly sagittate to rarely long-sagittate, apical appendage usually ovate and concave, without resin ducts, glandular or glabrous, rarely setulose; pollen spheroidal, tricolporate, echinate, caveate, with internal foramina in tectum and columellae; style exappendiculate or appendiculate, trunk typically with 2 vascular strands, trunk glabrous, branches somewhat flattened, recurved or in functionally staminate florets undivided, with single stigmatic surface continuous over all or most of the abaxial surface of style branch or stigmatic surfaces 2-banded in parallel longitudinal adaxial zones from base to near apex, apex rounded to attenuate, distal adaxial surface of branch and apex often papillose. Cypselae often biconvex and somewhat compressed to sometimes quadrate, never obcompressed, rays often triquetrous, usually with 5 or fewer ribs, rarely with 8-10 ribs, usually free from phyllaries and palea, but sometimes fused to phyllaries into a conceptacle (e.g. Xanthium) or held within paleae forming a perigynia-like structure (e.g., Aldama and Sclerocarpus), winged or exalate, carbonized with phytomelanin deposits, without raphid crystals, exocarp typically dry or very rarely fleshy (e.g., Clibadium eggersii and Tilea), smooth or sometimes tuberculate, sometimes with longitudinal striatulate interrupting the phytomelanin layer, carpopodium often not well-developed, rarely associated with elaiosomes (e.g., Oyedaea and Wedelia); epappose or more typically pappus present and bilaterally disposed, infrequently radially arranged, coroniform or often of few small persistent awns, aristae, bristles, or squamellae, infrequently caducous (e.g., Melanthera, Perymenium, and Rojasianthe). Aprox. 113 genera, 1500 spp., mostly American. 56 gen., 192 spp. in Mesoamerica, total including Tehuana calzadae which is expected in Mesoamerica.

One of the most "meaningful" (Panero, 2007-HELIANTH) studies of subtribes of Heliantheae since Bentham y Hooker (1873) was that by Robinson (1981), who based partly on his detailed study floral microfeatures recognized 35 subtribes and realigned many genera in novel ways. The fine study of Karis y Ryding (1994) quickly followed on the heels of Robinson. The subsequent revelation, however, that Eupatorieae is cladistically nested within Heliantheae sensu Robinson coupled with the desire to maintain usage of a traditionally circumscribed Eupatorieae (itself containing about 1% of the Angiosperms), however, lead to a more exclusive concept of Heliantheae. Landmark works narrowing the then-followed circumscription of Heliantheae, for example, include those of Baldwin et al. (2002), who recognized earlier divergent epaleate Bahieae and Chaenactideae among six tribes basically newly recognized by them and Panero (2007-HELIANTH) who, for example, recognized several important changes among them the resurrection of Millerieae and Neurolaeneae.

The circumscription of Heliantheae adopted here is basically that of Panero (2007-HELIANTH), which as circumscribed by him includes 100+ genera and about 1500 species, more or less about 0.5 % of the Angiosperms. Ten of the 14 subtribes recognized by Panero (2007-HELIANTH) occur in
Mesoamerica. As now circumscribed members of Helianthae s. str. for the most part have in various combinations scabrous trinerved ovate leaves, herbaceous phyllaries, paleate clinanthia, yellow corollas, papillose style branches, and conduplicate paleae surrounding biconvex weakly pappose cypselae. The subtribal circumscriptions of Heliantheae are mostly well-defined and widely accepted: hence in this treatment the genera of Helianthae s. str. are grouped into and keyed under subtribes, with the subtribes (and component genera) only thence arranged alphabetically. Use of such a subtribal scheme is essential so that an entire hierarchy of information (subtribal information) will not be lost, but also because the three of our ten subtribes, the Ecliptinae (50 gen., aprox. 410 spp.), Helianthinae (aprox. 21 gen. and 350 spp.), and Verbesininae (4 gen. 215-315+ spp.), are each as speciose as many moderate-sized families treated elsewhere in Flora Mesoamerica. This contrast to the treatment of the equally speciose tribe Eupatoriae, in which subtribal circumscriptions are somewhat still in flux, and consequently the 48 Mesoamerican genera of Eupatoriae are arranged strictly alphabetically.


**Key to subtribes of Heliantheae in Mesoamerica**

1. Paleae obviously acrescent with age.

2. Filaments glabrous, not densely long-papillose distally; epappose. XII. F. Montanoinae

2. Filaments densely long-papillose distally, pappus of c. 10 short caducous awns.

XII. G. Rojasianthinae

1. Paleae not acrescent with age.

3. Ray corollas marcescent, tube lacking. XII. J. Zinniinae

3. Ray corollas deciduous, tube present.

4. Pistillate floret (when plants monoecious or when disk florets functionally staminate) or disk floret style branches with stigmatic surfaces 2-banded.

5. Plants monoecious, or when dioecious the ray cypselae forming a dispersal complex with adjacent disk florets and paleae. XII. A. Ambrosiinae

5. Plants dioecious, the cypselae not forming a dispersal complex with adjacent florets and paleae.

6. Disk corolla throats usually with fibers associated with the nerves and then often with styles short-appendiculate, when disk corollas without fibers associated with the nerves then
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style then appendiculate and cypselae usually with intermediate squamellae.

XII. B. Ecliptinae

6. Disk corolla tubes without fibers associated with the nerves, exappendiculate, cypselae with pappus marginal or on angles, without intermediate squamellae. XII I. Verbesininae

4. Disk floret style branches with continuous stigmatic surfaces.

7. Disk corolla throats with prominent fibers associated with the nerves. II. D. Engelmanniinae

7. Disk corolla throats without prominent fibers associated with the nerves.

8. Clinanthia conical; paleae bases decurrent onto clinanthium; ray florets (when present) pistillate.

XII.H. Spilanthinae

8. Clinanthia flat to convex or sometimes low-conical; paleae bases not decurrent onto clinanthium; ray florets (when present) sterile.

9. Cypsela margins long-ciliate-sericeous with trichomes to c. 2 mm; styles exappendiculate.

XII. C. Enceliinae

9. Cypselae glabrous to pubescent with trichomes less than 1 mm, margins never obviously long-ciliate-sericeous; styles exappendiculate or appendiculate.

XII. E. Helianthinae

XII. A. Heliantheae subtribus Ambrosiinae Less.

Ambrosiaceae Link, Ambrosieae Cass., Iveciueae Rydb., Partheninae Pfeiff.

Por J.F. Pruski.

Monoecious or less commonly dioecious, annual or perennials herbs to shrubs or rarely trees to 4+ m, often tap rooted. Leaves cauline or rarely solely in rosettes, alternate or opposite, unlobed to frequently 1-3-pinnatifid, sessile to petiolate; blade chartaceous, venation trinerved to palmate or pinnate, surfaces usually pubescent or stipitate-glandular, often punctate-glandular, ultimate margins entire to serrate. Capitulescence terminal or infrequently axillary, spicate or glomerate to paniculate, pluricapitulate and usually wind-pollinated. Capitula unisexual or heterogamous, often discoid (and then unisexual with a few pistillate capitula borne below staminate capitula on same plant) or sometimes radiate; involucre mostly campanulate to hemispherical but ranging from cylindrical to crateriform; phyllaries free or connate, in fruit sometimes indurate and spiny, graduate or subequal, 1-3+-seriate, outer ones often herbaceous, inner ones chartaceous to scarious; clinanthium usually flat to convex, usually paleate at least in staminate heads, paleae usually filiform to spatulate. Pistillate florets 1-few, 1-seriate; corolla absent, tubular, or radiate with inconspicuous limb, white to yellowish, deciduous, tube absent or cylindrical, limb absent or bilobed; style branches with stigmatic surfaces 2-banded. Disk florets functionally
staminate; corolla cylindrical to campanulate, (4-)5-lobed, mostly white or ochroleucous, usually glandular, sometimes pubescent, throat with a single colorless resin duct along each vein, without fibers embedded in nerves, lobes deltate, often glandular; anther thecae usually free (e.g., *Ambrosia* and *Xanthium*) or infrequently connate (synantherous, e.g., *Parthenium*), pale, endothecial cells mostly broader than long, wall thickening pattern usually radial, filaments free or connate, apical appendage eglandular; ovary sterile, style with branches undivided. Cypselae carbonized but not microstriatulate, sometimes 1-5-nerved-striate, cypselae of 1(-2)-flowered pistillate capitula often enclosed within a conceptacle, cypselae of heterogamous capitula prismatic to mostly obcompressed and forming a complex with adjacent disk florets and paleae; usually basically epappose or pappus when present not prominent, coroniform, squamellose, or few-awned. 8 genera, aprox. 70 spp. American, sometimes weedy in Old World. 3 gen., 6 spp. in Mesoamerica.

Ambrosieae Cass. was one of the originally named tribes of Compositae, but was soon thereafter and has since been mostly recognized as Ambrosiinae Less. The most well-known genus and the type of the subtribe, *Ambrosia*, is wind-pollinated and a causal agent of hay-fever. Typical Ambrosiinae differ from most Compositae by having capitulescences with nutant functionally staminate distal capitula with free anther thecae and proximal pistillate capitula. *Iva* L. s. lat. is characterized by disciform bisexual capitula and should be looked for in Tabasco and the Yucatan Peninsula. Species most likely to be encountered in Mesoamerica are *I. asperifolia* Less., *I. cheiranthifolia* Kunth, *I. frutescens* L., and *I. xanthiifolia* Nutt.

1. Capitula bisexual, radiate, florets with corollas; anther thecae connate; cypselae forming a dispersal complex with accessory structures of the adjacent disk florets and paleae.

2. *Parthenium*

1. Capitula unisexual, discoid or florets lacking corollas; anther thecae free; fruit a large spiny conceptacle.

2. Capitulescence terminal; staminate capitula with phyllaries basically connate throughout; fruiting conceptacles small, 2.5-4 mm; clinanthia flat or convex.

1. *Ambrosia*

2. Capitulescence axillary-fasciculate; staminate capitula with phyllaries free; fruiting conceptacles very large, 15-25(-35) mm; clinanthia conical. 3. *Xanthium*

1. *Ambrosia* L.
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_Acanthambrosia_ Rydb., _Franseria_ Cav., _Gaertneria_ Medik., _Hemiambrasia_ Delpino, _Hemixanthidium_ Delpino, _Hymenolea_ Torr. et A. Gray, _Xanthidium_ Delpino (non Ehrenb. ex Ralfs)

Por J.F. Pruski.

Monoecious, annual herbs to shrubs, glandular-aromatic, usually with +/- stiff trichomes; stems prostrate to erect, unarmed. Leaves simple to more commonly pinnately or palmately lobed or dissected, sometimes pinnatisect with filiform segments, opposite proximally becoming alternate distally, sessile or petiolate; blade usually chartaceous, glandular and pubescent. Capitulescence virgate, terminal, wind-pollinated, several-many-capitulate, ultimate branches spicate or racemose; capitula sessile to subsessile or staminate capitula short-pedunculate, staminate capitula ebracteate, distal on axis, typically nutant at top on strict peduncles; pistillate capitula proximal on axis, axillary. Capitula unisexual, discoid or without corollas, involucre green; florets 1-65+, clinanthium flat or convex. Staminate capitula many; involucre cupular, +/- unlobed to 5-12-lobed; phyllaries subequal, basically connate throughout; clinanthia flat, paleate, paleae filiform; florets few to many, discoid; corolla campanulate, (4-)5-lobed, ochroleucous to yellow; anther thecae free, stramineous, base rounded or short-sagittate; ovary sterile, epappose, style undivided. Pistillate capitula few; phyllaries connate proximally, forming a nut-like conceptacle, phyllary apices transformed into a few spines or tubercles; clinanthium epaleate; florets 1(-2-7), lacking a corolla and represented solely by the pistil; style exerted through involucre beak, branches linear. Fruit a conceptacle; conceptacle small, 2.5-4 mm in our spp., pyriform or obovoid, pale, few-spined, formed by the included epappose cypselae and the tightly enveloping involuclral bract, the entire conceptacle deciduous as a unit; cypselae proper 1 or more per conceptacle. \( x = 18. \) 30-43 often closely related spp; mostly Mexican and North American, but with several spp. native to the Neotropics and subtropical South America; sometimes weedy in warmer parts of the Old World.

_Ambrosia_ is recognized in subtribe Ambrosiinae, in Mesoamerica represented by _Ambrosia_, _Parthenium_, and _Xanthium_, characterized 2-banded stigmatic surfaces and disk florets (capitula either unisexual or functionally staminate) functionally staminate and on paleate clinanthia. Although Payne (1964) provided an overview of _Ambrosia_, he gave no key nor did he fully treat either of our species. _Hymenolea_ Torr. & A. Gray was recognized as distinct by Robinson (1981) and Karis y Ryding (1994b), but was reduced to synonymy of _Ambrosia_ by Strother y Baldwin (2002).
By wind-pollination, dissected leaves, and virgate ultimate capitulescence branches *Ambrosia* resembles and is often misidentified as *Artemisia*, which differs (in addition to technical tribal features) by having bisexual capitula with free phyllaries.


1. Maritime, prostrate or decumbent herbs or subshrubs; leaves mostly opposite, proximal leaves tripinnatifid, blades 2-5(-7) cm.  
   1. *A. hisa*

1. Non-maritime; erect herbs; leaves mostly alternate, proximal leaves bipinnatifid, blades 4-14 cm.  
   2. *A. peruviana*


*Ambrosia crithmifolia* DC.  

Maritime; prostrate or decumbent perennial herbs or subshrubs; stems 0.1-0.5(-1+) m, spreading from hard base, with erect branches every 5-15 cm, pilose to hirsutulous. Leaves mostly opposite, short-petiolate; blade 2-5(-7) × 1-3 cm, proximal leaves tripinnatifid grading to distal ones bipinnatifid, finely divided to near to rachis, ovate to triangular in outline, surfaces grayish, pilose to more commonly hirsutulous or strigillose, ultimate margins entire or toothed, lobe apex acute to obtuse; petiole 0.5-2.5 cm. Capitulescence of often dense racemes 3-10 cm, bracteate proximally; staminate capitula many, peduncles 1-2 mm, directed laterally, proximal staminate capitula often with basal bracteole as long as peduncle; pistillate capitula 3-5(-10) per fascicle, sessile, bracts longer than capitula. Staminate capitula 2-3 × 3-4 mm; involucre 2-3 mm, strigillose, lobes 0.5-1 mm; florets 6-15(-20); corolla 2.1-3.5 mm, cream, densely glandular. Pistillate capitula 3-5 x 2-3 mm; involucre 3-4 mm in fruit, apical beak c. 0.5 mm; florets 1; corolla absent; style branches to 3.5 mm. Fruiting conceptacle 2.5-4 mm, pyriform, strigillose, spines 0-5, 0.1-0.5 mm, terminal in a single series, broad-based, strict, directed apically. 2n = 36, 104. Flowering Apr-Dec. Beaches, duna costera, strand vegetation. Y (*Gaumer 680*, F); C (*Chan y Burgos 676*, MO); QR (*Cabrera y Cabrera 11472*, MO); B (*Fosberg y Sachet 53840*, MO); H
Gray (1884) noted that the type locality was presumably the Bahamas, and Cronquist (1980) excluded \textit{A. hispida} from South Carolina. Nash (1976d) included \textit{A. hispida} in the Flora of Guatemala, but in Mesoamerica the species appears to occur only in neighboring areas. In Honduras, \textit{A. hispida} appears to be known from only Islas de la Bahía. The report by Nash (1976d) of \textit{A. hispida} in South America and Panama appear to be erroneous.


\textit{Ambrosia artemisiifolia} var. \textit{trinitensis} Griseb., \textit{Ambrosia cumanensis} Kunth, \textit{Ambrosia orobanchifera} Meyen, \textit{Ambrosia paniculata} var. \textit{cumanensis} (Kunth) O.E. Schulz, \textit{Ambrosia paniculata} var. \textit{peruviana} (Willd.) O.E. Schulz, \textit{Ambrosia psilostachya} DC.

Common, non-maritime; short-lived perennial erect herbs 0.4-1.5 m, sometimes tap-rooted, base sometimes becoming woody; stems laterally few-branchied from main axis, loosely strigose-pilose. Leaves mostly alternate, petiolate; blade 4-14 × 2-15 cm, deltable to ovate in outline, proximal leaves bipinnatifid grading to distal ones pinnatifid, rachis often broad, adaxial surface green, shortly strigose, abaxial surface gray-green, strigose and also pilose near veins, marginal lobes regularly spaced, few-crenate-serrate, apex acute to subulate; petiole 1-4(-6) cm. Capitulescence of often open racemes 5-20(-28) cm, bracteate proximally; staminate capitula 10-100+, along distally ebracteate capitulescence axis, peduncles 1-2 mm, directed laterally; pistillate capitula usually 1-5 per fascicle with 2-5 fascicles per axis, sessile, bracts longer than capitula. Staminate capitula 1.5-2.5 × 2-3 mm; involucre 2-3.5 mm diam., +/- shallowly 5-7(-9)-crenate-lobed, pilose; paleae c. 1 mm, filiform, hidden among the florets; florets 12-35; corolla 1.5-2 mm, brownish-greenish, lobes 0.3-0.4 × c. 0.5 mm; anthers c. 1 mm, stramineous, apical appendage long, to c. 0.5 mm, mucronate to filiform. Pistillate capitula to c. 3 mm pre-fruit; involucral conceptacle c. 3 × 3 mm, apical beak c. 1 mm; phyllaries 1-3, fused to ovary; florets 1; corolla absent; style branches c. 2+ mm. Fruiting conceptacle 2.5-4 mm, pyriform, longitudinally and transversely ribbed, sometimes sparsely glandular, spines 4-8, 0.5-1.5 mm, mostly terminal in a single series, broad-based, bent, directed apically. 2\textit{n}=36. Flowering (Mar-)May-Nov(-Jan).

\textit{Dry open slopes, disturbed areas, lake shores, pastures, river banks, roadsides, secondary}
floras, sometimes cultivated. T (Cabrera y Cabrera 14995, MO); Ch (Ghiesbrecht 612, MO); C (Villaseñor, 1989: 27 sub A. cumanensis); QR (Sousa y Cabrera, 1983: 77 sub A. cumanensis); B (Walker 1128, MO); G (Türckheim II 1280, MO); H (Molina y Molina 25772, MO); ES (Berendsohn y Berendsohn 177, MO); N (Smith 135, MO); CR (Hammel 21994, MO); P (Bartlett y Lasser 16392, MO). 5-2200 m. (?Canada, ?Estados Unidos, Mexico, Mesoamerica, Colombia, Venezuela, Ecuador, Peru, Bolivia, Brazil, Chile, Argentina, Cuba, Jamaica, Hispaniola, Puerto Rico, Virgin Islands, Lesser Antilles, Trinidad and Tobago.)

Amo-Rodríguez y Gómez-Pompa (1976) took Ambrosia psilostachya DC. as conspecific with A. cumanensis (i.e., our A. peruviana) and did not take supposed leaf shape and petiole length differences as diagnostic. Rzedowski y Calderón de Rzedowski (2008) and Cronquist (1980), however, recognize Ambrosia psilostachya DC. as distinct, but if synonymous with A. peruviana, the range of A. peruviana (which has nomenclatural priority) would thus extend into the United States and Canada. Tropical material tends to have longer trichomes on the staminate involucres, but this character is often variable. Payne (1964) used the name A. cumanensis in passing for this species.

Pruski (1997) noted that the perennial herb A. microcephala DC. is very similar to our species, but A. microcephala is maritime and has leaves shallowly lobed. The type locality of A. microcephala DC., published as French Guiana, appears to be West Indian, and A. peruviana remains unknown from the Guianas. Ambrosia artemisiifolia L. (syn. A. elatior L.) is very similar to A. peruviana (and A. psilostachya if distinct from A. peruviana), basically differing by annual habit, always petiolate leaves, +/- unlobed staminate involucres and strict conceptacle spines directed apically.

2. Parthenium L.

Argyrochaeta Cav., Bolophyta Nutt., Echetrosis Phil., Hysterophorus Adans., Partheniastrum Fabr., Villanova Ortega nom. rej. (non Lag.)

Por J.F. Pruski.

Annual or perennial herbs or shrubs; stems erect, usually much-branched, subterete, pubescent. Leaves usually all cauline at anthesis, simple to pinnatifid, alternate, sessile or petiolate; blade linear to obovate, venation pinnate to weakly trinerved, surfaces usually glandular and pubescent. Capitulescence terminal, usually corymbiform or paniculate, many-capitulate; peduncles usually short. Capitula bisexual, short-radiate (ours) or rarely disciform, hemispherical to globose; phyllaries free, subimbricate to imbricate, subequal or unequal, 2(-4)-seriate, finely 3-5-striate,
usually scarious-indurate or outer phyllaries with subherbaceous apices; outer phyllaries persistent; inner phyllaries immediately subtending the ray florets, often deciduous with associated ray floret; clinanthium convex, paleate; paleae elliptic to oblong, the outer ones strongly conduplicate, the inner ones papillose distally or fimbriellate. Ray florets 5(-8), pistillate, each ray floret typically adnate at base to 2 opposed disk florets and associated paleae; corolla ochroleucous, +/- persistent, tube short, glandular, limb typically present, oblong to orbicular, inconspicuous, 2-3-lobed, sometimes glandular and papillose; style branches exappendiculate. Disk florets 12-50+, functionally staminate, the inner florets and the inner paleae held together distally by interwoven trichomes and often falling together as a unit; corolla funnelform, 4-5-lobed, ochroleucous, glandular and setulose, lobes short-triangular; anther thecae connate, white or yellow, bases rounded, appendage ovate; style undivided, ovary sterile, linear. Cypselae obcompressed, cuneate to pyriform, +/-black, abaxial face convex, smooth, adaxial face 1-costate, forming a dispersal complex with accessory structures of adjacent disk florets and paleae by attachment to 2 adjacent disk florets by marginal tissue and falling with them and their paleae; epappose or pappus 2-3-awned to 2-3-squamose. x = 12, 17, 18. Aprox. 16 spp. Native to Estados Unidos and Mexico, one sp. a pantropical weed.

In the early and mid-1900s Parthenium argentatum A. Gray (n.v. guayule), a source of natural rubber, was cultivated in the SW. United States. Herbaceous Mexican Parthenium bipinnatifidum (Ortega) Rollins occurs southwards into Oaxaca and should be looked for in western Chiapas. It has been reported to hybridize with P. hysterophorus.


1. Annual herbs; leaves usually pinnatifid or bipinnatifid grading to distal leaves simple; phyllaries subequal.

2. P. hysterophorus

1. Shrubs to small trees; leaves simple to less commonly lyrate-lobed; phyllaries unequal.

2. Phyllaries graduated to indistinctly graduated, c. 3-seriate; leaf blade bases usually obtuse to truncate, rarely cordate, often abruptly attenuate onto petiole, surfaces usually discolorous, abaxial surface usually cinereous-tomentose.

1. P. fruticosum

2. Phyllaries graduated, 3-4-seriate; leaf blade bases usually cuneate, typically gradually decurrent onto petiole, surfaces usually concolorous, abaxial surface hirsutulous-hirtellous to villosulous.

3. P. schottii

Infrequent shrubs to small trees (0.5-)2-4 m; stems striate, arachnoid-tomentose and hirsutulous-hirtellous; herbage with arachnoid-tomentose indumentum of trichomes 1-2.5 mm, hirsutulous-hirtellous indumentum of trichomes c. 0.3 mm. Leaves simple to less commonly few-lyrate-lobed, petiolate; blade 4-15 × (1.5-)3-10 cm, ovate to triangular-ovate, usually with 4-6 pairs of secondary veins per side, surfaces usually discolorous (less frequently concolorous), adaxial surface sparsely arachnoid-tomentose and hirsutulous-hirtellous, the hirsutulous-hirtellous indumentum with trichome basal (not subsidiary) cells enlarged, abaxial surface usually cinereous-tomentose (less frequently villosulous), also usually glandular, base usually obtuse to truncate, rarely cordate, often abruptly attenuate onto petiole, margins few-lyrate-lobed to more commonly irregularly crenulate-serrate, apex acute; petiole 1-3 cm, sometimes irregularly winged. Capitulescence corymbiform-paniculate, held above stem leaves, capitula somewhat congested; peduncles 1-3(-4) mm. Capitula 2.5-3.5 mm; involucre 2.5-4.5 mm diam., hemispherical; phyllaries imbricate, unequal, graduated to indistinctly graduated, c. 3-seriate, scarios; outer 5 phyllaries 1-2 mm, about ½ as long as the inner phyllaries, ovate to suborbicular, hirtellous, apex obtuse; inner c. 5 phyllaries 3-4 mm, orbicular, distally hirtellous, apex broadly rounded; paleae 2.5-3 mm. Ray florets: corolla tube c. 0.4 mm, often bulbous, limb c. 1 mm, suborbicular, apex emarginate. Disk florets 20-40; corolla c. 2.5 mm, lobes c. 0.4 mm. Ray cypselae 1.5-2 × 1-1.5 mm, papillose; usually epappose (less commonly pappus of 1-3 stiff aristae to c. 1 mm and longer than ray corolla tube). 2n = 36. Flowering Aug-Oct. *Selva baja caducifolia*. Ch (Breedlove 37479, MO). 700-1000 m. (E. y S. Mexico, Mesoamerica.)

Shrubby *Parthenium fruticosum* and its close relatives are separated basically by only leaf indumentum features. *Parthenium fruticosum* appears most similar to extra-Flora Area *P. tomentosum* DC., which lacks enlarged trichomes basal cells on the adaxial leaf surface, and to *P. schottii*, which differs by 4-seriate phyllaries, leaves usually concolorous with cuneate bases, and especially in geography. In Chiapas, *P. fruticosum* seems to occur only between Tuxtla Gutierrez and the Oaxaca-Veracruz border.

artemisia, coriente, siiu, silantro, B; hauay, tacana, G; ajenjo, baby, encaje, escobilla, escoba
amarga, H; manzanilla montera, N.

_Echetrosis pentasperma_ Phil., _Parthenium lobatum_ Buckley, _Parthenium pinnatifidum_ Stokes.

Common weedy tap-rooted annual herbs (0.2-)0.4-1(-1.5) m; stems much-branched distally or
throughout, costate, hirsutulous-strigillose; herbage with trichomes generally ≤ 0.4 mm. Leaves
3-10(-25) × (0.4-)2-7(-12) cm, usually pinnatifid to bipinnatifid grading to distal leaves simple,
basal leaves infrequently remaining as loose rosette at anthesis, narrowly winged-petiolute or
distal most sessile, proximal and distal leaves usually heteromorphic; blade usually deltate to
ovate in outline grading to distal leaves lanceolate, rachis 0.1-0.4(-0.8) cm diam., primary lobes
2-6 paired, 0.3-3(-9) × 0.1-0.8 cm, linear-lanceolate to lanceolate, surfaces strigillose to
hirtellous. Capitulescence paniculate, rounded, open, held well above main stem leaves;
peduncles 3-12(-15) mm. Capitula 2-3 mm; involucre 3-4(-5) mm diam., crateriform; phyllaries
subimbricate, subequal, 2-seriate; outer 5 phyllaries 1.5-2.5(-3.5) mm, elliptic-ovate, apex acute,
distally hirtellous and glandular; inner c. 5 phyllaries 2-3(-3.5) mm, ovate to orbicular, often
hyaline-marginated, apex rounded; paleae 1-2.5 mm, apex acute to truncate. Ray florets: corolla
tube c. 0.2 mm, limb 0.5-1 × c. 1 mm, orbicular, often brown-nerved abaxially, apex truncate or
emarginate; style branches c. 0.5 mm, smooth, apex obtuse. Disk florets 15-50, 4-merous, at fruit
sometimes (palea and floret) obovoid, tuberculate-indurate; corolla 1.2-2 mm, lobes c. 0.3 mm.
Ray cypselae 1.5-3 × 1.5-2 mm, papillose distally; pappus squammas 2, to c. 0.7 × c. 0.6 mm,
deltate to ovate, erect, lateral-tangential, resembling lateral corolla limb lobes, sometimes
papillose proximally. 2n = 34, 36. Flowering year-round. *Cultivated areas, disturbed areas, dry
open slopes, fields, orillo de camino, pine-oak forests, potreros, secondary vegetation, selva baja
caducifolia.* T (Pruski et al. 4235, MO); Ch (Pruski et al. 4228, MO); Y (Gaumer 558, F); C
(Martinez et al. 28652, MO); QR (King y Garvey 10657, MO); B (Lundell 4756, NY); G (Pruski
et al. 4522, MO); H (Molina et al. 32136, MO); N (Rueda et al. 16472, MO); CR (Hammel et al.
20528, MO); P (Burch et al. 1305, MO). 0-1500 m. (Estados Unidos, Mexico, Mesoamerica,
Colombia, Venezuela, Guyanas, Ecuador, Peru, Bolivia, Brazil, Uruguay, Paraguay, Chile,
Argentina, Cuba, Jamaica, Hispaniola, Puerto Rico, Virgin Islands, Lesser Antilles, Trinidad and
Tobago; Africa, Asia, Australia, Pacific Islands.)

*Parthenium hysterophorus* is largely circum-Caribbean, and a common weed in northern
Mesoamerica. It is apparently absent from El Salvador, was not treated included for Nicaragua
by Dillon et al. (2001), and is represented by few Mesoamerican collections south of the
Honduras-Nicaragua border. It is most similar to *P. bipinnatifidum* (Ortega) Rollins, which
differs by proximal and distal leaves all pinnatifid, and some trichomes much longer on stems
than leaves. Rodríguez et al. (1977) noted the concentration of allergens (the sesquiterpene lactone parthenin) in leaf trichomes of *Parthenium hysterophorus*, as is typical of Ambrosiinae.


Abundant shrubs to small trees 1.5-6 m; stems sparsely arachnoid-tomentose and hirsutulous-hirtellous; herbage with arachnoid-tomentose and hirsutulous-hirtellous indumentum. Leaves simple to less commonly lyrate-lobed, petiolate; blade 5-12 x 2-7 cm, ovate to triangular-ovate, surfaces usually concolorous, abaxial surface hirsutulous-hirtellous to villosulous, also usually glandular, base usually cuneate (less frequently obtuse to truncate), typically gradually decurrent onto petiole forming a wing; petiole 1-3 cm. Capitulescence corymbiform-paniculate, held above stem leaves, capitula somewhat congested; peduncles 1.5-6 mm. Capitula 3-4 mm; involucre 3-4 mm diam., hemispherical; phyllaries imbricate, unequal, graduated, 3-4-seriate; outer phyllaries 1-1.5 mm; inner phyllaries 2.5-3.5 mm. Ray florets: corolla limb c. 1 mm. Disk florets 25-35; corolla c. 2.5 mm. Ray cypselae 2-3 × 1-1.3 mm, papillose; pappus usually of 2-3 soft aristae to c. 0.4 mm, shorter than ray corolla tube (less commonly epappose). 2n = 36. Flowering Jun-Jan, Apr. *Orillo de camino, selva baja caducifolia, thickets.* Y (Bradburn y Darwin 1293, MO). 0-22(-200) m. (Endemic.)

Strother (1999) suggested that this species may prove synonymous with *P. fruticosum*.

3. *Xanthium* L.

*Acanthoxanthium* (DC.) Fourr., *Xanthium sect. Acanthoxanthium* DC.

Por J.F. Pruski.

Coarse tap-rooted annual monoecious herbs; stems often tripartite-spined and/or deflected at nodes. Leaves simple to deeply lobed, alternate or sometimes opposite proximally, petiolate; blade chartaceous, glandular and usually pubescent. Capitulescence axillary-fasciculate, wind-pollinated; staminate capitula distal, pistillate capitula proximal. Capitula unisexual, discoid or without corollas; clinanthium conical, palaete. Staminate capitula 1-few, peduncles 1-5 mm; involucre subglobose; phyllaries 5-8, free, 1-3-seriate, similar to and intergrading into palaete; palaete linear to oblanceolate, glandular; florets 15-75; corolla funnelform or campanulate, ochroleucous, setose and glandular, tube indistinct, lobes 5, deltate; anthers with filaments
connate, thecae free, black, appendage short-ovate; ovary sterile, epappose, style undivided or bifid. Pistillate capitula bur-like, lateral, sessile and 1-5+ per fascicle or axis; involucre ellipsoid to fusiform; phyllaries 2-seriate; outer series of phyllaries few, free; inner series of phyllaries connate into indurate conceptacle completely enclosing the cypselae, conceptacle green, with 20-50+ usually uncinate lateral spines and apically (1-)2-corniculate, corniculum prominent or obscure, spines and corniculum c. ½ as long as conceptacle diam.; paleae fused into conceptacle; florets 2, lacking a corolla; style bifid, exerted from apical aperture on the inside of each corinculum of conceptacle, branches papillose. Fruit a very large spiny conceptacle; conceptacle 15-25(-35) × 10-15(-25) mm (our sp.), bilocular, brown; cypselae proper 2 per conceptacle, elliptical, blackish, epappose. x = 18. 3 spp., 2 neotropical, 1 southern South American.

Although Millspaugh y Sherff (1922) recognized 20+ species, most authors recognize only southern South American X. ambrosioides Hook. y Arn., X. spinosum L., and X. strumarium. Xanthium spinosum L. (syn. X. catharticum Kunth) is occasional in Mexico and South America, and should be looked for in Flora Area. Millspaugh y Sherff (1922) distinguished species mostly based on shape, length, and pubescence characters of the conceptacles and spines.


Xanthium cavanillesii Schouw, Xanthium echinatum var. cavanillesii (Schouw) O. Bolös et Vigo, Xanthium strumarium subsp. cavanillesii (Schouw) D. Löve et Dans., Xanthium strumarium var. cavanillesii (Schouw) D. Löve et Dans.

Coarse annual herbs 0.2-1.5(-2) m; stems erect simple or few-branched, unarmed, scabridulous, often deflected at the distal nodes. Leaves simple or shallow-palmate 3-5-lobed, long-petiolute; blade 4-15 × 4-20 cm, triangular-ovate to suborbicular, venation trinerved from base, surfaces glandular and scabrous, trichomes broad-conical, base truncate to cordate, margins crenate or serrate to lobed, apex acute or obtuse; petiole 4-12 cm. Capitulescence branches 10-15 cm, from distal nodes, capitula fasciculate. Staminate capitula c. 7 × c. 7 mm, sessile; phyllaries 2.5-3 × c. 0.5 cm, often spreading laterally at anthesis; florets 30-60; corolla 1.5-3 mm, lobes c.
0.4 mm. Pistillate capitula to c. 4 mm long at anthesis. Fruiting conceptacle 15-25(-35) × 10-15(-25) mm, spines usually 3-5 mm, few and remote to numerous, the uncinate apex c. 0.2 mm, conceptacle surface and spines variously short-puberulent to long-hispid and glandular; cypsela 8-11 mm. 2n = 36. Disturbed areas, dry hillsides, pastures. Ch (Breedlove 20020, MO); Y (Gaumer 1145, F). 0-900 m. (Canada, Estados Unidos, Mexico, Mesoamerica, Colombia, Venezuela, Peru, Bolivia, Brazil, Uruguay, Paraguay, Chile, Argentina, Cuba, Jamaica, Hispaniola, Puerto Rico, Lesser Antilles; Europa, Africa, Asia, Australia, Pacific Islands.) Only a few of the more historically commonly used names are listed here in synonymy.

XII. B. Heliantheae subtribe Ecliptinae Less.

Por J.F. Pruski.

Annual herbs to trees, leaves cauline; plants often fire-adapted and xylopodial, but rarely so in Mesoamerica; herbage often heterotrichous and plants very rarely completely glabrous. Leaves simple, opposite to sometimes alternate distally, sessile to petiolate; blade various, mostly unlobed, thinly chartaceous to stiffly subcoriaceous, venation mostly trinervate, indumentum especially of adaxial surface tuberculate-based (with obviously bulbous subsidiary cells). Capitulescence typically terminal or rarely axillary, monocephalous to paniculate, capitula typically pedunculate although sometimes in simple or compound glomerules. Capitula radiate, infrequently discoid or disciform; involucre mostly campanulate to hemispherical, rarely cylindrical; phyllaries usually imbricate, graduated to obgraduate, usually 2-4+-seriate, at least the outer mostly stiffly green-herbaceous or even foliaceous, the base of outer phyllaries often pale and indurate, inner phyllaries often stiffly green-herbaceous distally as well but infrequently even broadened and thinly membranous and thereby reminiscent of members of Anthemideae; clinanthium usually flat to convex, paleate, rarely epaneate and then mostly when capitula disciform with a single marginal pistillate floret 1 and the disk florets functionally staminate (Riencourtia). Ray florets 1(-3)-seriate, pistillate or sometimes sterile; corolla most often golden-yellow, limb typically obviously exserted from involucrre but occasionally small and inconspicuous, adaxially papillose, often with the 2 calyx/support veins more prominent than the others. Disk florets bisexual or infrequently functionally staminate; corolla mostly funnelform, most often golden-yellow, usually shortly (4-)5-lobed, usually not glandular, throat characteristically with fibers associated with the nerves which are all the more prominent in dried corollas, typically without colored resin in the ducts, lobes usually papillose within, abaxial surface usually scabrous as is on occasion either the tube or throat; anthers usually black, thecae very rarely free post anthesis, appendages typically stramineous but occasionally black at maturity although when black more common black in pre-anthesis anthers which become stramineously
appendaged post-anthesis; style branches with stigmatic surfaces 2-banded, often short-appendiculate, in functionally staminate taxa the style branches fused. Cypselae dry or rarely baccate, carbonized with phytomelanin deposits manifest as fruit nears maturity but without longitudinal striatulae interrupting the phytomelanin layer, characteristically black but sometimes brown or even pale, sometimes either rays or disks winged on angles, but either or both sometimes completely exalate, surfaces glabrous to pubescent or subsericeous with trichomes less than 1 mm, not with margins long-ciliate-sericeous with trichomes to c. 2 mm, sometimes strongly tuberculate occasionally the corky tuberculate layer completely covering the carbonized inner cypsela surfaces, tubercules sometimes black but often tan, fruit apex rostrate or rounded to truncate and eroseate, when rostrate the rostrum usually straight and centric, rostrum rarely geniculate and extremely excentric, rays cypselae typically triquetrous and then obcompressed and disk compressed-biconvex or quadrate with these conditions only slightly dimorphic, occasionally, however, obvious extreme dimorphism between ray and disk cypselae of a single taxon occurs (e.g., *Synedrella*), often disk cypselae however quadrate in cross section and not obviously compressed; pappus typically of 2 persistent stout awns or aristae at angles, without intermediate squamellae forming a crown, or sometimes solely of a fimbriate minute corona, sometimes fully epappose. 50 gen., aprox. 410 spp. Largely Neotropics. 26 gen., 67 spp. in Mesoamerica.

Ecliptinae is interpreted here more or less as circumscribed by Rindos (1980), Robinson (1981), Strother (1991, 1999), Pruski (1996), and Panero (2007), and its members often readily often recognized by their disk corollas with embedded fibers. Bremer (1994) recognized as an overly broadly defined Verbesininae most taxa of Ecliptinae, but treated *Eclipta* as *incertae sedis*.

Much of the generic-level taxonomic activity in Ecliptinae has involved taxa at one time or another placed in either *Wedelia* or *Zexmenia*. For example, *Lasianthaea* was resurrected by Becker (1979) from synonymy of *Zexmenia*. Most of the taxa in the *Zexmenia* lineage (sensu Jones, 1905) were realigned by Rindos (1980), although still maintained formally in *Zexmenia*. The subsequent formal adoption of the Rindos species groups that occur in Mesoamerica as segregate genera has mostly been championed by John Strother (as summarized in Strother, 1991, 1999) and is widely accepted. Conversely, reduction of *Aspilia* to *Wedelia* and wholesale species transfers by Turner (1994) of Aspilias to *Wedelia* is not widely followed, but rather the partial trend of a more narrowed concept of *Wedelia* by Strother (1991) and Pruski (1996), who segregated *Sphagneticola* from *Wedelia* for example, has been adopted. Turner’s (1992) supposition that the sterile-rayed vs. pistillate-rayed conditions have little generic-level merit is not wholly followed here, and for example, it is presumably no coincidence that the occasional discoid Ecliptinoid species and infraspecies (e.g., those of *Elaphandra*, *Melanthera*, *Otopappus*, and *Tilesia*) are mostly treated within genera that are otherwise sterile-rayed. Strother (1991) and Pruski (1996), respectively, removed the sterile-rayed satellites *Elaphandra* and *Tuberculocarpus* Pruski from the core
of *Aspilia*. In the paleotropics, Wild (1965) and Orchard (2013) variously modified the circumscription of *Melanthera*, but only parts of their work are followed here. Lastly, it should be noted Strother (1991) refined the lines between *Wedelia* and *Zexmenia*, for example by transferring several former *Zexmenias* into *Wedelia*.

Although the subtribe is moderately well-defined, identification of some taxa in the generic key and placement of some shrubby species within genera is not always without difficulties. For example, although treated traditionally as obviously rostrate and obviously winged, our two species of *Oyedaea* are often neither, and are perhaps better termed subrostrate becoming winged only occasionally at full maturity. Because of this the below generic key is so constructed so they will sometimes key out instead by their cypselae with elaiosomes. Other than by its pinnately veined leaves, *Zyzyxia lundellii*, originally described as an *Oyedaea*, in essentially characters basically matches *Oyedaea verbesinoides*, the generitype, which similarly is typically seen without winged fruits. *Zyzyxia* is thus returned to *Oyedaea*. A second pinnately veined species also from the Yucatan peninsula that also may key poorly is weakly winged-fruited *Lundelliathus steyermarkii*, similarly described originally in *Oyedaea*. *Lundelliathus steyermarkii* is retained in *Lundelliathus*, however, on the basis of its basically connate paleae, but remains difficult to key out. It should be mentioned that Turner (1988) treated both *Zyzyxia lundellii* and *Lundelliathus steyermarkii* within *Lasianthaea*.

The citation by Hemsley (vol. 4: 112. 1887) of South American *Blainvillea dichotoma* (Murray) Hemsl. collected by Gaumer on Cozumel (Mexico, Quintana Roo) was not verified and is presumably erroneous. This citation is most likely based upon misdetermined collection of *Baltimora recta*, thus *Blainvillea* is not formally treated herein.


1. Pappus of 2-35 fragile or caducous aristae.
   2. Capitula discoid; corollas white.  
   12. *Melanthera*
   2. Capitula radiate; corollas golden-yellow.  
   16. *Perymenium*
1. Pappus absent, coroniform or of persistent strout aristae or awns.

12. *Melanthera*
16. *Perymenium*
3. Disk florets functionally staminate.
   4. Involucres plano-compressed, samara-like.  
      4. Delilia
   4. Involucres more or less terete, not plano-compressed nor samara-like.
   5. Capitula disciform.
         3. Clibadium
      19. Riencourtia
   5. Capitula radiate.
      7. Annual herbs; leaf blades abaxial surface finely glandular; ray cypselae trigonous.
         1. Baltimora
      7. Shrubs to small trees; leaf blades eglandular; ray cypselae slightly biconvex.
         18. Rensonia

3. Disk florets bisexual.
   8. Cypselae rostrate or subrostrate.
      9. Cypselae base with obvious large plate-like carpopodia and 1-2 elaiosomes.
         10. Ray florets sterile; corollas yellow.  
            15. Oyedaea
         10. Ray florets fertile or when sterile then corollas reddish to purplish.
            25. Wedelia
   9. Cypselae base usually without elaiosomes, carpopodium usually small and inconspicuous.
      11. Cypselae with rostrum curved-geniculate and strongly eccentric.
         17. Plagiolophus
   11. Cypselae with rostrum straight and centric.
      12. Plants procumbent to procumbent-ascending herbs, rooting at the proximal nodes, elongating sympodially; cypselae surface tuberculate at maturity.
         20. Sphagneticola
      12. Plants scandent to erect and not rooting at the nodes; cypselae surfaces smooth or tuberculate.
         13. Herbaceous annuals or short-lived perennials; cypselae surfaces tuberculate.  
            7. Eleutheranthera
         13. Long-lived perennial herbs to shrubs; cypselae surfaces smooth.
         14. Ray florets sterile; cypselae biconvex, exalate.
            6. Elaphandra
            26. Zexmenia
8. Cypselae erostrate.

15. Cypselae exalate.

16. Ray florets sterile; cypselae baccate.  

16. Ray florets pistillate; cypselae dry.

17. Ray corollas filiform, white; paleae filiform; cypselae tuberculate.

5. Eclipta

17. Ray corollas oblong to obovate, yellow; cypselae faces usually basically smooth.

18. Short-lived perennial herbs; disk corollas 4-lobed; paleae lanceolate.

2. Calyptocarpus

18. Long-lived perennial herbs to shrubs or trees; disk corollas usually 5-lobed.

19. Disk cypselae compressed and bivonvex, body typically flattened; pappus awns confluent with cypselae margins.

10. Lasianthaea

19. Disk cypselae quadrate; pappus awns (when present) not continuous with cypselae margins.

20. Leaf blade venation pinnate; clinanthium hemispherical to short-conical; disk corollas 4(-5)-lobed.  

8. Iogeton

20. Leaf blade trinerved; clinanthium flat to weakly convex; disk corollas 5-lobed.

24. Wamalchitamia

15. Cypselae winged.

21. Annual or short-lived perennial herbs; disk corollas 4(-5)-lobed; ray and disk cypselae obviously strongly dimorphic.  

21. Synedrella

21. Long-lived perennial herbs to subshrubs, shrubs, trees, or vines; disk corollas 5-lobed; ray and disk cypselae isomorphic or at least not obviously strongly dimorphic.

22. Capitula discoid or if radiate then rays florets sterile.

14. Otopappus

22. Capitula radiate, rays florets pistillate.

23. Phyllaries very strongly obgraduate; outer 2-6 phyllaries very large and leafy, spreading laterally.  

9. Jefea
23. Phyllaries graduate to obgraduate but never very strongly obgraduate; outer 2-6 phyllaries never very large and leafy, appressed to spreading but never spreading laterally.

24. Paleae fused at base.  

11. Lundellianthus

24. Paleae free at base.

25. Disk cypsela weakly compressed and disk body more than half as thick as wide.

13. Oblivia

25. Disk cypsela strongly compressed and disk body less than half as thick as wide.

23. Tuxtla


Por J.F. Pruski.

Annual herbs; stems much-branched, erect, strigillose to hispid, quadrangular to subterete. Leaves opposite, long-petiolate; blade ovate, chartaceous, 3-veined from near base, both surfaces pubescent, the abaxial surface also finely glandular, truncate to short-attenuate at base, serrate to crenate, less commonly serrulate, acute to acuminate at apex, capitulescence terminal and axillary from the distal nodes, commonly open and diffusely branched; peduncles slender, strigose. Capitula small, radiate, 4-24-flowered; involucre cylindrical to hemispherical, more or less terete, not plano-compressed nor samara-like; phyllaries few, elliptic, imbricate, graduate to more commonly subequal, 2-3-seriate, several-striate, the outer ones herbaceous tipped, hispid-strigose, the inner ones scarious; cliananthium convex, paleate; paleae lanceolate, conduplicate, often ciliate at apex. Ray florets 2-8, pistillate; corollas yellow, lightly strigose on veins abaxially, the limb shortly exserted from involucre, notched; style branches linear, with paired stigmatic lines. Disk florets functionally staminate; corollas funnelform to broadly so, 5-lobed, yellow, glabrous except for the triangular, the tube short, lobes pubescent; anthers black, slightly exserted, bases fertile, short-sagittate, apical appendage broadly ovate-navicular; ovary sterile; style undivided; ovary narrowly cylindrical, wingless; pappus coroniform, crown hispidulous. Ray cypsela trigonous, occasionally slightly winged, broadly obpyramidal, truncate or rounded at the puberulent obscurely rostrate apex, the apex with 3 protruding short horns, the faces smooth or rarely tuberculate, often puberulent; pappus reduced to a crown of minute scales or less
commonly of very short awns. x = 15. 2 spp. Mexico, Central America, South America, Cuba, Hispaniola; introduced into Java and India.


Herbs 0.2-1.5(-3) m, tap-rooted; stems erect, sometimes climbing, moderately to densely branched, sometimes spindly with internodes much longer than leaves, quadrangular to broadly-ribbed distally, especially when dried to sometimes becoming subterete proximally, strigose-hispid to subglabrous proximally, sometimes maculate or angles purplish. Leaves: blade (2-)3-12(-15) × (1-)2-9(-12) cm, elliptic-ovate to broadly ovate, trinerved from just above base, heterotrichous with simple erect multicellular trichomes of greatly differing lengths, adaxial surface scabrid, hispidulous, abaxial surface hispid to hispidulous, also glandular, base broadly obtuse to cordate, then also often short-attenuate, margins crenate to mildly serrate, apex acuminate to attenuate; petiole 0.8-5(-9) cm, typically hispid to strigose-hispid. Capitulescence corymbiform to rarely monopetalous, sometimes much-branched so that some herbarium material consists solely of the branching capitulescence without mature leaves, branches typically 4-8 cm, typically ascending, few-capitulate, substrigose, typically once-bracteolate, bracteoles 3-5 mm, elliptic-lanceolate; peduncles (0.2-)0.6-2.8(-7.5) cm, slender, typically strigose. Capitula 4.5-8 mm, 18-33-flowered; involucre 3-5(-6) mm diam., generally campanulate; phyllaries 5-7, 3-6 mm × 1.7-2.8 mm, elliptic-ovate, 2(-3)-seriate, strigose, occasionally slightly glandular, 5-9-nerved; clinanthium with mostly outer paleae persistent; paleae 3.5-5 mm, linear-lanceolate, occasionally slightly glandular, apex long-ciliate, seemingly rounded to attenuate but shape commonly obscured by cilia. Ray florets 3-8; corolla 4.8-8.9 mm, tube 1-1.4 mm, limb (3.8-)5-7.5 × 1.2-3.2 mm, oblong, abaxially glandular, hirtellous on two larger veins, c. 10-veined, apex emarginate or less commonly short-bidentate; style branches 1.4-2 mm. Disk florets 15-25;
corolla 2.7-3 mm, tube 0.5-0.7 mm, throat usually about 2x as long as tube, lobes 0.3-0.4 mm, erect, apically hirsutulous; anthers shortly-exserted, c. 1.5 mm, apical appendage broadly ovate, apically rounded to truncate; style unbranched, slightly clavate, exserted from 1.5-2 mm past anther cylinder, shaft hispidulous, ovary 2-2.5 mm, linear-stipiform. Cypselae 2.4-3.2 × 1.6-1.9 mm, obovate in outline, occasionally shortly winged, strigillose or only so apically. 2n = 30.

Flowering mostly Aug-Mar. Weedy roadsides, matorral, terreno plano, orilla de arroyo, seasonal evergreen forest, tropical deciduous forest, weedy in cornfields, edge of pineland, cultivated pastures, corozal, clearing, bosque tropical seco, bosque de galería a orillas de rios, swampy ditches, pantanos. low scrub forest, old lake beds, savannas, lower montane wet forest, disturbed dry forest, bosque húmedo subtropical, ponds bordered by marshy fields, lowland pastures, portrero, open hillsides, brushy savanna.

This very weedy species sometimes occurs in dense stands covering several hectares. It is very similar to the less common, but more widespread, B. geminata (Brandegee) Stuessy, which differs by shorter anthers with pointed appendages and by weakly ciliate paleae with apices consistently pointed. Baltimora alata Meerb. by winged stems was excluded from Baltimora in the revision by Stuessy (1973). However, my examination of the plate in the protologue shows that the stems are not winged by rather sulcate-quadrangular, the disk florets are incorrectly drawn with bifid styles, and the species to be a synonym of B. recta.

2. Calyptocarpus Less.

Por J.F. Pruski.

Perennials herbs, trichomes patent or appressed; stems usually decumbent, often rooting at the proximal nodes, dichotomously to oppositely much-branched throughout, slender, intrapetiolar ridge often present. Leaves opposite, petiolate; blade thinly chartaceous, triplinerved from above base, surfaces +/- strigose, trichomes appressed, tuberculate-based, eglandular, usually with basal acumen slightly decurrent onto petiole, margins toothed; petiole usually narrowly winged from basal acumen, strigose and often also pilose. Capitulescence few-capitulate, capitula terminal or axillary, solitary or sometimes ternate, sessile to pedunculate, never with several clustered in axils; peduncles ebracteolate. Capitula small short-radiate; phyllaries (3-)4-5, subequal or inner
slightly shorter, c. 2-seriate, broadly over-lapping, nervation obscure, pubescent, the outer ones thinly green-herbaceous, the inner shorter and narrower, thinly herbaceous throughout or only apically so; clinanthium low-convex, paleate throughout; paleae persistent, lanceolate, flat to slightly concave, not carinate, scarious, apex acute, glabrous. Ray florets 3-11, pistillate, 1-2-seriate, only the outer ones each subtended by a broad phyllary; corolla pale yellow, limb short, ascending to slightly spreading, faintly 5-7-nerved, 2-3-dentate, abaxially eglandular, often setulose. Disk florets 3-20, bisexual; corolla narrowly funnelform, 4-lobed, pale yellow to yellow, tube evenly slender throughout, shorter than throats, tube and throat glabrous, with fibers embedded in vascular strands, nerves divaricate well-below sinus, lobes deltate, nerves intramarginal, inner surface papillose; anthers black, base short-subauriculate, appendage lanceolate-ovate, usually eglandular; style branches 2-banded, sterile apical appendage narrowly acuminate to attenuate, papillose, nectary tubular, deeply lobed. Cypselae more or less isomorphic, dry, compressed (rays rarely triquetrous, lacerate-margined, or narrow-subwinged distally), 2(-3)awned, cuneate or obovate in outline, erostrate, exalate, base narrowed to small symmetric carpododium, body blackish and faces smooth or infrequently with a tan corky or finely tuberculat covering, usually striate when immature, often setulose especially distally; pappus persistent, represented by 2(-3) elongate stout spine-like awns from corners, sometimes very short intermediate trichomes or squamellae present. x = 12. 2 spp. S. United States, Mexico, Central America, ?Brazil, West Indies; introduced and weedy in Asia, Australia, Islas del Pacifico.

Isomorphic and erostrate *Calyptocarpus* is accepted here, and remains ditypic as treated by McVaugh y Smith (1967). *Calyptocarpus* is, however, closely related to the earlier isomorphic and rostrate *Blainvillea* Cass. (described in 1823, and including the synonymous *Galophthalmum* Nees et Mart. described in 1824) and to the still earlier yet dimorphic and erostrate *Synedrella* Gaertn. (described in 1791). These three pantropical genera are similar by their often subequal phyllaries, stout pappus awns, ray florets with short corolla limbs, and 4-merous disk florets. Several American species have been included variously in two of these three genera, indicative of the overall similarity of the genera and their component species.

For example, South American *Blainvillea brasiliensis* (Nees et Mart.) S.F. Blake [syn.: *Calyptocarpus biaristatus* (DC.) H. Rob.] was transferred to *Calyptocarpus* by (Turner,1988). *Calyptocarpus*, however, has never been reduced to synonymy of *Blainvillea*. *Blainvillea brasiliensis* differs from *Calyptocarpus* by erect habit and incompletely paleae clinanthium.

On the other hand, *Calyptocarpus* was reduced by Gray (1882, 1884) to synonymy of *Synedrella*, which has similar lobed nectaries and 1-2-seriate obcompressed rays. *Synedrella*
differs from *Calyptocarpus*, however, by non-tuberculate cypselae clearly dimorphic with some obviously winged, and by obcompressed disks. *Calyptocarpus* was resurrected from *Synedrella* by Small (1903), who mentioned its typically unwinged ray cypselae. *Calyptocarpus* was subsequently recognized by Sherff y Alexander (1955) and McVaugh y Smith, 1967).

*Blainvillea* has, to the best of my knowledge, never been reduced to synonymy of *Synedrella*. The feature of rostrate vs. erostrate cypselae being used as diagnostic generically is perhaps incorrect, and indeed I admit describing the cypselae of *Calyptocarpus* as "rarely nearly subrostrate." Similarly, the extremes of presence or absence of rostra on cypselae has been used as diagnostic generically in the *Zexmenia* generic group, where I admittedly also described nebulously some cypselae as "subrostrate." Also contributing to our generic disarray is the fact that many specialists base generic concepts on variously misdetermined non-types. For example, at MO, most Old World specimens of *Blainvillea* prove to be *Acmella*. Although it is possible that either or both *Calyptocarpus* and *Blainvillea* will be reduced in the future to the synonymy of *Synedrella*, I nevertheless recognize *Calyptocarpus* as distinct.

At the species rank within *Calyptocarpus*, Sherff y Alexander (1955) treated *C. wendlandii* as a synonym of *C. vialis*, whereas McVaugh y Smith (1967) recognized both *C. vialis* and *C. wendlandii*. By its awned cypselae, *Calyptocarpus* is similar to *Sanvitalia* which lacks ray corolla tubes and belongs to subtribe Zinniae.


1. Longer awns ascending-divergent at maturity, 1-2.3 mm, setulose throughout, much shorter than cypselae; peduncles strigose(-pilose), trichomes appressed(-patent); phyllaries 5-7(-8) mm; cypselae 3-4.5 mm.

1. *C. vialis*

2. Longer awns horizontally spreading or reflexed at maturity, (2-)3-5 mm, setulose at base only, usually ≥ 1/2 as long as cypselae, nearly as long as cypselae; peduncles villous, trichomes ascending to patent; phyllaries 7-12.5 mm; cypselae (4.5-)5-7 mm.

2. *C. wendlandii*


Short-lived tap-rooted to fibrous-rooted perennial herbs; stems several, 20-60 cm, but ascending to only 3-15 cm, internodes mostly 1-3+ times as long as leaves; herbage strigose, trichomes appressed. Leaves: blade (1-)1.5-3(-4.5) × (0.5-)1-2.5(-3.5) cm, ovate to triangular-ovate, base acute to truncate often with basal acumination, margins crenate, apex acute; petiole 0.3-1(-1.5) cm, narrowly winged. Capitulescence: peduncles 0-3(-5) cm. Capitula 6-14(-20)-flowered; involucre 5-7(-8) × 3-4(-4.5) mm, turbinate; phyllaries 5-7(-8) × 2-4(-5) mm, oblong to obovate, strigose to densely so, also outer pair of phyllaries occasionally hirsute, apex acute or acuminate; paleae 3.5-4.8 × 0.6-0.9 mm, linear. Ray florets 3-7(-11); corolla tube c. 2 mm, limb 2-3(-4) × 0.7-1 mm, oblong-spatulate. Disk florets 3-7(-9); corolla 2.5-3(-3.5) mm. Cypselae 3-4.5 × 1.2-1.8 mm; pappus awns 2(-3), the longer ones 1-2.3 mm, ascending-divergent at maturity, much shorter than cypselae, awns setulose throughout, smaller intermediate awns or trichomes 1-3, to c. 0.3 mm. Flowering year-round. 2\(n = 24\). *Campo abierto, disturbed areas, fields, lawns, ruderal, wet ditches*. T (Rzedowski y Calderón de Rzedowski, 2008: 123); Y (Steere 1676, F); ?B (Dwyer y Spellman, 1981). 0-1500 m. (S. Estados Unidos, Mexico, Mesoamerica, ?Brazil, Cuba, Dominican Republic, Bahamas; introduced to Asia, Australia, Islas del Pacífico.)

"Linnaea VII. ined." is cited in the protologue of *Calyptocarpus vialis*. Neither the species nor Lessing's treatment is found in that volume, but in the enumeration of the Schiede Compositae collections Lessing (1834) cited *Schiede y Deppe 221*, the presumed type, as the sole collection cited as *C. vialis* in Linnaea vol. 9. *Calyptocarpus blepharolepis* B.L. Rob. was cited by Strother (2005) as a synonym of *C. vialis*. However, the protologue locality of *Calyptocarpus blepharolepis* is in error, and it is sympatric with and a synonym of *Sanvitalia ocymoides* (Cronquist, 1980; Torres. 1964). The name *C. blepharolepis* is thus excluded from synonymy here.

The unvouchedered report by Dwyer y Spellman (1981; repeated by Balick et al., 2000) of *C. vialis* in Belice is not confirmed. McVaugh y Smith (1967) excluded *C. wendlandii* from synonymy of *C. vialis*, and the earlier citations of *C. vialis* in Central America by Standley (1938), Sherff y Alexander (1955), etc. are more often than not in reference to material here referred to *C. wendlandii*. The common names used and the reports by Standley y Calderón (1925, 1941) and Berendsohn y Araniva de González (1989) of *Calyptocarpus vialis* in El Salvador were based on misidentifications of material referred here *C. wendlandii*.

The citation of *Calyptocarpus* in Venezuela by Hokche et al. (2008) is based on a misdetermination, and indeed the genus was not cited for Venezuela by Badillo (1994, 1997a,
I could not verify the report by Peng et al. (1998) of *Calyptocarpus vialis* in Brazil, although it seems possible that the species has been collected there as a waif.


Perennial herbs from woody caudex; stems to c. 35 cm, hirsute to pilose or villous, trichomes patent or ascending, proximal internodes longer than leaves, distal internodes sometimes much shorter. Leaves: blade 2.5-5(-6.5) × 1.3-3.5 cm, ovate or rhombic-ovate, base long-acuminate to obtuse, margins crenate-serrate, surfaces +/- strigose, trichomes appressed; petiole 1-2(-2.5) cm. Capitulescence: peduncles 0-4 cm, villosulous to villous, trichomes ascending to patent. Capitula 9-20(-29)-flowered; involucre 7-12.5 × 3-6(-7.5) mm, campanulate to turbinate; phyllaries 7-12.5 × 2-4 mm, elliptic-ovate, apex acute or acuminate, densely strigose; paleae 6-8 mm, linear to linear-lanceolate. Ray florets 3-5(-9); corolla tube 1.5-2 mm, limb 3-6 × 2-2.5 mm, obovate. Disk florets 6-15(-20); corolla 4-5 mm, tube to c. 1.5 mm; anthers c. 1.8 mm; style branches c. 1.3 mm, nectary c. 0.9 mm, c. 4-lobed to midpoint. Cypselae 4.5-7 × 1.5-2 mm; pappus awns 2(-3), (2-)3-5 mm, usually ≥ 1/2 as long as cypselae, horizontally spreading or reflexed at maturity, awn base to c. 0.5 mm diam., setulose, distal ¼ glabrous. 2n = 72. *Cafetales, cultivated areas, damp thickets, fields, grasslands, humid areas, marshes, moist meadows, open forests, orilla de desague, pastures, roadsides, ruderal, secondary thickets, shaded areas, stream sides, volcano craters*. Ch (Pruski et al. 4225, MO); G (Pruski y Vega 4480, MO); H (Molina y Molina 25846, MO); ES (Standley 23422, NY); N (Seymour 966, MO); CR (Worthen s.n., MO); ?P (Dillon et al., 2001; Correa et al. 2004). 100-1600(-2000) m. (Mexico, Mesoamerica.)

Although Standley (1938) and Sherff y Alexander (1955) treated *Calyptocarpus* as monotypic, McVaugh y Smith (1967) recognized a second species, *C. wendlandii*, which they resurrected from synonymy of *C. vialis*. The common names used, for example, by Standley (1938) for *C. vialis*, which does not occur in Costa Rica, are thus applied here to *C. wendlandii*. Our Costa Rican voucher of *C. wendlandii* was cited by Torres (1964) as the sole voucher of *Sanvitalia* in Costa Rica, a genus here excluded from Costa Rica. The occurrence of *C. wendlandii* in Panama, as suggested in the unvouchedered report by Dillon et al. (2001; repeated by Correa et al., 2004) was not confirmed by me, although this species is very possibly in Panama.
3. *Clibadium* F. Allam. ex L.


Por J.E. Arriagada & J.F. Pruski.

Shrubby herbs to small trees; stems glabrate to variously pubescent, branching opposite. Leaves opposite, petiolate or rarely sessile; petiole very rarely winged; blade chartaceous to less commonly subcoriaceous, usually triplinerved from well above base to less commonly palmately 3-veined from base, margins serrulate to serrate, surfaces eglandular, adaxial surface frequently scabrous or strigose to less commonly pilose-hirsute, the abaxial surface glabrescent to tomentose. Capitulescence open, generally thyrsoid-paniculate, main axis trichotomously branched, dichotomously branched distally, ultimate branches infrequently with capitula subglomerate. Capitula disciform; involucre turbinate to subglobose, more or less terete, not plano-compressed nor samara-like; phyllaries few, imbricate, subequal or weakly graduate, generally biseriate, greenish or sometimes cream-colored, often drying black, striate, glabrate or pubescent, indurate, innermost subtending but not enclosing the marginal florets; clienantheum small, epaleate or less commonly with inconspicuous scarious paleae subtending disk florets, rarely (in Mesoamerica) with female paleae subtending the inner series (when multiseriate) of pistillate florets. Marginal florets 3-40, pistillate, uniseriate (sometimes seemingly biseriate in mature fruit) to less commonly several-seriate, commonly fewer than disk florets; corolla small, only slightly exserted, funnelform, usually white, occasionally slightly pubescent, apex denticulate, limb absent; style exappendiculate, branches stigmatic surfaces inconspicuously 2-banded. Disk florets 2-10, functionally staminate; corolla small, funnelform to campanulate, (4-)5-lobed, slightly to greatly exserted at anthesis, usually white, lobes shortly triangular, pubescent to densely so; anthers (4)5, thecae typically black, slightly exserted, basally short-sagittate, appendage black; ovary sterile, style undivided. Ray cypselae subtennnded by phyllary but not enclosed by it, generally drying black, dry or rarely (in Mesoamerica) fleshy, obovoid to pyriform, slightly obcompressed, glabrous or more commonly villous at apex, indumentum typically denser on adaxial (ventral) surface; carpopodium tan, small to broad, sometimes substipitate; pappus absent. 30 spp. Neotropics.

A revision recognizing 29 species was provided by Arriagada (2003), which modifies the treatment by Schulz (1912). The number of species recognized was raised to 30 by Pruski (2005), who described *Clibadium arriagadae* Pruski from Ecuador. Each of the three most broadly distributed species in the genus (*C. eggersii*, *C. surinamense*, and *C. sylvestre*) occur in
Mesoamerica. Eight species in the genus (total modified from Acevedo-Rodríguez, 1990), including species in Mesoamerica, are used as fish poisons.

The bracts external to all florets, some of which subtending pistillate florets, are here called phyllaries, but the innermost phyllaries were called paleae by Schultz (1912) and Arriagada (2003). Paleae are defined as receptacular bracts within the outermost florets and subtending disk florets (thus matching the typically usage of the term) and sometimes (in capitula with multisieriate pistillate florets) subtending inner series of pistillate florets. This second type of paleae (i.e., those that subtend the inner series of pistillate florets in capitula with multisieriate pistillate florets) are here called "female paleae" in order to distinguish them from typical paleae. These female paleae are indurate and more closely resemble phyllaries in texture and indument than they do paleae. Although the only Mesoamerica species for which use of the term "female paleae" applies is C. eggersii, it should noted that the corrected terminology of phyllary and palea here differs from that in Arriagada (2003) and Schultz (1912), where phyllaries were defined in a more restricted sense as only the sterile bracts external to all, but not those immediately subtending, pistillate florets. This terminology as corrected here conforms with usage elsewhere in this treatment and elsewhere in Compositae, although one must remember that most previous descriptions of species of Clibadium are inaccurate.

An important feature used in taxonomy of Clibadium is whether taxa have herbage with appressed or patent trichomes. Although this features varies occasionally, it should be noted in taxa with patent trichomes the trichomes are elongate, whereas in taxa with appressed trichomes the trichomes are typically short.


1. Marginal florets 5-7-seriate, more numerous than discoid staminate florets; cliananthia obviously paleate throughout; cypselae somewhat fleshy at maturity (subg. Paleata).

4. C. eggersii

1. Marginal florets uniseriate, often fewer than disk florets; cliananthia epaleate or sometimes inconspicuously paleate; cypselae dry (subg. Clibadium).

2. Ultimate branches of capitulescence with capitula subsessile and subglomerate.
3. Leaves subsessile or short-petiolate; petioles winged to base or nearly so.

8. C. sessile

3. Leaves petiolate; petioles unwinged or rarely winged distally.

4. Herbage with appressed indument; capitulescences typically flat-topped, lateral branches typically directed outward at nearly right angles to the main axis, ultimate branches with clusters of (2-)3-6 capitula. 2. C. anceps

4. Herbage with elongate, ascending to patent trichomes; capitulescences typically round-topped, lateral branches typically ascending at about 45° angle to the main axis, ultimate branches with clusters of 10-20 capitula.

5. C. glomeratum

2. Ultimate branches of capitulescence with capitula moderately to well-spaced.

5. Leaves (12)25-40(-50) × 10-30(-40) cm; petioles winged or unwinged; capitulescences typically with more than 200 capitula. 6. C. grandifolium

5. Leaves less than 22(-28.5) × 15(-18) cm; petioles unwinged; capitulescences with fewer than 200 capitula.

6. Peduncles, stems, and leaf surfaces typically strigose.

7. Cypselae moderately papillose-glandular and also occasionally villous.

1. C. acuminatum

7. Cypselae villous, sometimes also sparsely papillose-glandular when immature.

10. C. sylvestre

6. Peduncles densely pilose-tomentose with patent trichomes, stems hirsutulous or densely pilose-tomentose to less commonly strigose proximally, leaf surfaces hirsutulous, strigose, scabrous, or short-pilose.

8. Leaf surfaces typically strigose; cypselae subglabrous or less commonly sparsely villous or papillose-glandular at apex. 7. C. leiocarpum

8. Leaf surfaces hirsutulous, scabrous, or short-pilose; cypselae villous.

9. Leaf blade bases typically cuneate or less commonly obtuse and then abruptly contracted and acuminate to attenuate; disk florets typically 4-11.

3. C. arboretum

9. Leaf blade bases typically obtuse or less commonly attenuate to slightly decurrent onto petiole; disk florets typically 10-14.

9. C. surinamense

*Clibadium parviceps* S.F. Blake, *Clibadium pediculatum* Aristeg., *Clibadium sneidernii* Cuatrec.

Shrubs to 3-5 m; stems with slender branches, branches striate, strigose to densely strigose. Leaves petiolate; petiole unwinged, slender, 1.5-5(-6) cm, strigose; blade ovate to ovate-lanceolate, 6-20 × 2.5-10 cm, thinly chartaceous, 3-plinerved from well above base, proximal 1 or 2 pairs of secondaries strongly arching towards apex, base obtuse to often acuminate, margins serrulate or crenate-serrate, teeth usually mucronate, apex acuminate, surfaces strigose. Capitulescence with fewer than 200 capitula, ultimate branches with sessile or short-pedunculate capitula moderately to well-spaced; peduncles typically strigose. Capitula subglobose, 4-6 mm; involucre hemispheric, 3-4 mm diam.; phyllaries greenish, suborbicular-orbicular, 3-4 × 2.5-3.5 mm, (5-)7-veined, strigose, distally short-ciliate, apex acute; cliananthium epaleate or rarely inconspicuously paleate. Marginal florets uniseriate, 4-6(-8); corolla 2.5-3 mm, 3-dentate, white, glabrous or sparsely pubescent at apex, teeth c. 0.4 mm, irregularly deltoid.; style c. 1.5 mm, branches c. 1 mm. Disk florets (4-)5-10; corolla 3-4 mm, funnelform, 5-lobed, white, lobes deltate, c. 0.5 mm, sparsely pilose at apex; anthers c. 1 mm; ovary c. 1.5 mm, sparsely pilose at apex. Cypselae c. 2 mm, obovoid, rarely short-rostrate, moderately papillose-glandular and also occasionally (in Mesoamerica) villous distally. *Edges of secondary forests*. CR (Rojas 3637, MO). 200-300 m. (Mesoamerica, Colombia, Venezuela.)

Material from Cocos Island is moderately papillose-glandular and infrequently villous, whereas continental material (as in the above cited illustration) of this species is villous and sparsely papillose-glandular, and ultimately may prove best referred to *Clibadium sylvestre*.


*Clibadium pilonicum* Stuessy.

Arching or scandent shrubs to lianas, 3-6 m; stems running horizontal and rooting at the nodes, glabrate proximally to strigose distally; herbage with appressed indument. Leaves petiolate; petiole unwinged, 1-3(-4.5) cm, strigose; blade ovate to narrow-ovate, 7-15 × 3-9(-11.5) cm, typically 3-plinerved from above base or sometimes (in Panama in material often called *C. pilonicum*) palmately 3-veined from base, this pair of strongly arching secondary veins...
continuing well past mid-blade and often nearly to apex, base cuneate, sometimes slightly attenuate onto petiole, margins serrulate remotely denticulate, apex acuminate, surfaces glabrate to strigose. Capitulescence typically flat-topped, with 50-120 sessile capitula, lateral branches typically directed outward at nearly right angles to the main axis, branches strigose to densely so, trichomes appressed, ultimate branches with subglomerate clusters of (2-)3-6 subsessile capitula, subglomerate clusters to c. 6 × 10 mm in fruit, often wider than tall, subspherical, moderately dense. Capitula 3-5 mm; involucre 3-4 mm diam., broadly turbinate; phyllaries 3-4 × 2.5-3 mm, ovate, 2-seri ate, 7-12-veined, strigose, ciliate distally, apex acute; cli ananthium epaleate, rarely long-setose. Marginal florets uniseriate, 3-5; corolla 2-2.5 mm, 4-dentate, white, teeth c. 0.4 mm, deltate, margins short-ciliate; styles c. 3 mm, branches c. 1.5 mm. Disk florets 4-10; corolla 2.6-3 mm, 5-lobed, lobes c. 0.4 mm, deltate; anthers c. 2 mm; ovary c. 2 mm, villous distally, style c. 3 mm. Cypselae c. 2 mm, glabrous. 2n = 32. *Edges of and light gaps in forests, disturbed areas, secondary forests, roadsides*. CR (Arriagada 408, OS); P (Dwyer & Correa 8844, MO). 50-2700 m. (Endemic.)

In the field *Clibadium anceps* has fleshy phyllaries at maturity with greenish juice. The Panamanian populations described by Stuessy (1975) as *C. pilonicum* have leaves palmately 3-veined from base, but here we follow Arriagada (2003), who treated these as synonymous with *C. anceps*, the type of which has leaves pinnately 3-plinerved from above base.


*Clibadium donnell-smithii* J. M. Coult., *Clibadium oligandrum* S.F. Blake, *Clibadium pueblanum* S.F. Blake.

Shrubs or small trees 1.5-6(-8) m; stems much-branched, branches densely pilose, trichomes patent. Leaves petiolate; petiole unwinged, 2-4.5 cm, pilose; blade ovate to broadly ovate, 9-19 × 6-14(-18) cm, 3-plinerved from above base, base typically cuneate or less commonly obtuse and then abruptly contracted and acuminate to attenuate, margins serrulate to less commonly serrate, apex acuminate to long-acuminate, adaxial surface scabrous, abaxial surface densely short pilose. Capitulescence few-branched, with fewer than 100 capitula, capitula subsessile or short-pedunculate, branches densely pilose, ultimate branches with capitula moderately to well-spaced. Capitula subglobose, 4.5-5.2 mm; involucre hemispheric, c. 3.5 mm diam.; phyllaries broadly obovate, prominently 3-7-striate, 3.3-5 × 4-5 mm, strigose, ciliate distally or sparsely so, apex acute to obtuse; cli ananthium epaleate. Marginal florets uniseriate, 3-6; corolla c. 2.5 mm, 4-
dentate, white, teeth c. 0.2 mm, apex sparsely pubescent; style c. 2 mm, branches c. 1.5 mm, apex recurved. Disk florets typically 4-11; corolla 2.5-3.7 mm, funnelform, 5-lobed, white, tube c. 0.8 mm, lobes c. 1 mm, delatale, apex setose to densely so; ovary c. 1.5 mm, hirsute distally. Cypselae blackish, obovoid, c. 2 × 1.5 mm, villous at apex. 2n = 32. *Humid dense forest, selva subperennifolia, stream sides, damp or wet secondary forest, roadsides.* T (Cowan 2427, MO); Ch (Breedlove 26504, MO); B (McDaniel 14482, MO); G (Skutch 927, F); H (Harmon & Dryer 4031, MO); ES? (cited by Linares, 2003); N (Atwood A151, OS). 0-2600 m. (Mexico, Mesoamerica.)

*Clibadium arboreum* is the northern-most distributed species of the genus. Strother (1999) treated this species as a synonym of the very closely related *C. surinamense*, but it seems appropriate to recognized each species until such a time when they can be adequately studied in the field. The report by Linares (2003) of this species in El Salvador was not verified by us.


Shrubby herbs to shrubs 1-4 m; stems subterete, hirsute or less commonly (in Mesoamerica) strigose. Leaves petiolar; petiole unwinged, 1-5(-8) cm; blade elliptic to ovate, 4-16.5 × 2-11 cm, 3-plinerved from well above base, base cuneate or abruptly attenuate to rounded, sometimes slightly decurrent onto petiole, margins serrulate to serrate, apex acute to acuminate, surfaces strigose especially adaxially or hirsute. Capitulescence 3-11(-25)-headed, ultimate branches with capitula moderately to well-spaced; peduncles 3-12 mm, hirsute or less commonly (in Flora Area) strigose. Capitula 4-5 mm, to c. 7 mm in fruit, marginal pistillate florets more numerous than discoid staminate florets; involucre hemispherical, 4-4.5 mm diam., to c. 8 mm diam. in fruit; phyllaries mostly closely subtending each outermost pistillate floret, subequal, elliptic-ovate, to c. 4 × 1.5 mm, stiff, strigose, apex acute; cliananthium obviously paleate throughout; female paleae indurate, strongly resembling and grading from phyllaries, subtending the inner pistillate florets, moderately c. 5-striate; central paleae subtending disk florets linear-lanceolate, c. 3 mm, scarious, somewhat conduplicate, hirsute apically. Marginal florets 5-7-seriate, 28-40; corolla 1.2-1.5 mm, shortly c. 4-dentate, white, apically hirsutulous; style branches c. 0.5 mm. Disk florets 4-10; corolla 1.7-2.2 mm, broadly funnelform, 4-5-lobed, cream-colored, tube c. 0.3 mm, throat much
broadened, lobes 0.4-0.5 mm, pilosulose; anthers c. 1.5 mm; ovary linear, 1.4-1.8 mm, long-pilosulose, style undivided. Cypselae somewhat fleshy at maturity, oblong-pyriform, 2-2.5 × 1.6-2 mm, villous at the flat to rounded apex. 2n = 32. Secondary vegetation, disturbed areas, roadsides, stream banks, swamps. B (Gentle 8251, MO); G (Türckheim 4148, F); H (Williams & Molina 14621, GH); N (Seemann 88, BM); CR (Pittier 11290, GH); P (Bussey 825, MO).

0-1100(-1200) m. (Mesoamerica, Colombia, Ecuador, Peru.)

Clibadium eggersii is distinctive in its several-seriate pistillate florets which in fruit become fleshy at maturity with the capitulum taking on an unusual aspect suggestive of aggregate fruits of Rubus. Wulffia sodiroi is the earliest binomial for this species, but is blocked by C. sodiroi Hieron. Individuals of C. eggersii from Central America having stems with patent trichomes are more common, whereas in South America plants commonly have stems with strigose indumentum. Although in C. eggersii the strigose vs. patent stem indumentum features varies geographically, leaf or stem indumentum types elsewhere in the genus are consistent and diagnostic (for example) in Clibadium arriagadae Pruski, C. pentaneuron S.F. Blake, and C. sylvestre (Pruski, 2005). Nash (1976) cited this species (sub. C. pittieri) as occurring in the West Indies, but we believe that this report is in error.


Illustr.: None. N.v.: None.

Shrubs 1.5-4 m; stems typically densely pilose to tomentose; herbage with elongate, ascending to patent trichomes. Leaves petiolate; petiole unwinged, 5-8 cm, pilose; blade broadly ovate or rarely narrowly lanceolate-ovate, 10-20(-29) × 5-15 cm, 3-plinerved from well above base, proximal-most pair of large secondary veins typically diverging from midrib well above base and continuing only to about mid-blade, base obtuse to cordate, margins irregularly crenate-serrulate or serrulate-dentate to occasionally irregularly and deeply so, apex acute, pilosulose to pilose adaxially, pilose to densely so abaxially, more densely so on veins. Capitulescence typically round-topped, lateral branches typically ascending at about 45° angle from the main axis, ultimate branches with dense subglomerate clusters of 10-20 subsessile capitula, branches commonly hispid-pilose to tomentose, subglomerate clusters spherical, dense, to c. 8(-10) mm and broad in fruit. Capitula 3-4 mm; involucre 2-3 mm diam.; phyllaries 2-seriate, ovate to orbicular, c. 3 × 2-2.5 mm, 7-12-nerved, ciliate distally; cliananthium epalate. Marginal florets uniseriate, c. 5; corolla c. 1.4 mm, 4-dentate, tube c. 0.6 mm, teeth deltate, sparsely pubescent at apex; style c. 1 mm, branches c. 0.5 mm. Disk florets c. 5; corolla 2.2-3 mm, campanulate, 5-lobed, tube c. 0.6
mm, lobes deltate, c. 0.5 mm; anthers c. 1.1 mm; ovary villose distally, styles undivided, c. 1 mm.
Cypselae c. 2 mm, villous distally. 2n = 32. Second-growth tropical rain forests, open roadsides.
CR (Arriagada 152, OS); P (Hartman 3963, OS). 0-1600 m. (Endemic.)

*Clibadium glomeratum* is characterized by pilose herbage, but occasionally scabrous plants
with narrowly lanceolate-ovate (vs. broadly ovate) may be encountered. Although the protologue
cited "Tonduz 11508," the lectotype has both "7330" and "11508" on the label. It is not clear
which of theses numbers is the collection number and which is an herbarium +/- or species
number.

(1978). N.v.: Oa-grá, P.

*Clibadium grande* S.F. Blake, *Clibadium pacificum* Cuatrec., *Clibadium terebinthinaceum*
(Sw.) DC. subsp. *colombiense* Cuatrec.

Soft-wooded shrubs to small trees 2-7 m; stems striate, strigose; herbage with appressed or
patent trichomes; Leaves petiolate; petiole often broad, unwinged or distal half occasionally
winged from decurrent blade, 4-19 cm, glabrate to strigose; blade broadly ovate, (12-)25-40(-50)
× 10-30(-40) cm, thinly chartaceous, plinerved from well above base with proximal few pairs of
secondary veins about equally prominent, base cordate or obtuse to less commonly cuneate and
then typically shortly attenuate, occasionally decurrent onto petiole, margins serrate to
occasionally irregularly and deeply so, apex acute to rounded or less commonly acuminate,
adaxial surface glabrate to strigose, abaxial surface strigose. Capitulescence typically with more
than 200(-800) short-pedunculate capitula, ultimate branches with capitula moderately to well-
spaced; peduncles c. 0.5 mm, strigose or hirsutulous. Capitula broadly campanulate to
subglobose, (3-)4-6.5 mm; involucre cupulate, 3-5 mm diam.; phyllaries light green, ovate to
suborbicular-ovate, 3-5 × 3-4 mm, prominently 4-5(-7)-veined, glabrate to strigillose distally,
margins ciliate distally; cliananthium epaneate or rarely inconspicuously palaete. Marginal florets
uniseriate, (3-)6-8(-12); corolla 2-3 mm, 2-3-dentate, white, teeth deltate, to c. 0.3 mm, sparsely
pubescent at apex; style c. 2.5 mm, branches c. 1.2 mm. Disk florets (4-)8-12(-14); corolla 3-4
mm, 5-lobed, white, lobes c. 0.5 mm, sparsely pubescent at apex; anthers c. 2 mm; ovary c. 1.5
mm, villose at apex, style c. 3 mm. Cypselae c. 2.5 mm, villose distally. *Tropical moist forests,
secondary vegetation, disturbed forests, stream banks, roadsides*. N (Stevens 4816, MO); CR
(Pittier 11280, US); P (Allen 3621, MO). 0-1700 m. (Mesoamerica, Colombia, Ecuador.)
Juvenile plants of *Clibadium grandifolium* with smaller leaves are superficially similar to *C. sylvestre*, but *C. sylvestre* is distinguished by strigose phyllaries. The protologue of *C. pacificum* Cuatrec. reports up to 20 staminate florets per capitulum, but we were unable to confirm this count.


*Clibadium leiocarpum* var. *strigosum* S.F. Blake, *Clibadium schulzii* S.F. Blake.

Shrubs or less commonly treelets, 2-5 m; stems usually densely branched, striate-angulate, densely pilose-tomentose to often strigose proximally or rarely strigose throughout. Leaves petiolate; petiole unwinged, (1-)2-6 cm, densely strigose to pilose-tomentose; blade lanceolate to ovate, 5-20 × 2-10 cm, chartaceous to rarely thickly so, 3-plinerved from well above base, base acute to attenuate, margins serrate, apex acuminate, surfaces typically strigose to abaxial surface sometimes sericeous or very rarely pilose-tomentose or sparsely strigose. Capitulescence often more or less flat on top, with fewer than 100 capitula, ultimate branches with capitula moderately to well-spaced; peduncles 0.5-1 mm, typically densely pilose-tomentose with patent trichomes or rarely strigose. Capitula 3.5-4.5 mm; involucre turbinate to subglobose, 3-3.5 mm diam.; phyllaries suborbicular to broadly ovate, 3.5-4.5 × 3-4 mm, 7-9-veined, typically glabrous proximally and strigose distally, rarely strigose throughout, margins distally ciliate to sparsely so, apex acute; cliananthium epaleate or rarely inconspicuously paleate. Marginal florets uniseriate, (5-)7-9; corolla 1.5-2.2 mm, white, glabrous, 3-dentate, teeth c. 0.4 mm; style c. 2 mm, branches 0.5-0.8 mm. Disk florets 10-15; corolla 2.5-3 mm, 5-lobed, white, lobes c. 0.5 mm, apex strigillose; anthers c. 1.5 mm; ovary c. 2 × 1 mm, glabrous, styles undivided. Cypselae 1.5-1.7 mm, often short-rostrate, subglabrous or less commonly sparsely villous with c. 5 trichomes or sparsely to moderately papillose-glandular at apex. 2n = 32. *Secondary wet forests, roadsides, forest edges, cloud forests, elfin forests, disturbed slopes, thickets, pastures, gravel bars*. N (Araquistain & Moreno 655, MO); CR (Pruski et al. 3822, MO); P (Woodson et al. 908, MO). (30-)1000-2800 m. (Endemic.)

*Clibadium leiocarpum* is most similar to *C. sylvestre*, but differs from it by typically longer trichomes of the stems and leaves, its peduncles typically with patent trichomes, phyllaries that are typically glabrate proximally and strigose distally, and cypselae that are often subglabrous. Perhaps the most striking feature useful in identification of *C. leiocarpum* is the indumentum (and in turn color) contrast between the typically densely pilose-tomentose peduncles and the typically
proximally glabrous phyllaries, although it should be noted that occasionally individual plants with one branch with strigose and one branch with patent indumentum maybe encountered. Strother (1999) treated *C. leiocarpum* as a synonym of *C. surinamense*. *Clibadium leiocarpum*, however, clearly differs from *C. surinamense* by its leaves with abaxial surface with appressed (vs. patent) trichomes. The report by Nash (1976) of *C. leiocarpum* in Chiapas is based on a misdetermination.

Populations of *C. leiocarpum* in the vicinity of San José, Costa Rica are occasionally morphologically variable, and one such population has been segregated as *C. leiocarpum* var. *strigosum*, which approaches the morphology of *C. sylvestre*. Atypical characters at the extreme in variation occasionally encountered throughout the range of the species include plants with thicker, more prominently plinerved, or sparsely strigose leaf blades, strigose stems, strigose peduncles, phyllaries strigose throughout, or cypselae moderately papillose-glandular at apex. However, none of these extremes have all been observed in single individuals and such variation does not correlate well with geography. Thus, it seems best to broadly circumscribe *C. leiocarpum* as done by Arriagada (2003), yet to be aware that several morphological features used here to characterize this taxon are occasionally plastic.


*Clibadium subauriculatum* Stuessy.

Shrubs 1-4 m; stems glabrous to strigose. Leaves subsessile to short-petiolate; petiole typically winged to base or nearly so, 0.5-2 cm, subauriculate at base; blade narrowly ovate, broadest near the middle, (6-)8-20 × 5-8 cm, 3-plinerved from well above base, base cuneate, margins serrate, apex acuminate, adaxial surface glabrous, abaxial surface strigose. Capitulescence with 70-100 capitula, ultimate branches, ultimate branches with subglomerate clusters of 3-7 subsessile capitula. Capitula 3.5-4.5 mm; involucre cupulate, 3-4 mm diam.; phyllaries oblanceolate or obovate to ovate, 3-4 × 2.5-3 mm, 7-12-veined, glabrous to strigose, margins distally ciliate, apex obtuse; cliananthium epaleate. Marginal florets uniseriate, c. 5; corolla c. 2 mm, 2-dentate, white, teeth irregularly c. 0.3 mm, deltate, shortly ciliate; style branches c. 1 mm. Disk florets 6-8; corolla c. 3 mm, 5-lobed, white, lobes c. 0.5 mm, deltate, setose; anthers c. 1.6 mm; ovary pilose toward apex, style c. 3 mm. Cypselae c. 2 mm, glabrous. *Lower montane rain forest on open hillsides.* P (D'Arcy 10911, MO). 1400-1900 m. (Endemic.)

The type collection of *Clibadium sessile* is also the sole paratype collection of *C. subauriculatum*. 


Subshrub to shrub from 0.3-4(-5) m; stems hispidulous to scabrous, rarely villose. Leaves petiolate; petiole unwinged, (1.5-)2-5 cm, hirsute; blade lanceolate to broadly ovate or broadly obovate, 5-17(-21) × 2-8(-12) cm, stiffly chartaceous, 3-plinerved from well above base, base typically obtuse or less commonly attenuate to slightly decurrent onto petiole, margins serrate to crenate-serrulate, apex acute to acuminate, adaxial surface weakly to moderate hispidulous, dark green, abaxial surface strongly hispidulous, pale gray green. Capitulescence with 10-180 short-pedunculate capitula, ultimate branches with capitula moderately to well-spaced. Capitula obovoid, 4-5 mm; involucre 3-4 mm diam., yellowish; phyllaries ovate to broadly so, c. 4 × 3-5 mm, rigid, c. 5-veined, strigose, margins distally ciliate, apices acute; ciananthum epaleate or less commonly inconspicuously paleate. Marginal florets uniseriate, 3-5; corolla c. 2 mm, 3-dentate, teeth c. 0.4 mm, irregularly deltoid, setulose at apex; style c. 3 mm, branches c. 1.5 mm. Disk florets typically 10-14; corolla c. 3 mm, campanulate, (4-)5-lobed, lobes irregularly deltoid, c. 0.5 mm, sparsely setulose at apex; anthers 1.6-1.8 mm; style 3.5-4 mm, branches c. 2.5 mm, ovary c. 2 mm, apex villous. Cypselae 2.5-3 mm, distal half villose, also often papillose-glandular. 2n = 32. *Bosque tropical, bosque nublado, forest edges, secondary growth, disturbed areas, riverine vegetation, roadsides, pastures.* H (Nelson & Romero 4653, MO); N (Jansen & Harriman 547, OS); CR (Skutch 3937, MO); P (Woodson et al. 1408, MO). 0-1500(-2000) m. (Mesoamerica, Colombia, Venezuela, Guyana, Surinam, French Guiana, Ecuador, Peru, Bolivia, Brazil, Jamaica, Hispaniola, Lesser Antilles, Trinidad; introduced to Java, Mauritius, and Sumatra.

*Clibadium surinamense* and *C. arboreum*, whose ranges overlap, are closely related and differ mostly in leaf shape and numbers of disk florets per capitula. Arriagada (2003) cited *C. surinamense* in Guatemala based on *Croat 41776* (MO). This voucher, however, has capitula typically with 9 disk florets and is here re-determined as *C. arboreum*. *Clibadium surinamense* is thus excluded from the flora of Guatemala. Similarly, Perez et al. (2005: 84) cited *Cowan 2427,
as the sole vouchering *C. surinamense* in Tabasco, but this collection is herein determined as *C. arboreum*, and thus *C. surinamense* is excluded from Tabasco.

The character of the number of corolla lobes of the disk florets (4-lobed in *C. surinamense* and 5-lobed in *C. arboreum*) used by Arriagada (2003) proves unreliable, yet these two species seem distinct are provisionally maintained here, although treated as but a single taxon by Strother (1999). Material from Tabasco and Chiapas referred to *C. surinamense* is here mostly treated as the closely related *C. arboreum*. *Clibadium surinamense*, the most common species of the genus, differs from the nearly equally abundant *C. sylvestre* by typically hispidual (vs. strigose) stems and leaf surfaces.


Shrubs to vining shrubs 1-3(-6) m; stems subterete or sometimes hexagonal, strigose or very rarely patent. Leaves petiolate; petiole unwinged, 1-5(-7) cm, strigose; blade elliptic to ovate, 5-15(-28) × 1.5-10 cm, 3-plinerved from well above base, basally decurrent onto petiole, then abruptly tapering, margins irregularly and remotely serrate, apex narrowly acute or more commonly acuminate, adaxial surface slightly scabrous, abaxial surface strigose or very rarely patent.

Capitulescence 25-100-headed, bracteolate, bracteoles lanceolate, to c. 2 mm, strigose, ultimate branches with capitula moderately to well-spaced; peduncles 1-3(-6) mm, strigose with appressed trichomes. Capitula 4-5 mm; involucre hemispherical, c. 3 × 2.5-5 mm; phyllaries c. 8, 2-3-seriate, striate, but drying black and obscuring striations, remotely strigose, outer phyllaries deltoid-ovate, 2-3 × 1.5-2 mm, about as wide as involucre, apex acute, inner phyllaries broadly ovate, 3-3.5 × 2-3 mm, apex obtuse, in fruit sometimes wider than long; cliananthium epaleate or rarely inconspicuously paleate. Marginal florets uniseriate, 4-6(-9); corolla 1.5-2.1 mm, shortly 3-4-dentate, white, teeth c. 0.4 mm, apically hirsutulous; style branches c. 0.5 mm. Disk florets 7-14; corolla 2.5-3.3 mm, narrowly campanulate, 5-lobed, tube narrow, 0.4-0.5 mm, throat abruptly ampliate, setose distally, lobes triangular, 0.5-0.7 mm, densely setose; anthers c. 1.3 mm; ovary linear, 1.2-1.7 mm, apically setose, style undivided. Cypselae dry, obcompressed-pyriform, c. 2 mm, often short-
rostrate, villous at maturity, when immature sometimes also sparsely papillose-glandular at apex; carpopodium often large. *Bosque secundario, bosque transicional, bosque inundable estacional, orillo de rios, sand and gravel bars in rivers, thickets.* CR (Grayum & Sleeper 5890, MO); P (Williams 698, NY). 0-1100(-1800) m. (Mesoamerica, Colombia, Venezuela, Guyana, Surinam, French Guiana, Ecuador, Peru, Bolivia, Brazil, Cuba, Lesser Antilles, Trinidad.)

*Clibadium sylvestre* is one of the most broadly distributed species in the genus, and has been much collected in Panama, less commonly so in Costa Rica. This species is often cultivated and is commonly used as a fish poison. Arriagada (2003) reported the disk corollas to be 4-merous, whereas we find them to be typically 5-merous.

The morphology of *C. sylvestre* throughout its range is very consistent, and by strigose leaves it is similar to *C. acuminatum* and *C. leiocarpum*. The narrowly circumscribed *C. acuminatum* basically differs by its cypselae that are moderately papillose-glandular but only occasionally villous, whereas the broadly circumscribed *C. leiocarpum* differs by peduncles typically with patent indumentum.

Earlier workers (e.g., Schulz, 1912; Stuessy, 1975) note frequent misapplication of the names *C. asperum* and *C. sylvestre*. Arriagada (2003) noted that the names written on the type specimens of *Bailliera aspera* and *Bailliera sylvestre* at BM have been transposed. Therefore, the sheet labeled as *Bailliera aspera* is the type of *Bailliera sylvestris*, and vice versa. Schulz (1912) treated *C. sylvestre* as a synonym of a broadly defined *C. surinamense*, but *C. sylvestre* clearly differs by its leaves with appressed trichomes. Stuessy (1975) recognized two species as distinct, but used the name *C. asperum* for material we now refer to *C. sylvestre*. More recently, Pruski (1997) and Arriagada (2003) recognized *C. sylvestre* and *C. surinamense* as distinct, and treated *C. asperum* as a synonym of *C. surinamense*.

### 4. Delilia Spreng.


Por J.F. Pruski

Annual fibrous-rooted herbs; stems erect or prostrate. Leaves opposite, petiolate to subsessile; blade lanceolate to ovate, thinly chartaceous, pinnately 3-veined from above base, eglandular, margins subentire to serrate. Capitulescence terminal or axillary, closely subtended at the node by pair of opposite leaves, few-many-capitulate, in subumbellate fascicles; peduncles slender, ebracteolate, shorter than subtending leaves. Capitula obscurely radiate, few-flowered, ray florets asymmetrically disposed, corollas weakly emergent from phyllaries at anthesis; involucre plano-
compressed, samara-like; phyllaries generally 3, more or less ovate, herbaceous-membranaceous, greenish; outer phyllaries generally 2; inner phyllary 1, smaller, held within outer two; clinanthium minute, epealeate. Ray florets pistillate, 1(-3); corolla whitish to yellow, inconspicuous, tube glabrous, limb narrow; style branches with a 2-banded stigmatic surface. Disk florets 1(-4), functionally staminate; corolla funnelform, (4-)5-lobed, whitish to yellow, glabrous or lobes sparsely pubescent, tubes slender, about as long as or slightly shorter than throat; anthers black, basally short-sagittate, appendage navicular, eglandular; style not branched, hirtellous-papillose, ovary sterile, elongate, linear. Cypselae (ray) completely enclosed within the two flattened samara-like outer herbaceous phyllaries, flattened-trigoneous, 3-costate, obovate in outline, glabrous or distally minutely puberulent; pappus absent. 2 spp., 1 widespread, other a Galapagos endemic.

The name Elvira Cass (1824) was used for most of the 19th Century because it was thought incorrectly that Delilia was originally published in Sprengel's Syst. Veg. in 1826, but proves to date from 1823.


Herbs 0.2-1 m; stems erect, moderately branched, subterete, strigose or sometimes hirsute, pith solid. Leaves; blade 2-6(-10) × 0.8-3(-4.5) cm, lanceolate to narrowly ovate, surfaces strigillose, base cuneate to obtuse, sometimes slightly tapered, margins serrulate to serrate, apex acute to acuminate; petiole 4-11 mm, strigose-hirsute. Capitulescence of globose fascicles, to c. 20-capitulate; peduncles 2-5 mm, strigose. Capitula 4-5 mm, 2(-6)-flowered, florets at anthesis slightly longer than middle phyllary and about as long as outer phyllary; involucre of 3 phyllaries, the inner progressively smaller than the outer; phyllaries palmate-reticulate veined, strigose to inner ones merely slightly so abaxially, outer phyllaries 4-5 × 3-4.5 mm, cordiform-orbicular with a narrow sinus at the cordate base, margins entire or sometimes crenulate; middle phyllary 3-3.5 × 1.5-3 mm, ovate or obovate, appressed to the outer, basally cuneate; innermost phyllary smaller
and held within the outer two. Ray floret 1; corolla 1.4-1.8 mm, glabrous, tube 1-1.3 mm, limb 0.4-0.5 × c. 0.3 mm, ovate, c. 4-veined; style branches 0.7-1.3 mm, long-exserted. Disk florets 1(-4); corolla 1.5-2.5 mm, tube 0.6-1.1 mm, lobes 0.1-0.3 mm; ovary 1-1.5 mm, stipiform. Cypsela 2.1-2.5 × c. 0.9 mm, obovate, flat, winged, glabrous or sometimes puberulent when young. 2n = 24. Flowering year-round. Disturbed areas, bluffs, bosque húmedo subtropical, bosques seco tropical, broken ridge, cafetal, cultivated areas, evergreen forest, forest edges, grassy stream sides, grazed pastures, oak forests, open woodland, outwash plain, quebradas, ramonal, roadsides, rocky stream sides, scrubby forested hills, secondary vegetation, selva alta perennifolia, selva mediana. T (Menendez et al. 423, MO); Ch (Pruski et al. 4231, MO); Y (Gaumer 367, MO); C (Houstoun s.n. LINN 1031.3, 1031.4); QR (Téllez et al. 3671, MO); B (Schipp 643, MO); G (Heyde y Lux 6297, MO); H (Molina y Molina 25840, MO); ES (Standley 22711, MO); N (Baker 138, MO); CR (Pruski y Sancho 3816, MO); P (Greenman y Greenman 5249, MO). 0-1400(-2100). (México, Mesoamerica, Colombia, Venezuela, Guyana, Ecuador, Perú, Bolivia, Brasil, Argentina, Cuba; Africa).

5. **Eclipta** L., nom. cons.


Por J.F. Pruski.

Annual or short-lived perennial herbs, with quickly-deciduous corollas and often collected solely in fruit; stems erect to prostrate and rooting at the nodes, few- to much-branched, subterete, strigose, pith narrowly fistulose or solid. Leaves opposite, sessile or short-petiolate; blade elliptic to lanceolate, chartaceous, triplinerved from near base or subpinnate, margins subentire to serrulate, surfaces eglandular, both surfaces strigose. Capitulescence monocephalous to corymbiform, capitula 1-3(-5) per node, axillary from distal most nodes; peduncles slender, strigose, commonly shorter than the leaves. Capitula small, inconspicuously radiate, many-flowered; involucre hemispherical, of 8-11 foliaceous phyllaries later spreading to expose clinanthium; phyllaries imbricate, subequal or the outer ones longer, slightly 2-3-seriate, broad, more or less herbaceous, strigose; clinanthium flat or slightly convex, paleate; paleae filiform. Ray florets pistillate, 8-50, 1-3-seriate; corolla filiform, quickly caducous, white (ours) or yellowish, tube glabrous or weakly puberulent, the limb lanceolate, glabrous. Disk florets bisexual, 8-40; corolla 4(5)-lobed, quickly caducous, yellow or greenish-white, tube short, glabrous, limb narrowly campanulate, glabrous or sparingly puberulent near the apex of lobes;
anthers usually black, 4(5), included, basally short-sagittate; style branches short, slightly exserted, stigmatic lines more or less continuous stigmatic surface, not distinctly 2-banded, apex papillose. Cypselae obconical, 4-angled or ray achenes triquetrous, occasionally with those of disk somewhat flattened, dry, quickly maturing, readily caducous from clinanthium, tuberculate, erose, exalate but sometimes thin-margined, apex truncate; pappus absent or of a few short teeth. \( x = 9, 10, 11, 12 \). 2 spp., native to the Americas, 1 sp. nearly cosmopolitan, more common in warmer climates; both spp. in the Neotropics, 1 restricted to southern South America.

*Eclipta* is among the most quickly maturing Compositae, with both quickly caducous corollas and quickly maturing fruits. Technical features diagnostic of *Eclipta* are the filiform paleae and 4-merous disk florets. The synonymy of our species discussed by Koyama y Boufford (1981), but specifically and is copied from that of Pruski (2010).


Weedy annual or short-lived perennial herbs to 1 m; stems mostly single, greenish to reddish-brown, sometimes succulent, often prostrate proximally and ascending distally. Leaves subsessile or petiolate; blade 1-12(-13.5) × 0.3–3.3 cm, elliptic to lanceolate, triplinerved from near base with basal pair of veins more prominent than other secondary veins to subpinnately veined with most secondary veins equally prominent, surfaces eglandular, strigose, basally narrowly cuneate to tapering and sometimes slightly decurrent onto petiole, margins serrate to crenate, apex acute to acuminate; petiole (0-)2-5(-10) mm; commonly broadened proximally. Capitulescence terminal, of 1-few solitary pedunculate capitula; peduncle 1-5(-6) cm, slender, strigose, commonly shorter than leaves. Capitula 3-5 mm, 35-80-flowered; involucre 3-6 mm diam.; phyllaries 2.5-7 × c. 2 mm, elliptic to lanceolate, mostly biseriate, slightly imbricate, strigose, the apex acute to caudate; paleae 2-2.5 mm, erect or slightly flexuous, glabrous of more often strigose apically. Ray florets 20-40; corolla 1.2-2.5 mm, white, the tube 0.2-0.5 mm, glabrous or sparsely puberulent, limb 1-2 mm × c. 0.1 mm, filiform, shortly exserted from involucre, glabrous, apically notched or entire. Disk florets 15-40; corolla 1-2 mm, tube 0.2-0.3 mm, greenish-white, glabrous, limb glabrous or sparingly puberulent near apices of the lobes, lobes 4, 0.2-0.4 mm; anther cylinder 4-merous. Cypselae 2-2.5 mm, essentially glabrous with a few short non-glandular trichomes at apex, those of disks not compressed; pappus minutely biaristate or more commonly absent at maturity. 2n = 18, 22, 24.

Beaches, cultivated areas, disturbed areas, fields, pastures, roadsides, savannas, secondary vegetation, streamsides, wet areas. T (Menendez et al. 242, MO); Ch (Breedlove y Thorne 21346, CAS); Y (Gaumer 1162, MO); C (Martínez et al. 30450, MO); QR (Gaumer 1340, F); B (Schipp 179, MO); G (Pruski et al. 4515, MO); H (Molina et al. 32158, MO); ES (Reyna de Aguilar 1466, MO); N (Moreno 15391, MO); CR (Pruski y Sancho 3811, MO); P (Fendler 169, GH). 0-1700 m. (United States, Canada, Mexico, Mesoamerica, Colombia, Venezuela, Guyana, Surinam, French Guiana, Ecuador, Peru, Bolivia, Brazil, Uruguay, Paraguay, Chile, Argentina, Cuba, Jamaica, Hispaniola, Puerto Rico, Virgin Islands, Lesser Antilles, Trinidad and Tobago; Europe, Africa, Asia, Australia, Pacific Islands).
The species has often in the past been treated under the name *Eclipta alba* (L.) Hassk. As may be inferred from the long list of synonyms, this species is common and nearly cosmopolitan. *Eclipta prostrata* var. *undulata* (Willd.) DC., often treated here within synonymy, proves by quadrangular hispid stems to be a synonym of pantropical *Eleutheranthera ruderalis* (Sw.) Sch. Bip. var. *ruderalis*.

6. **Elaphandra** Strother

Por J.F. Pruski.

Scandent to erect long-lived perennial herbs to shrubs, not rooting at the nodes; stems subterete to subhexagonal or striate; herbage sometimes heterotrichous with reduced moniliform trichomes (described in protologue as minute, curled, glandular hairs) and longer stiff trichomes, never punctate-glandular nor obviously stipitate-glandular. Leaves opposite, petiolate; blade lanceolate to ovate, chartaceous to stiffly so, venation 3(-5)-nerved from near base, longest secondary reaching beyond distal third of blade, surfaces pubescent, not punctate glandular, sometimes black-dotted abaxially, base rounded to attenuate, margins subentire to serrulate, apex acute to acuminate; petiole exalate. Capitulescence terminal, monoecephalous to open-cymose, 1-5-capitulate; peduncles ascending, ebracteate, hirsute to weakly so, less commonly strigillose to strigose. Capitula radiate (ours) or rarely discoid; involucre hemispherical to campanulate, mostly globose-ovoid in bud; phyllaries 10-18, dimorphic, obgraduate to graduated, c. 3-seriate; outer 3-5 phyllaries ovate to lanceolate, mostly herbaceous, pubescent, often so on both surfaces; inner phyllaries oblong to obovate, chartaceous or scarious proximally, distally thin-membranous, often glabrous, sometimes black-dotted or black-lined, apex often broadly rounded and overlapping in bud, strongly contrastin gto paleae; clinanthium flat to convex, paleate; paleae shorter than disk floret, lanceolate to oblanceolate or oblong, conduplicate, navicular, striatulate, persistent, mostly stramineous, keel or apex often finely hispidulous or pilosulous. Ray florets (0-)5-11, sterile, 1(-2)-seriate; corolla golden-yellow, tube short, glabrous or weakly hispidulous distally, limb ovate to oblong, abaxial surface eglandular, glabrous or sometimes setulose, apex usually bifid; style lacking. Disk florets 17-60, bisexual; corolla funnelform, 5-lobed, yellow or less commonly blackish, tube shorter than limb, tube and throat typically glabrous, lobes 5, triangular, glabrous to papillose or scabridulous; anther thecae black, appendage deltate-ovate, black or rarely stramineous within or distally, usually eglandular; style branch apex sometimes attenuate, densely papillose. Cypselae obovate-pyroid in outline, compressed, biconvex, exalate, blackened without intervening pale striations, surface smooth or infrequently latent-tuberculate, evenly pubescent,
Elaphandra was proposed by Strother (1991) as monotypic albeit perhaps congeneric with
Aspilia quinquenervis S.F. Blake, was soon thereafter expanded by Robinson (1992, 1994) and
Pruski (1996, 2001) to include most shrubby northern Andean Aspilias, and as is circumscribed


Scrambling or vining perennial herbs or shrubs to 1.5-5 m; stems subterete, hirtellous to
pilosulose or sometimes long-pilose, the longer trichomes arcuate to patent, also often
heterotrichous with moniliform trichomes, sometimes with strigillose indumentum. Leaves: blade
6-20 × 1.2-7.5 cm, lanceolate to oblong-ovate, usually (3-)5-plinerved with two pairs of
prominent secondary veins arching past mid-blade towards apex, adaxial surface scabridulous or
scabrous, also usually heterotrichous with moniliform trichomes, abaxial surfaces pilosulose-
hirtellous to pilose-birsute, trichomes spreading-antrorse, base cuneate to obtuse or rounded,
margins serrulate, apex acuminate to attenuate; petiole 0.5-2 cm. Capitulescence monocephalous
to open-cymose, branchlets mostly 1-3(-5)-capitulate, not held well above subtending leaves;
peduncle 3-12 cm, densely hirtellous. Capitula 9-14 mm; involucre 6-10 × 10-14 mm,
campanulate; phyllaries slightly graduated; outer phyllaries 7-10 × 5-6 mm, lanceolate to ovate,
strigillose-scabrous, apex obtuse to acute; inner phyllaries 8-11 × 5-7 mm, obovate, minute-
scabridulous distally to very inner most glabrous, apex obtuse to broadly rounded; paleae 4-7
mm, oblanceolate to obovate, somewhat 3-lobed, stramineous or purplish distally. Ray florets 8-
11; corolla tube 0.8-1.2 mm, limb 10-15 × c. 4 mm. Disk florets 25-60; corolla 4-5.5 mm, yellow,
tube 1-1.5 mm, lobes 1-1.2 mm, scabridulous; style branch attenuate. Cypselae 3-6 mm, gradually
constricted above into short rostrum, sparsely strigillose; pappus low-coroniform, corona fringed,
also with 2 lateral ciliate awns-squamellae 0.1-0.5 mm. Flowering Jun-Jul, Dec. Disturbed areas,
forest edges, stream sides. P (Folsom et al. 6306, MO). 1200-1400 m. (Panama.)
Herbaceous annuals or short-lived perennials; stems erect (ours) or prostrate, weakly to moderately branched, subterete to quadrangular, striate, pubescent, pith solid. Leaves opposite, petiolate; blades chartaceous, 3-veined from near base, surfaces pilose-strigose to weakly so, the abaxial surface also glandular, sometimes obscurely so, margins serrulate or subentire.

Capitulescence terminal or axillary, typically of few-capitulate corymbiform clusters from the uppermost nodes; peduncles 0.5-2(-7) cm. Capitula discoid and commonly < 10-flowered (in Mesoamerica) or less commonly radiate to c. 35-flowered; involucre campanulate; phyllaries weakly or loosely imbricate, dimorphic, 2-3-seriate, subequal or outer series longer, outer series foliar, thinly chartaceous, pubescent, often spreading at maturity, inner ones somewhat paleate or sometimes foliar; clinanthium minute, paleate; paleae persistent, pilose at apex, receptacular cypsela scars often broadly ovate. Ray florets 0(-4-10), sterile; tube short, limb oblong, weakly dentate apically; ovary sterile. Disk florets 2-25, bisexual; corolla funnelform(-narrow campanulate), 5-lobed, pale yellow, tube glabrous, the lobes deltoid, often glandular, generally hispid within along the margins; anthers included, black, free at apex or more commonly post anthesis nearly completely free to base, the appendage navicular, broad, glandular, sometimes tan in center; style branches linear-lanceolate, abaxially pilose, less densely so apically, attenuate at apex, with paired marginal stigmatic lines. Cypsela obovoid, tuberculate at maturity, rostrate, rostrum straight and centric, puberulent at apex, otherwise glabrous, carpodium small and inconspicuous, base without elaeiosomes; pappus absent or less commonly a ciliate ring on top of the short neck of the cypsela. 2 sp.; the typical var. of one a pantropical weed, the other endemic to South America.

*Eleutheranthera* is named for the peculiar trait of its post-anthesis anthers often longitudinally curving inwards, so much so that the thecae separate nearly to their base. The genus is traditionally (e.g., Baker 1884; Nash, 1976) taken as having a single discoid species, but Robinson (1992) and Pruski (2001) each place taxa with radiate capitula in *Eleutheranthera*.


1a. **Eleutheranthera ruderalis** (Sw.) Sch. Bip. var. **ruderalis**

Herbaceous annuals to short-lived perennials 0.1-0.8 m; stems erect, branched from most nodes, subterete to hexagonal, striate, subtrigose to pilose. Leaves: blade 2.7-8.4 × 0.9-4.2 cm, elliptic to ovate, broadly obtuse to decurrent at base, weakly serrulate, acute at apex; petiole (0.3-)0.7-1.8 cm. Capitulescence of 2-5-capitate corymbiform clusters from shorter than the associated leaves or less commonly capitula solitary; peduncles commonly 5-12 mm, pilose.

Capitula 5-8 mm, discoid; involucre c. 3 mm, campanulate; phyllaries c. 10, weakly imbricate, 2–3-seriate, subequal or outer series commonly longer; the outer 1-2 series 5-8 × 2.3-3.8 mm, elliptic to pyriform, foliar, thinly chartaceous, long-hispid, glandular, tips reflexed or in fruit entirely reflexed; the inner series lanceolate, 3-4 mm, scarious or apically greenish, smaller than the outer 2 series of foliar phyllaries, more or less resembling paleae; paleae lanceolate, onduplicate, to c. 5 mm, slightly longer than the cypselae, apically attenuate to apiculate, apically pilose, less commonly glabrate. Disk florets 3-10, corolla quick-deciduous and fruit forming quickly; corolla 1.8-2.8 mm, pale yellow, the tube 0.4-0.6 mm, the throat slightly broader, 1.2-1.8 mm, the lobes 0.2-0.4 mm, deltoid, glandular, hispid and marginally; anthers 0.7-0.9 mm, very weakly apically exserted, black, the appendages broader than tall, often weakly glandular; style weakly exserted, the style branches c. 0.5 mm, erect or nearly so, linear-lanceolate. Cypselae 3-3.5 × c. 1.5 mm, obovoid, black, often angled, carpodium indistinct, elaiosomes absent. 2n = 20, 32. Flowering mostly Apr-Sep. *Roadsides, disturbed areas, limestone outcrops, lake shores, fields, near streams, beaches, lawns.* B (Gentle 6560, MO); G (Molina y Molina 25394, MO); H (Kamb 2112, MO); N (Robleto 1183, MO); CR (Rodríguez y Estrada 6, MO); P (Pittier 6752, NY). 0-500(-800) m. (southeastern United States [rarely weedy], Mesoamerica, Colombia, Venezuela, Guyanas, Ecuador, Peru, Bolivia, Brazil, Argentina, Cuba, Jamaica, Hispaniola, Puerto Rico, Virgin Islands, Lesser Antilles, Trinidad and Tobago; Africa, Asia, Australia, Pacific Islands.)
Baker (1884) listed *Gymnopsis microcephala* Gardner and *Verbesina foliacea* Spreng., each described as having radiate capitula, as synonyms of *E. ruderalis*. However, more specifically each of these are presumably synonyms of *E. ruderalis* var. *radiata* Pruski, formerly thought to be endemic to Venezuela, but know, by virtue of the above synonymy, presumably also occurring in Brazil and the Lesser Antilles. Greuter (2007) correctly noted that *Eleutheranthera ovata* Poit. predates by four years our name and proposed to conserve *Melampodium ruderale* over *E. ovata*.

### 8. *Iogeton* Strother

Por J.F. Pruski.

Ascending to erect long-lived perennial herbs or subshrubs, rooting at the proximal nodes; stems subterete to subhexagonal or striate, pubescent distally, trichomes antrorse to subappressed. Leaves opposite, short-petiolate; blade lanceolate or oblanceolate, venation pinnate, surfaces sparsely pubescent, eglandular. Capitulescence terminal, monocephalous to open-cymose, 1-3-capitulate, only slightly exserted from subtending leaves; peduncles slender, ascending, ebracteate. Capitula short-radiate; involucre narrowly obconic; phyllaries 7-12, 2-3-seriate, subequal, ascending to appressed, pubescent; outer phyllaries triangular to linear-lanceolate, herbaceous with cartilaginous base, not foliar; inner phyllaries linear-lanceolate to lanceolate, grading in size shape and texture into paleae; clinanthium hemispherical to short-conical, paleate; paleae lanceolate, weakly conduplicate proximally, weakly carinate, stramineous, distally flat. Ray florets pistillate; corolla pale yellow, tube hispidulous, limb elliptic-ovate, abaxially glabrous, apex 2-3-dentate; style well-exserted, usually at least half as long as corolla limb. Disk florets bisexual; corolla tubular-funnelform, shortly 4(-5)-lobed, pale yellow, tube not dilated basally, about as long as throat, proximally hispidulous, throat with fibers embedded in vascular strands, lobes triangular-lanceolate, adaxially papillose; anther thecae brown, appendage deltate, stramineous; style branches slender, ascending and not recurved, apex hispidulous, attenuate. Cypselae brown, dry, triquetrous (rays) to quadrate (disks), erostrate, apex truncate, exalate but margins setulose, carpopodium inconspicuous; pappus of 2-4 unequal to subequal, scabridulous thin awns arising from shoulders, not continuous with cypselae margins, longer than fruit, intermediate squamellae 0-3, minute, indistinct. 1 sp. Panama.

*Iogeton* is accepted as a segregate of *Lasianthaea* (which in turn may be viewed basically as a segregate of *Zexmenia*), from which it differs by its pinnate leaf venation and 4-merous disk florets (Strother, 1991).


Perennial herbs or thin stemmed subshrubs 10-30 cm, stems 3-20 from somewhat woody caudex, hirsutulous becoming glabrate proximally, distal internodes much shorter than leaves. Leaves: blade 2-5 × 0.3-0.8 cm, secondary veins usually 4-7 per side, thin, at about 45° to midrib, running parallel to margins and forming looping reticulum, a single tertiary vein running to sinus above each tooth, surfaces sparsely strigose, base long-acuminate onto petiole, margins few-serrulate, teeth 4-7 per side, to c. 0.5 mm, apex narrowly acute; petiole 0.1-0.5 cm. Capitulescence: peduncles 3-5 cm, hirsute to densely so immediately below capitulum, trichomes patent to subappressed. Capitula 8-10 mm; involucre 5-7 × 4-6 mm; phyllaries 5-7.4 × 1.2-1.8 mm, apex acute or acuminate, outer phyllaries strigillose, inner phyllaries sparsely strigillose; paleae 6-8 mm, linear-lanceolate, margins subentire, often finely ciliolate or finely hirtellous, apex subulate. Ray florets 8-13; corolla tube 2.5-4 mm, slender, limb 3.5-1.5-2 mm, c. 6-nerved. Disk florets 25-40; corolla 5-7 mm, tube very slender, lobes c. 0.5 mm; anthers 1.5-2 mm, appendage 0.1-0.2 mm; style branches c. 1.5 mm. Cypselae (immature) 2-2.5 mm, sparsely setulose especially on margins; pappus awns 3.2-6.5 mm, longer than cypselae. Flowering Nov-Dec. *Rocks in rivers, streamsides.* P (D’Arcy 9523, MO). 0-300 m. (Endemic.)

9. *Jefea* Strother

Por J.F. Pruski.

Erect or ascending subshrubs to 1 m, branched throughout; stems subterete to subhexagonal or striate. Leaves opposite or sometimes distal ones alternate; blade deltate to orbicular to sometimes lanceolate, usually trinerved from base or nearly so, surfaces pubescent, abaxial surface glandular, base cuneate to truncate or cordate, margins entire or serrate, apex acute to obtuse; petiole sometimes winged. Capitulescence terminal, open-cymose, of single capitula at ends of each of several closely spaced branchlets, usually well-exserted from subtending leaves; peduncles elongate, often 2-3-bracteate. Capitula radiate; involucre campanulate to hemispheric, mostly 8-12 × 6-10 mm; phyllaries 22-38, very strongly obgraduate (ours) to nearly subequal, 3-4-seriate, dimorphic; outer 2-6 phyllaries very large and leafy, spreading laterally; inner 2-3 series
of phyllaries lanceolate or deltate to pandurate, appressed, mid-series often herbaceous with indurate base, innermost series often chartaceous to scarios; clinanthium convex to conical, paleate; paleae linear-lanceolate, conduplicate, persistent, stramineous, carinate, minutely hispidulous, apex stiffly attenuate. Ray florets 5-20, pistillate; corolla golden-yellow, tube cylindrical, oblong to elliptic, apex 2-3-dentate. Disk florets 30–60(–100), bisexual; corolla funnelform, 5-lobed, yellow, tubes shorter than to as along as throat, base somewhat dilated, throat without fibers embedded in vascular strands, lobes deltate, margins papillose; anther thecae usually black, appendage deltate to triangular-lanceolate, stramineous; style branches hispidulous, attenuate and short-appendiculate. Cypselae triquetrous (rays) to strongly compressed (disks) but rays and disks not obviously strongly dimorphic, oblanceolate to cuneate in outline, brown to black, faces usually tuberculate, gradually tapered at base, often winged (ours) or typically winged, wings continuous or interrupted, often becoming corky, carpopodia small, without elaiosomes, erostrate, apex truncate; pappus of 2-3 unequal scabridulous awns arising from apex of cypselae inside shoulders, and of 2-8 intermediate shorter erose or lacerate squamellae, awns and squamellae persistent (ours) to fragile, awns seemingly continuous with cypselae margins but squamellae seemingly borne from near annulus. x = ?10, ?11, 14. 5 spp. SW United States, Mexico, Central America.

Rindos (1980) grouped the five species together as the "Zexmenia brevifolia complex," and Strother (1991) said the genus seems most similar to Verbesina, differing primarily by cypselae having short squamellae between the two longer pappus awns. Strother (1991) questioned the accuracy of the lower chromosome numbers.


Shrubs 0.4-1.5 m, often densely branched or brittle-stemmed, stems white-hirtellous to pilose, also finely glandular; herbage with trichomes 0.4-1+ mm. Leaves: blade mostly 3-7 × 0.6-1.8 cm, lanceolate, trinervation extending past mid-blade, veins impressed above, surface somewhat
discolorous, often indistinctly glandular below indumentum, adaxial surface pilose-hirsute, abaxial surface pilose or strigillose to subsericeous or canescent, base narrowly cuneate and decurrent onto petiole, margins subentire to denticulate, usually revolute, apex acute; petiole 0.2-1.2 cm, often winged to near base. Capitulescence: peduncles 2-15(20) cm, pilose. Capitula 10-12 mm, disk 12-20 mm diam.; involucre hemispherical; phyllaries extremely obgraduate, extremely dimorphic; outer 2-6 phyllaries leafy, spreading laterally and as long or longer than distal most stem leaves, shape, texture, and indumentum as in stem leaves; inner phyllaries 8-10 × 3-6 mm, often strigillose to pilose distally, apex obtuse to rounded; paleae 8-10 mm. Ray florets 12-20; corolla tube 2.5-3.2 mm, setose distally, limb 8-12 × 4-5 mm, oblong, c. 11+-nerved, abaxially glandular and setulose. Disk florets 50-100; corolla 5-6.5 mm, tube very slender, lobes 0.8-1.2 mm, sparsely glandular, veins intramarginal; anthers c. 2 mm, appendage 0.3-0.4 mm. Cypsela 3-4 mm, faces hispidulous distally, wings continuous, corky, ciliolate; pappus awns 1.5-4 mm, squamellae 0.5-1 mm. ?2n = 20, 22. Flowering Jun-Dec. Disturbed forest, pine-oak forests, roadsides, rocky slopes, serpentine soils, steep hillsides, thickets. G (King y Renner 7091, MO). 1100-2800 m. (Endemic.)

10. Lasianthaea DC.

_Telesia_ Raf.

Por J.F. Pruski.

Tuberous rooted long-lived perennial herbs to trees; stems erect, mostly rough-pubescent, branching opposite, intrapetiolar ridge often present, lateral branches typically not over-topping main axis. Leaves opposite, petiolate to sessile; blade chartaceous to stiffly so, subpinnate to trinervate, at least the largest proximal pair of secondary veins arching toward apex, surfaces smooth to rugulose, pubescent with conical and sometimes with moniliform trichomes, eglandular, adaxial surface conical trichomes with subsidiary cells prominent. Capitulescence monocephalous to umbelliform-corymbiform, distal-most nodes often fasciculate; peduncles ebracteate. Capitula radiate, many-flowered; phyllaries imbricate, graduate to obgraduate, outer series and mid-series foliar or more commonly herbaceous or green-papyraceous distally with scarious base, grading texturally to inner phyllaries scarious throughout, in fruit outer and mid-series moderately indurate basally; cliananthium flat to low-convex, paleate; paleae lanceolate, conduplicate, sometimes subcarinate, stramineous, narrowed apically, infrequently longer than longest phyllaries. Ray florets 5-21(-30), fertile; corolla yellow to sometimes red, tube short, limb short-well-exserted, elliptic to oblong, 10+-nerved (at least in Mesoamerica), the 2 supporting
nerves much thicker than medials and laterals, apex obtuse, 2-3-denticulate, eglandular but often setulose abaxially. Disk florets bisexual, 8-60(-200); corolla narrowly funnelform to narrowly campanulate, 5-lobed, yellow to sometimes red, concolorous with rays, eglandular, glabrous or lobes pubescent, throat with prominent fiber sheaths, lobes margins papillose within; anthers +/- occupying c. ½ throat length, blackish to brownish, rounded at base, appendage stramineous, lanceolate; style branches shortly exserted, recurved, slender, stigmatic surface 2-banded adaxially, apex with sterile papillose appendage. Cypsela dimorphic, black with at least one edge stramineous, cuneate or oblong in outline, erostrate at least in fruit, exalate and not obviously winged although sometimes thin-margined, faces basically smooth although 1-few-striatulate, often glabrous, apically truncate, gradually narrowed basally, without elaïosomes, carpododium small, not obvious; rays triquetrous, obcompressed, 3(-4)awned, edges stramineous, thin-margined, distal margins sometimes subulate and continuous with awns, adaxial awn usually longest, abaxial face rarely with central striation apically producing an elongate awn; disk cypsela compressed and biconvex, body typically flattened (sometimes subquadrate distally), 2(-3)-awned, margins asymmetrical, abaxial margin black, adaxial margin thin-stramineous, sometimes narrowly subulate and continuous with adaxial awn; pappus represented by 2 or 3 unequal or subequal scabridulous to scabrous persistent awns usually arising from apex at angles, and usually by intermediate narrow fringe of trichomes or occasionally squamellae often continuous with the decurrent awn bases or rarely within from a pseudorostrum, awn base sometimes v-shaped, disk awns often flattened distally perpendicular to plane of cypsela. $x = \text{?8, 10, 11, 12}$. Aprox. 15 spp. SW. Estados Unidos, México, Mesoamérica, Venezuela.

_Zexmenia_, monographed by Jones (1905), was circumscribed by him as containing taxa with cypsela variously rostrate or erostrate and winged or exalate. _Lasianthaea_ was resurrected from synonymy of _Zexmenia_ and monographed by Becker (1979), and was circumscribed by him as containing species with only erostrate cypsela and +/- flat-fruited disks with one edge thin-margined. Turner (1988) expanded _Lasianthaea_ to include additional erostrate species, including the type of _Lundellianthus_, but some of the species added by Turner (1988) have disk cypsela clearly winged and subquadrate. Strother (1989b), however, treated the winged and subquadrate species of Turner (1988) as _Lundellianthus_. _Oyedaea lundellii_, treated by Turner (1988) as a _Lasianthaea_, is accepted as _Oyedaea_, which along with _Wedelia_ and _Zexmenia_ have rostrate or subrostrate fruits, thus differing from both _Lasianthaea_ and _Lundellianthus_.

The limits of _Lasianthaea_ approach those of segregated _Lundellianthus_ in Mesoamerica by the fruiting characters of _Lasianthaea ceanothifolia_, which has subulate ray cypsela and disk fruits somewhat subquadrate distally. Although each _Lundellianthus_ and _Lasianthaea_ typically have
disk corolla throats usually with prominent fiber sheaths, this character occurs sporadically in several related genera and cannot be used taxonomically to support separation nor merger of *Lasianthaea* and *Lundellianthus*.

*Lundellianthus* was excluded by Strother (1989) from *Lasianthaea* by paleae strongly adnate to the cliananthium and the disk cypselae not asymmetrically margined. *Lasianthaea* is provisionally accepted here as excluding *Lundellianthus*.

*Lasianthaea* is known only from a single collection in South America, but that collection appears to be native. The "campanulate" disk corollas described by Becker (1979) are narrowly funnelform.


1. Involucres narrow-campanulate, phyllaries clearly graduate; outer phyllaries ≤ 1/3 as long as longest phyllaries; ray corolla limbs ≤ 7 mm.  
   1. *L. ceanothifolia*

1. Involucres campanulate to hemispherical; phyllaries usually subequal or obgraduate; outer phyllaries ≥ ½ as long as longest phyllaries; ray corolla limbs ≥ 8.5 mm.

2. *L. fruticosa*


Suffrutices to shrubs. Involucres 2-9 mm diam., turbinate to campanulate; phyllaries usually clearly graduate, (2-)3-6-seriate, the outer phyllaries ≤ 1/3 as long as longest phyllaries. Ray florets 7-13. Disk florets 8-35. Disk cypsela 2.5-5 × 0.7-1.2 mm. x = 10, 12. México. 4 vars.

Becker recognized four varieties, of which only the typical occurs in Mesoamerica. The synonyms above exclude varietal combinations, are synonyms of the species, but not of the typical variety.
1a. Lasianthaea ceanothifolia (Willd.) K.M. Becker var. ceanothifolia


Suffrutices or more commonly shrubs 0.5-3(-6) m; stems much-branched, spreading, subhexagonal to subterete, striate, strigillose to hirsute, trichomes patent to more commonly antrorse, intrapetiolar ridge narrow, internodes usually about as long as leaves, internodes immediately subtending capitulescence fasciculate; herbage with trichomes to c. 0.5 mm. Leaves: blade (2-)4-13(-15) × (1-)1.5-5 cm, lanceolate-ovate to ovate, chartaceous or sometimes stiffly so, sometimes rugulose, subtriplinerved from well above base, proximal veins not much thicker than distal veins, secondary veins arching towards apex, base cuneate to rounded or sometimes cordate, margins serrate, apex acute to acuminate, adaxial surface scabrous to hirsute, abaxial surface hirsutulous to pilose, trichomes patent to antrorse; petiole flattened, 0.3-1 cm, often hispid. Capitulescence branches umbelliform-corymbiform, usually c. 13-capitulate, not well-exserted from subtending leaves; peduncles (1-)1.5-2.5(-3.5) cm, somewhat slender, striate, strigillose or hirsute, trichomes antrorse or appressed, apex sometimes ampliate and gradually transitioning into involucre. Capitula 7-10 mm; involucre narrow-campanulate, corollas typically exserted; phyllaries clearly graduate with outer phyllaries ≤ 1/3 as long as longest phyllaries, 3-5-seriate, appressed, faintly nerved, at least apically strigillose, outer ones scarious with narrowly herbaceous apex grading to inner phyllaries scarious throughout; outer phyllaries 2-3 × 1.5-2.5 mm, ovate to rhomboidal, apex obtuse; penultimate series of phyllaries 6-7.5 × 3-4 mm, ovate or obovate, apex obtuse to rounded, quickly grading to inner series; inner phyllaries 5-7 × 1-3 mm, usually shorter than penultimate series, lanceolate to elliptic-lanceolate, paleae 5.5-7.5 mm, much shorter than awns. Ray florets 8-13; corolla yellow, tube 1.5-2 mm, limb 4.5-7 × 1.5-3.2 mm, short-exserted, oblong, 9-12-nerved, apex 3-denticulate, the two support nerves setulose abaxially. Disk florets 10-35; corolla 5-6.7 mm, narrowly funnelform, yellow, tube 2.2-3 mm, lobes c. 0.6 mm, triangular, sparsely setulose or glabrous, inner surface short-papillose; anthers 3-3.5 mm; style branches 1.5-2 mm. Cypselae with pappus apices ultimately well-exserted in fruit from involucre, awns basally "v"-shaped in cross-section; ray cypselae 2.7-4 × 1-1.3 mm, edges narrow-margined and subwinged distally to c. 0.2 mm diam., awns unequal, base to c. 0.5 mm diam., adaxial awn longer, 1.5-3.5 mm, the 2 abaxial awns 0.5-2 mm, fringe (rarely to c. 0.3 mm) present between the 2 adaxial awns, basically absent abaxially; disk cypselae 3-4(-5) × c.1-1.2 mm, cuneate, awns subequal, (2-)3.5-5.5 mm, distinctly flattened distally, continuing to elongate
post anthesis, ultimately exserted from palea for c. half their length. $2n = 20, 24$. Open dry disturbed areas. Ch (Matuda 1559, MO). 1900 m. (C. y S. Mexico, Mesoamerica.)

I have seen only the above cited voucher in Mesoamerica. Breedlove y Strother 46520, one of three vouchers from Chiapas referred to *Lasianthaea ceanothifolia* by Strother (1999), is here determined as *L. fruticosa*. Similar material from NW coastal Guatemala is referred to *L. fruticosa* as well. *Lasianthaea ceanothifolia* is notable by its subwinged ray cypselae margins that are continuous with the awns, thus resembling the ray cypselae of *Lundellianthus*.


Frequent suffrutices to small trees. Involucres 4-19 mm diam., turbinate to campanulate; phyllaries somewhat graduate to obgraduate, the outer phyllaries more than half as long as the inner phyllaries. Ray florets 4-13(-21). Disk florets 9-60+. Disk cypselae 3-6 × 1-2 mm. $2n = ?16$, 22. México a Mesoamerica, Venezuela.

Becker recognized six varieties, of which only the typical occurs in Mesoamerica.

2a. *Lasianthaea fruticosa* (L.) K.M. Becker var. *fruticosa*. Illust.: Nash, *Fieldiana, Bot.* 24(12): 533, t. 78 (1976). N.v.: Pomtez, Ch; arnica che, k'an-xikin, sactah, sak-k'an-xikin, x-chc-toka'ban, Y; zac-tah, C; ish-tá, margarita, shti-pú, zta'ach, B; cambrillo, faciscó, flor amarilla, palo de escoba, saján, sos negro, tasiscobo colorado, taxiscon, taxixte, tisate, vara colorada, G; botoncillo, tatascamite, tatascamite rojo, tepemisque, ES; asan tanni, girasol, jalacatillo, monte blanco, tatascán, tizate, vara blanca, H; tatascama, tatascame, tatascán, N.


Shrubs or small trees (0.3-)1-10 m; stems erect or sometimes sprawling, subterete-striate, subglabrous or strigillose to densely villous, trichomes appressed to patent, intrapetiolar ridge
present and prominent after leaf fall, internodes usually about as long as to half as long as leaves, internodes immediately subtending capitulescence fasciculate, often collapsing when dried; herbage subglabrous or with trichomes appressed to patent, 0.1-1.2 mm. Leaves: blade (3-)6-15(-19) × (1.5-)2-7(-10) cm, lanceolate to ovate, chartaceous to stiffly so, subtriplinerved from well above base, proximal veins not much thicker than distal veins, base cuneate to obtuse or infrequently rounded, often with basal acumination decurrent onto petiole, margins serrate to serrulate, apex acute to attenuate, surfaces smooth or sometimes rugulose with venation clearly reticulate, adaxial surface subglabrous to scabrous or hirtellous, abaxial surface sparsely strigillose to pilose, trichomes appressed to patent; petiole (0.2-)0.7-2.5(-4.5) cm, flattened, canalicate, sometimes ciliate. Capitulescence branches umbelliform-corymbiform, (3-)7-13-capitulate, not well-exserted from subtending leaves; peduncles (0.5-)1.5-7 cm, somewhat slender to stout, strigillose or sericeous to villous, apex sometimes subclavate and gradually transitioning into involucre. Capitula 10-14 mm; involucre at anthesis 7-12 × 4-9 mm, campanulate to hemispherical, usually stramineous proximally (but often green in bud) and green distally; phyllaries 8-14(-19), usually subequal or obgraduate, sometimes slightly graduate with outer phyllaries ≥ ½ as long as longest phyllaries, 3(-4)-seriate, appressed or tips of outer phyllaries rarely spreading, smooth, usually green distally and stramineous proximally, margins sometimes long-ciliate with trichomes often longer than on surface, the 2-4 outermost phyllaries slightly shorter than to more often as long as or longer than mid-series, 5-13 × 2-6 mm, triangular-lanceolate to more often oblong or obovate, infrequently oblanceolate, often slightly ampliate distally, green-papyraceous in distal ½, usually reticulate-veined apically, apex broadly obtuse to acute or sometimes acuminate, often becoming membranous distally and withered in fruit, surface subglabrous to strigillose or hirsute, mid-series 3-5 mm diam., usually ovate to obovate, usually conspicuously c. 10-nerved, apex usually obtuse to rounded, typically green-papyraceous distally, quickly grading to inner series, innermost phyllaries usually much shorter than mid-series, 5-9 × 1-2.5(-4) mm, lanceolate, scarious; paleae 6-8(-9) mm, at anthesis reaching to near apex of awns but in fruit much shorter than the elongated pappus awns, costa sometimes ciliolate. Ray florets 8-13(-21); corolla yellow, tube 1.5-2.5 mm, limb 8.5-14 × 3.5-4.5 mm, exserted, oblong, 12-15(-20)-nerved, apex 2-denticulate, setulose to sparsely so abaxially. Disk florets 35-72+; corolla 5.7-7.8 mm, narrowly funnelform, yellow or golden-yellow or often merely yellow-tipped and pale proximally, tube 1.5-2 mm, lobes 0.6-0.8 mm, lanceolate, setulose to sometimes subglabrous, inner surface long-papillose; anthers 2.7-3.5 mm; style trunk cylindrical throughout, base immersed in 1 mm cylindrical nectary, branches to c. 2.5 mm, appendage papillose. Cypselae apex sometimes slightly constricted below pappus, sometimes nearly subrostrate at anthesis but
erostrate in fruit; ray cypselae 3-4.2(-4.8) × 1.2-1.5 mm, 3(-4)-awned, edges thin-margined, awns unequal, adaxial awn longer, 2.4-3 mm, the 2 abaxial awns 0.5-1.5(-2) mm, abaxial face infrequently with central striation apically producing an elongate awn; disk cypselae 3.5-5 × 1.1-1.3 mm, cuneate, glabrous or rarely sparsely setulose, awns (1-)2.5-4(-5) mm, usually +/- subequal but with abaxial awn slightly longer, in fruit both awns much longer than subtending paleae, moderately flattened distally. 2\(n = 22\). Bosque húmedo, bosque secundario, cafetal, campo abierto, clearings, cloud forest, disturbed areas, disturbed forest, forest edges, oak forests, pinares, roadsides, scrub-forests, selva baja caducifolia, secondary vegetation, selva mediana, steep hillsides, stream-sides, thickets. T (Magaña y Zamudio 134, MO); Ch (Pruski y Ortiz 4187, MO); Y (Gaumer et al. 23499, NY); C (Martínez S. et al. 28231, MO); QR (King y Garvey 11604, MO); B (Schipp 857, NY); G (Pruski y MacVean 4489, MO); H (Pruski et al. 4537, MO); ES (Standley 20681, NY); N (Molina 23026, MO); CR (Oersted 99, K); P (Woodson et al. 1748, MO). 0-1700(-2200) m. (S. Mexico [Oaxaca, Veracruz], Mesoamerica, Venezuela.)

This is one of our most common (viz the number of common names) and widespread Mesoamerican Compositae and occurs in all twelve Mesoamerican political units. *Lasianthaea fruticosa* may usually be identified by its involucre typically with few, appressed, broad, subequal, glabrous or strigillose, green-papyraceous-tipped phyllaries and by its disk cypselae asymmetrically margined but with subequal pappus awns. It varies vegetatively throughout its range mostly in vestiture and phyllary shape, features seemingly basically correlated elevation and latitude. Lower elevational populations typically have broad rounded phyllaries, although the low elevational type of synonymous *Z. elegans var. kellermannii* has lanceolate outer phyllaries. As noted by Becker (1979), populations from higher elevations (c. 1000+ m; see map in Turner, 1990) often have narrower outer phyllaries with acute apices and may have herbage villous, thus superficially resembling other taxa of the *Zexmenia* group. Turner (1990) following Blake (1915b) treated the higher elevational and long-pubescent plants as *L. fruticosa var. villosa*, but the pubescence differences are perhaps clinal and not as noteworthy as are the characters separating the varieties as recognized by Becker (1979). Thus, *L. fruticosa var. villosa* is not recognized here.

I have seen material of the typical variety always with 8 or more ray florets per capitulum, although capitula with as few as 5 ray florets were reported by Becker (1979). Material with up to 21 ray florets per capitulum has been seen only above 1000 meters elevation in Honduras and Nicaragua. At lower elevations ray corolla limbs are generally c. 12-nerved, but this character is seemingly clinal and at high elevations ray corolla limbs often become be 15-20-nerved. It thus
seems that the variation in ray number and ray corolla limb nervation, at least with regard to pollination syndromes, is insignificant.

*Zexmenia macropoda* and *Z. elegans var. kellermannii* represent the occasional form found at various elevations with two-four outer phyllaries triangular-lanceolate. The type of synonymous *Z. macropoda* was described by Blake (1922) as having leaves glandular abaxially, a character he presumably misinterpreted. The leaf veins of *L. fruticosa* are sometimes resinous and the conical trichomes bases may reflect light irregularly, thus sometimes falsely appearing glandular. Additionally, sometimes of mid-cells of moniliform trichomes are expanded, but the leaves of the species and genus are eglandular. The type locality of "Carthagena" given in the protologue of *Bidens fruticosa* was corrected to "Cartago" by Blake (1915b).


Por J.F. Pruski.

Long-lived perennial herbs to shrubs; stems hexagonal distally, becoming subterete proximally, pubescent; herbage greenish, rarely with reddish cast in dried specimens, trichomes patent to appressed, intrapetiolar ridge typically present. Leaves opposite, petiolate, usually not connate-perfoliate; petiole usually unwinged; blade stiffly chartaceous or subcoriaceous, pinnate or trinervate from well above base, surfaces pubescent, eglandular, subsidiary cells of adaxial surface trichomes prominent. Capitulescence corymbiform or infrequently monocephalous, 1-9-capitulate, typically not well-exserted from subtending leaves; peduncles 1-2 mm diam. or infrequently dilated distally and c. 4 mm diam., basically terete throughout and pubescent. Capitula radiate, many-flowered; involucre campanulate to hemispherical, infrequently cylindrical; phyllaries dimorphic, imbricate, subdecussate to spirally inserted, 2-3-seriate, usually obgradient with the outer phyllaries the longest but not very strongly obgradient, less commonly graduate or subequal; outer phyllaries ascending to spreading or reflexed, herbaceous or at least herbaceous-tipped but never very large and leafy nor spreading laterally, base typically becoming indurate; inner phyllaries appressed, scarious; cliananthium flat or low-convex, paleate; paleae stramineous, conduplicate, typically noticeably longer than inner phyllaries and exserted from involucre in fruit, often trifid with short to long apiculum, fused at base and strongly adnate to cliananthium. Ray florets 8-16, usually fertile and styliferous, rarely sterile and without styles; corolla yellow to rarely cream-colored or orangish-yellow, tube short, limb usually well-exserted, with (2)7-12(-20) abaxially puberulent nerves, the 2 supporting nerves much thicker than medials and laterals, obtuse, apex 2-3-denticulate, denticulations 0.2-0.4 mm, apex rarely bilobed, lobes to
c. 1 mm, eglandular abaxially; style well-exserted, often more than 2x as long as tube. Disk florets bisexual; corolla narrowly campanulate or funnelform, 5-lobed, yellow to rarely cream-colored or orangish-yellow, eglandular, typically with prominent fiber sheaths to infrequently without prominent fiber sheaths, tube cylindrical, not dilated basally, lobes setulose outside, margins papillose within; anthers more or less occupying c. ½ throat length, blackish or rarely stramineous, base sagittate, apical appendage blackish to stramineous, sagittate-ovate, endothecial cells usually with 1-2 polar thickening; style trunk cylindrical throughout, base emmersed in 1 mm cylindrical nectary, branches shortly exserted, spreading laterally or sometimes more erect and recurving, slender, apex with papillose sterile appendage. Cypselae of rays and disks somewhat dimorphic but not obviously strongly dimorphic, erostrate but often disks inconspicuously constricted apically below the pappus, winged (at least the rays), 0-3-awned, body black-brown to less commonly covered with a corky stramineous outer layer, faces 1-few-sтратiate, gradually acuminate to attenuate to narrow poited base to minute carpopodium, without elaiosomes, wings thin, stramineous to brownish, usually connate and extending distally onto the awns; ray cypselae triquetrous, obcompressed, usually broadly obovate in outline, asymmetrically winged, 2-3-awned, wings 2(-3), lateral, the adaxial angle either with wing undeveloped or poorly developed, abaxial apex often without intermediate squamellae; disk cypselae either compressed-subquadrate (obdeltate in outline and usually narrowly winged) or quadrate (seemingly compressed when immature; oblanceolate in outline, and exalate), margins symetrical, 0-2 awned and usually with intermediate squamellae; pappus arising submarginally and from near angles on top of fruit, usually represented by (0-)2-3 persistent elongate awns and a few intermediate squamellae, awns stramineous, subequal to unequal, when unequal with the adaxial longer on disks, stout, usually erect, v-shaped in basal cross-section, scabridulous, often slightly exserted from the involucr. x = 16. 8 spp. México, Central America.

Turner (1988) reduced Lundellianthus to the synonymy of Lasianthaea, and treated the type of Lundellianthus as a synonym of Lasianthaea (née Zexmenia) guatemalensis. Lundellianthus was upheld by Strother (1989b) as a segregate from Zexmenia, from which it differs by non-rostrate (vs. rostrate) cypselae and paleae strongly adnate to the cliananthium. The disk fruits of Lundellianthus have margins symetrical (those of Lasianthaea are 1-margined), but the ray fruits of the two genera are moderately similar.

The character of disk cypselae of Lundellianthus that are often inconspicuously constricted apically (and thus "nearly subrostrate"), is a very technical character, and the differences between cypselae nearly subrostrate (in Lundellianthus), subrostrate (in Oyedaea) and rostrate (in Zexmenia) are very difficult to acurately discern, especially in imperfect material.
More than half of the species of *Lundellianthus* have yellow 7-12-nerved ray corolla limbs, but the two species (*L. belizeanus* and *L. steyermarkii*) occurring on limestone in the Yucatán peninsula have cream-colored or pale yellow 2-nerved shortly exserted ray corolla limbs, and *L. harrimanii* has 15-20-nerved and sometimes orangish-yellow ray corolla limbs. Three Mesoamerican species (*L. belizeanus*, *L. breedlovei*, and *L. guatemalensis*) have quadrate exalate disk cypselae. The corollas of *Lundellianthus*, when rehydrated, enlarge 50% more than do most Compositae, thus the measurements within need to be used with this in mind.

Four of the seven Mesoamerican species are known from only the type and at most one other collection. The two more common species, *L. guatemalensis* and *L. salvinii*, are frequently misdetermined by collectors as either *Lasianthaea* or *Zexmenia*.


1. Leaves connate-perfoliate; petioles winged.
2. Leaf blade venation pinnate; phyllaries slightly graduate or subequal, the outer ones slightly shorter than or subequal to inner; corollas cream-colored or pale yellow; ray florets sterile, without styles; disk corollas without prominent fiber sheaths.
3. *L. guatemalensis*

1. Leaves not connate-perfoliate; petioles unwinged.
2. Leaf blade venation trinervate; phyllaries obgraduate, the outer longer than the inner; corollas yellow or pale yellow; ray florets fertile, styliferous; disk corollas usually with prominent fiber sheaths.
3. Leaf blades narrowly lanceolate; ray florets 3-6; involucre cylindrical; corollas sometimes cream-colored.
4. *L. belizeanus*

3. Leaf blades lanceolate to ovate; ray florets 8-16; involucre campanulate to hemispherical; corollas yellow or orangish-yellow.
4. Herbage with reddish-cast in dried specimens; paleae 6-8 mm, short-apiculate; ray corolla limb 8-11 mm, deeply bilobed; cypselae 3-4 mm; disk cypselae quadrate, exalate.

2. *L. breedlovei*

4. Herbage greenish; paleae (7-)7.5-11 mm, usually long-apiculate; ray corolla limb 11.5-18 mm, mostly 2-3-denticulate; cypselae 3-5.5 mm; disk cypselae compressed-subquadrate, winged.
5. Peduncles gradually dilated in distal cm; stems and peduncles usually densely hirsute to hispid, trichomes patent; longer trichomes of stem usually half or more the stem diam.; disk cypselae awns usually subequal.

6. **L. salvini**

5. Peduncles terete throughout or sometimes subphyllary vascular bundles becoming abruptly prominent apically; stems and peduncles strigillose to hirsutulous, trichomes appressed or patent; longer trichomes of stem much shorter than half of stem diam.; disk cypselae awns usually strongly unequal.

6. Stem trichomes appressed or patent; ray corolla limbs 13-20-nerved, yellow or sometimes orangish-yellow.

4. **L. harrimanii**

5. **L. kingii**


Weak-stemmed shrubs ≤ c. 3 m; stems strigose, main stem internodes about as long as leaves, axillary branches with short capitulescence internodes. Leaves: blade 6-12(-14) × (1-)1.5-3 cm, narrowly-lanceolate, trinervate from above base, adaxial surface strigillose, abaxial surface strigillose, base narrowly cuneate to attenuate, margins subentire to denticulate, apex attenuate; petiole 0.7-1.8 cm. Capitulescence open, corymbiform, lateral branches not over-topping central axis, branches 3-9-capitulate; peduncles 3-12(-25) mm, slender, strigose. Capitula 10-12 mm; involucre cylindrical, 3-5 mm diam.; phyllaries obgraduated, outer series longer than the progressively smaller inner, 2-3-seriate, outer 3-5 phyllaries 10-11.5 × e. 2 mm, lanceolate to oblanceolate, ascending, herbaceous distally, acuminate, densely strigillose, inner phyllaries 6-8.5 × 1-2 mm, elliptic-ovate, apex acute to obtuse; paleae c. 6 mm, linear-lanceolate, apex acute. Ray florets 3-5; corolla pale yellow, tube 2-2.5 mm, limb 3-6 × 2-3 mm, elliptic-ovate, only the 2 support veins visible, setulose abaxially. Disk florets 6-14; corolla 5-6 mm, funnelform, yellow, tube c. 2.2 mm, lobes c. 0.7 mm; anthers c. 2.7 mm, appendage black; style branches c. 1.5 mm. Cypselae 4-5 mm, surfaces setulose apically; ray cypselae broadly 2-winged (the inner wing not developed), 2-3 mm broad, 2-awned, wings 0.5-0.7 mm diam., awns 2-3 mm, squamellae 0.8-1.5 mm; disk cypselae quadrate, exalate, unequally 2-3-awned, awns 1-2.5 mm, squamellae 0.2-0.5 mm. Limestone outcrops. B (*Liesner y Dwyer 1475*, MO). c. 100 m. (Endémica.)

Suffrutices to shrubs ≤ c. 2 m; stems strigillose, trichomes 0.2-0.4 mm, internodes 1-6 cm, usually about as long as leaves, axillary branches of varying lengths; herbage with reddish cast in dried specimens. Leaves: blade 3-7(-13) × 1-3.5(-5) cm, lanceolate to elliptic-lanceolate, subtrinervate from well above base, adaxial surface hirsute, abaxial surface strigillose, base cuneate, margins remotely serrulate, apex acute to acuminate; petiole 0.3-1 cm. Capitulescence open, corymbose, lateral branches not over-topping central axis, branches 1-3(-5)-capitulate; peduncles 5-30(-45) mm, slender, hirsutulous to substrigose. Capitula 9-12 mm; involucre 8-9 mm diam., campanulate; phyllaries obgraduate, the outer much longer than the inner, 3-seriate, outer 5-8 phyllaries 9-13 × 3.5-4 mm, elliptic-ovate, ascending or slightly spreading, sparsely strigose, apex obtuse, inner phyllaries ovate, progressively decreasing within 4-7 mm, apex obtuse to rounded; paleae 6-8 mm, short-apiculate, apiculum c. 1 mm. Ray florets 8(-13); corolla yellow, tube 2.5-3 mm, limb 8-11 × 3-4 mm, elliptic-ovate, faintly 7-9-nerved, sparsely setulose abaxially, apex deeply bilobed, lobes to 1 mm. Disk florets 30-45; corolla 5-6-6.5 mm, funnelform, yellow, tube 1.5-2.5 mm, lobes 0.6-0.9 mm; anthers c. 2.7 mm, appendage black; style branches 1.5-2 mm, apical appendage elongating tardily. Cypselae 3-4 mm, awns sometimes broad-based and connate with squamellae, ray cypselae sometimes maturing with corky outer layer, laterally 2-winged (the inner angle not winged), wings to c. 0.5 mm diam., 2-3-awned, awns 1.5-2 mm, subequal, squamellae none or few, 0.5-1 mm; disk cypselae quadrate, exalate, unequally 2-awned, awns 1-2.6 mm, squamellae few, c. 1 mm. 2n = 32. *Openings in montane rain forests, openings in Quercus-Liquidambar forests, pine-oak forests*. Ch (*Breedlove* 52254, cited by Strother, 1999); G (expected). 800-1500 m. (Endémica.)


Few-branched subvirgate suffrutices, 0.7-1.5(-2) m; stems strigillose with appressed trichomes to c. 0.4 mm to pilose with patent trichomes to c. 2.5 mm, the two indument types sometimes found on same individual with the patent trichomes typically more distal on plant, main stem distal vegetative internodes to 15 cm, often 1.5+ × leaf length, axillary branches with congested
capitulescence internodes. Leaves narrowly connate-perfoliate, nodal cupule to c. 2 mm; blade 3-12(-18) × 1-5(-6) cm, lanceolate to ovate, trinervate from above basal acumination, adaxial surface hispid to hirsute, abaxial surface hirsute to pilose, base cuneate to rounded, margins serrate to serrulate, apex acute to attenuate; petiole 0.2-3.5 cm, winged, wings smooth or sometimes strongly crisped. Capitulescence open, 1-few-capitulate, lateral branches often overtopping central capitulum; peduncles 1-6 cm, slender, densely pilose-substrigose. Capitula 10-12 mm; involucre 7-12 mm diam., campanulate to hemispheric; phyllaries oblong, the outer longer than the inner; outer phyllaries (4-)5-8, 9-14 × 2.5-5(-6) mm, oblong to pandurate, ascending or slightly spreading, herbaceous, rounded to acuminate, pilose; inner phyllaries 8-13, 6-7 × 2-2.5 mm, oblong to ovate, apex acute to obtuse; paleae 6.5-8 mm, exserted from involucre, apiculum when distinct 0.5-1.5 mm. Ray florets 8; corolla yellow, tube 2-3 mm, limb (8-)10-13(-16) × 4.5-6 mm, elliptic-oblong(-ovate), c. 12-nerved, two support veins setulose abaxially. Disk florets 25-50; corolla 6-7.6 mm, yellow, tube 2.5-3 mm, lobes c. 0.8 mm; anthers 3-3.5 mm, appendage blackish fading to nearly stramineous, c. 0.5 mm; style branches 1.5-2 mm, sterile appendage penicellate, c. 0.4 mm. Cypselae 2.7-4 mm, black or rays sometimes stramineous and seemingly sheathed by wing tissue; ray cypselae 2-3-winged (the inner wing sometimes not developed), to c. 3 mm diam., smooth, 2-3-awned, wings to c. 0.7 mm diam., awns unequal, 1-2 mm, lacking outer squamellae, inner side of apex with intermediate coroniform squamellae 0.8-1.2 mm; disk cypselae quadrate, exalate, becoming rugulose-tuberculate, exaristate or adaxial edge 1(-2)-awned, awn (2-)3.5-4.5 mm (aristate and exaristate cypselae often within same capitulum), squamellae c. 0.2 mm. Disturbed areas, gravel bank in river beds, pine-oak forests, roadsides, savannas, thickets, wooded slopes. Ch (Pruski et al. 4244, MO); QR (Villaseñor, 1989: 113 sub Zexmenia guatemalensis); B (Davidse y Brant 32435, MO); G (Contreras 8218, MO); ES (cited as Zexmenia guatemalensis by Calderón, S. y Standley, 1941: 290). 80-1600 m. (Endémica.)

Some lower elevational collections from the Yucatán have shorter ray corollas limbs and shorter broader outer phyllaries than does more typical material. The reports from Quintana Roo and El Salvador have not been verified. In the hills in and around Ocosingo (Chiapas), *Lundellianthus guatemalensis* and *Zexmenia serrata* frequently grow intermixed.

### 4. Lundellianthus harrimanii

Weak or climbing shrubs 1-4 m; stems strigillose with appressed trichomes to hirsutulous with patent trichomes, longer trichomes 0.3–0.4(-0.5) mm, much shorter than half of stem diam., internodes 2.5–10 cm, usually c. ½-3/4 as long as leaves.

Leaves: blade 6-10 × 2.5-6.5 cm, elliptic-ovate to ovate, trinervate from well above base, surfaces substrigillose to hirsutulous, abaxial veins sometimes with longer trichomes than areoles, base cuneate to obtuse, rarely broadly obtuse, then typically abruptly narrowed into basal acumination, margins serrulate to finely serrate, apex acute to acuminate; petiole (0.3-0.5)-1.5 cm.

Capitulescence branches (1-)3-5-capitulate; peduncles 1-6(-9) cm, basically terete throughout, strigillose to hirsutulous, trichomes appressed or patent. Capitula 12-16 mm; involucre 13-17 mm, broadly campanulate to hemispherical; phyllaries obgraduate, the outer c. twice or more as long as the inner, 3-seriate, becoming strongly indurate proximally; outer c. 5 phyllaries 12-16 × 4-6.5(-8.5) mm, lanceolate to ovate or pandurate, ascending, both surfaces strigillose to hirtellous, subsidiary cells of trichomes prominent, margins with trichomes subequal to those on surface, apex acute to obtuse, inner phyllaries 4.5-6 mm, progressively smaller, ovate, apex broadly obtuse to rounded; paleae 7.5-10 mm, typically long-apiculate, apiculum 2-4 mm. Ray florets (8-)13; corolla yellow or sometimes orangish-yellow, tube 2-3 mm, limb 4-5 mm, oblong, 13-20-nerved, nerves closely spaced, abaxially setulose, setulae spread over entire distal surface and not restricted to veins. Disk florets 40-80; corolla 7-8 mm, narrowly funnelform, yellow or sometimes orangish-yellow, fiber sheaths especially prominent, tube 1.8-2.5 mm, lobes 0.7-0.9 mm, strongly papillose within distally and marginally; anthers c. 3.5 mm, appendage stramineous; style branches 2-2.5 mm. Cypselae broadly 2-3-awned, (3.5-)4-5 mm, 1.8-3 mm broad at apex, narrowly winged, sometimes maturing with perforated corky stramineous outer layer, wings 0.3-0.5 mm diam.; ray cypselae 3-awned, awns subequal, 2.5-4 mm; disk cypselae compressed-subquadrate, faces often setulose-papillose, 2-awned, awns usually strongly unequal, abaxial awn 2-2.5 mm, adaxial awn 3.5-4 mm, squamellae 0.4-1 mm. Mixed oak forests. N (Rueda 12167, MO). 800-1600 m. (Endémica.)

*Lundellianthus harrimanii* is a regional endemic known only from 12 km of Esteli in NW Nicaragua and in the vicinity of Tegucigalpa, Honduras. It presumably occurs in geographically intermediate localities as well. *Lundellianthus harrimanii* is very similar to and seemingly intergrades with *L. kingii*, the differences between the two (*L. harrimanii* has generally longer internodes, longer outer phyllaries, and generally shorter paleae) perhaps merely semantical, not biological; these weak metric differences were noted by Strother (1989b). The multiple-nerved ray corolla limbs used here as perhaps useful in distinguishing *L. harrimanii* are often unimportant in many radiate Compositae, and within *L. harrimanii* this feature is perhaps best
veiwed as clinal (the Honduran material is 13-15-nerved, whereas the Nicaraguan material is 15-20-nerved). A collection of *Lasianthaea fruticosa* from Esteli, Nicaragua (*Laguna 249A, MO*) similarly has more ray corolla nerves than usual, casting doubt on the value of the character of corolla limb nervation, at least in some localities. The leaf, petiole, and disk corolla measurements given by Strother (1989b) as distinguishing *L. harrimanii* and *L. kingii* fail to distinguish them. Thus *L. harrimanii* is merely provisionally recognized.

The corolla color of *L. harrimanii* is described as "yellow" on the labels of eight of 12 collections that mention color, whereas two collections are described as "orange," one as "yellow-orange," and one reads "rays yellow, disks orange." The ray corollas are not the same tint of orange, for example, seen in ray corollas of either *Comaclinium* or *Pseudogynoyxs*, but instead match what I refer to here as "orangish-yellow" and elsewhere (e.g., for *Wamalchitamia aurantiaca*) as "orangish-yellow" or "golden-yellow."


*Lasianthaea kingii* (H. Rob.) B.L. Turner.

Shrubs ≤ 4 m; stems strigillose, trichomes appressed, c. 0.3 mm, much shorter than half of stem diam., internodes ≤ 5.5 cm, usually c. half as long as leaves, axillary branching at 45-90°, branches not overtopping main stem. Leaves: blade 4-8 × 2-4.5 cm, elliptic-ovate to ovatetrinervate from well above base, adaxial surface hispidulous, trichomes subappressed, abaxial surface strigillose-hispidulous, trichomes appressed or some patent, base obtuse often narrowed into basal acumination, margins serrulate, apex acuminate; petiole 1-2 cm.

Capitulescence open, corymbiform, lateral branches not over-topping central axis, branches 1-5-capitulate; peduncles 15-25 mm, basically terete throughout, strigillose to densely so, sometimes subphyllary vascular bundles becoming abruptly prominent apically, trichomes appressed. Capitula 11-13 mm; involucre 10-15 mm diam., campanulate, becoming strongly indurate; phyllaries obgraduate, the outer much longer than the inner, 3-seriate, outer 5-8 phyllaries 7-12 × 3-4.5 mm, elliptic-ovate, ascending to spreading in fruit, strigillose, apex obtuse, inner phyllaries 4-5 mm, ovate, apex obtuse to rounded; paleae c. 10 mm, trifid, long-apiculate, apiculum 2.5-3.5 mm. Ray florets 13-16; corolla yellow, tube 2-2.5 mm, limb 11.5-15 × 3-4 mm, elliptic-ovate, 7-12-nerved, sparsely setulose abaxially. Disk florets 30-45; corolla 6.5-8 mm, funnelform, yellow, tube 2-2.5 mm, lobes c. 0.7 mm; anthers 2.5-2.8 mm, appendage stramineous; style branches 1-1.5 mm. Cypselae 4-5.5 mm, 3-4 mm broad at apex, winged, sometimes maturing with corky
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outer layer, wings 0.5-1 mm diam., awns 2.5-4 mm; ray cypselae 3-awned, awns subequal; disk cypselae compressed-subquadrate, broadly 2-awned, awns usually strongly unequal, spreading at maturity, squamellae c. 0.5 mm. Roadsides, thickets. G (Stuessy & Gardner 4371, MO). 1000-1500 m. (Endémica.)

Lundellianthus kingii is similar to, but distinguished from the sympatric L. salvinii by its differences in stem vestiture (appressed vs. patent trichomes), which elsewhere in the genus (e.g. L. guatemalensis and L. harrimanii) vary within individual species. The leaf, petiole, and disk corolla measurements given by Strother (1991) as distinguishing L. kingii from L. harrimanii fail, and the two known collections of L. kingii differ from the later described L. harrimanii basically only by ray corolla limbs with 7-12 (vs. 15-20) nerves. I have seen neither L. harrimanii nor L. kingii in the field, thus the later described L. harrimanii is provisionally treated as distinct.


Lasianthaea salvinii (Hemsl.) B.L. Turner.

Perennial herbs to weak shrubs 1-4 m; stems usually densely hirsute to hispid, trichomes patent or sometimes retrorse, longer trichomes 0.7-1 mm, usually half or more the stem diam., main stem internodes usually 1/2-3/4 leaf length. Leaves: blade 4-15(-20) × 2-8(-10) cm, lanceolate to elliptic-ovate, trinervate from well above base, adaxial surface hirsute to hirsutulous, abaxial surface hirsutulous to pilose, base cuneate to broadly obtuse, sometimes with basal acumination, margins serrate, apex acute to acuminate. Capitulescence corymbiform, usually to c. 5 cm broad, 1-5-capitulate; peduncles 0.5-3.5(-8) cm, stout, gradually dilated in distal cm to c. 4 mm diam., usually densely hirsute to hispid, trichomes patent or sometimes retrorse; petiole 0.5-2(-3) cm. Capitula 11-15 mm; involucre 8-15 mm diam., campanulate to hemispheric; phyllaries obglandate, the outer longer to much longer than the inner; outer phyllaries 5-8, 12-20 × (3-)5-8 mm, oblong to pandurate, slightly spreading or reflexed distally, herbaceous, sometimes the 5-7 nerves prominent, apex broadly acute to obtuse, white-hirsutulous-strigose; inner phyllaries 8-13, 5-9.5 × to c. 4 mm, oblong to ovate, apex acute to more frequently obtuse; paleae (7-)9-11 mm, exserted from involucre, often purple-tipped, long-apiculate, apiculum 2-4 mm. Ray florets 8-13; corolla yellow, tube 2.5-3 mm, limb 12-15 × 4-6 mm, oblong, c. 12-nerved, two support veins sparsely setulose abaxially. Disk florets 30-60+; corolla 8-10 mm, yellow, tube 2.5-3 mm, lobes c. 1 mm; anthers 3-3.5 mm, appendage blackish fading to nearly stramineous, sagittate-cordiform, base broader than theca; style branches c. 2.5 mm. Cypselae 3-5.5 × 1.5-2.5 mm, narrowly
winged, brownish-stramineous, seemingly sheathed by wing tissue yet blackish underneath, finely striate, sometimes rugulose, wings 0.1-0.2 mm broad; ray cypselae 3-awned, awns 1.5-3.5 mm, erect or occasionally spreading, lanceolate, intermediate faces all with ovate to deltate squamellae 0.5-1 mm; disk cypselae compressed-subquadrate, (1-)2-winged, 2-awned or very rarely 1-awned, awns 1-4 mm, usually subequal, squamellae 0.5-1 mm. 2n =32. Disturbed areas, edges of and openings in bosque premontano húmedo, grassy slopes, mixed forests, pine-oak forests, roadsides, steep slopes, thickets. Ch (Panero 2530, NY); G (Pruski et al. 4551, MO); H (Molina y Molina 24484, MO). 1000-2600 m. (Endémica.)

The citations of this species in Belice by Williams (1976) and Villaseñor (1989) are based on misidentifications.


*Lasianthaea steyermarkii* (S.F. Blake) B.L. Turner.

Shrubs c. 3 m; stems strigillose to densely strigillose, trichomes 0.2-0.3 mm, main stem internodes usually c. 3/4 leaf length. Leaves: blade (6-)9-12.5 × (2.5-)3-4.7 cm, elliptic-ovate to ovate, venation pinnate with 4-7 equal-sized secondaries per side arching at c. 55°, adaxial surface strigillose, subsidiary cell complex very prominent, trichomes 0.2-0.3 mm, midrib densely strigillose, abaxial surface strigillose to substrigillose, base cuneate, margins crenate-serrulate, apex acute to acuminate; petiole 0.3-1 cm. Capitulescence corymbiform, usually to c. 3 cm broad, 3-6-capitulate; peduncles slender, 3-18 mm, densely white-strigillose. Capitula 10-12 mm; involucre 8-11 mm diam., campanulate to fruit hemispheric; phyllaries slightly graduate or subequal, the outer ones slightly shorter than or subequal to inner, 3-seriate, outer c. 5 phyllaries c. 6 × c. 2 mm, lanceolate-ovate, subherbaceous, acute, strigillose, inner phyllaries 6-6.5 × 2.5-3 mm, oblong to oblong-ovate, chartaceous, apex obtuse to rounded; paleae 8-10 mm, exserted from involucre, apiculum 1-2 mm, broad. Ray florets c. 8, sterile, without styles; corolla cream-colored or pale yellow, tube 1-1.5 mm, limb 5-6 × c. 2.5 mm, ovate, only the 2 support veins visible, setulose abaxially; ovary 2.5-3 x. c. 1.5 mm, enlarging but without seed, becoming obcompressed and triquetrous, glabrous, 3-awned, awns 2.5-3.5 mm, broad-based, central awn basally contiguous with lateral two on inner surface of ovary, outer surface of ovary without lateral awns contiguous and without intermediate squamellae. Disk florets 35-40; corolla c. 7.5 mm, cream-colored or pale yellow, without prominent fiber sheaths, tube c. 2.2 mm, lobes c. 0.8 mm; anthers 2.5-3 mm, appendage black; style branches 2-2.5 mm, sterile appendage c. 0.5 mm.
Cypselae finely striate; disk cypselae 3.4-3.6 × c. 1.2 mm, compressed-subquadrate, angles thin- 
margined but not winged, unequally 2-awned, sparsely strigillose, smaller abaxial awn 1.5-2.5 
mm, longer adaxial awn 3.3-3.8 mm, crown 0.5-1 mm. Open areas of knife-sharp limestone 
ridges and rocky hills. G (Contreras 6635, US). 200-500 m. (Endémica.) 

This is the sole species of Lundellianthus known to have ray florets without styles. Nash 
(1976) incorrectly gave the upper elevational limit as 700 meters.

12. Melanthera Rohr

Echinocephalum Gardner

Por J.F. Pruski y J.C. Parks.

Coarse perennial herbs or subshrubs usually from somewhat woody rootstock; stems commonly 
erect or ascending, sometimes weak and reclining on other plants, quadrangular and sulcate, 
pubescent or glabrate, nodes usually with an interpetiolar ridge. Leaves typically opposite, 
petiolate or less commonly subsessile; blade triangular-ovate or 3-lobed to linear-lanceolate, 
chartaceous to stiffly so, usually trinerved from near base or sometimes pinnately veined, surfaces 
eglandular, adaxial surface usually scabrous, trichomes often bulbous-based, abaxial surface 
usually hispid-hirsute, sometimes glabrescent, base attenuate to hastate, margins commonly 
doubly and irregularly dentate or serrate, occasionally subentire to serrulate, apex acute(-obtuse) 
to attenuate. Capitulescence largely terminal, open cymose and paucicephalous or occasionally 
monocephalous; peduncles elongate, slender, ebracteate. Capitula discoid (ours) or radiate, many- 
flowered, ours globose to dome-shaped at anthesis with the peripheral florets spreading laterally; 
involucre hemispherical to crateriform; phyllaries mostly 8-16, imbricate, subequal or graduate, 
2-3-seriate, persistent, mostly elliptic-ovate to lanceolate, mostly distally indurate-stiff, 
subherbaceous with pallid base, often green-striatulate but venation usually obscure, typically 
subapressed pubescent; clianthium flat to convex to sometimes low-conical post-fruiting, 
paleate; paleae ob lanceolate, conduplicate, indurate-rigid, strongly pluricostate, carinate, apices 
mucronate or aristate, pungent. Ray florets 0(-8-15), sterile; corolla yellow, limb exserted. Disk 
florets 20-100+, bisexual, much longer than phyllaries; corolla narrowly funnelform, 5-lobed, 
white or rarely yellow, lobes delgate to long-triangular, generally puberulent; anthers black, 
appendages ovate, stramineous; style narrowly appendiculate, branches elongate, apex acuminate 
to triangular, papillose, nectary low-annular. Cypselae plump, obpyramidal-quadrangular to 
slightly compressed, exalate, dry and never baccate, exocarp smooth or rarely tuberculate, never 
strongly corky, faces often glabrous, apex truncate, e rostrate, carpododium elliptic-annular;
pappus of 2-12 subequal to unequal fragile or caducous barbellulate aristae about as long as the
cypselae, aristae 1+-seriate, arising inwardly from annulus and not marginally atop fruit. $x = 15$. 4-13 spp., S.E. United States, Mexico, Central America, South America, West Indies; Africa.  

Melanthera includes three traditional discoid globose-capitulate American species with well-
exserted white corollas, but has been expanded by Cabrera (1974) and Pruski (1997) to include
monotypic South American Echinocephalum, which is characterized by sterile non-pistillate ray
florets with yellow corollas. Wild (1965) included in Melanthera 14 radiate African species, nine
of which have sterile rays and are similarly accepted provisionally in Melanthera. Orchard
(2013) treated the remaining African species of Melanthera (sensu Wild, 1965) with pistillate
rays as Lipotriche R. Br. Wild (1965) and Wagner y Robinson (2001) treated Wollastonia DC. ex
Decne. [including the common W. biflora (L.) DC.] in synonymy of Melanthera, but
paleotropical Wollastonia in the narrow sense has fertile rays, large nectaries, basically
exappendiculate styles, and often epappose (-inwardly curved 1-2-awned) corky cypselae, and
following Fosberg y Sachet (1980) and Orchard (2013) is excluded from synonymy of
Melanthera. As such, Melanthera s. str. is unknown from the Pacific ragion. The most inclusive
treatment is that of Wagner y Robinson (2001) who recognized 35 species of Melanthera, but
their circumscription is not followed.

Parks (1973) considered short-aristate-paleate M. aspera and widespread long-aristate-paleate
M. nivea as distinct, but elsewhere (e.g., Cronquist, 1980; Pruski, 1997) M. aspera has been
placed in synonymy of M. nivea. Although M. nivea is circumscribed here extremely broadly, M.
angustifolia is conversely narrowly circumscribed as including only plants with both narrow-
leaves and short-aristate-paleae, and is possibly synonymous with M. nivea (Strother, 1999).

(1965).

1. Leaf blades linear to narrowly oblanceolate, mostly (4-)6-14× long as wide; capitulescences
usually of solitary long-pedunculate capitula; paleae mostly short aristate, apical mucros c. 0.5(-
1) mm, straight to slightly recurved.

1. M. angustifolia
1. Leaf blades broadly ovate to triangular-ovate, frequently distinctly hastate-lobed, < 4x long as wide or > 2 cm diam. or both; capitulescences open cymose with 3(-5) short to moderately long capitula; palea short- to long-aristate, aristae 0.5-1.5 mm, often recurved.

2. **M. nivea**


Slender perennial herbs or subshrubs 0.25-1 m; stems several, sparsely branched, ascending or infrequently procumbent, mostly reddish-tinted, strigillose to subglabrous. Leaves subsessile or short-petiolate; blade 2.7-9 × 0.3-1.5 cm, mostly (4-)6-14× long as wide, linear to narrowly oblanceolate, rarely narrowly ovate-elliptic or basally subhastate, 1-3-nerved, surfaces sparsely strigillose, base cuneate to attenuate, infrequently obscurely hastate near the base, margins irregularly serrulate, apex acute(-obtuse); petiole 0-0.5(-1.3) cm. Capitulescence usually of solitary long-pedunculate capitula at ends of branches; peduncles (3.5-)8-20 cm, sulcate, sparsely strigillose to nearly glabrescent. Capitula discoid; involucre 6-12 mm diam.; phyllaries 3-5 × 2-3 mm, ovate, usually slightly graduated with outermost 1-3 phyllaries about 2/3 as long as other phyllaries; paleae 3.5-5 × c. 1 mm, mostly short arista, apical mucro c. 0.5(-1) mm, straight to slightly recurved. Disk florets 30-80; corolla 4-5.5 mm, white. Cypselae 2.2-2.5 × c. 1.5 mm; pappus awns 2-4, 1-2 mm. 2n = 30. Flowering Jun-Nov(+Feb). *Encinal, marshy areas, pine forest, savannas, secondary areas.*

D'Arcy (1976) recognized this taxon as *Melanthera aspera* var. subhastata (O.E. Schulz) D'Arcy, and although Strother (1999) recognized *M. angustifolia*, he said it may be conspecific with *M. nivea*. Indeed, D'Arcy (1976) said the narrow leaves of the plants may represent simply "an edaphic response of populations …. to habitats with impeded drainage."


Perennial herbs or subshrubs 0.5-2(-3) m; stems ascending to erect or occasionally subscandent and reclining on other plants, usually much branched, sometimes mottled, scabrous-hispid. Leaves long-petiolate, sometimes alternate distally; blade (3-)5-15(-20) × (1-)3-9(-15) cm, < 4x long as wide or > 2 cm diam. or both, broadly ovate to triangular-ovate or even pandurate, frequently distinctly hastate-lobed, trinerved, surfaces hispid to pilose-hirsute with elongate trichomes and also more or less scabrous-hispidulous with much smaller trichomes, base broadly cuneate to truncate or sometimes hastate with lobes laterally divergent, margins doubly and irregularly dentate to serrate or very rarely lacerate, apex acute or acuminate; petiole 1-5 cm. Capitulescence open cymose with 3(-5) short to moderately long capitula; peduncles mostly 3-10(-14) cm, strigose. Capitula 10-15 × 8-20 mm, plants on limestone sometimes with capitula barley half as large, discoid; involucre 8-20 mm diam.; phyllaries 2-6(-13) × 1-3 mm, broadly ovate to lanceolate(-linear-lanceolate), appressed but often loosely imbricate, usually somewhat graduated, strigillose; clinanthium 3-4 mm diam., convex; paleae (4-)5-7 mm, sometimes setulose distally or marginally, short- to long-aristate, arista 0.5-1.5(-2) mm, often recurved. Disk florets
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30-100; corolla 5-7(-8.5) mm, white, lobe apices acute; anthers c. 1.52 mm; style branches 1.2-2.5 mm, acuminate. Cypselae 2-3 × 1.3–2.3 mm, the truncate apex hirtellous; pappus awns 2-8, 0.7-2.8 mm. 2n = 30. Flowering year-round. Borde de bosque, bosque secundario, campo abierto, clearings, cultivated fields, disturbed areas, pine-oak forests, riparian forests, roadisdes, rocky places, savannas, thickets, secondary areas, waste ground, wet ditches. T (Pruski et al. 4236, MO); Ch (Pruski Y Ortiz 4177, MO); Y (Gaumer et al. 23537, MO); C (Lundell 922, MO); QR (Téllez y Cabrera 2661, MO); B (Bartlett 11882, US); G (Pruski y MacVean 4499, MO); H (Barclay 2721, BM); ES (Calderon 173, MO); N (Baker 2239, MO); CR (Pruski 418, LSU); P (Kuntze 1834, NY). S. United States, Mexico, Mesoamerica, Colombia, Venezuela, Guyana, French Guiana, Ecuador, Peru, Brazil.

Melanthera nivea, diagnosed by its globose white-flowered discoid capitula, is one of the more common Caribbean-Central American Compositae and is found in each of the 12 political units in Mesoamerica. The disposition of many West Indian names occasionally treated in synonymy of M. nivea is unkown to me. They could conceivably be synonyms of the similar M. angustifolia.

13. Oblivia Strother

Por J.F. Pruski

Weak-stemmed shrubs; stems ascending to more commonly scandent, subterete, finely striate, pubescent. Leaves opposite or rarely subopposite, petiolate; blade typically lanceolate, glandular or eglandular, pubescent, chartaceous, margins entire to serrulate, convergent-plinerved from above base with larger secondary veins continuing to and converging near blade apex. Capitulescence terminal or axillary from distal nodes, corymbiform, few- to several-capitulate, peduncles short or much less commonly elongate. Capitula (13-)25-57-flowered, short-radiate, typically less than 15 mm; involucre campanulate; phyllaries 3-5-seriate, imbricate, unequal, graduated and never strongly obgraduate, indurate; outer phyllaries never very large and leafy nor spreading laterally; cliananthium convex, paleate; paleae indurate, resembling inner phyllaries, free at base. Ray florets pistillate, uniseriate; corolla yellowish, tube present or absent, limb oblanceolate to oblong, short, apically pubescent; nectary large or minute; style well-exserted, nearly as long as limb. Disk florets bisexual; corolla funnelform, yellowish, 5-lobed, apically pubescent; anthers basally rounded-sagittate, thecae black, connectives stramineous, apical appendage ovate-deltate, stramineous; style branches with a 2-banded stigmatic surface, apically acute. Cypselae narrowly obconical, narrowly winged, the rays triquetrous, the disk compressed
and plump-biconvex, but rays and disks not obviously strongly dimorphic, body black, erosestrate, apex truncate, without shoulders, wings thick, cartilaginous, stramineous, adnate to pappus, cypsela base long-tapered, carpopodium indistinct; pappus represented by 2 (disks) or 3 (rays) awns (rarely with one or two additional much shorter awns) and a small entire to lacerate crown between awns, awns borne laterally on truncate cypsela apex, stramineous, stout, subequal, weakly divergent, abaxially scabridulous, awns gradually broad-based, v-shaped in basal cross-section. \( x = 16 \). 3 spp.; northern to central Andean South America and Panama.

The thickly winged, long-obconical cypselae with wings distally adnate to the two subequal pappus awns seem to be the morphologically features that distinguish the provisionally recognized segregate Oblivia, yet are the feature which make it seemingly congeneric with simultaneously validated Tuxtla. Otopappus and Zexmenia, each also having radiate capitula with pistillate rays and winged fruits, are the closest relatives of Oblivia, but in the protologue of Oblivia, Strother (1989) incorrectly stated that Wedelia and Zexmenia were congeneric. Later, Strother (1999) recognized Otopappus, Wedelia, and Zexmenia, within one of which (or within Tuxtla) Oblivia may ultimately be shown to be nested cladistically. The genus Salmea has eglandular leaves, discoid capitula, and unwinged cypsela often with reduced (but subterete vs. basally v-shaped and awned) bristles between the 2 awns, but otherwise is very similar to this suite of genera.


Otopappus australis S.F. Blake, Otopappus ferrugineus V.M. Badillo, Salmea mikanioides

Britton, Zexmenia columbiana S.F. Blake, Zexmenia mikanioides (Britton) S.F. Blake, Zexmenia mikanioides var. australis (S.F. Blake) R.L. Hartm. et Stuessy

Vining shrubs; stems 2-6(15-25) m, strigillose to sparsely so. Leaves: blade 4.5-17 × 1-4.2 cm, lanceolate to less commonly elliptic, venation 3- (or 5-) nerved from well above base, main lateral pair(s) of veins reaching nearly to blade apex, the adaxial surface strigillose, the abaxial surface strigillose or sometimes strigillose-hirsutulous, typically glandular, base obtuse to
cuneate, sometimes short-attenuate onto petiole, apex acuminate to attenuate, margins entire to sparsely serrulate; petiole 3-12 mm, winged distally. Capitulescence 3-20-capitulate, to 7 cm and wide, not greatly held above distal leaves, peduncles 2-10 mm, strigose, 1(-2)-bracteolate; bracteoles deltate-lanceolate, c. 2 mm. Capitula (6-)7-9 mm, (13-)25-47-flowered; involucre 3-4(-5) mm; phyllaries 3-4-seriate, apex obtuse to rounded, much less commonly acute, the outer few phyllaries c. 2 mm, lanceolate or obspathulate, herbaceous-tipped, puberulent, also sometimes sparsely glandular, apex generally reflexed, grading to the inner series, these 3-4(-5) mm, elliptic, glabrate to puberulent, margins sometimes ciliolate; paleae 6-8 mm, linear-lanceolate, typically much longer than innermost phyllaries, glabrous or outer ones sometimes puberulent, stramineous, margins ciliolate, grading from outer ones flat to inner ones conduplicate, keeled, weakly trifid. Ray florets (2-)5-12; corolla limb 3-4 × 0.6-0.9 mm, inserted directly upon ovary, 3-5-veined, sometimes abaxially glandular, apex bidentate, shortly exserted from the involucre; nectary cylindrical, c. 0.5 mm, texturally distinguished from corolla. Disk florets (11-)20-35; corolla 3.5-4.5 mm, tube 0.5-0.7 mm, glabrous, throat gradually broadened, lobes c. 0.5 mm, deltate, erect to inflexed, short-setose and sometimes also glandular; anthers 2-2.5 mm, partly to mostly exserted form corolla, apical appendage to c. 0.5 mm, glandular; style branches c. 1.5 mm, sweeping hairs minute. Cypselae 3-6 mm, faces glabrous, occasionally with 1 or 2 short stramineous lines, lines sometimes raised, to c. 2 mm, wings c. 0.2 mm diam.; pappus awns 2-4 mm, lanceolate, intermediate lacerate crown c. 0.4 mm. 2n = 32. Roadsides. P (Anderson 3886, FSU). 300-400 m. (Panama, Colombia, Venezuela, Ecuador, Peru, Bolivia.)

Anderson et al. (1979) provided a thorough treatment of this species (sub. Zexmenia) and recognized Z. mikanioides var. australis. However, I cannot see any significant variation and thus do not recognized infrataxa. The label of one collection from Peru (Rojas et al. 125, MO) described the plant as "arbol, 25 m." This characterization is taken here as incorrect, and it is more likely that this collection was simply a vine in a tall tree, if indeed any of the collection label data are correct.


Notoptera Urb., Zexmenia sect. Otopappus (Benth.) O. Hoffm.

Por J.F. Pruski

Shrubs to woody vines, sometimes with a nodal ridge. Leaves opposite or rarely subopposite, short-petiolate; blade narrowly lanceolate to ovate, variously pubescent, glandular or eglandular, chartaceous, sometimes basally oblique, margins entire to more commonly serrulate to serrate,
venation triplinerved to pinnate. Capitulescence terminal or axillary from distal nodes, monocephalous to corymbiform or paniculate, with opposite branches from main axis, 1-many-capitulate, peduncles typically short, less commonly elongate. Capitula radiate or discoid; involucre much shorter than to evenly grading in size to the outermost paleae; phyllaries 2-7-seriate, imbricate, unequal, graduated, appressed or soemtimes outer series reflexed, outer series herbaceous, inner series stramineous sometimes with herbaceous apex, apically acute to rounded; clysanthium paleate; paleae conduplicate, indurate, generally shorter than associated florets, erect or apically curved inwards or outwards, often carinate. Ray florets (when present) pistillate or rarely sterile, uniseriate; corolla yellowish, limb broad, exserted from involucre, rarely (*O. mexicanus*) narrow and obscure. Disk florets bisexual; corolla tubular-funnelform to campanulate, 5-lobed, white to yellow; anthers basally rounded-sagittate, thecae black, connectives typically stramineous, apical appendage ovate-deltate, stramineous or rarely brown; style branches with a 2-banded stigmatic surface, recurved. Cypselae triquetrous (rays) or compressed (disks), 1-(2-)winged, 1-2-awned, coroniform or not so, wings stramineous, thick, cartilaginous, grading into pappus awn and thus extending above cypsela body, the adaxial margin typically broadly winged, the abaxial margin unwinged or sometimes narrowly winged, body black, often pubescent apically, infrequently glandular, smooth to sometimes longitudinally white-streaked, base long-tapered, carpodendium indistinct, apex typically without shoulders or clear rostra but often slightly constricted; pappus 1-2-awned, intermediate squamellae between awns sometimes present, squamellae free or sometimes fused into a crown, adaxial awn typically fused to wing, adaxial awn typically much longer than dorsal. 15 spp, all neotropical.

Blake (1915, 1921), Blake et al. (1926), and Nash (1976) defined *Notoptera* as having non-coroniform cypselae and lacking intermediate squamellae between the pappus awns, whereas *Otopappus* has either coroniform cypselae or lacking intermediate squamellae between pappus awns. Hartman y Stuessy (1983) in their monograph of *Otopappus* took the pappus feature as variable thus artificial, and reduced *Notoptera* to synonymy.

1. Leaf blades eglandular; capitula radiate; corollas yellow; outermost phyllaries spreading or reflexed, (at least apically); cliananthia convex (Sect. Otopappus).

2. Leaf blades hispidulous adaxially, trichomes patent; involucres 7-9 × 10-16 mm; rays (13-)17-28.

  4. O. scaber

2. Leaf blades strigillose adaxially, trichomes appressed; involucres 3.5-5(-6) × 5-10 mm; rays 8-13(-16).

  6. O. verbisinoides

1. Leaf blades abaxially glandular; capitula discoid; corollas white; all phyllaries appressed; cliananthia short-conical (except convex in O. syncephala) (Sect. Loxosiphon).

3. Inner phyllaries grading into outermost paleae; all corollas recurved at maturity (Ser. Loxosiphon).

  4. Capitulescences typically shorter than the subtending leaves; peduncles, when present, 1-4.5(-10) mm.

  1. O. brevipes

  4. Capitulescences typically longer than the subtending leaves; peduncles 5-20(-23) mm long.

  2. O. curviflora

3. Phyllaries typically distinct from and less than half as long as paleae; corollas erect at maturity or rarely a few slightly bent (Ser. Hirsutus).

  5. Capitula 6-10 mm; involucres 3-4 mm; corollas 3.1-3.7 mm; pappus squamellae none.

  3. O. guatemalensis

  5. Capitula 5-6.5 mm; involucres 2-2.5 mm; corollas 2.2-2.5 mm; pappus squamellae connate into a corona 0.8 mm.

  5. O. syncephala


   Notoptera brevipes (B. L. Rob.) S.F. Blake, Otopappus brevipes var. glabratu (J.M. Coult.) B.L. Rob., Otopappus curviflorus var. glabratu J.M. Coult., Otopappus glabratu (J.M. Coult.) S.F. Blake, Salmea curviflor var. glabratu (J.M. Coult.) Greenm.

   Shrubs or woody vines to 10 m; stems slender, arching, pubescent to villous. Leaves: blade (3-)4.5-13(-16) × (1-)1.8-4(-5.5) cm, lanceolate to lanceolate-ovate, venation subpalmately 3-nerved from well above base, the adaxial surface pubescent, the abaxial surface slightly strigillose to villous, glandular, base cuneate and sometimes slightly decurrent onto petiole to less commonly obtuse or rarely rounded, margins serrulate or less commonly subentire, apex acute to long-acuminate; petiole (0.4-)1.1-1.8(-2.5) cm. Capitulescence spiciform-racemose to sometimes
capitate-paniculate, 5-13 or more-capitulate, shorter than the subtending leaves, branches irregularly angled to somewhat flattened; peduncles, when present, 1-4.5(-10) mm, villose to nearly glabrous, subtended by a young leaf or more commonly by a bracteole; bracteole elliptic-ovate, 1.5-3 mm. Capitula discoid, 30-50(-70)-flowered, 6-8(-10) mm; involucre 3.5-5(5.5) × 3.5-7(-9) mm, narrowly to broadly campanulate; phyllaries 20-30, 3-4-seriate, appressed, the outer series 1.2-1.5 × 0.8-1 mm, elliptic-ovate, glabrous to puberulent, grading to the mid and inner series, these 3-5.5 × 1-1.5 mm, lanceolate-ovate, glabrous to slightly puberulent, sometimes fimbriate-ciliate, the innermost phyllaries more or less evenly grading to the outermost paleae; cliananthium c. 2 mm broad, short-conical; paleae 4-5 mm, sometimes carinate, sometimes reflexed, apically acute to acuminate, typically shorter than associated florets. Disk florets 30-50(-70); corolla 3-4.4 mm, tubular-campanulate, white, glabrous, abruptly reflexed medially at maturity and the outer ones exserted from involucre, or scattered-glandular, throat slightly shorter than tube, abruptly ampliate, lobes 0.5-0.9 mm; anther apical appendage tan or brown, sometimes glandular; style branches c. 0.7 mm. Cypselae body 1.8-2.5 × 0.9-1.2 mm, elliptic-ovate, glabrous to apically puberulent, smooth to indistinctly nerved, adaxial margin distally winged, wing grading into pappus awn; pappus 2-awned, the dorsal awn narrow, 0.5-1 mm, the adaxial awn 1-2.5 mm, broad and outwardly flattened into a wing 0.5-0.8 mm diam., wing slightly decurrent onto cypselae body, intermediate squamellae between awns sometimes present. *Bosque húmedo subtropical, bosque de pino-encino, bosque prémontano, disturbed forest, dry hillsides, forest edges, pastures, pine-oak forests, secondary vegetation, selva baja caducifolia, steep rocky slopes, streamsides, wet thickets*. Ch (Matuda 1907, MO); G (Heyde y Lux 4235, MO); H (Molina 2669, MO); ES (Standley 1974, MO); N (Williams et al. 27849, NY). (100-600-1600(-2100) m. (Endemic.)

A circumscribed by Hartman y Stuessy (1983), *O. brevipes* includes *O. glabratus*, these two names being treated by Blake (1915) in separate genera because the presence or absence of pappus squamellae. Indeed, the capitula size of *O. brevipes* varies greatly, and in herbarium specimens the color of the florets and capitula varies from tan to nearly black. Nevertheless, the short-pedunculate discoid capitula with corollas reflexed at maturity and graduate scarious phyllaries diagnose the species. Much material from El Salvador has narrowly lanceolate and very lightly pubescent leaves


*Notoptera curviflora* (R. Br.) S.F. Blake, *Notoptera scabridula* S.F. Blake

Shrubs or woody vines to 8 m; stems slender, arching, puberulent to densely villous. Leaves with petiole 0.5-1.9 cm; blade 5-12(-18) × (0.8-)2-5(-6) cm, lanceolate to ovate, venation more or less pinnately veined with 1 or 2 pairs of veins from well above base arching towards apex, the adaxial surface pubescent, the abaxial surface strigillose to densely villous, glandular, base obtuse to rounded, rarely subcordate or cuneate and then only in the capitulescence, margins serrulate to serrate or less commonly subentire, apex acute to acuminate or rarely attenuate. Capitulescence open, corymbiform-racemiform paniculate, 3-19-capitulate, typically larger than the subtending leaves, branches striate, villous; peduncles 5-20(-23) mm, typically villous, 1(-3)-bracteolate; bracteoles elliptic-ovate, 2-3 mm. Capitula discoid, (30-)38-68-flowered, 5-8 mm; involucre 3-5 × 5-7(-8) mm, turbinate-campanulate; phyllaries 16-24, 3-4-seriate, appressed, the outer series elliptic-ovate, 1-1.5 × c. 1 mm, glabrous to slightly puberulent, grading to the mid and inner series, these lanceolate-ovate, 2.5-5 × 1-1.6 mm, glabrous to slightly puberulent, sometimes fimbriate-ciliate, the innermost phyllaries more or less evenly grading to the outermost paleae; clysananthium short-conical, 1.5-2 mm broad; paleae 3-4.3 mm, erect or outer ones reflexed, apically acute to acuminate, sometimes puberulent, shorter than associated florets. Disk florets (30-)38-68; corolla 3-3.8 mm, tubular-funnelform, abruptly reflexed medially at maturity and the outer ones exserted from involucre, white, glabrous or scattered-glandular, throat broadened, lobes 0.6-0.8 mm; anther apical appendage tan, sometimes glandular; style branches c. 1 mm. Cypselae body elliptic-ovate, 2-2.7 mm, glabrous to apically puberulent, smooth to indistinctly nerved, adaxial margin distally winged, wing grading into pappus awn; pappus 1-2-awned, the dorsal awn (0-)1, narrow or sometimes minutely winged, 0.5-0.9 mm, the adaxial awn 2-2.5 mm, broad and outwardly flattened into a wing, c. 0.7-1.1 mm diam., wing slightly decurrent onto cypsela body, intermediate squamellae typically absent. Disturbed forest, forest edges, gallery forests, lower montane rain forests, oak forests, pine forests, roadsides, secondary vegetation, selva alta perennifolia, selva baja, thickets, tropical rain forests, wet areas. T (*Matuda 3032*, F); Ch (*Breedlove y Almeda 57935*, MO); Y (cited by Villasenor, 1989: 79); C (*Goldman 481*, F); QR (*Cabrera y Torres 995*, MEXU); B (*Liesner y Dwyer 1550*, MO); G (*Standley 23740*, NY); H (*Edwards P-732*, MO); ES (*Mangandi ISF00483*, MO); N (*Pipoly 4600*, MO); CR (*Molina et al. 18251*, MO). 20-1000 m. (Veracruz, Oaxaca, Mesoamérica).

As noted by Strother (1999), *Otopappus curviflorus* is very similar to, and perhaps eventually may include in synonymy, *O. brevipes*. Nevertheless, it seems best to follow Hartman...
y Stuessy (1983) in recognizing the two as distinct, and indeed *O. curviflorus* may generally be recognized by its more open capitulescence and long-pedunculate capitula. Additionally, the leaves of *O. curviflorus* are not clearly plinerved and may be rarely subcordate, further distinguishing it from *O. brevipes*. *Otopappus brevipes* and *O. curviflorus* are the only Mesoamerica species placed by Hartman y Stuessy (1983) in *Otopappus* sect. *Loxosiphon* (S.F. Blake) R.L. Hartm. y Stuessy.

*Notoptera gaumeri* (Greenm.) Greenm., *Notoptera leptocephala* S.F. Blake,  
*Salmea gaumeri* Greenm.  
Shrubs or woody vines to 4 m; stems slender, scandent or arching, hispidulous or villosulous to densely so. Leaves with petiole 0.4-1.3(-1.8) cm, hispidulous or villosulous; blade lanceolate to elliptic-ovate, 3-10(-14.5) × 1.5-5.5 cm, venation pinnately veined, without a pair of proximal secondary veins arching towards apex, the adaxial surface hispidulous, the abaxial surface villose to tomentose, glandular, base obtuse to subcordate, margins subentire to slightly serrulate, sometimes slightly revolute, apex acute to obtuse, less commonly rounded. Capitulescence terminal and axillary, corymbiform-paniculate, 6-9 cm, of many capitula in several paniculately arranged corymbiform groups of 5-9 capitula each, the primary and secondary capitulescence branches progressively reduced in length, the second order branches typically subtended by a hispidulous lanceolate bracteole 3-8 mm; peduncles (0-)1-6 mm, often subtended by a hispidulous lanceolate bracteole c. 2 mm. Capitula discoid, 12-20(-26)-flowered, 6-10 mm; involucre narrowly campanulate, 3-4 × 3-3.5(-6) mm; phyllaries c. 3-seriate, appressed, distinct from and less than half as long as paleae, the outer series 1-1.3 × 0.4-0.8 mm, elliptic-lanceolate, hispidulous, slightly glandular, grading to the inner phyllaries, these 2.5-3(-3.5) × 1-1.3 mm, these elliptic-ovate, hispidulous to slightly so proximally, sometimes glandular, the innermost phyllaries distinctly smaller than the outermost paleae; cliananthium short-conical, c. 1 mm broad; paleae 4.1-5.7 mm, erect, glabrous or nearly so, finely striate, typically not carinate, distal margins slightly fimbriate-ciliolate, apically acute. Disk florets 12-20; corolla 3.1-3.7 mm, funnelform-campanulate, erect, white, throat and lobes often slightly setose or glandular, throat narrowly campanulate, lobes 0.9-1 mm; anther apical appendage tan, sometimes glandular; style
branches c. 1 mm. Cypselae body 3.2-4.2 mm, oblong in outline, flattened, slightly puberulent distally, eglandular, smooth to indistinctly nerved, adaxially 1-winged, wing grading into pappus awn; pappus 2-awned, intermediate squamellae absent, dorsal awn 0.7-1.7 mm, sometimes narrowly winged, adaxial awn elongate, 1.4-2.8 mm, broad and outwardly flattened into a wing, wing 0.4-0.8 mm diam., decurrent onto cypselae body. Acahual de selva, acahual de selva mediana, deciduous forests, forest edges, secondary forests, selva alta perennifolia, selva baja subcaducifolia, selva mediana subcaducifolia, selva mediana subperennifolia, tintal, zapotal. Y (Gaumer et al. 23473, MO); C (Lundell 1007, MO); QR (Cabrera y Cabrera 7791, MO); B (Gentle 1823, MO); G (Contreras 5431, MO). 10-200 m. (Endémica.)

Blake recognized both *Notoptera guatemalensis* and *N. gaumeri*, but noted that they may be synonymous, as subsequently treated by Nash (1976) and Hartman and Stuessy (1983). Later, Blake (1921) described *Notoptera leptcephala*, which he characterized by having subcylindrical capitula, but this and *N. gaumeri* were each placed in synonymy of the present species by Nash (1976) and Hartman and Stuessy (1983), who considered *Otopappus syncephalus* as a close congener. Blake (1921) described the corollas as "curved or reflexed," but I find them to be typically erect and rarely slightly curved, but never curved to the extent found in *O. brevipes* and *O. curviflorus*. Several collection labels draw attention to the fragrant flowers, but it is not apparent whether this species is more fragrant than the others.

Although during the time when the type was collected the "Captaincy General of Guatemala" included the modern countries of Guatemala, El Salvador, Honduras, Nicaragua, and Costa Rica, Friedrichsthal is not known to have collected in the Yucatán Peninsula nor within the limits of modern day Guatemala. Nash (1976) thus suggested the type was actually from Costa Rica. The morphology of the type (leaf shape, insect damage, phyllaries very distinct in length from the paleae, etc.) indeed matches the Hartman and Stuessy (1983) circumscription of this taxon, so the name does not seem to be misapplied. Assuming the type was collected by Friedrichsthal as labeled, it seems probable therefore either that Friedrichsthal actually collected in the Yucatán peninsula or that the type locality is far southeast of Guatemala (perhaps Nicaragua), but that this taxon has yet to be recollected or otherwise documented there.

Shrubs or woody vines to 15 m; stems typically sprawling or clambering, strigillose to strigose. Leaves with petiole (0.3-)0.5-0.8(-1) cm, strigillose; blade lanceolate to elliptic-ovate, (3-)5.5-12(-15) × (1-)2-6(-8) cm, venation more or less pinnate to subpalmately 3-nerved from above base, larger secondary veins 2-4 per margin typically arching towards apex, smaller secondary veins many, closely spaced, not prominent, branching from midrib at nearly right angles, the adaxial surface hispidulous or less commonly slightly so, trichomes patent, very rarely subtrigillose with trichomes nearly appressed, often nitidous, the abaxial surface hispidulous to sometimes strigillose, eglandular, base cuneate to obtuse or rarely rounded, margins serrulate to less commonly crenulate or serrate, apex acute to acuminate or less commonly attenuate.

Capitulescence terminal or also axillary, monocephalous or more commonly openly corymbiform, generally 1-3(-5)-capitulate, typically shorter than the subtending leaves; peduncles (2-)5-35(-40) mm, strigillose, ebracteolate. Capitula radiate, (62-)67-118-flowered, 10-15 mm; involucre hemispherical, 7-9 mm (excluding outer foliaceous phyllaries), 10-16 mm diam. (excluding outer foliaceous phyllaries); phyllaries dimorphic, 30-40, c. 4-5-seriate, the outer 5-10, herbaceous and spreading or reflexed, spatulate, 5-10(-15) × 1-3(-5) mm, typically hispidulous, apically obtuse, mid and inner series not spreading, elliptic-ovate to lanceolate, 4.5-7 × 1.5-2 mm, typically scarious-indurate with a central herbaceous thickening, densely strigillose-hispidulous or less commonly slightly so, margins often fimbriate or ciliolate, the innermost more or less evenly grading in size to the outermost paleae; cliananthium convex, 2.5-5 mm broad; paleae bent inward apically, later fully erect, 8.5-11 mm, puberulent, slightly thickened centrally, noticeably carinate, margins often hyaline, apically acuminate. Ray florets (13-)17-28; corolla 8-13.2 mm, yellow, the tube 1.5-2.2 mm, the limb c. 9-nerved, 6.5-11 × 2-4 mm, the apex shortly lobed; style very long-exserted. Disk florets 50-90; corolla 5-6 mm, narrowly funnelform, erect, yellow, glabrous or scattered-glandular, lobes 0.5-0.9 mm, generally setose; anther mostly exserted, apical appendage tan; style c. 2.1 mm. Cypselae body oblanceolate in outline, 3.3-4.7 mm, glabrous or nearly so, sometimes white-streaked, sometimes slightly constricted apically, those of the disks generally longer than those of the rays, those of the rays narrowly 3-winged, those of the disk narrowly winged adaxially, this wing grading into pappus awn; pappus 1-awned and coroniform, awn elongate, on adaxial side, 2-3 mm, broad and outwardly flattened into a wing, wing to 1.2 mm diam., decurrent onto cypsela body, crown cartilaginous, 0.5-1.5 mm. Acagual, bosque tropical húmedo, gallery forests, lower montane rain forests, seasonal evergreen forest, selva alta, selva baja caducifolia inundable, selva baja subcaducifolia, selva mediana, selva mediana subperennifolia, subtropical forest, thickets, tropical deciduous forest, zapotal. Ch

Shrubs or woody vines, length unknown; stems puberulent to hispidulous. Leaves with petiole 1-2 cm, slightly strigillose; blade lanceolate to elliptic-lanceolate, 6.3-16.5 × 3-5.9 cm, venation pinnately veined, without a pair of proximal secondary veins arching towards apex, the adaxial surface hispidulous-strigillose, trichomes slightly appressed, the abaxial surface hispidulous, trichomes patent, glandular, base obtuse to rounded-truncate, margins subentire to slightly serrulate, apex acute to acuminate. Capitulescence terminal and axillary, glomerulate-paniculate, 5-8 cm, of many capitula in glomerules, the glomerules 3-7 subspherical, paniculately arranged, a single glomerule terminating main axis, lower glomerules in 1-3 decussately branched-pairs along main axis, individual glomerules 3-7-capitulate, stalked, stalk to c. 1 cm, subtended by a hispidulous lanceolate bracteole 2-3 mm; peduncles 0-2 mm. Capitula discoid, 13-15(-20)-flowered, 5-6.5 mm; involucre turbinate-campanulate, 2-2.5 × 2.5-3 mm; phyllaries 3-4-seriate, typically distinct from and less than half as long as paleae, the outer series lanceolate-ovate, 1-1.2 × 0.5-0.8 mm, hispidulous, glandular, grading to the inner series, these elliptic-ovate, 2.2-3 × 0.9-1.2 mm, hispidulous and glandular to slightly so proximally; cliananthium convex, c. 1 mm broad; paleae 2.5-3.3 mm, sometimes carinate, slightly hispidulous and glandular apically and along keel, distal margins fimbriate-ciliolate, apically acute. Disk florets 13-15(-20); corolla 2.2-2.5 mm, campanulate, erect, white, throat and lobes glandular and sometimes also slightly setose, throat campanulate, lobes 0.5-0.7 mm; anther apical appendage tan, sometimes glandular; style branches c. 1 mm. Cypselae body oblong in outline, 2.2-3.1 mm, flattened to slightly quadrangular, the distal-dorsal side puberulent, sometimes glandular, smooth to indistinctly nervet, 1-or 2-winged with adaxial wing much more prominent, wing(s) grading into pappus awn(s); pappus 1-2-awned and coroniform, dorsal awn, when present, 0.3-1 mm, sometimes narrowly winged, adaxial awn elongate, 1-1.5 mm, broad and outwardly flattened into a wing, wing 0.5-0.8 mm diam., decurrent onto cypsel body, squamellae connate into a corona, corona lacerate, cartilaginous, c. 0.5-1 mm. G (*Lundell y Contreras* 20792, MO). 300-400 m. (Endémica.)

This species is apparently rare, being known from only two collections, the type and a collection from near La Cumbre, Petén. Nash (1976) gives the floret number as 15-20 per
capitula, Hartman and Stuessy (1983) as 25-35, whereas I find the florets per capitulum to be fewer in number.


Otopappus asperulus S.F. Blake, Otopappus trinervis S.F. Blake

Shrubs or woody vines to 12(-32) m; stems scrambling to high-climbing, subglabrous to strigillose to hispidulous. Leaves with petiole 0.3-0.9(-1.2) cm, strigillose; blade lanceolate to sometimes lanceolate-ovate, (2.5-)4-14.5 × 1.5-4.3(-5.5) cm, venation subpalmately 3-nerved from well above base, other secondary veins closely spaced, prominent, branching from midrib at nearly right angles, the adaxial surface strigillose, trichomes appressed, often nitidous, the abaxial surface strigillose or much less commonly hirsutulous, eglandular, less commonly heterotrichous with small moniliform hairs, larger trichomes of both surfaces generally directed outwards towards margins, base cuneate to rounded, sometimes slightly decurrent, margins serrulate to rarely serrate, apex acute to acuminate or less commonly attenuate. Capitulescence terminal and axillary, corymbiform, generally 3-5-capitulate, typically shorter than the subtending leaves; peduncles 5-25 mm, villous or strigillose, typically ebracteolate. Capitula radiate, 43-83(-86)-flowered, 7-10 mm; involucre 3.5-5(-6) mm (excluding outer foliaceous phyllaries), 6-10 mm diam. (excluding outer foliaceous phyllaries), campanulate; phyllaries 25-35, dimorphic, c. 4-5-seriate, the outer c. 10, 2-10(-18) × 1-2(-4) mm, oblong-ovate, herbaceous and spreading or reflexed, strigillose, apically obtuse, mid and inner series not spreading, mid series phyllaries 2-4 × 1.5-1.8 mm, elliptic-ovate, scarious-indurate with a strigose, herbaceous tip, margins often fimbriate, grading to the inner series, these lanceolate to 5.5 × c. 1 mm, glabrous or nearly so, or more or less evenly grading in size to the outermost paleae; cliananthium convex, c. 4 mm broad; paleae 5-7 mm, erect, often slightly puberulent, apically acute, outer ones sometimes reflexed, inner ones sometimes bent inward. Ray florets 8-13(-16); corolla 5-12 mm, yellow, the tube 1-2 mm, the limb 4-10 × c. 2 mm, oblong, 7-9-nerved, the apex shortly lobed; style very long-exserted. Disk florets 35-70; corolla 4.5-5.5 mm, funnelform, erect, tube 1.2-1.5 mm, yellow, glabrous or scattered-glandular, lobes 0.5-0.7 mm, sometimes setose; anther mostly exerted, apical appendage tan; style branches c. 1.5 mm. Cypsela body 3-4 mm, oblong in outline, those of the disks longer than those of the rays, glabrous, sometimes strongly white-streaked longitudinally, those of the rays narrowly 3-winged, those of the disk narrowly winged adaxially,
this wing grading into a adaxial pappus awn; pappus 1-awned and coroniform, awn elongate, 2-3
mm, broad and outwardly flattened into a wing, wing c. 0.8 mm diam., slightly decurrent onto
cypsela body, crown cartilaginous, 0.7-1.4 mm. Cloud forest, forest edges, gallery forests,
montane wet forest, roadsides, thickets. Ch (Purpus 6678, MO); B (Whitefoord 10014, MO); G
(Heyde y Lux 6174, MO); H (Blake 7400, US [photograph: MO]); ES (Standley 20096, NY n.v.,
as cited by Hartman y Stuessy, 1983); N (Molina 22921, MO); CR (Tonduz 12739, MO). 40-2000
m. (Oaxaca, Mesoamérica).

Blake (1915), Hartman and Stuessy (1983), and Strother (1999) each gave "1873" as the date
of publication of Hooker's Icon. Pl. vol. 12 (which includes the name O. verbesinoides), but I use
the date "1876" as given in TL-2 (Staffleu y Cowan, 1979). This species is similar to Otopappus
scaber, but O. scaber generally differs by larger capitula and leaves with several secondary veins
arching towards apex.

15. Oyedaea DC.

Zyzyxia Strother

Por J.F. Pruski.

Suffrutices to trees; stems subterete or sometimes angled or subhexagonal distally, pubescent.
Leaves opposite, typically petiolate; blade stiffly chartaceous or subcoriaceous, pinnately veined
or 3-veined from well above base, surfaces pubescent, eglandular. Capitulescence corymbiform to
thyrsoïd-paniculate, of 1-many capitula; peduncles stout, pubescent, often short. Capitula radiate,
commonly globose; involucre campanulate to hemispherical; phyllaries imbricate, weakly
graduated and unequal or subequal to obgraduate with the outer phyllaries longer, 2-5-seriate, at
least the outer phyllaries stiff becoming strongly indurate, acute to acuminate, less commonly
rounded, membranous apically to much more commonly herbaceous distally or the outer
phyllaries foliar; ciananthium slightly convex, paleate; paleae conduplicate, sometimes keeled,
stramineous or medial nerve golden, firm, typically puberulent, apex acuminate and often ciliate.
Ray florets sterile, usually without styles; corolla yellow (ours) or rarely white, tube short, limb
well-exserted, 7-10+-nerved, the 2 supporting nerves much thicker than medials and laterals,
smaller bifurcating (above limb base) and/or anastomosing veinlets also typically present between
medials and laterals, abaxially puberulent, ovaries triquetrous, mostly shortly 3-awned, often also
squamulose. Disk florets bisexual, many; corolla narrowly funnelform, 5-lobed, yellow (ours) or
rarely white, throat usually without very prominent fiber sheaths, lobes papillose within,
generally weakly puberulent on outer surface; anthers more or less occupying c. ½ throat length,
black or connectives cream-colored, rarely cream-colored throughout, bases sagittate, collar slightly swollen, about as long as basal lobes, apical appendage black or stramineous, sagittate-ovate or sometimes merely lanceolate, usually discontinuous from thecae, glandular or not; style branches slender, shortly exserted and somewhat recurved, abaxially papillose, stigmatic surface 2-banded adaxially, apex with lanceolate papillose sterile appendage. Cypselae biconvex, compressed, oblong or obovoid, black, winged or sometimes only very tardily so, wings and subrostrum brown to stramineous, apex without shoulders, apically constricted into a short rostrum, rostrum straight and centric, radially 2-winged at extreme maturity, margins ciliate but wings stiff and eciliate, usually belatedly adnate apically to pappus awns, body plump, pubescent, faces rounded, cypsela base with obvious large plate-like carpopodia and 1-2 elaiosomes (oil-bearing bodies); pappus represented by 2 awns, somewhat stout, persistent, scabridulous, subequal to unequal with the adaxial longer, often slightly exserted from the involucre, usually with several inwardly produced or intermediate squamellae arising from subrostrum. Aprox. 18 spp. Mesoamerica and South America.

*Oyedaea* as traditionally defined (e.g., Blake, 1921) is closely related to *Zexmenia*, but differs by its sterile rays and merely subrostrate cypselae. Also, species of *Oyedaea* have corolla limbs with peculiar bifurcating and anastomosing smaller veinlets and may have abaxial moniliform-subglandular or short-stipitate-glandular trichomes, features not observed in *Zexmenia*.

Blake (1921) revised *Oyedaea* and included Central American, Andean, Guayanan, and Brazilian planaltine elements within it. The planaltine species were later transferred by Robinson (1984) to *Dimerostemma* Cass. *Dimerostemma* has subsequently been accepted (e.g., Bremer, 1994), and seems to differ from *Oyedaea* by its stramineous (vs. black) anther appendages, abaxially glandular (vs. eglandular) style branches, non-rostrate (vs. subrostrate) cypselae with very stout (vs. moderately stout) awns arising directly from cypsela body and wings (vs. from short subrostrum). Both Turner (1988) and Strother (1989, 1991) transferred *O. lundellii* and *O. steyermarkii* (of the Yucatán peninsula) from *Oyedaea*, but only *O. steyermarkii* is excluded here. Monotypic *Zyzyxia*, typified by *O. lundellii* and segregated by Strother (1991), seems not to differ in significant generic-level features, and is here treated provisionally in synonymy of *Oyedaea*, in which its type was described originally.

In the Peruvian and Bolivia Andes and foothills, several species appear weakly differentiated, and the usually reliable distinguishing leaf features (degree of leaf trinervation and amount of abaxial leaf pubescence) used by Blake often seem uncomfortably variable.


1. Stems densely scabrous and scabridulous; leaf blade venation pinnate; apex of inner phyllaries rounded or less commonly acute; support nerves of ray corolla limb abaxially finely setulose proximally, limb otherwise glabrous or nearly so.

1. *O. lundellii*

1. Stems villous-strigillose; leaf blade venation trinervate; apex of inner phyllaries narrowly acute; ray corolla limb abaxially short-stipitate-glandular and setose.

2. *O. verbisinoides*


Shrubs to small trees 1-3 m; stems subhexagonal distally, quickly becoming subterete, densely scabrous and scabridulous, trichomes antrorse, 0.1-0.3(-0.5) mm, the bases indurate, darkened, to c. 0.2 mm diam., intrapetiolar ridge present, distal internodes closely spaced, ¼-3/4 leaf length, proximal internodes about as long as leaf or sometimes longer; herbage often heterotrichous, longer trichomes long-conical, various-sized, sinuous minute moniliform or moniliform-subglandular trichomes also often present. Leaves: blade (3-)4-10(-14) × (1.5-)2-3.5(-4.5) cm, elliptic, subcoriaceous, venation pinnate, secondaries equal-sized, 4-5 per side, arching at c. 50°, adaxial surface scabridulous, trichomes arcuate, bases raised, subsidiary cells very prominent, abaxial surface heterotrichous, scabridulous, also with moniliform trichomes mostly associated with vein, base cuneate to obtuse, margins subentire to remotely serrulate, apex acute to obtuse; petiole 0.5-1.1(-2) cm. Capitulescence to c. 10 cm broad, corymbiform, 3-8+-capitulate, slightly rounded on top, not well-exserted from subtending leaves; peduncles 0.5-2(-3.5) cm, stiff, densely scabrous and with minute moniliform trichomes. Capitula 10-13 mm; involucre 12-15 mm diam., broadly campanulate to hemispheric.; phyllaries 15-20, slightly graduated, 3-4-seriate, outer 2-4 phyllaries 5-8 × 3-4 mm, elliptic-ovate, herbaceous, spreading, scabridulous, next c. 5 phyllaries ascending to recurved, oblong-pandurate to obovate, 10-15 × 4-5.5 mm, base stramineous-indurate, apex herbaceous, acute to obtuse, distal 2/3 scabridulous, gradually grading into inner phyllaries; inner phyllaries obovate, 10-15 × 4-6 mm, proximal 2/3 chartaceous, distal 1/3 thin and membranous, margins ciliate, apex rounded or less commonly acute, glabrous; paleae 7-8.5 mm, linear-lanceolate, subcarinate proximally, distally subdilated and flattened distally,
apex obuse, about as long as involucre to slightly exserted, the outer paleae somewhat connate basally. Ray florets 10-16; corolla yellow, tube 1.7-2 mm, limb (10-)16-18 × c. 4-6 mm, ovate, 15-20-nerved, veinlets between medials and laterals bifurcating and anastomosing, support nerves finely setulose proximally, otherwise glabrous or nearly so; ovaries stramineous, 2.5-3 mm, margins setulose, awns 1.5-2.5 mm, squamellae to c. 1 mm. Disk florets (35-)52-59; corolla 5.7-6.2 mm, yellow, fiber sheaths present but not very prominent, tube 2-2.5 mm, cylindrical, not dilated basally, lobes 0.7-0.9 mm, sparsely minute-setulose, margins papillose within; anthers 2.8-3.2 mm, appendage stramineous, sagittate-ovate, c. 0.5 mm; style branches c. 1.5 mm. Cypselae 3.5-4.5 × c. 1.1-1.4 mm, subquadrate, cuneate-oblong in outline, setose distally, edges stramineous, setose, thin-margined but wings not seen in material at hand, possibly never forming, adaxial margin sometimes more prominent, subequally 2-awned or adaxial awn slightly longer, awns 2.5-3.3 mm, squamellae 0.3-1 mm. Flowering Mar, Jun. Scrubby areas, open pine forests. G (Tún 1638, F); B (Brewer 1538, MO). 300-900 m. (Endémica.)

The report by Martinez et al., 1994 of the species in the Lacandona region of Chiapas is based on a misdetermination. The transfer of this subrostrate species to erostrate Lasianthaea by Turner (1988) is provisionally not accepted.


Oyedaea acuminata (Benth.) Benth. et Hook. f. ex Hemsl., Oyedaea macrophylla (Benth.) Benth. et Hook. f. ex Hemsl., Oyedaea verbesinoides var. glabrior Steyerm., Viguiera acuminata Benth., Viguiera drymonia Klatt, Viguiera macrophylla Benth.

Suffrutices to trees 1-8(-13) m; stems striate, heterotrichous, villous-strigillose, with various-sized, long-conical trichomes, also sinuous minute moniliform-subglandular trichomes present beneath longer indumentum, intrapetiolar ridge present, internodes usually c. half as long as leaves. Leaves: blade 4-17(-23) × 2-8(-10) cm, lanceolate to ovate-lanceolate, usually broadest in proximal 1/3, trinervate in basal aculation from 1-2.5 cm above base, this pair of secondary veins continuing to mid-blade, adaxial surface strigose-hirsute, trichome subsidiary cells sometimes prominent, abaxial surface pilose-tomentose, base obtuse then abruptly acuminate, margins serrate to serrulate, apex long-acuminate; petiole 0.5-1.5(-2.5) cm. Capitulescence usually c. 15 cm broad, corymbiform, several to many-capitulate, somewhat flat-topped with lateral branches nearly over-topping central axis, not well-exserted from subtending leaves; peduncles 0.5-3 cm. Capitula 11-17 mm; involucre campanulate, 12-17 mm diam.; phyllaries 7-
13 mm, lanceolate to pandurate, apex 3-4-seriate, slightly graduated to obgraduate, narrowly acute, commonly reflexed distally, strigose; paleae 7-12 mm, medial nerve sometimes dark, apex acute. Ray florets 8-14, occasionally styliferous; corolla yellow, tube 1-2 mm, limb 15-25 × c. 5+ mm, oblong, usually 12+-nerved, apex 2-3-dENTICULATE, abaxially short-stipitate-glandular and setose; ovaries stramineous, 3-4 mm, edges setose. Disk florets 30+; corolla 6-9 mm, yellow, tube c. 2 mm, lobes delicate to short-triangular, c. 1 mm, setulose; anthers 2-3 mm; style branches 1-1.5 mm. Cypselaelae 3.5-6 mm, body strigose-setose, wings usually present but slow developing, stramineous to sometimes slightly muculate, to c. 0.6 mm diam., sometimes ciliate distally, elaiosomes to c. 0.6 mm, annular subrostrum c. 0.2 mm high; pappus awns typically unequal, 2.5-5.5 mm, the adaxial one usually thicker, squamellae 0.4-0.9(-2) mm, sometimes basally connate and not well differentiated from subrostrum. Roadsides, cafetal, thickets, dry hillsides, lava flows, stream sides, disturbed areas, open forests. CR (Wussow y Pruski 126, LSU); P (Allen 2866, MO). 400-2300 m. (Mesoamérica, Colombia, Venezuela.)

_Quedaea verbesinoides_ is one of the most common woody Heliantheae in southern Mesoamérica. This woody composite is notable in its often swollen trichome subsidiary cells, its strongly reticulate leaf venation with very small (ca. 0.3 mm diam.) often white areoles, and its strongly indurate fruiting capitula. The small-leaved plants from drier habitats with shorter ray corollas tend to have densely pubescent herbage, but in critical features grade into typical populations. _Oyedaea verbesinoides_ is recognized here without infrataxa, and _O. verbesinoides_ var. _hypomalaca_ Steyerm. from northeastern Venezuela, characterized by its nearly pinnate subsessile leaves and recognized in the key by Pruski (1996), is perhaps distinct specifically.

16. _Perymenium_ Schrad.

Por J.F. Pruski.

Perennial herbs or shrubs to scrambling woody vines or trees to 20 m; stems exalate, sometimes with nodal ridges, often sulcate-costate and subhexagonal; herbage not stipitate-glandular (Mesoamerica) to infrequently stipitate-glandular. Leaves opposite, subsessile or more commonly petiolate; blade usually lanceolate to ovate, usually 3-5-nerved from near or above base, rarely pinnately veined, surfaces often strigillose, abaxial surfaces sometimes glandular. Capitulescence terminal, open-cymose to corymbiform-paniculate; peduncles sometimes bracteolate. Capitula radiate; involucre cylindrical to hemispheric; phyllaries subequal to more commonly moderately graduate, imbricate, 2-4-seriate, often strigillose, infrequently glandular; outer phyllaries usually stiff, commonly subherbaceous-green distally, base often pale; inner phyllaries usually subherbaceous-green distally
and thus more or less gradually transitional in shape and texture to paleae, occasionally inner phyllaries with a membranous rounded spreading apex and the inner phyllary thereby contrasting to paleae; clinanthium flat or convex, paleate; paleae conduplicate, carinate distally. Ray florets pistillate; corolla yellow or golden-yellow, limb oblong to obovate, mostly 9-13-nerved, eglandular abaxially or very rarely glandular, usually setulose at least on the two support veins. Disk florets bisexual; corolla funnelform to rarely narrowly campanulate, yellow or golden-yellow. tube relatively short, limb eglandular or very rarely glandular, lobes often setulose; anthers black; style-branches short-appendiculate. Cypselae dimorphic, black, eglandular, broadly rounded distally and short-rostrate but often indistinctly so, the rays triquetrous, the disks biconvex or compressed-tetragonal, sometimes adaxial and abaxial angles of disk and all angels of rays winged and then with wings often prolonged distally into pappus-like appendages, without elaiosomes, carpopodium not prominent; pappus of (10-)15-35 unequal fragile or caducous aristae from annulus set in from cypselae margins, the abaxial and adaxial awns usually longest and stoutest. Aprox. 40-50 spp. Neotropical.

*Perymenium* was reviewed by Robinson y Greenman (1899) and more recently revised by Fay (1978).


1. Cypselae often winged to the base or nearly so, wings typically prolonged distally into pappus-like appendages; leaf blade abaxial surfaces typically glandular.
   2. Involucres 4.5-13 × 5-10 mm.
   3. Inner phyllaries typically appressed, typically transitional to paleae, apices acute to obtuse; involucres 4.5-6 mm × 5-6.5 mm.  
      4a. *P. grande* var. *grande*
   3. Inner phyllaries spreading distally, contrasting with paleae, apices mostly rounded; involucres 7-13.5 × 6-10 mm.  
      4b. *P. grande* var. *nelsonii*

2. Involucres 3.5-5 × 3-5 mm.

4. Sprawling soft-wooded shrubs; leaf blades widest near the base, adaxial surface substrigillose to hirsutulous, abaxial surface hisrute-pilose, trichomes antrorse to patent; phyllaries often moderately glandular, apices broadly obtuse to rounded.
   5. *P. gymnolomoides*

4. Erect shrubs or small trees; leaf blades widest near the middle, surfaces strigillose, trichomes appressed; phyllaries eglandular or sparsely glandular, apices usually acute to obtuse.
   9. *P. nicaraguense*
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1. Cypselae exalate although sometimes sharp-edged, cypsela shoulders rounded and typically not prolonging into pappus-like appendages or very rarely with ray cypselae short marginal setae coalescing into stout structures; leaf blade abaxial surfaces eglandular or glandular.

5. Inner phyllaries with broadly obtuse to rounded ciliate membranous apex, either much broader than paleae or contrasting texturally with paleae.

6. Leaf surfaces discolorous, abaxial surfaces densely white-strigillose or matted white-tomentulose; disk florets 40-60.

7. **P. klattianum**


7. Capitulescences corymbiform or corymbiform-paniculate, pluricapitulate; capitula small; involucres 4.5-5.5 mm, turbinate or narrowly campanulate; disk florets 9-13(-19); paleae 4.2-4.5 mm.

3. **P. gracile**

7. Capitulescences open cymose, 3-15-capitulate; capitula mid-sized; involucres 6.5-8.5 mm, campanulate; disk florets c. 25+; paleae 4.2-4.5 mm.

6. **P. jalapanum**

5 Inner phyllaries transitional to paleae, stiffly herbaceous-tipped, apex usually acute to obtuse, not ciliate.

8. Ray florets 4-5, corolla limbs 3-4 mm; disk florets 6-8.

8. **P. pinetorum**

8. Ray florets 6-12, corolla limbs 4-13 mm; disk florets 15-50.

9. Leaf blades ovate or oval-ovate, veins often more or less immersed abaxially, surfaces eglandular; corollas eglandular.

1. **P. chloroleucum**

9. Leaf blades lanceolate to lanceolate-ovate, veins often prominent abaxially, abaxial surface usually glandular, corollas sometimes glandular.

2. **P. ghiesbreghtii**


Shrubs to 1.5 m; stems strigillose. Leaves: blade 1.5-4 × 0.5-2.7 cm, ovate or oval-ovate, trinerved, veins often more or less immersed abaxially, surfaces strigillose or subappressed hispidulous, eglandular, base cuneate to rounded or truncate, margins serrulate to crenate-serrate, apex acute; petiole 0.2-1.1 cm. Capitulescence somewhat open-cymose and held somewhat above leaves, branchlets 3-5-capitulate; peduncles mostly 10-25(-40) mm, moderately to densely strigillose. Capitula: involucre 4.5-6.5 × 3.5-5.5 mm, campanulate to narrowly so; phyllaries c. 3-seriate, appressed, apex acute to less commonly broadly obtuse, graduated with most outer
phyllaries about half as long as inner phyllaries; outer phyllaries triangular-ovate, moderately to densely griseous-strigillose; inner phyllaries oblong, slightly to moderately strigillose, transitional to paleae, apex acute to obtuse; paleae 3.8-5.5 mm. Ray florets 7-10; corolla limb 4.5-8.5 mm, eglandular. Disk florets 15-32; corolla 3.1-3.7 mm, eglandular, lobes 0.4-0.7 mm. Cypselae 2.5-3 mm, exalate, cypsela shoulders rounded and not prolonging into pappus-like appendages, sparsely strigillose-setulose; pappus awns 15-20, 0.8-2 mm. 2n = 30. Flowering Jun-Dec. Disturbed areas, mixed forests, open forest, roadsides. Ch ( Breedlove y Strother 46529, MO); G (Steyermark 52012, NY). 1100-2500 m. (Mexico [Oaxaca], Mesoamerica.)

Perymenium chloroleucum has 7-10 (vs. 4-5) ray florets with longer corolla limbs and more florets per capitulum, but is otherwise very similar in gestalt to the equally uncommon P. pinetorum.

Holotype: México: Chiapas, Ghiesbreght 576 (GH, as web image!). Illust.: none. N.v.: none.


Perennial herbs or shrubs 1-3 m; stem strigillose or strigose to hispid. Leaves: blade 2.5-11.5 × 1-3(-5.5) cm, lanceolate to lanceolate-ovate, widest in proximal 1/3, chartaceous, trinerved from well above base, sometimes appearing as arching pinnate, veins often prominent abaxially, adaxial surface subglabrous to sparsely strigillose or hispidulous, abaxial surface usually glandular and moderately strigillose to hispidulous or infrequently hispid-pilose, base usually cuneate to rounded or truncate, usually with short basal acumen, margins serrulate to serrate, apex usually acuminate to attenuate; petiole 0.5-2.2 cm. Capitulescence usually openly corymbiform-paniculate or much less commonly paucicapitulate and open-cymose, held well above leaves, usually from several distal strongly ascending but straight branchlets, each 3-13-capitulate; peduncles mostly 5-50 mm, moderately to densely strigillose or hispidulous. Capitula small to mid-sized; involucre 3-5 × 4.5-8 mm, campanulate; phyllaries 3-seriate, graduated with outer few phyllaries about half as long as inner phyllaries, mostly appressed but apex often spreading or recurved, surface eglandular, strigillose to inner phyllaries progressively less so; outer phyllaries ovate or orbicular, apex often acuminate or attenuate, but sometimes acute to broadly obtuse; inner phyllaries lanceolate to ovate, apex sometimes thinner but nevertheless somewhat green-subherbaceous and thus with inner phyllaries more or less transitional to paleae, apex attenuate to obtuse or less commonly broadly obtuse; paleae 3.8-7.5 mm. Ray florets 6-9(-12); corolla tube relatively short, limb 3.5-8 mm, rarely glandular abaxially. Disk florets 13-36(-49); corolla 3-5.3
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mm, rarely glandular, lobes 0.4-0.9 mm. Cypselae 1.8-3 mm, exalate, strigillose-hispidulous distally, shoulders rounded and not prolonging into pappus-like appendages; pappus awns (10-15-25+), 1-2.5+ mm. 2n = 30. Flowering year-round. Disturbed areas, montane forests, pine-hardwood forests, roadsides, shrubby slopes. Ch (Purpus 6639, MO); G (Pruski y Ortiz 4294, MO). (700-)1100-3000 m. (Endemic.)

The citation by Fay (1978) of the taxon occurring to 3800 meters elevation is presumably based on erroneous label data of Molina 15901. Material from Belize cited as Perymenium ghiesbreghtii by Nash (1976) and Balick et al. (2000) and that from Quintana Roo as cited by Sousa y Cabrera (1983) is redetermined here as P. gymnolomoides. Material from Honduras traditionally determined as Perymenium purpusii and also that cited as P. ghiesbreghtii by Nelson (2008) is redetermined here as P. nicaraguense.

Perymenium inamoenum, placed by Fay (1978) in synonymy of P. ghiesbreghtii, has hispid-pilose leaf indumentum, does not appear transitional to P. ghiesbreghtii, and may be deserving or resurrection.


Perymenium microcephalum Sch. Bip. ex Klatt.

Perennial herbs or soft-wooded shrubs 1-2 m; stems strigillose. Leaves: blade 3-8 × 1.5-3.5 cm, lanceolate-ovate to ovate, chartaceous, trinerved from near base, surfaces concolorous, sparsely strigillose, abaxial surface glandular, base rounded, margins serrulate, apex acute to attenuate; petiole 0.8-1.7 cm. Capitulescence corymbiform or corymbiform-paniculate, pluricapitulate, not held well above leaves, from several distal branchlets, each 13-40-capitulate; peduncles mostly 4-17 mm. Capitula small; involucre 4.5-5.5 × 2.7-3.8 mm, turbinate or narrowly campanulate; phyllaries 3-seriate, strongly graduated with most outer few phyllaries usually much less than half as long as inner phyllaries, surface eglandular, strigillose to inner phyllaries progressively less so, margins ciliate; outer phyllaries ovate(-orbicular), appressed, apex acute(-obtuse); inner phyllaries oblong, spreading distally, apex broadly obtuse to rounded, membranous, contrasting with paleae; paleae 4.2-4.5 mm, apex acute, sometimes inflexed. Ray florets 5(-8); corolla limb 6-9 mm, c. 7-nerved. Disk florets 9-13(-19); corolla 3.8-5 mm, lobes 0.5-0.6 mm. Cypselae 2-2.5 mm, exalate but sometimes sharp-margined distally with each margin terminal-appendaged, surfaces glabrous proximally to distal portions strigillose; pappus awns 15-20, mostly 1-2 mm. Flowering June-Oct. Pacific watershed: Pine forest, pine-Oak forests. Ch (Heath 1113, CAS); G (Skutch 1470, GH). 1000-1300 m. (Endemic.)
Perymenium gracile is very similar in gestalt, indumentum, and rounded phyllaries to the moderately common low-elevational P. gymnomoloides, which differs by technical feature of winged (vs. exalate to sometimes sharp-margined distally) cypselae. Also, P. gracile is rare in Mesoamerica, where it is known to me from only two collections of the Pacific watershed.


Shrubs or trees 2-5(-20) m; stems with branches ascending, straight, hispidulous or strigillose.

Leaves: blade 7-17(-26) × 3.5-9, ovate, chartaceous, trinerved from well above base, adaxial surface scabrous or strigillose, abaxial surface usually glandular, also substrigillose or hispidulous to hispid-pilose or tomentulose, at least some trichomes not appressed, base cuneate to subcordate, margins serrate, apex acute to acuminate; petiole 1-3(-7) cm. Capitulescence usually broadly corymbiform paniculate mostly 20-100-capitulate; peduncles mostly 10-50 mm, hirsute.

Capitula: involucre 4.5-13 × 5-10 mm, campanulate to hemispherical; phyllaries c. 3-seriate, graduated with outer few phyllaries about half as long as the inner, inner two series all more or less subequal, appressed to spreading, usually ciliate; outer phyllaries ovate to lanceolate-ovate, strigillose, apex acute; inner phyllaries oblong, progressively less pubescent, contrasting to or transitional to paleae, apex obtuse; paleae 5-8.8 mm, apex acute to rounded. Ray florets 5-8(-12); corolla limb 8-17 mm, sometimes glandular abaxially. Disk florets 24-65; corolla 4-8.5 mm, lobes 0.6-1 mm. Cypselae 2.5-4.5 mm excluding wings, thinly winged to near base, wings typically prolonged distally into pappus-like appendages; pappus awns c. 15, 1-4 mm. 2 vars.

4a. Perymenium grande Hemsl. var. grande.


Leaves: blade abaxial surface hispidulous to hispid-pilose, base cuneate to nearly truncate.

Capitula mid-sized; involucre 4.5-6 mm × 5-6.5 mm; inner phyllaries typically appressed, typically transitional to paleae, apex acute to obtuse; paleae 5-6 mm. Disk florets c. 25. Flowering mostly (Jul-)Sep-Jan. Disturbed areas, montane forests, pine-oak forests, roadsides, wooded slopes. Ch (Breedlove 42484, CAS); G (Pruski et al. 4550, MO); H (Molina 22619, NY); ES (Padilla 226, MO). 900-3000 m. (Endemic.)

*Perymenium latisquamum* S.F. Blake.

Leaves: blade abaxial surface densely strigillose to nearly tomentose, base broadly cuneate to subcordate. Capitula relatively large; involucre 7-13 × 6-10 mm; inner phyllaries spreading distally, contrasting with paleae, apices mostly broadly rounded, membranous, and ciliate; paleae 6.5-8.8 mm. Disk florets 25-65. 2n = 80, c. 172. Flowering mostly May-Feb. *Dry forest, montane forests, pine-oak forests, roadsides, secondary thickets, thorn scrub.* Ch (*Seler 2970, NY*); G (*Harmony Dwyer 3508, MO*); H (*Molina 2674, MO*); ES (*Sandoval y Rivera 1473, MO*); N (*Molina 22844, NY*); CR (*Heithaus 404, MO*). 200-2500 m. (S. Mexico [Oaxaca], Mesoamerica.)

*Perymenium grande* var. *nelsonii* is probably worthy of specific recognition.


*Perymenium goldmanii* Greenm., *Perymenium peckii* B.L. Rob.

Perennial herbs or sprawling soft-wooded shrubs 1-2 m; stems strigillose, curving upwards distally. Leaves: blade 2-5 × 1-2 cm, lanceolate to lanceolate-ovate, widest near the base, stiff-chartaceous, triplinerved from near base, adaxial surface substrigillose to hispidulous, abaxial surface glandular and hirsute-pilose, trichomes antrorse to patent, base mostly obtuse to rounded, margins subentire to serrulate, apex acute to attenuate; petiole 0.3-1 cm. Capitulescence corymbiform or corymbiform-paniculate, not held well above leaves, from several distal branchlets, each 7-13+-capitulate; peduncles mostly 5-10(-16) mm. Capitula: involucre 3.5-4 × 3-4.5 mm, usually campanulate; phyllaries c. 3-seriate, appressed to slightly spreading, graduated with most outer phyllaries about half as long as inner phyllaries, at least some moderately glandular, apex broadly obtuse to rounded; outer phyllaries orbicular to ovate, strigillose to pilosulose(-pilose), distinctly ciliate; inner phyllaries oblong-ovate, progressively less pubescent, usually much broader than paleae; paleae 3.5-5 mm, sometimes glandular. Ray florets 5-7; corolla limb 3.5-5 mm. Disk florets 20-28; corolla 2.7-4 mm, lobes 0.4-0.7 mm. Cypselae 1.7-2.5 mm excluding wings, winged to near base, wings early developing, sometimes corky-thickened, prolonged distally into pappus-like appendages; pappus awns 15-20, 0.5-2 mm. 2n = 28-30. Flowering Dec-Mar. *Mostly Gulf of Mexico and Caribbean watershed: Forests edges, pine...*
ridges, pine savannas, secondary vegetation, selva baja, selva mediana. T (Ventura 20915, MO); Ch (Martínez 10333, MO); C (Goldman 487, US); QR (Cabrera y Cabrera 16045, MO); B (Arvigo et al. 370, NY); G (Aguilar 344, NY). 5-500 m. (Mexico, Mesoamerica.)

The material from Chiapas is in bud and is only provisionally referred here.


Shrubs to 2 m; stems strigillose. Leaves: blade 4-11.5 × 1.2-3.4 cm, lanceolate, chartaceous, trinerved from less than 1 cm above base, surfaces concolorous, sparsely strigillose, base obtuse to rounded, margins serrulate to dentate, apex acute to attenuate; petiole 0.6-1.5 cm. Capitulescence open cymose, 3-15-capitulate, capitula held above leaves on relatively elongate peduncles; peduncles mostly 10-40 mm, strigillose. Capitula mid-sized; involucre 6.5-8.5 × 5-6 mm, campanulate; phyllaries c. 3-seriate, surface glabrous or subglabrous margins ciliate, graduated with most outer few phyllaries about half or less as long as inner phyllaries, inner 2 series subequal; outer phyllaries ovate, apex broadly acute to obtuse; inner phyllaries oblong, progressively less pubescent, spreading distally, apex broadly obtuse to rounded, membranous, ciliate, contrasting with paleae; paleae 7-7.5 mm, apex acute, often inflexed. Ray florets 8; corolla limb c. 7.5 mm. Disk florets c. 25+; corolla 5-6.5 mm, lobes c. 1 mm. Cypselae 3-3.5 mm, exalate, strigillose especially distally, shoulders rounded and not prolonging into pappus-like appendages; pappus awns c. 15, mostly 1-2 mm. Flowering Dec-May. *Montane forests, meadows.* G (Williams 14236, F). 2000-2300 m. (Endemic.)


Shrubs to 2 m; stems strigillose. Leaves: blade 3-8 × 0.8-2.5, lanceolate to ovate, usually widest near proximal 1/3 of blade, chartaceous, trinerved from near base, surfaces discolorous, adaxial strigillose, abaxial surface densely white-strigillose or matted white-tomentulose, typically glandular but glands obscured by tomentum, base narrowly cuneate to truncate, margins subentire to serrulate, apex acute to acuminate; petiole 0.3-0.8 cm. Capitulescence somewhat open-cymose, branchlets 3-5-capitulate, terminal branchlets leafy, but sometimes subterminal non-leafy branchlets to 5 cm; peduncles 5-20 mm, moderately to densely strigillose. Capitula: involucre 5-8.5 × 6-8 mm, broadly campanulate; phyllaries c. 3-seriate, usually ciliate, graduated with most outer phyllaries about half as long as inner phyllaries; outer phyllaries ovate, strigillose, apex broadly acute to rounded; inner phyllaries oblong, progressively less pubescent,
spreading distally, apex rounded, membranous, ciliate, contrasting with paleae; paleae 4-5 mm, apex acute. Ray florets 9-12; corolla limb 5-8 mm. Disk florets 40-60; corolla 3.8-4.7 mm, lobes 0.5-0.7 mm. Cypselae 2-2.5 mm, exalate, strigillose, shoulders rounded and not prolonging into pappus-like appendages; pappus awns c. 15, mostly 1-2.5 mm. Flowering Dec. *Open rocky areas.* Ch (Matuda 783, US). 1200-1500 m. (Mexico [Veracruz], Mesoamerica.)


Erect shrubs or small trees to 0.5-3(-5) m; stems strigillose. Leaves: blade 2-7(-10) × 1-4(-5) cm, lanceolate to ovate, widest near the middle, stiff-chartaceous to subcoriaceous, trinerved from above base, surfaces strigillose, trichomes appressed, base cuneate to truncate, margins serrulate, apex acute or obtuse; petiole 0.5-1.5(-2) cm. Capitulescence corymbiform, not held well above leaves, 5-20+-capitulate; peduncles mostly 4-10 mm. Capitula: involucre 3.5-4.5 × 3-5 mm, turbinate to campanulate; phyllaries 3-4-seriate, appressed, graduated with most outer phyllaries about half as long as inner phyllaries, eglandular or sparsely glandular, apices usually acute to obtuse; outer phyllaries ovate, strigillose; inner phyllaries oblong, progressively less pubescent, transitional to paleae; paleae 4.5-6(-7) mm, apex acute. Ray florets 7-9; corolla limb 3.5-7 mm. Disk florets 10-30; corolla mostly 4-5 mm, lobes 0.5-0.8 mm. Cypselae 2-2.8 mm excluding wings, narrowly winged to near base or disks only adaxially so, wings tardily developing, sometimes lacerate-margined, prolonged distally into pappus-like appendages; pappus awns c. 15, 0.5-2 mm. 2n = 30-34. Flowering mostly Jul-Jan. *Pine forests, pine-oak forests.* G (*Pruski et al. 4539*, MO); H (*Pruski et al. 4535*, MO); ES (*Monterrosa 1304*, MO); N (*Williams et al. 27907*, NY). 400-2200 m. (Endemic.)


Shrubs c. 1 m; stems sparsely strigillose. Leaves: blade 2-4.3 × 1-2.3 cm, elliptic-ovate to sometimes ovate, trinerved from c. 0.4 cm above base, surfaces sparsely strigillose, eglandular, base cuneate to obtuse, margins subentire to weakly serrulate, apex acute to acuminate; petiole 0.3-0.7 cm. Capitulescence compact cymose-corymbiform, more or less held within subtending leaves, branchlets 3-9-capitulate, lateral branchlets usually shorter than central axis; peduncles 3-7 mm, moderately strigillose. Capitula: involucre 3-4(-5) × 2.5-3(-4) mm, campanulate; phyllaries c. 3-seriate, appressed to sometimes slightly recurving, apex mostly acute(-acuminate), usually graduated with outer few phyllaries about half as long to less than half as long as inner phyllaries;
outer phyllaries ovate, strigillose; inner phyllaries oblong, progressively less strigillose, transitional to paleae, apex acute to obtuse; paleae 4-4.5(-5) mm. Ray florets 4-5; corolla limb 3-4(-5.5) mm. Disk florets 6-8; corolla 3.5-4 mm, lobes 0.6-0.7 mm. Cypselae 1.8-2 mm, exalate, cypsela shoulders rounded, not prolonging into pappus-like appendages or only occasionally with ray cypselae short marginal setae coalescing into stout structures, faces strigillose-setulose distally; pappus awns c. 15, 0.5-1.5(-2) mm, very fragile. Flowering Jun-Sep. Pine-oak forests, rocky pine forests. Ch (Purpus 10245, US). 700-1000 m. (Mexico [Oaxaca], Mesoamerica.)

In Mesoamerica, *Perymenium pinetorum* is known only from near the Chiapas-Oaxaca border.

17. **Plagiolumphus** Greenm.

Por J.F. Pruski

Annual herbs to 1 m; stems subterete to subhexagonal, pubescent. Leaves opposite, short-petiolate; blade lanceolate-ovate to ovate, chartaceous, venation 3-nerved from base, longest secondary reaching to about distal third of blade, surfaces pubescent, trichomes only slightly bulbous-based, abaxial surface also punctate-glandular. Capitulescence terminal, open-cymose, 1-5+-capitulate; peduncles elongate, slender, ascending, ebracteate, pubescent. Capitula discoid; involucre hemispherical; phyllaries usually obviously strongly dimorphic, obgraduate, 2-3-seriate; outer (3-)5 phyllaries, herbaceous, spreading laterally, pubescent; inner phyllaries erect, chartaceous with herbaceous tips, pubescent distally; clinanthium hemispherical to short-conical, paleate; paleae conduplicate, navicular, persistent, mostly stramineous. Disk florets 25-40, bisexual; corolla funnelform, 5-lobed, white or yellow, tube shorter than limb, throat without obvious fibers embedded in vascular strands, tube and throat typically glabrous, lobes triangular, glandular, adaxially papillose, veins intramarginal; anther thecae black, appendage deltate-ovate, stramineous, sparsely glandular; style branch apex acuminate. Cypselae heteromorphic, rostrate, rostrum strongly eccentric and arising very near adaxial margin, curved-geniculate in radial plane, carpopodium small and inconspicuous, slightly asymmetric, without elaiosomes; the outer cypselae biconvex and strongly tuberculate, oblong, exalate or sometimes narrowly 1-alate, black, apex nearly truncate, setulose; inner cypselae strongly compressed and alate, obovate to cuneate, body smooth or nearly so, black, sparsely setose, wings stramineous, the adaxial often larger and extending well above cypsela body; pappus of 2 unequal awns and 1-few intermediate laciniate squamellae. 1 sp. Mexico.
Robinson (1981) and Panero (2007) placed *Plagiolophus* in Ecliptinae, the fruits and disk corollas without embedded fibers of *Plagiolophus* approach characters of subtribe Verbesiniae, where the genus may instead perhaps belong.


Diffusely branched herbs 0.4-1 m; stems pilose-hirsute. Leaves: blade 1-3.5 × 0.5-1.7, surfaces moderately antrorse pilose-hirsute to abaxial surface subcanescent, base cuneate to obtuse, then short-decurrent as basal acumen, margins subentire to serrulate-crenulate, apex acute to acuminate; petiole 0.3-0.7 mm. Capitulescence loosely spreading to c. 15 cm diam.: peduncles 4-10 cm, hirsute. Capitula 6-8 mm; involucre 5-7 × 5-8 mm; outer phyllaries 6-11 × 1-2 mm, oblanceolate or oblong, subappressed hirsute; inner phyllaries 3-4 × 1-2 mm, lanceolate-ovate to ovate, antrorse hirsute distally; paleae 3.6-4.4 mm, lanceolate, ciliolate or antrorse hirsute distally along keel, apex acute to acuminate. Disk florets slightly exserted from involucre; corolla 2.8-3.2 mm, lobes c. 0.4 mm. Cypselae 2-2.5 mm, rostrum 0.2-0.3 mm, wings larger in central fruits, the larger wing to c. 0.7 mm diam., thin-cartilaginous, often ciliolate; pappus awns to 2 mm.

Flowering Dec-Apr. Cornfields, disturbed area, secondary selva baja caducifolia. Y (*Gaumer 1055*, NY); C (*Taylor y Taylor 12671*, MO). 0-50 m. (Endemic.)

18. *Rensoniana* S.F. Blake

Por J.F. Pruski.

Shrubs to small trees; stems leafy, with opposite branching. Leaves opposite, slender-petiolate; blade chartaceous, venation pinnately 3-nerved from well above base, pubescent, eglandular, margins serrate. Capitulescence terminal and axillary from the distal nodes, openly corymbose to corymbose-paniculate, of several to many capitula. Capitula small, radiate, pedunculate; involucre turbinate-campanulate, more or less terete, not plano-compressed nor samara-like; phyllaries subequal, c. 2-seriate, stiffly chartaceous, indurate basally, herbaceous apically; ciananthism small, flat to subconvex, solid, paleate; paleae conduplicate; peduncles naked to few-bracteolate, typically subtended by a bracteole. Ray florets pistillate; corolla limb yellow, weakly exserted from the involucre; style shaft apically exserted from corolla throat, branches
each with a 2-banded stigmatic surface, without obvious sweeping hairs. Disk florets functionally staminate, not forming fruits, throat partly exserted from involucre; corolla funnelform, 5-lobed, yellowish, veins thickened, tube narrow, throat abruptly broadened, lobes erect, apically hirtellous; anther thecae black, bases short-sagittate, apical appendage navicular, ovate, stramineous, connectives stramineous; style branches weakly branched, branches appressed or nearly so, externally hirsutulous; ovary narrowly cylindrical, exalate; pappus coroniform, crown hispidulous. Ray cypselae obovate, obcompressed, slightly biconvex, apex often with thin continuations of the flat wings projecting above annulus, adaxial face often with a central ridge, 2-winged, wings thin, thinly 7-10-striate distally, widely oblong, entire or few-lacerate distally; pappus lacking. 1 sp. Mexico, Guatemala, El Salvador, Costa Rica.

*Rensonia* resembles *Baltimora* in general aspect and by functionally staminate disk florets, but differs most noticeably by its eglandular leaves and broadly 2-winged ray cypselae.


Shrubs to small trees 1-5 m; stems erect to scandent, moderately to much-branched, angled or broadly striate distally to subterete proximally, densely strigillose, rarely also hirsute. Leaves: blade (2.5-)5.5-17(-26) × (1.5-)2-9.5 cm, elliptic to ovate, venation with 2 or 3 larger pairs of opposite to subopposite secondary veins strongly directed apically, smaller secondary veins at nearly right angles to midrib, adaxial surface scabrid, hispidulous, subsidiary cells of trichomes enlarged and raised from surface, abaxial surface strigillose or rarely hirsute, hispid to hispidulous on veins, base cuneate and typically short-attenuate, apex acuminate, sometimes falcate; petiole (0.5-)1.5-4(-8.5) cm, strigillose to densely so. Capitulecence with main branches typically 8-12 cm, opposite or distal-most occasionally subopposite, densely strigillose, typically 5-20-capitulate, bracteoles 3-5 mm, linear-lanceolate; peduncles (2-)4-17(-20) mm, slender, densely strigillose. Capitula 22-32-flowered, 5-11 mm; involucre 2.8-4.5 mm diam., campanulate to turbinate; phyllaries c. 8, 5-7 × 1.4-2.5 mm, oblancoceolate, strigillose, thinly c. 5-nerved, nerves concolorous to slightly discolorous with phyllaries; paleae 5-5.3 mm, linear-lanceolate, persistent, apically attenuate, narrowing beginning at about top of cypselae. Ray florets 8, tube 1-1.5 mm, glabrous, limb 3-4 × 1.5-2.4 mm, oblong to obovate, abaxially hirtellous on two larger veins, c. 10-veined, apex bidentate or less commonly tridentate, teeth 0.3-0.8 mm, larger veins ending in
teeth; style branches 1.4-2 mm long. Disk florets 14-24; corolla 4.1-5.1 mm, tube 1-1.3 mm, lobes 0.7-1.1 mm, erect, apically hirsutulous; style branches c. 0.4 mm; ovary 2.5-3.7 mm. Cypselae (including wings) 5.1-6 mm, body 3.4-4 × 1.2-1.3 mm, black, strigillose or only so apically, wings to 1.6 mm longer than cypsela body, extending to c. 1 mm outward from cypsela body, directed apically, stramineous. 2n = 34. Flowering year-round. Slope with tropical deciduous forest, wooded ravine, bosque primario, lugar húmedo, damp thickets, forested rocky ravines, borde de bosque secundario avanzado. Ch (Matuda 750, MO); G (cited by Nash, 1976: 293-294); ES (Lopez s.n., ISF00457, MO); CR (Poveda y Castro 3952, MO). 400-2000 m. (Mexico [Oaxaca, Veracruz], Mesoamerica.)

The single specimen seen with stem indumentum strigillose and hirsute is a different sheet than the single sheet seen without abaxially strigillose leaf indumentum.


Por J.F. Pruski.

Annual or perennial herbs or subshrubs; stems subterete, hispid or strigose, remotely leafy with internodes usually much longer than leaves. Leaves opposite, sessile or shortly petiolate; blade linear to oblong or ovate, chartaceous to subcoriaceous, 1-veined or 3-5-veined from near base, both surfaces eglandular, pubescent, base attenuate to rounded, margins entire to serrate, sometimes revolute, apex acuminate to obtuse. Capitulescence terminal, open, few-branched, main capitulescence branches to 15(-20+) cm, terminating in dense spherical glomerate clusters each usually with capitula clustered yet again and spirally disposed in sometimes elongated internal fascicles on a slender secondary receptacle, glomerules usually subtended by a few longer stiff bracts and several bracteoles, each 3-12+ sessile capitulate, the common flat primary and slender secondary receptacles usually hirsute. Capitula disciform, 5-9-flowered, typically without all corollas exerted simultaneously; involucre narrowly campanulate, often irregularly compressed from contact with other capitula in glomerules but basically more or less terete, not plano-compressed nor samara-like; phyllaries usually 4(-6), oblong or obovate, nearly subequal with the inner two slightly smaller, weakly imbricate, 2-seriate, outer rigid and flat, the inner two somewhat folded, strigose especially distally, apex acute to obtuse, sometimes conspicuously callous-mucronate; clinanthium proper small, flat, epealeate. Marginal floret 1, pistillate; corolla tubular, 3-5-lobed, white or ochroleucous, unequally or subequally the lobes often hirsute-pilose. Disk florets 4-8, functionally staminate, typically not reaching anthesis synchronously; corolla funnelform, 5-lobed, white or ochroleucous, the lobes triangular, often hirsute-pilose; anthers
mostly included, black; style undivided, ovary linear, flattened, sterile. Cypsela ovoid or obovoid, plump, erose, exalate, glabrous or pilose at apex; epappose. Panama, tropical South America; 5-6 spp.

Riencourtia was not treated by D'Arcy (1976), but was documented in Panama by Pruski (1998), who cited Dwyer 6925 (MO) as R. latifolia.


Riencourtia ovata S.F. Blake, Riencourtia pittieri S.F. Blake.

Perennial herbs or subshrub 0.5-1.5 m; stems erect, few-branched, slender, hispid with wide-spreading trichomes to sometimes strigillose with trichomes closely appressed. Leaves short-petiolate; blade 2-11 × 0.5-3 cm, lanceolate or elliptic-ovate to rarely ovate, chartaceous, 3-5-plinerved from very near base, prominently-reticulate abaxially, surfaces hispid pilose and hispidulous with spreading trichomes, base obtuse to broadly rounded or rarely subcordate, margins serrulate, apex obtuse, petiole 0.2-0.8 cm, hispid-strigose. Capitulescence branch supporting glomerules 4-15 cm, hispid or strigillose, glomerules 7-13 mm diam., 8-12-capitate, bracts usually 3-5 mm. Capitula 4-5 × 2-4 mm, obovoid, 8-9-flowered; phyllaries broadly obovate, subequal, apex broadly rounded, obscurely callous-tipped. Marginal floret: corolla 2.8-3 mm, unequally 3-5-lobed; style equaling corolla, branches recurved. Disk florets 7-8; corolla 1.6-3 mm, tube very short, veins of throat sometimes blackened, teeth to 0.5-1 mm, trichomes often nearly as long; anthers about half as long as corolla; sterile ovaries to 4 mm, long-persistent. Cypsela 1.5-3.2 mm, obovoid, sparsely pilose at apex. Savannas. P (Dwyer 6925, MO). ?±-?? m. (Mesamerica, Colombia, Venezuela, Guyanas, Brazil.)

20. Sphagnosticola O. Hoffm.

Complaya Strother, Thelechitonia Cuatrec., Wedelia sect. Stemmodon Griseb.

Por J.F. Pruski.

Perennial herbs; stems ascending above, commonly rooting at the nodes below, elongating sympodially, often succulent, strigose or hirsute to glabrate. Leaves opposite, sessile and slightly connate to shortly petiolate; blade lanceolate or oblanceolate to rhombic in outline, subpalmately 3-veined from above base, entire, toothed, or trilobed. Capitulescence terminal (appearing axillary when capitulum laterally displaced), monocephalous or few-capitulate from distal most
nodes; peduncles elongate, not leafy, puberulent to strigose. Capitula radiate, many-flowered; involucre campanulate to subhemispherical, weakly 2(-3)-seriate; phyllaries foliar or inner ones apically so, loosely imbricate, acute to obtuse; clysanthium convex or sometimes conical, palaec; palaec conduplicate, erose, acuminate; peduncles about twice as long as leaves. Ray florets pistillate; corolla yellow or orange, the tube short, the limb showy, c. 10-veined, abaxially glandular; style branches smooth, not papillose. Disk florets many, bisexual; corolla funnelform, yellow or orange; anthers basally short-sagittate, thecae black, apical appendages ovate, blackish or occasionally tan near connectives, glandular; styles weakly exerted, the branches nearly erect or slightly reflexed, with paired stigmatic lines, strongly papillose, attenuate. Cypsela pyriform becoming biconvex to subquatrate or triquetrous, short-rostrate in flower becoming obscurely so and coroniform in fruit, body black but sometimes covered with paler corky tissue, surface tuberculate at maturity, tubercles tan, rostrum straight and centric, margins nearly exalate, corky at maturity, apex generally weakly glandular, base lacking a large carpopodium small and inconspicuous, without elaiosomes; epappose or pappus fimbriae obscured by a thickened, corky, crown-like collar and continuous with the body of the cypsela. x = 15. 4(?-5) spp.; 3 species in the neotropics; 1 sp. native [S. calendulacea (L.) Pruski] to the paleotropics; S. trilobata occurs in subtropics of both hemispheres and also in the paleotropics.

*Sphagneticola* is a generic segregate of *Wedelia*, differing by being a stoloniferous herb rooting at the nodes with stems elongating sympodially thereby laterally displacing the terminal capitula, by abaxially glandular ray limbs, by black ovate anther appendages, and by tuberculate cypselas without well-developed carpopodia and without elaiosomes or pappus awns (Strother, 1991; Pruski, 1996). Strother (1991) used the name *Complaya* for the group, but Pruski adopted the much earlier *Sphagneticola*.


Procumbent to procumbent-ascending herbs, rooting at the proximal nodes; stems subterete, to 2 or more meters long, at times climbing to more than 1 m. Leaves sessile and slightly connate to more commonly short-petiolate; blade (2-)3-10.5 × (0.6-)2.5-8 cm, oblongate to rhombic, rarely lanceolate, typically 3-lobed, chartaceous to subsucculent, surfaces strigose, at least on veins, abaxially glandular, basally gradually or abruptly tapering, sometimes subconnate, the margins subentire or toothed, each margin typically with a prominent medial lobe, the apex acute to acuminate; petiole 0-0.5 cm. Capitula solitary; involucre 10-14 × 10-14 mm, campanulate; phyllaries 12-15, 10-14 × 2.5-4.5 mm, subequal, oblongate to oblong, green, strigose, weakly glandular or inner ones merely puberulent; pales oblongate; peduncles 3.5-14 cm. Ray florets 4-14; corolla yellow, often much more deeply so proximally, the tube 1-2 mm, the limb to 15 mm, the apex 3-lobed; styles greatly exserted, branches 1.5-2 mm. Disk florets: corolla 4.5-5.5 mm, 5-lobed, yellow, the lobes 0.6-0.8 mm, strongly pubescent-papillose adaxially or marginally, occasionally glandular on abaxial surface; anthers 2-2.3 mm, partly exserted; style branches 1-1.5 mm. Cypselae c. 3 mm, the collar to c. 1.1 mm, generally glandular, especially prominent when young, sometimes apically strigose; pappus fimbriate occasionally to 1.3 mm. 2n = 50, 54, 56, 60. Flowering year-round. Bare ocean rocks, bosques mesófilo, bosques seco tropical, coconut groves, disturbed areas, fields, gravel bars and river banks, lake shores, lawns, marshes, pine savannas, near streams and lakes, sandy areas, secondary forests, forest edges, railroad tracks, roadsides, sandy hummocks, streamsides, wet ditches. T (Revirosa 255, NY); Ch (Breedlove y Strother 46888, MO); Y (cited by Villaseñor, 1989: 112 sub Wedelia triloba); C (Matuda 3910, MO); QR (Davidse et al. 20216, MO); B (Kay 78, MO); G (Steyermark 51555, MO); H (Nelson y Hernández 940, MO); ES (expected); N (Friedrichsthal 461, NY); CR (Pruski y Sancho 3808, MO); P (Fendler 168, MO). 0- 500(-1500) m. (S. United States, Mexico, Mesoamerica, Colombia, Venezuela, Guyanas, Ecuador, Peru, Bolivia, Brazil, Uruguay, Paraguay, Cuba, Jamaica, Hispaniola, Puerto Rico,
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Virgin Islands, Lesser Antilles, Trinidad and Tobago; Africa, Asia, Australia, Pacific Islands).
Our species widely cultivated throughout both tropical and temperate regions of each hemisphere.

The species is not native to Chile, Argentina, or Europe, nor is it known to me to be cultivated in any of these three regions. The species was not documented by Calderon y Standley (1941) for El Salvador, but is nevertheless presumed to be native there.

21. **Synedrella** Gaertn.

*Ucacou* Adans.

Por J.F. Pruski.

Annual or short-lived perennial herbs, fibrous-rooted; stems subterete, glabrate proximally, strigose to pubescent distally; herbage with trichome bases with prominent subdideary cells.
Leaves opposite; blade elliptic to ovate, pinnately 3-veined from near base, both surfaces strigose, eglandular. Capitulecence axillary, usually of 1-several sessile or generally nearly sessile capitula, capitula infrequently long-pedunculate. Capitula radiate, 9-17(-18)-flowered; phyllaries imbricate, subequal, elliptic-lanceolate, the outer 2 or 3 foliar, the inner ones scarious, stramineous, striate; clianianthium convex, palicate. Ray florets pistillate; corolla limb shortly exserted. Disk florets bisexual; corolla narrowly funnelform, shortly 4(-5)-lobed; anthers 4(or 5), black; style branches with paired stigmatic lines. Cypselae of rays and disks obviously strongly dimorphic; ray cypselae large, oblong-ovate, flattened, winged, the wings deeply cut and increasing in size above where they grade into 2 stout pappus awns, these commonly much shorter than cypsela body; disk cypselae of disk small, obconical, unwinged, faces sometimes muricate, stoutly 2(-4)-awned, awns about as long as the cypsela. 1 sp. Native to the neotropics, but widespread pantropically (Pruski, 1997; Turner, 1994).

*Calyptocarpus* has very similar stout disk pappus awns and 4-merous disk florets, but differs by isomorphic tuberculate cypselae and compressed disks. In the southern Mesoamerica
*Calyptocarpus* has awns glabrous apically, whereas *Synedrella* has awns setulose throughout.
Generic misdeterminations are frequent, and names used in various studies (chromosome reports, etc.) are not confirmed.


Herbs to 1(-1.5) m; stems weakly branched, erect or procumbent. Leaves petiolate; blade (1.5-)3-12 × (0.5-)1.5-7 cm, chartaceous, adaxial surface weakly strigose, abaxial surface strigose, the base abruptly contracted and short-decurrent, the margins subentire to somewhat serrate, the apex subacuminate to obtuse; petioles obscure or to 3 cm, commonly winged, strigose. Capitulescences with peduncles 0(-4) cm, strigose to pubescent. Capitula 7-9 mm; involucre cylindrical; phyllaries c. 9, the outer ones to c. 9 × 2.5 mm, strigose, the inner ones 5-6.5 × 0.7-1.8 mm, glabrous; cliananthium minute, the pales c. 6 mm, c. 1 mm, narrowly elliptic, conduplicate. Ray flowers 3-6(-7); corolla 3-4 mm, yellow, glabrous, limb sometimes shallowly notched. Disk flowers 6-11; corollas to 3.5 mm, yellow, lobes c. 0.3 mm, puberulent; anther apex slightly exerted; style branches to c. 1 mm. Cypsela: ray cypsela 3-5 mm, awns and marginal teeth of wings c. 1 mm; disk cypsela c. 3 mm, the awns to c. 3 mm, spreading to nearly lateral displaced, generally exerted from involucre. *Roadsides, disturbed areas, lake shores, forest edges, fields, dry ridges, lawns, coconut plantations, gravel bars, swampy areas, bosque húmedo subtropical, bosque subtropical seco, selva baja caducifolia, selva alta subperennifolia* (alterada). T (Cowan 1758, TEX); Ch (Pruski y Ortiz 4176, MO); Y (Gaumer 2085, F); C (Martínez et al. 30127, MO); QR (Cabrera y Cabrera 10506, MO); B (Arvigo et al. 321, MO); G (Contreras 258, MO); H (Molina 27979, MO); ES (Sandoval y Chinchilla 702, MO); N (Baker 2129, MO); CR (Pruski y Sancho 3809, MO); P (Peterson y Annable 6624, US). 0-1300 m. (S.E. United States, Mexico, Mesoamerica, Colombia, Venezuela, Guyanas, Ecuador, Peru, Bolivia, Brazil, Paraguay, Cuba, Jamaica, Hispaniola, Puerto Rico, Virgin Islands, Lesser Antilles, Trinidad and Tobago; Africa, Asia, Pacific Islands).


Por J.F. Pruski

Scandent herbs, shrubs, or sometimes climbing shrubs to lianas; stems moderately branched, angled to subterete, striate, puberulent, pith solid. Leaves opposite, petiolate; blade lanceolate to ovate, both
surfaces eglandular; venation pinnate to palmately 3-5-veined. Capitulescence terminal or axillary from distal nodes, in corymbiform or subumbellate groups of 3(-7) capitula; peduncles typically stout, pubescent. Capitula radiate or much less commonly discoid, 40-105-flowered; involucre broadly campanulate to hemispherical; phyllaries c. 20, imbricate, 2-3-seriate, subequal or nearly so to less commonly with outer phyllaries very much longer than the inner ones, the outer ones herbaceous tipped or sometimes foliar, the inner ones scarious, strongly striate, resembling paleae; cliananthium paleate, the paleae obovate, stoutly acuminate to apiculate, rigid, conduplicate, weakly keeled, strongly striate, glabrous or finely strigillose apically, protruding in fruit. Ray florets (when present) 8-15, uniseriate, sterile; corolla yellow or yellow-orange, the tube glabrous, the limb exserted from involucre, abaxially puberulent. Disk florets 40-90, bisexual; corolla funnelform, 5-lobed, yellow or orange-yellow, the lobes long-triangular, apically puberulent; anthers included, the thecae black or less commonly brown, the connective cream-colored, the appendages deltoid, cream-colored, glandular or eglandular, basally short-sagittate; style branches becoming reflexed, stigmatic surface broadly 2-banded, apex acuminate, long-papillose. Cypselae erostrate, exalate, black, glabrous or apically setulose, fat and baccate (surface fleshy) at maturity; pappus absent. 3 spp., Neotropical, 1 var. of 1 sp. in Mesoamerica.


Lectotype (designated by D'Arcy, 1975): Surinam, Dalberg s.n. (LINN 1026.7 as microfiche!).


1a. *Tilesia baccata* (L.) Pruski var. *baccata*

Herbs or shrubs to vines, 1-3(-6) m; stems hexagonal; to suberete, sometimes purple-maculate, strigillose. Leaves: blade (5-)10–16 × (3-)4–8(-9) cm, elliptic to ovate, chartaceous to stiffly so, palmately 3-5-veined from near base, adaxial surface strigose, abaxial surface strigose or hispidulous, basally cuneate, rounded, or rarely becoming decurrent, the margins serrate or crenate to subentire, apex acute or acuminate; petiole 0.4-2(-3.2) cm, strigose. Capitulescence with peduncles 1-4(-7) cm, moderately stout, angled, strigillose to hispidulous. Capitula radiate, 48-105-flowered; involucre 1-1.5 cm diam., broadly campanulate, phyllaries 2.5-6 × 1.5-2 mm, lanceolate to elliptic, strigillose, becoming indurate past flower; ciananthium c. 1.5 mm diam.; paleae 4-6 mm, c. 20-striate, becoming indurate past flower. Ray florets 8-15; corolla yellow, the tube 0.8-1 mm, the limb oblong, 10-17 × c. 4 mm, entire or notched, abaxially hirtellous. Disk florets 40-90; corolla 5-6(-7) mm, yellow to yellow-orange, the tube c. 1 mm, the throat 3-3.5(-4.5) mm, glabrous to sometimes distally hirtellous, the lobes 1-1.5 mm, hirtellous, margins typically papillose within; style branches weakly exserted, c. 1 mm. Disk cypselaes (3-)4-5 × 2-2.5 mm, baccate, oblong or pyriform, rounded (not angled) apically. *Riversides, swampy areas, thickets, disturbed areas.* P (*Mori y Kallunki* 2517, MO). 0-900(-1600) m. (Panama, Colombia, Venezuela, Guyanas, Ecuador, Peru, Bolivia, Brazil, Paraguay, Argentina, Cuba, Hispaniola, Lesser Antilles, Trinidad and Tobago).

This species contains two varieties. In Panama, it is known only from individuals with radiate capitula, treated at the species level in D'Arcy (1975), but here recognized as *Tilesia baccata* var. *baccata*. I have not examined the type of *Wulffia blanchetii* DC., but rather have seen only a microfiche reproduction (IDC microfiche 800. 942.II.5!) of it. Consequently, *Wulffia blanchetii* DC. is listed here only as a probable synonym.

The second (discoid) variety, *T. baccata* var. *discoidea* (S.F. Blake) Pruski, was recognized by Pruski (1996), this endemic to South America and centered in Peru. *Wulffia scandens* DC. appears to be discoid, thus I follow Pruski (1996) in taking *Wulffia scandens* as a synonym of *T. baccata* var. *discoidea*.

23. **Tuxtla** Villaseñor et Strother

Por J.F. Pruski

Woody vines; herbage with small differently-sized conical trichomes, the larger 0.2-0.4 mm, the smaller of the same type seemingly mixed with a few moniliform trichomes. Leaves opposite, petiolate; blade elliptic-lanceolate to ovate, convergent-plinerved with larger secondary veins continuing to and converging near blade apex, chartaceous to stiffly so, margins subentire to
serrulate, white-strigillose to sometimes subglabrous, eglandular. Capitulescence terminal or axillary from distal nodes, corymbiform-paniculate, with opposite branches from main axis. Capitula short-radiate; involucre cylindrical-campanulate or drum-shaped; phyllaries imbricate, unequal, graduated and never strongly obgraduated, appressed, herbaceous, tips erect; outer phyllaries never very large and leafy nor spreading laterally; cliananthium paleate; paleae conduplicate, subindurate, free at base. Ray florets pistillate; corolla cream-colored to pale yellow, weakly exserted from involucre. Disk florets bisexual; corolla yellow, tubular-funnelform, actinomorphic to rarely with all lobes directed outward and corolla mimicking rays, strongly 5-nerved, 5-lobed; anthers basally rounded-sagittate, thecae black, apical appendage deltate-ovate, stramineous; style branches ascending-spreading, with a 2-banded stigmatic surface reaching to apex. Cypselae obovoid, tardily winged, rays triquetrous, disks strongly compressed and disk body less than half as thick as wide, body black distally and stramineous proximally, apex truncate, without shoulders or rostrum, wings stramineous and to c. 1 mm diam., sometimes adnate to base of pappus awn, cypselae base long-tapered, carpododium indistinct; pappus represented by 2-3(-4) awns, awns borne laterally on truncate cypselae apex, stramineous, stout, subequal, weakly divergent, abaxially scabridulous, awns gradually broad-based, v-shaped in basal cross-section, sometimes with few minute squamellae to c. 0.1 mm long between awns. \( x = 17 \). 1 sp.; SE. Mexico, Costa Rica.


Woody vines to 20 m, bark furrowed at mid-stem, smoother at base, base to c. 20 cm diam.; stems ascending, younger purple-maculate, subhexagonal, sulcate-striate, strigillose to glabrate, fistulose, nodes slightly ridged. Leaves: blade (6-)8-13(-15) × 4.5-7(-8) cm, 3-5-plinerved from near or above base, finely reticulate with smaller veins at right angles to each other and to plinervy, the adaxial surface strigillose to subglabrous, the abaxial surface strigillose, base obtuse to rounded, sometimes pressing oblique due to irregular folding of canaliculate petiole-blade juncture, apex acuminate to sometimes obtuse; petiole (0.6-)0.8-2(-3) cm, slender deeply canaliculate. Capitulescence to c. 10 × 10 cm, open, to c. 30-capitulate, rounded, held slightly above the subtending leaves, proximal branches few, not overtopping central axis, each to c. 6-capitulate and corymbiform; peduncles (3-)7-14(-20) mm, strigillose, sometimes 1-bracteolate. Capitula 28-53-flowered, 6-8 mm; involucre 4-5 × 4-6(-7.5) mm; phyllaries 18-22, 3-seriate,
strigillose, acute to acuminate, the outer series lanceolate, 1.5-2 mm, inner 2 series subequal, lanceolate-ovate, 3-5 × 1.4 mm, shorter than the paleae; cliananthium flat to convex, 2-3 mm broad; paleae lanceolate to cymbiform, 4.5-6.5 mm, subcarinate, apically acuminate, midrib setulose distally. Ray florets 8-13; corolla 3-4.5(-5) mm, short, inconspicuous, tube 1-1.5 mm, limb 2-3(-3.5) mm, lanceolate-involute, ascending, faintly c. 5-nerved, apex 2-3-dentate, sparsely setulose abaxially. Disk florets 20-40; corolla 4-4.7 mm, throat scarcely broadened, lobes deltate, 0.5-0.7 mm, setulose; style branches 1-1.5 mm. Cypselae 2.5-4.5 mm, glabrous or nearly so; pappus awns 2-3.5 mm, intermediate squamellae typically absent. 2n = 34. Forests. CR (Tonduz 9565, US). 200 m. (SE. Mexico, Costa Rica.)

Pittier's 9500 series dates from 1921 in Venezuela, whereas Tonduz's 9500 series dates from 1895. "Pittier 9565," the GH holotype (a tracing and fragment from an undesignated herbarium), matches Tonduz 9565 (US), which is thus an isotype with the correct collector and collection number. The type locality of "Tsâki" was renamed Soki and is near the Caribbean and the border with Panama. The species is known only from the Costa Rican type and a very few collections from Estación de Biología Los Tuxtlas and environs in southern Veracruz, Mexico.

24. Wamalchitamia Strother

Por J.F. Pruski.

Subshrubs to trees 0.4-6 m; stems mostly strigillose but sometimes also hirsute-pilose or stipitate-glandular, young stems somewhat hexagonal. Leaves opposite, petiolate or sometimes subsessile; blade usually lanceolate to ovate, trinerved from above base, surfaces pubescent, trichomes appressed to patent, adaxial surfaces with tuberculate-based trichomes, abaxial surface sometimes punctate-glandular. Capitulescence monocephalous to usually flowering branches open-cymose and paucicapitulate; peduncles ebracteate. Capitula radiate; involucre mostly campanulate with truncate base; phyllaries dimorphic, nearly subequal to strongly gradate, pauciseriate, the outer ones usually mostly herbaceous with base indurate, the inner ones mostly chartaceous; cliananthium flat to weakly convex; paleae lanceolate, narrowly navicular, often somewhat indistinctly (as viewed abaxially) carinate-nerved, trifid, persistent. Ray florets 5-21, pistillate; corolla yellow to yellow-orange, tube 2-3 mm, limb oblong to elliptic-ovate, usually about 15-nerved, apex 2-3-dentate. Disk florets 20-60+ (ours); corolla yellow to yellow-orange, usually glabrous, tubes shorter than funnelform limb, lobes triangular to deltate, margins finely papillose; anther thecae usually black, appendages narrowly lanceolate, stramineous, sometimes glandular; style branch apex acuminate. Cypselae dry, triquetrous (rays, keeled on the adaxial face) or
mostlly quadrat or plump-biconvex (disks), exalate, apex truncate, never rostrate, carpopodia small, elaiosomes none; pappus usually dimorphic, usually of 1-5 unequal awns and 0-6+ short intermediate squamellae, all inserted directly on apex of achene body and not continuous with cypselae margins. 4-7 spp. Mexico and Central America.


1. Peduncles and outer phyllaries moderately to densely stipitate-glandular; leaves subsessile.

4. W. williamsii

1. Peduncles and phyllaries stipitate-glandular or infrequently sparsely stipitate-glandular; leaves petiolate to distal ones subsessile.

2. Leaf blade trichomes appressed; capitulescence monocephalous.

1. W. appressipila

2. Leaf blade trichomes spreading to patent; capitulescence monocephalous to open cymose.

3. Phyllaries obviously obgraduate, outer phyllaries mostly 9-18 mm.

3. W. dionysi

3. Phyllaries nearly subequal to obgraduate, outer phyllaries mostly 8-12 mm.

2. W. aurantiaca


Shrubs to 5 m; stems strigillose, distal internodes shorter than leaves; herbage with trichomes appressed, mostly 0.1-0.5 mm. Leaves petiolate; blade 6-15(-18) × 2-4(-5) cm, lanceolate to falcate, the youngest sometimes ovate, lateral trinervation reaching to near apex, surfaces strigillose, abaxial surface also punctate-glandular, base cuneate to rounded, often short-decurrent and forming a small acumen, margins serrulate, apex attenuate; petiole 0.4-0.7 cm. Capitulescence monocephalous, not held well above subtending leaves, capitula mostly erect in bud; peduncle 3-4.5 cm, strigillose, not stipitate-glandular. Capitula 12-15 mm; involucr 11-13 × 10-13 mm, narrowly campanulate; phyllaries slightly obgraduate, c. 3-seriate; outer phyllaries 11-13 × 2.5-4 mm, elliptic-lanceolate, spreading distally, herbaceous distally and indurate basally, strigillose, apex acute; inner phyllaries about 2/3 as long as the outer phyllaries, usually ovate, erect, mostly chartaceous, sometimes strigillose distally, apex obtuse; paleae 10-12 mm, sometime maroon-tinged, hispidulous distally, apex acuminate to subulate. Ray florets 9-13;
corolla 21-30 mm, yellow to yellow-orange, the two calyx veins sparsely setulose abaxially. Disk florets 30-50; corolla 6.5-8 mm, yellow to yellow-orange, lobes 1-1.2 mm. Cypselae 4-5.5 mm, 3-4-angled, dark, strigillose; pappus awns 1-3, 2-5 mm, intermediate scales 2-6, 0.5-1 mm. Flowering Nov. Pinares. Ch (Matuda 3954, MO). 1700-2000 m. (Endemic.)

The aspect of the plant is much like that of an Otopappus.


Subshrubs or shrubs to sometimes trees 0.4-4(-6) m; stem sometimes vine-like distally, strigillose or sometimes in places especially the nodes also hirsute-pilose. Leaves usually petiolate or distal-most sometimes subsessile; blade 4-12(-15) × 1.4-5.5(-7) cm, lanceolate to more commonly ovate, adaxial surface usually hirsut-hirsute, abaxial surface commonly hirsute-pilose especially on veins, trichomes spreading to patent, infrequently strigillose, base cuneate to rounded, often short-decurrent and forming a small acumen, margins serrulate or serrate, apex attenuate; petiole 0.3-2(-3.5) cm. Capitulescence monocephalous to open-cymose, 1-5-capitulate, capitula mostly erect in bud; peduncles 2-12(-16) cm, moderately to densely strigillose to strigose or sometimes hirsute-pilose, not stipitate-glandular. Capitula usually 10-14 mm; involucre 8-12 mm, narrowly campanulate; phyllaries 1-3.3 mm diam., nearly subequal to obgraduate, 3-4-seriate; outer phyllaries mostly 8-12 mm, elliptic-lanceolate or sometimes pandurate, spreading distally, herbaceous with base indurate, usually strigillose or strigose, margins stiff-ciliate, apex acute to obtuse; inner phyllaries usually ovate, erect, mostly chartaceous with only midrib or apex herbaceous, subglabrous or midrib strigillose distally, apex acute; paleae (7-)9-12 mm, often trifid with two small subterminal lateral teeth, sometime maroon-tinged, hispidulous distally or only so on midrib, apex acuminete. Ray florets 8-14; corolla yellow to yellow-orange, limb (8-)10-16 mm, glabrous to the two calyx veins setulose abaxially. Disk florets 25-50+; corolla 7-9 mm, yellow to orange, lobes 1-1.5 mm. Cypselae about 3-5.5 mm, 3-4(-5)-angled, dark with paler tuberculae, tuberculate-strigillose-hispidulous; pappus awns 1-4, 2-6.5 mm, intermediate scales 0-4(-8), 0.5-1.5 mm. Flowering Oct-Jan(-Mar). Disturbed areas, open forest, pine forests, ravines, roadsides. Ch (Breedlove y Strother 46755, MO); ?G (Nash, 1976: 351 as Wedelia fertilis
Turner (2013) recognized *Wamalchitamia aurantiaca* and *W. strigosa* (*Wedelia fertilis*) as distinct, treating *W. aurantiaca* as a Central American endemic ranging from Costa Rica northeastward into Honduras, and *W. strigosa* as a Mexican endemic restricted to Oaxaca (the type locality) and Chiapas. Nash (1976) used the name *Wedelia fertilis*, for what appears to be the latter species group as the latter *W. aurantiaca* because the holotype of *W. strigosa* (*Andrieux 313, G-DC, as IDC microfiche 800 609.I.8 and Macbride neg. 33751) is depauperate and not obviously conspecific with Mesoamerican material.


Shrubs 1-2 m; stems strigillose and often also hirsute-pilose. Leaves petiolate; blade 5-15 × 2-7 cm, lanceolate to ovate-elliptic, adaxial surface scabrous, abaxial surfaces pilose-hirsute, trichomes spreading to patent, also punctate-glandular, base cuneate to rounded, margins serrulate, apex attenuate. Capitulescence monocephalous to open-cymose, 1-3-capitulate, not held well above subtending leaves, capitula mostly erect in bud; peduncle 0.5-9 cm, not stipitate-glandular. Capitula 11-18+ mm; involucre 9-18+ × 10-15 mm, campanulate; phyllaries obviously obgraduate, c. 3-seriate; outer phyllaries 9-18+ × 3-7 mm, broad-lanceolate to oblanceolate, herbaceous with base indurate, erect, herbaceous distally and indurate basally, mostly strigillose; inner phyllaries much shorter and broader, erect, mostly chartaceous; paleae 8-13 mm, central lobe hispidulous, subulate to spatulate. Ray florets 8-15; corolla 12-20 mm, yellow to yellow-orange. Disk florets 25-60+; corolla 7.5-10 mm, yellow to yellow-orange, lobes 1-1.2 mm. Cypselae 4-6 mm, 3-4-angled, dark, sparsely strigillose; pappus awns 1-3, 3-7 mm, intermediate scales (0-)2-6, 0.5-1.5 mm. 2n = 178-192, 204-216. Flowering Sep-Dec. *Pine-oak forests, secondary vegetation, streamsides, thickets, tropical deciduous forest.* Ch (*Breedlove y Strother* 46424, MO). 800-1600 m. (Endemic.)

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Shrubs 1-4 m; stem heterotrichous, stipitate-glandular and also hirsute with non-glandular trichomes, distal flowering branchlet internodes often longer than leaves; herbage characteristically stipitate-glandular (cap cells fragile and sometimes broken-off) but usually with at least some elongate non-glandular trichomes. Leaves subsessile; blade 5-14(-16) × 1.7-5.5(-6.5) cm, lanceolate to ovate, adaxial surfaces hispid-hirsute, also typically stipitate-glandular and hirtellous, abaxial surfaces hirsute or hispidulous to pilose (trichomes 0.5-1.5 mm), also stipitate-glandular, base (obtuse-)rounded to subcordate, margins serrulate, apex abruptly acuminate to attenuate; petiole 0.1-0.2 cm. Capitulescence monocephalous to open-cymose, 1-4+–capitulate, capitula sometimes nodding in bud; peduncles 1-4(-8) cm, heterotrichous, moderately to densely stipitate-glandular and also hirsute with non-glandular trichomes. Capitula usually 8-12 mm; involucre 5-15 × 5-8(-10) mm, narrowly campanulate; phyllaries obviously obgraduate to nearly subequal, c. 3-seriate; outer c. 4-6 phyllaries 5-15 mm, usually 2-3 mm diam. at base but only 1-1.5 mm diam. distally, linear-lanceolate or pyriform, ascending, herbaceous, stipitate-glandular and also hirsute with non-glandular trichomes, apex long attenuate; inner series of phyllaries usually 5-6.5 × 1.5-2.5 mm, lanceolate to ovate or pyriform, erect, mostly chartaceous, often purplish distally, mid-zone hirsutulous distally, also short-stipitate glandular grading to innermost eglandular, apex usually acute; paleae 7-9.5 mm, sometime maroon-tinged, hispidulous distally or only so on midrib, apex acuminate. Ray florets 7-8; corolla yellow, limb 9-15 mm, the two calyx veins setose abaxially. Disk florets 20-40+; corolla 5.5-7.5 mm, yellow, lobes 0.8-1.2 mm. Cypselae 3-4 mm, 3-4-angled, dark, subglabrous; pappus awns 1-3, 1-4 mm, intermediate scales 0-2(-4), 0.3-1 mm. Flowering (Aug+)Oct-Feb(-Apr). Oak forests, pine forests, pine-oak forests, rocky areas, thickets. H (Williams y Molina 23252, MO). 600-1500 m. (Endemic.)

Strother (1991) referred some non-stipitate-glandular plants to *Wamalchitamia williamsii*, but such plants match the type of *Zexmenia melastomacea*, treated as a synonym of a broadly defined *W. aurantiaca*, to where such plants are referred here.


Rough-pubescent, perennial herbs to shrubs; stems branched, erect, less commonly lax, rarely prostrate and rooting at a few proximal nodes. Leaves opposite, sometimes alternate near of the capitulescence, petiolate or occasionally sessile; blade mostly lanceolate to ovate, chartaceous or
stiffly so, 3-veined from or above base, surfaces usually stiff-pubescent, rarely glandular-punctate abaxially, base cuneate to rounded(-cordate), margins entire to serrate, apex attenuate to obtuse. Capitulescence monocephalous or open-cymose, 1-several-capitulate; peduncles non leafy, pubescent. Capitula radiate (ours) or rarely discoid, 12-168-flowered; involucre campanulate to hemispherical, less commonly turbinate; phyllaries several, imbricate, 2-4-seriate, graduate or subequal, outer ones often foliar and longer than the inner ones, or merely herbaceous at apex, pubescent, inner phyllaries chartaceous to scariosus, at least at base, often ciliate or pubescent at apex; clinanthium convex, paleate, the paleae conduplicate, in Mesoamerica puberulent and tapering at apex. Ray florets 4-18, typically pistillate and fertile (rarely sterile or absent), (0-)4-18, uniseriate; corolla commonly golden-yellow, the limb 2-3-lobed, occasionally deeply so, puberulent or glabrous. Disk florets 8-150, bisexual; corolla 5-lobed, commonly yellow, lobes deltate to lanceolate, puberulent adaxially and also commonly so abaxially, tube glabrous or with puberulent veins; anther thecae commonly blackish, the appendages mostly tan, deltate to lanceolate; style branches usually papilllose, with paired stigmatic lines. Cypselae flattened to subquadrinate, alate or exalate, rostrate, rostrum straight and centric, surfaces smooth or very rarely tuberculate, often pubescent, eglandular, cypsela base with obvious large plate-like carpopodia and 1-2 elaiosomes (oil-bearing bodies) at base and thereby ant-dispersed; pappus a fimbriate crown from rostrum, mostly without awns or aristae, but sometimes persistently and firmly attached 1-3-awned, awns erect. 50-110. Americas, Africa.

As traditionally defined, *Wedelia* contains species with pistillate rays and rostrate cypselae with elaiosomes, whereas similar sterile-rayed taxa have been recognized as *Aspilia*. However, *Aspilia* species are never alate-fruited and for the most part appear generically distinct. Conversely, some Wedelias are exalate, and it now also seems clear that on occasion some species of *Wedelia* (e.g., *Wedelia tambilloana* B.L. Turner) are sterile-rayed. Mesoamerican *Aspilia purpurea* is here even provisionally accepted in *Wedelia* as in Turner (1992) and Strother (1999). However, the reduction of *Aspilia* to *Wedelia* and the blanket transfer of the bulk of *Aspilia* species to *Wedelia* by Turner (1992) is not accepted. Rather, *Wedelia* is treated in the sense of Pruski (1997), who recognized *Aspilia* Thouars as a closely related genus, but distinct from *Wedelia*.


1. Rays florets without pistils, sterile; ray corolla limbs usually reddish or purplish; exalate.

6. *W. purpurea*
1. Ray forets pistillate fertile; ray corolla limbs golden-yellow or white at least adaxially, purplish; cypselae alate or exalate.

2. Main stems appearing fasciculate-leaved and densely leafy with nodes very closely spaced proximally.

5. **W. ligulifolia**

2. Main stems moderately leafy but not appearing fasciculate-leaved and not with nodes very closely spaced proximally.

3. Annual herbs; ray corolla limbs orange-yellow or ochroleucous. 4. **W. iners**

3. Perennial herbs to shrubs; ray corolla limbs usually golden-yellow.

4. Stems often rooting at proximal nodes.

3. **W. filipes**

4. Stems not rooting at proximal nodes.

5. Leaf blade abaxial surface usually with uncinate trichomes; ray corolla limbs not deeply bilobed at apex; cypselae mostly flattened-biconvex in cross-section, often broadly winged.

1. **W. acapulcensis**

5. Leaf blade abaxial surface without uncinate trichomes; ray corolla limbs often deeply bilobed at apex; cypselae flattened-quadratde or irregularly biconvex in cross-section, exalate to narrowly winged. 2. **W. calycina**


Perennial herbs to shrubs 0.2-2(-3) m; stems erect to less commonly scrambling, not rooting at proximal nodes, main stems moderately leafy but not appearing fasciculate-leaved and not with nodes very closely spaced proximally, pilose-hirsute to sparsely so, usually also finely hirtellous beneath, at least some trichomes often uncinate-tipped. Leaves: blade 3-8 (-15) × (0.5-)1.5-8 cm, usually lanceolate to ovate or rounded-deltate, sometimes lance-elliptic, or nearly linear-lanceolate or even trullate, chartaceous to stiffly so, venation trinerved, adaxial surface scabrid-
hirsute, abaxial surface scabrous or strigose-hispid to hirsute-pilose, occasionally also sparsely pubescent with moniliform trichomes or stipitate-glands, usually with elongate straight trichomes as well as finier uncinate trichomes, base cuneate or sometimes rounded to truncate, margins serrate or sometimes subentire, apex acute to acuminate; petiole 0.2-1.5(-2) cm, commonly winged from decurrent blade. Capitulescence monoecephalous to open cymose, 1-5-capitulate, held slightly above the subtending leaves; peduncles 1-6(-15) cm, slender, pilose-hirsute to sparsely so, short-stipitate glandular. Capitula: involucre 4-14 mm, obconic to broadly campanulate; phyllaries c. 3-seriate, graduated to subequal or obgraduate; outer phyllaries green except at base; paleae (4.5-)6-9 mm, sometimes purplish. Ray florets (5-)8-15, pistillate; corolla golden-yellow, tube 1.5-3.3 mm, glabrous, limb 3-15 mm, ovate to oval or orbicular, not deep bilobed at apex. Disk florets (8-) 20-80; corolla mostly 4-7 mm, (2.2) mm, lobes 0.4-1.2 mm. Cypselae 3-6 mm, mostly flattened-biconvex in cross-section, oblong to cuneate in outline, typically broadly winged to disks often nearly exalate, glabrous to antrorsely hispid to glabrous, gray to black, often mottled, rostrum 0.1-1.3 mm; pappus an irregularly cut crown 0.1-1 mm, plus 0-3 bristles or awns to 5 mm. 2n = 22, 26, 46, 52. Flowering year-round. Brushy hillsides, disturbed areas, dry hillsides, forest borders, open rocky hillsides, pine-oak forests, pine savannas, roadsides, savannas, scrub-forests, secondary growth, streamsides, thickets, thorn woodland. T (Magana y Zamudio 135, MO); Ch (Matuda 3757, MO); Y (Gaumer 826, MO); C (Lundell 865, MO); QR (Cowan 3029, NY); B (Proctor 35716, MO); G (Pruski et al. 4526, MO); H (Standley 27460, MO); ES (Calderon 1254, MO); N (Molina 22859, NY); CR (Wussow y Pruski 132, LSU); P (Stern et al. 1185, MO). 0-2100 m (Mexico, Mesoamerica, Colombia.)

Strother (1991) recognized several varieties in Mesoamerica, but here the species is provisionally interpreted in the broad sense. *Wedelia acapulcensis* var *acapulcensis* sensu Strother (1991) has winged disk cypselae, whereas *W. acapulcensis* var. *parviceps* (S.F. Blake) Strother has exalate biconvex disk cypselae and is perhaps better reinstated as *W. parviceps*. Perhaps similarly other taxa may be culled from within the synonymy of *Wedelia acapulcensis* as well. Identity of some names treated by Strother (1991) is not clear to me, and several of these are not given here in synonymy. Applications of common names from many floras are based on misidentifications and cannot be applied with certainty to the present species.


Perennial herbs to shrubs 0.5-1.5(-3) m; stems erect, not rooting at proximal nodes, much-branched, branching opposite with lateral branches typically overtopping main axis, suberect, pilose-hirsute to sparsely so, finely substipitate-glandular, main stems moderatly leafy but not appearing fasciculate-leaved and not with nodes very closely spaced proximally. Leaves petiolate; blade (1-)2-13(-16) × (0.6-)1-5(-7.5) cm, elliptic-lanceolate to elliptic-ovate(-ovate), chartaceous, venation 3-nerved from near base, adaxial surface scabrid-hirsute, abaxial surface hirsute-pilose, without uncinate trichomes, the veins typically more pubescent than the surface, occasionally also sparsely pubescent with moniliform trichomes or stipitate-glands, base obtuse to short-attenuate onto petiole, margins subentire, crenulate, or serrate, apex acute to acuminate; petiole 0.2-1.5(-2)
cm, commonly winged from decurrent blade. Capitulescence monocephalous to open cymose, 1-3-capitulate, held slightly above the subtending leaves; peduncles 1.5-4.5(-9) cm, slender, pilose-hirsute to sparsely so, sometimes also minutely papillose-glandular. Capitula 8-13(-18) mm, radiate, 25-40(-55)-flowered; involucre 10-20 mm diam., campanulate to sometimes nearly hemispheric; phyllaries 2-seriate, subequal to obgraduate, imbricate; outer series of 4-8 phyllaries 6-13(-18) × (2.5-)3.5-5 mm, elliptic-ovate, wholly, or partly herbaceous, weakly c. 5-nerved, hispid to pilosulous, apex acute, often reflexed, texturally distinct from and longer than the inner series; inner series of phyllaries 4.5-5.8 mm, lanceolate to oblanceolate, puberulent, scarious, obtuse to acute apically; paleae 5.5-7 mm, lanceolate, acute to acuminate apically, midrib sometimes greenish and puberulent. Ray florets 10-15, pistillate; corolla 7.5-13 (-20) mm, golden-yellow, tube 1.5-3 mm, glabrous, limb 6-11 (17) × 3-4.5 mm, oblong, c. 10-nerved, bilobed to deeply so, rarely 3-lobed, eglandular abaxially, the 2 larger veins hispidulous abaxially or only proximally so, apical lobes typically 1-2.5 (3) mm; style well-exserted. Disk florets 15-25 (40); corolla 5.2-7 (8) mm, tube 1.5-2 (2.2) mm, throat abruptly broadened, 2.5-4 (4.5) mm, lobes triangular, 0.7-1 (1.3) mm, puberulent, inner margins densely papillose; style branches weakly exserted, 1-2 mm, long-papillose, the apices narrowed. Cypselae 4-6 mm, oblong to cuneate in outline flattened-quadrate or irregularly biconvex in cross-section, brown to black, exalate to narrowly winged, puberulent to glabrous, rostrum to c. 1 mm, rays somewhat trigonous, often shortly 2-winged, disks slightly compressed, elaiosomes tan; pappus an irregularly cut crown to c. 0.5 mm, 1 or 2 short aristae rarely present. 2n = 48. Flowering year-round. *Disturbed areas, forest borders, roadsides, savanas, secondary growth.* P (Pittier 3451, MO). 0-1300 m. (Mesoamerica, northern South America, West Indies.)

The reports of *Wedelia calycina* in Honduras by Nelson (2008) and in the United States by Small (1933) are erroneous.


Decumbent to sprawling perennial herbs to subshrub 0.3-1.3 m; stems few-branched, often rooting at proximal nodes, main stems moderately leafy but not appearing fasciculate-leaved and not with nodes very closely spaced proximally, suberete to somewhat angled, pilose-hirsute; internodes usually about as long as to half as long as leaves; herbage heterotrichous, long pilose-hirsute with spreading non-uncinate trichomes 1-1.5+ mm and finely hirtellous often with minute moniliform trichomes. Leaves petiolate; blade 3-10(-12) × 1-6(-8) cm, rhombic to ovate or sometimes lanceolate, chartaceous, triplinerved from above base, surfaces heterotrichous, long
pilose-hirsute and finely hirtellous, base cuneate to broadly obtuse, often forming an acumen and
short-decurrent onto petiole, margins irregularly serrate, the larger leaves sometimes shallowly
lobed or hastate, apex acuminate; petiole 0.4-4 cm, sometimes shortly winged distally.
Capitulescence 1-3-capitulate; peduncles 1-10 cm, long pilose-hirsute to densely so immediately
below capitulum. Capitula 7-11 mm; involucre 5-10 × 7-10 mm, hemispherical; phyllaries 8-12,
subequal to obgraduate, 2-3-seriate; outer phyllaries 7-10 × (1.5-)2-3.5 mm, lanceolate to ovate,
herbaceous with stramineous indurate base, ascending, abaxially pilose-hirsute and finely
hirtellous, adaxial surface pilose-hirsute-distally, apex acute to obtuse; inner phyllaries 5-8 × 3-4
mm, ovate, chartaceous-scarious, appressed, hirtellous distally, apex obtuse to rounded; paleae 5-7
mm, stramineous-scarious, weakly carinate distally, apex usually dilated and obtuse to rounded.
Ray florets 8-12, pistillate; corolla golden-yellow, tube 1.5-2 mm, limb 6-10 × 3-6 mm, obovate,
c. 13+-nerved, hirtellous abaxially, apex obtuse to rounded, crenulate. Disk florets 60-80; corolla
3.5-5 mm, golden-yellow, funnelform, tube 1.5-2 mm, nearly as long as throat, lobes 0.5 mm,
triangular, papilloso marginally; anthers c. 1.5 mm; style appendiculate. Cypselae 2.5-4 × 1-2.3
mm, narrowly oblong to cuneate in outline, turgid, pale brown with epidermis somewhat corky,
sometimes mottled, rostrum c. 0.2 mm, broad-based and not well-defined, carpopodium shields
and elaiosomes 0.2-0.3 mm; ray cypselae triquetrous, indistinctly narrowly thick-winged, usually
glabrous to subglabrous, wings truncate apically and not extending distally as auricles; disk
cypselae subquadrate to biconvex, thinly setulose, exalate or narrowly winged with wings when
manifest usually seen only as apical auricles lower than rostrum; pappus a minute fimbriate
crown 0.1-0.2 mm, disks sometimes also with a single thin bristle to c. 0.5 mm. 2n = 22.
Flowering Apr-Nov. Disturbed areas, streamsides, thickets, wet areas. G (Tuerckheim II 1258,
MO); CR (Pruski et al. 3823, MO); P (Allen 4212, MO). 900-2200 m. (Endemic.)

Chinchiguaste, H.

Wedelia keatingii D'Arcy.

Annual herbs 0.1-0.6(-1) m; stems decumbent to erect, not rooting at proximal nodes, main
stems moderately leafy but not appearing fasciculate-leaved and not with nodes very closely
spaced proximally, costate-sulcate, sometimes mottled, hispid and scabridulous-hirtellous;
herbage heterotrichous, usually sparsely hispid with erect trichomes to 1+ mm and moderately
scabridulous-hirtellous with uncinate trichomes 0.1-0.3 mm. Leaves petiolate; blade 2-8(-13) × 1-
5-7 cm, lanceolate to deltate-ovate, thin-chartaceous, triplinerved from well above base, surfaces heterotrichous, hispid and scabridulous-hirtellous, base cuneate, margins crenulate-serrulate, apex acute to acuminate; petiole 0.4-3(-5) cm. Capitulescence 1-3(-5)-capitulate; peduncles 0.4-3(-6) cm, pilose-hirsute. Capitula 6-10 mm; involucre 6-9 × 3-10 mm, cylindrical-campanulate(-campanulate); phyllaries 7-13, obgraduate(-subequal), 2-seriate; outer phyllaries 6-9 × 1.5-2.5(-5) mm, lanceolate to oblong(-ovate), herbaceous with stramineous indurate base, ascending, usually hispid and moderately scabridulous-hirtellous abaxially, adaxial surface hispid distally, apex acute(-obtuse); inner phyllaries 5-6 × 2-3(-5) mm, lanceolate to oblanceolate(-ovate), chartaceous-scarious, appressed, mostly subglabrous; paleae 5-7 mm, linear-lanceolate, stramineous-scarious, sometimes purplish distally, often with midrib blackish-purple, distally usually finely hirtellous, apex often rounded. Ray florets 3-5, pistillate; corolla orange-yellow or ochroleucus, tube 1.5-2 mm, tube-limb juncture pilose adaxially, limb 3-4.5 × 2.5-4 mm, suborbicular, 5-7(-13)-nerved, the 2 support nerves hirsutulous abaxially, apex 2-3-lobed. Disk florets 5-13(-20); corolla 3.5-4.2 mm, pale yellow to orange-yellow, funnelform, tube and throat subequal, lobes 0.6-0.8 mm, triangular, setose; anthers c. 1.5 mm; style appendiculate, branches to c. 1 mm, flattened, apiculate. Cypselae 3-5 × 1.5-4 mm, oval-obovate in outline, 2(-3)-alate, body blackish with wings stramineous to bronze, sometimes either or both mottled, rostrum 0.3-0.8 mm, wings to 1 mm diam. laterally, also prolonged as apical auricles about as long as rostrum, wings of disks usually less developed than in rays and sometimes manifest only as apical auricles, ray body mostly subglabrous, disk body usually moderately pilosulous-sericeous, trichomes antrorse, carpodopodium of 1-2 ovate shields c. 0.5 mm, elaiosomes c. 0.5 mm diam.; pappus a fimbriate-lacerate crown 0.3-0.6 mm, sometimes also with 0-2(-3) lateral awns 0.4-1.5 mm arising from rostrum. 2n = 22. Flowering year-round. Disturbed areas, fields, sandy streamsides, shaded areas, thickets. Ch (Breedlove y Strother 46142, MO); G (Molina 25376, US); H (Harriman 14596, MO); ES (Standley 19414, NY); N (Stevens y Montiel 28018, MO); CR (Pruski y Sancho 3806, MO); P (Allen 4212, MO). 20-1400 m. (Mesoamerica, Colombia.)


Perennial herbs to subshrubs 0.3-0.5 m; stems several from base, erect to spreading, not rooting at proximal nodes, much-branched, subterete, often reddish, sparsely hirsute to hirtellous, main stems appearing fasciculate-leaved and densely leafy with nodes very closely spaced proximally, smaller branches with leaves remote and much shorter than internodes. Leaves
susile; blade 1.5-6 × 0.3-1 cm, linear-lanceolate, stiff-chartaceous, venation basically pinnate, surfaces usually heterotrichous, usually subtrigose-hispid with erect trichomes to 1+ mm and scabridulous-hirtellous with minute uncinate trichomes, adaxial surface subtrigose-hispid, abaxial surface scabridulous-hirtellous nearly throughout and subtrigose-hispid mostly on veins, base cuneate to rounded, margins subentire or obscurely serrulate, revolute, apex acute. Capitulescence open and held well-above stem leaves, the many naked branches 10-15+ cm and each usually 3-7-capitulate; peduncles 2-7 cm, strigillose. Capitula 5-7 mm; involucre 4.5-5.5 × 3-5 mm, campanulate; phyllaries 8-13, 4.5-5.5 × 1-1.5 mm, subequal, 2-seriate; outer phyllaries lanceolate-ovate, herbaceous with stramineous indurate base, sometimes purplish 5-nerved, ascending, subtrigose; inner phyllaries ovate, chartaceous-scarious, appressed, mostly subglabrous; paleae 4-5.8 mm, lanceolate, stramineous to purplish distally, distally usually finely hirtellous, apex acute. Ray florets (4-)5, pistillate; corolla golden-yellow, sparsely setulose, tube 1.4-2 mm, limb 2.5-4 × 1.5-3 mm, ovate to suborbicular, faintly-nerved, apex 3-lobed. Disk florets 8-20; corolla 3-4 mm, yellow with nerves often purplish, funnelform, tube to c. 1 mm, shorter than throat, lobes 0.5-0.6 mm, triangular, minutely setulose; style branches papilllose. Cypselae 2.5-3.5 × 1-2.5 mm, rostrate, body black, wings brown, often mottled, rostrum 0.4-0.7 mm; ray cypselae obovate or cuneate in outline, 2-3-winged, glabrous, wings to c. 0.8 mm diam., strongly prolonged as apical auricles often longer than rostrum; disk cypselae biconvex, basically exalate with wings manifest only as apical auricles, body moderately pilosulose-sericeous, trichomes antrorse, carpopodium of 1-2 ovate shields 0.2-0.4 mm, elaiosomes not prominent; pappus a fimbriate-lacerate crown 0.2-0.7 mm, often also with 0-2 lateral thin awns 1-2 mm. Flowering Aug-Nov (+May). Pinelands, pine-oak forests, rocky areas. G (Pruski et al. 4542, MO); H (Harriman 14596, MO). 900-1600 m. (Endemic.)


Aspilia scabrida Brandegee.

Perennials herbs or subshrubs 0.2-0.4 m; stems 1-few from xylopodium, erect, not rooting at proximal nodes, main stems moderately leafy but not appearing fasciculate-leaved and not with nodes very closely spaced proximally, hirsutulous-strigillose, trichomes usually appressed, internodes sometimes longer than leaves. Leaves subsessile; blade 2-5.5 × (0.5-)1-2.5 cm, oblong to oblanceolate, chartaceous to stiff-chartaceous, surfaces scabrous, base narrow-cuneate, margins few-serrate, apex acute to obtuse. Capitulescence of single long-pedunculate capitula terminating
branches and branchlets; peduncles 5-12 cm, hirsutulous-strigillose. Capitula 9-12 mm; involucre 8-11× 6-9 mm, campanulate; phyllaries 12-15, 4-5 mm diam., subequal, ovate, 2-3-seriate, strigillose, apex broadly acute to obtuse, outer phyllaries herbaceous with stramineous indurate base grading to inner phyllaries herbaceous only distally, sometimes tinted purplish; paleae 5.5-7.5 mm, linear-lanceolate, sometimes purplish distally, apex usually finely hirtellous. Ray florets 3-7, sterile, not pistillate; corolla reddish to purplish, tube 3-4 mm, limb 10-15 × 2-3 mm, oblong, c. 15-nerved, the 2 support nerves moderately thin, abaxially sparsely papillose. Disk florets 20-35; corolla 5.8-6.8 mm, reddish to purplish, tubular-funnelform, tube 1.5-2, lobes 0.9-1.3 mm, margins papillose, apical cells of lobe bulbous; style appendiculate, branches 1.5-2 mm, attenuate. Cypselae 3-4 × 2-2.5 mm, obovoid-biconvex, plump, brownish, mottled, exalate, moderately pilosulose-sericeous throughout, trichomes 0.3-0.4 mm, mostly appressed, rostrum 0.1-0.3 mm, carpodophilum of 1-2 oblong shields 0.5-1 mm, elaiosomes to 1 mm diam.; pappus a fimbriate-lacerate crown 0.2-0.5 mm, sometimes also with 1(-2) adaxial awn 0.5-1 mm, persistent. 2n = c. 24-28. Flowering June-Nov. Pine-oak forests, rocky slopes. Ch (Purpus 9107, MO). 700-1000 m. (S. Mexico, Mesoamerica.)

26. Zexmenia La Llave

Por J.F. Pruski.

Coarse erect long-lived perennial herbs to shrubs; stems clambering, pubescent to glabrate proximally, branching opposite, intrapetiolar ridge present, internodes usually about as long as leaves. Leaves opposite, petiolate; blade chartaceous to stiffly so, arching pinnate-subtrinervate, each side of midrib well above base with 2-5 arching more or less equally prominent (or the more-proximal slightly more so) secondary veins, surfaces pubescent, eglandular, adaxial surface trichomes strongly antarose, subsidiary cells prominent. Capitulescence open and corymbiform, of 1-several capitula, typically not well-exserted from subtending leaves, more or less flat-topped to somewhat rounded, terminal, lateral branches more or less equally long and with distal internodes congested, only the most distal pair of these branches nearly over-topping central capitulum; peduncles slender, ebracteate. Capitula radiate, many-flowered; phyllaries imbricate, unequal or subequal, graduated to obgraduate, 2-4-seriate, the outer series strongly indurate basally, distally herbaceous, often longer than inner series, inner phyllaries scarious at least at base; clinanthium low-convex, paleate; paleae stramineous, conduplicate, often exserted from involucre in fruit, much longer than inner-most phyllaries, sometimes keeled, apex acuminate to obtuse. Ray florets usually 8-13, fertile; corolla yellow, tube short, limb short- to well-exserted, c. 
10-nerved, the 2 supporting nerves much thicker than medials and laterals, apex obtuse and 2-3-denticulate, sparsely setulose and eglandular abaxially; style well-exserted. Disk florets bisexual; corolla narrowly campanulate to funnelform, 5-lobed, yellow, eglandular, tube short, c. half as long as throat, throat usually with prominent fiber sheaths associated with each of the 5 main nerves, lobes setulose outside, margins papillose within; anthers more or less occupying c. ½ throat length, blackish to brownish, appendage stramineous, deltate; style branches shortly exserted, spreading laterally, slender, stigmatic surface 2-banded adaxially, apex with narrowed sterile papillose appendage. Cypsela dimorphic, compressed, winged, rostrate or subrostrate, oblong to obovate in outline, body black, plump, faces rounded-convex, smooth, setose distally, apically constricted into 2-3-corniculate rostrum or subrostrum, rostrum straight and centric, gradually acuminate to attenuate basally, 1-2 elaiosomes infrequently present, elaiosomes (when present) small and inconspicuous, carpopodium small and inconspicuous, wings and rostrum stramineous at maturity, wings subequal, thin to coryx, pubescent; pappus represented by 2 or 3 subequal scabridulous persistent awns arising from rostrum, usually about as long as cypsela, and by 4-10 short intermediate squamellae sometimes connate into crown, awns isomorphic, terete or base very slightly tangentially flattened; rays triquetrous, slightly obcompressed, laterally 2-winged (abaxial edge of rays not developing a wing), 3-awned; disks compressed, radially 2-winged, 2-awned. 2 spp. México, Central America.

Zexmenia is one of several similar genera characterized in part by opposite leaves, yellow-flowered radiate capitula, herbaceous or largely herbaceous outer phyllaries, shortly-lobed disk florets with black anthers, and flattened 2-3-awned cypsela. Related genera are diagnosed basically by varying combinations of characters of the fruit, namely presence or absence of rostra, radial or lateral wings, elaiosomes, enlarged carpopodia, and strengthen v-shaped awns. The rostrum or subrostrum in Zexmenia, here used as a character always present in Zexmenia, is perhaps best seen in mid-aged fruits.

Zexmenia was revised by Jones (1905), who recognized 42 species, 2 sections, and included taxa with rostrate and erostrate cypsela in Zexmenia. Blake (1915, 1917) accepted Bidens fruticosa (now recognized as Lasianthaea fruticosa) as a species of Zexmenia, and thus believed, as did Jones (1905), that the character of cypsela with or without a rostrum was not generically significant. Lasianthaea, monographed by Becker (1979), is closely related to Zexmenia, also differs by lacking obvious wings on the cypsela.

Blake (1930) was the first to correctly circumscribe and fix the identity of the type species, Z. serrata, which has rostrate or subrostrate fruits and which for the 50 years previous was incorrectly identified as Z. scandens of the non-typical non-rostrate section. At its largest,
Zexmenia included more than 100 species, but most of these have erose or exalate cypselae and have been excluded.

The generic boundaries and relationships of Zexmenia were studied in detail by Rindos (1980), who recognized seven lineages within the genus, and many of these lineages were subsequently recognized as generically distinct (e.g. Jefea Strother, Lundellianthus H. Rob., Wamalchitamia Strother) by Strother (1989, 1991). Turner (1988) also noted that as traditionally envisioned Zexmenia was "ill-defined," considered recognition of Lundellianthus, but ultimately choose to reduce Lundellianthus into the synonymy of Lasianthaea. Indeed, species of both Lundellianthus and Lasianthaea are erose and typically have disk corolla throats usually with prominent fiber sheaths. Panero (2007) keyed Zexmenia as distinct from Lasianthaea by having disk corolla throats without prominent fiber sheaths, but in his generic description of Zexmenia Panero gives "with or without" fiber sheaths. I find fiber sheaths to be typically present in disk corollas of Zexmenia, as they are in Lasianthaea. Strother (1991) retained solely two species in Zexmenia. Although the boundaries of the Zexmenia generic group may perhaps shift once again and the differences between the erose cypselae of Zexmenia and rostrate cypselae of Wedelia are bridged by the apically constricted disk cypselae of Lundellianthus and the subrostrate cypselae of Oyedaea, I defer to the generic taxonomy employed in the treatments by Strother (1989b, 1991, 1999).


1. Outer phyllaries gradually narrowed, shorter to slightly longer than inner series; inner phyllaries 3-5 mm diam., apex obtuse or rounded to less commonly acute; cypsela awns strict, wings becoming thick and corky, ciliate, marginal trichomes 0.1-0.4 mm.

   1. Z. serrata

   1. Outer phyllaries abruptly narrowed, usually much longer (albeit sometimes tardily so) than inner series; inner phyllaries 2-3 mm diam., acute to obtuse; cypsela awns sometimes reflexed to recurved, wings thin and chartaceous, long-ciliate, marginal trichomes 0.3-0.8 mm.

   2. Z. virgulta


Frequent scandent to erect coarse herbs to shrubs 1-5(-6) m; stems hexagonal, tomentulose to pilose-tomentose, trichomes patent. Leaves: blade (3-)6-15 × (1.5-)2-6.5(-8) cm, lanceolate to ovate, adaxial surface scabrous to hirsutulous, abaxial surface hirsutulous to pilose-hirsute, trichomes patent to sometimes antrorse, base broadly cuneate to rounded, margins serrate to serrulate, apex acute to acuminate; petiole 0.6-2.5 cm. Capitulescence branches 3-7(-9)-capitulate; peduncles 1-3(-4) cm, densely hirsutulous. Capitula 9-11 mm; involucre 6-11 mm diam., campanulate to drum-shaped; phyllaries graduate to slightly obgraduate, 3-4-seriate, outer series shorter to slightly longer than inner series, (2.5-)4-8 × 1.5-4 mm, lanceolate to deltate-ovate, gradually narrowed distally, apex acute to obtuse, ciliate and strigillose-hirsutulous, slightly spreading or reflexed, inner series 5-6(-7) × 3-5 mm, deltate-ovate to broadly ovate, ciliate, apex obtuse or rounded to less commonly acute; paleae 6.5-8 mm, often subapically carinate, apex darkened, densely setulose, acute or more often noticeably obtuse, often slightly dilated. Ray florets 8-13; corolla tube 1.3-2 mm, limb 7-11 × 2-4(-5) mm, elliptic-oblong, well-exserted. Disk florets 25-70+; corolla 7-7.5 mm, funnelform, tube 1.5-2.5 mm, lobes lanceolate, c. 1 mm, setulose; style branches c. 1.5 mm. Cypselae 4-6.5 × 1.5-3.5 mm, setose distally, rostrum c. 0.5 mm, wings 0.5-1 mm diam., at maturity c. as broad as cypsela body, becoming thick, corky, ciliate, marginal trichomes 0.1-0.4 mm; awns 2-5 mm, strict, intermediate squamellae 0.3-1 mm.

*Largely Caribbean watershed: Clearings, disturbed areas, disturbed forest, forest edges, lake margins, orillo de camino, orilla del acahual, river banks, roadides, rocky hills, secondary vegetation, steep slopes, thickets.* T (Johnson 24, NY); Ch (Pruski et al. 4220, MO); B (Gentle 1494, NY); G (Contreras 743, MO); H (Wilson 578, MO). 0-1500(-2000) m. (S. México [Veracruz, Oaxaca], Mesoamérica.)

The type of *Zexmenia trachylepis* Hemsl. was distributed, and given by Hemsley (1881), as "Yucatán y Tabasco," but the species is unknown in Edo. Yucatán, and the type was surely collected in Edo. Tabasco, as treated by Blake et al. (1926). The above synonymy follows that of Blake (1930) and Strother (1991, 1999). The report by Nash (1976) of *Z. scandens* in Costa Rica is based, at least in part, on a misdetermination by Becker (en sched.) of *Brenes 5347* (NY!) as *Z. serrata*, a collection here redetermined as *Z. virgulta*. Other Costa Rican material determined by Becker (en sched.) as *Z. serrata*, proves to belong to other genera, for example, to traditionally
recognized *Lasianthaea*. The description by Jones (1905) of both leaf surfaces being "stellate-pubescent" is in error.


Much-branched herbs to clambering shrubs 1-5 m; stems subhexagonal to more commonly suberete, strigose-tomentulose and trichomes mostly appressed (most southeastern populations) to pilose-tomentose and trichomes mostly patent (northwestern populations). Leaves: blade (4-)8-15(-18) × (1.5-)-2-6(-7) cm, lanceolate to elliptic-lanceolate, adaxial surface scabrous to hirsidulous, abaxial surface hirsutulous to pilose-hirsute, trichomes patent or more frequently antrorse, base broadly cuneate to obtuse, margins serrate to serrulate, apex acuminately to attenuate; petiole 0.6-2(-3) cm. Capitulescence branches 3-5-capitulate; peduncles 1-5 cm, hirsutulous to densely so. Capitula 8-10 mm; involucre 9-12 mm diam., hemispheric; phyllaries unequal, usually obgraduate with the outer series usually much longer (albeit sometimes tardily so) than the inner series, 3-4-seriate, outer 5-8 phyllaries (4-)7-10 × 1-2(-3) mm, pyriform-lanceolate, spreading to reflexed, base broad, distal 2/3-3/4 abruptly narrowed, apex acute, ciliate and strigillose-hirsutulous, inner series 5-6 × 2-3 mm, deltate-ovate to oblong, ciliate, apex broadly acute to obtuse or rounded; paleae 5-7 mm, often subapically carinate, densely setulose, acute to obtuse. Ray florets (8-)13; corolla tube 1-2.2 mm, limb 3-8 × 2-3 mm, elliptic-oblong, short-exserted (typical of material from the southeast) or well-exserted (typical of material from the northwest), c. 10-nerved to faintly so. Disk florets 40-100; corolla 5.5-7 mm, broadly funnelform to campanulate, tube 1.5-2.3 mm, lobes lanceolate, 0.6-1 mm, setulose to apex often long-setose; style branches 1-1.5 mm. Cypselae 3-4 × 1.5-2.2 mm, sparsely setose distally, rostrum c. 0.4 mm, wings 0.2-0.7 mm diam., thin and chartaceous, long-ciliate, marginal trichomes 0.3-0.8 mm; awns sometimes reflexed to recurved, 3-4.3(-5) mm, intermediate squamellae 0.5-1 mm. *Disturbed forest, forest edges, river banks, roadsides, secondary vegetation, thickets*. Ch (Purpus 7192, MO); G (Standley 62169, NY); CR (Skutch 4617, MO); P (Busey 659, MO). 30-1700(-3200) m. (México, Mesoamérica.)

The species appears to be much more common in Costa Rica than to the northwestern portion of its range. The more northwestern populations, treated by Blake et al. (1926) as *Zexmenia leucactis* with *Z. chiapensis* as a synonym, typically have stems with patent trichomes, narrower disk corollas, and long ray corolla limbs, thus resembling *Z. serrata*, but are geographically
distinct from it, being known predominantly from the Pacific watershed. I have not seen type material of *Z. leucactis* S.F. Blake, but it is referred to synonymy here (albeit only provisionally so) following Strother (1991, 1999). *Williams 28548* (NY), by 1500 m the highest elevation voucher seen, has much smaller capitula than do most vouchers. *Atwood 1250* from Nicaragua has not been seen, and thus its field determination of *Z. virgulta* cannot be verified, not even to genus. It is mentioned here specifically to nip-in-the-bud spread of unverified database rumors.

*Zexmenia virgulta* is similar superficially *Otopappus verbesinoides* (each has capitula radiate, phyllaries usually obgraduate, outer phyllaries spreading to reflexed, and winged cypselae), but *Otopappus* differs by sterile ray florets, erose cypselae with wings unequal, and by pappus awns heteromorphic.

**XII. C. Heliantheae** subtribe *Enceliinae* Panero

Por J.F. Pruski.

Annual or perennial herbs to shrubs or rarely trees. Leaves alternate or infrequently opposite; blade usually linear to ovate, sometimes dissected, usually trinerved. Capitulescence terminal, monocephalous to corymbiform or paniculate. Capitula radiate or discoid; involucre turbinate to hemispherical; phyllaries typically subequal, 2-5-seriate, generally herbaceous to rarely chartaceous; clinanthium paleate, flat to convex; paleae bases not decurrent onto clinanthium, deciduous post-anthesis. Ray florets sterile, rarely styliferous; corolla tube often setulose, limb rarely setulose. Disk florets bisexual; corolla typically 5-lobed, throat veins mostly without (Mesoamerica) embedded fibers, lobes sometimes glandular or setose; anthers ecaudate, thecae yellow to black, appendages sometimes glandular, endothecial pattern polarized; style trunk with 2 vascular strands, branches with a more or less continuous stigmatic surface, apex exappendiculate. Cypselae typically compressed, often densely sericeous, Mesoamerican species with margins long-ciliate-sericeous with trichomes to c. 2 mm, sometimes winged, brown to black, carbonized but without longitudinal striatulae interrupting the phytomelanin layer; pappus usually bilateral and 2-aristate, with (Mesoamerica) or without squamellae in between, awns slender, sometimes epappose. *x = 15, 17, 18*. 5 gen. and aprox. 62 spp. Temperate and tropical America. 1 gen., 1 spp. in Mesoamerica.

*Flourensia* was placed in subtribe Ecliptinae Less. by Strother (1999). *Encelia* Adans. (the type of subtribe Enceliinae Panero) and *Flourensia* were treated as members of subtribe Ecliptinae Less. by Robinson (1981) and of subtribe Verbesininae Benth. by Karis y Ryding (1994b). *Flourensia* was revised by Blake (1921-FL) and Dillon (1984), who each discussed its similarly to *Encelia*. Here, I follow Panero (2007-HEL), who treated *Flourensia* in subtribe Enceliinae.

1. Flourensia

Por J.F. Pruski.

Glutinous subshrubs to trees. Leaves alternate, petiolate to subsessile; blade venation pinnate, surfaces usually resinous or glutinous. Capitulescence monocephalous to corymbiform. Capitula radiate or discoid; involucre campanulate to hemispherical; phyllaries 12-40, subequal to strongly gradate, often thickened, paleae navicular, typically glutinous, apex blunt to acute. Ray florets (0-5)-21; corolla yellow to golden, tube very slender, sometimes setulose, limb narrowly elliptic to oblong. Disk florets 12-100+; corolla yellow, mostly glabrous, tubes much shorter than funnelform limb, lobes triangular; anther thecae yellow to black, appendages sometimes glandular; style branch apex acute. Cypselae biconvex, moderately compressed, oblong in outline, black, margins usually ciliate or sericeous, faces subglabrous to densely sericeous; pappus of (0-)2(-4) persistent to caducous aristae, arista base sometimes laciniate.  x = 18. Aprox. 33 Spp., SW USA, Mexico, Peru, Bolivia, Chile, Argentina.

Flourensia differs from most genera of Enceliinae by its pinnate venation, and F. collodes differs from most species of Flourensia by its somewhat graduate phyllaries.


Shrubs to 4 m; stems grayish to brown, pilose to glabrate, never long-sericeous. Leaves: blade mostly 5-16 × 1.5-7 cm, lanceolate-ovate, subcoriaceous, with about 6-9 main secondary veins per side, adaxial surface glabrous, abaxial surface strigillose or pilosulose on veins, base oblique-obtuse, margins entire, apex acute to attenuate; petiole 0.5-2 cm. Capitulescence open-cymose, 2-7-capitulate, held somewhat above distal leaves; peduncles 2-8 cm, leafy-bracteate. Capitula 15-20 mm; involucre 18-22 mm diam., broadly hemispherical; phyllaries somewhat graduate, subcarnose-herbaceous or sometimes base cartilaginous, often vernicose but flat along the thinner scarious margins; outer phyllaries 3-5.5 mm, lanceolate, often broad-costate and navicular,
margins ciliolate, surfaces glabrous, apex acute; inner phyllaries 7-10 × 1.5-2 mm, narrowly oblanceolate, flat, apex obtuse; clinanthium mostly 5-7 mm diam., convex; paleae 12-15 mm, longer than the cypselae, oblanceolate, stiff, pluristriate, often carinate, ciliolate, apex obtuse-rounded, subcucullate. Ray florets 12-16; corolla yellow, tube 5-6 mm, glabrous, limb 15-22 × 5-8 mm, well-exserted, narrowly elliptic. Disk florets (30-)70-100; corolla c. 6 mm, lobes 0.6-1 mm; anthers to c. 3 mm, brown but often connectives and appendages stramineous; style branches c. 2.5 mm. Cypselae 8-10 mm, faces glabrous or sparsely hirsute-pilose, margins long-ciliate-sericeous with trichomes to c. 2 mm; pappus aristes 2, 4.5-7 mm, shorter than cypselae, with intermediate laciniate squamellae 1-3 mm. Flowering Aug-Dec. Rocky slopes, deciduous forests. Ch (Breedlove 20388, MO). 400-900 m. (S. Mexico, Mesoamerica.)

XII. D. Heliantheae subtribe Engelmanniinae Stuessy

Por J.F. Pruski.

Annual or perennial herbs, rarely shrubs; stems leafy or leaves infrequently rosulate. Leaves alternate or opposite (Mesoamerica); blade ovate or oblong to trullate, sometimes perfoliate, entire to pinnatifid. Capitulescence terminal, monocephalous to corymbiform or paniculate. Capitula radiate or discoid; involucre usually hemispherical or sometimes campanulate; phyllaries typically subequal, 2-4-seriate, usually herbaceous throughout or base indurate; clinanthium paleate, flat to convex. Ray florets pistillate, 1(-2)-seriate. Disk florets bisexual or functionally staminate; corolla 5-lobed, glabrous or pubescent, throat and lobe veins with prominent fibers associated with the nerves; anthers ecaudate or rarely long-sagittate, thecae black or rarely reddish, appendages sometimes glandular, endothecial pattern polarized; style trunk with 2 vascular strands, branches sometimes a continuous stigmatic surface (Mesoamerica), or more typically with a 2-banded, branches sometimes fused when florets functionally staminate. Cypselae of rays triquetrous or obcompressed, when disks fertile their cypselae compressed-rhomboïdal, faces often densely sericeous, sometimes winged, brown to black, carbonized; pappus usually bilateral and 2-aristate, with or without squamellae in between, sometimes epappose. x = 13, 14, 15, 16, 18, 19. 8 gen. and aprox. 63 spp. Canada to Mexico, infrequently in Caribbean and northern South America. 1 gen., 2 spp. in Mesoamerica.

Engelmanniiinae was treated in synonymy of subtribe Ecliptinae Less. by Robinson (1981), but was recognized as distinct by Karis y Ryding (1994b), who recognized six component genera, but treated Borrichia within subtribe Verbesininae Benth. Engelmanniiinae was recognized as distinct by Panero (2007-HEL), whose exclusion of Dugesia and expansion to eight genera, including Borrichia and two
additional genera with bisexual disk florets, is followed here. *Borrichia* is further somewhat atypical by its style branches with a continuous stigmatic surface.


1. **Borrichia** Adans.

*Diomedea* Cass.

Por J.F. Pruski.

Perennial fibrous-rooted resinous herbs to shrubs to 1.5(-2) m, plants often clonal and in colonies of many individuals; stems erect or less commonly decumbent, dichotomously branched proximal to terminal capitula and overtopping central axis, leafy distally with main stems leaves often much larger than branch leaves, internodes often shorter than leaves. Leaves opposite, sessile or subsessile with a petiolariform base; blade oblanceolate to ovate, not-lobed, often carnose or subcoriaceous, with midrib only visible or with several nearly parallel secondary nerves diverging from midrib apically, surfaces glabrous to villous or sericeous, usually concolorous, base cuneate to attenuate, margins entire or dentate, apex often cuspitate. Capitulescence monocephalous to few-capitulate and corymbiform; peduncles stout, ebracteolate. Capitula radiate, many-flowered; involucre (0.8 hemispherical to globose; phyllaries 10-35, imbricate, unequal to subequal, 2-4-seriate, green to gray, apex spinose to rounded; clinanthium convex, paleate; paleae loosely conduplicate, stiffly chartaceous to indurate, apex spinose to rounded. Ray florets pistillate, (7-12)-30; corolla yellow, sometimes persistent on cypselae, tube c. half as long as limb, limb shortly exserted, usually glandular abaxially, apex emarginate or shallowly 3-toothed. Disk florets bisexual, many; corolla narrowly funnelform, shortly 5-lobed, yellow, throat strongly costate with veins with embedded fibers; anthers black, basally short-sagittate, apical appendage triangular, appendage and sometimes connective glandular; style branches with a continuous stigmatic surface, papillose, attenuate. Cypselae slightly obcompressed and trigonus (rays) to prismatic (disks), black to gray, carpopodium sometimes slightly asymmetric; pappus coroniform. *x = 14.* 2 spp. and one hybrid; Estados Unidos, México, Central America, West Indies.

Semple (1978) provisionally recognized three species, including *Borrichia peruviana* (Lam.) DC., known only from the sterile Dombey types in G-DEL and P-LAM. The collection of Dombey shows a plant with discolorous leaves that seems to be *Borrichia arborescens*, but Semple (1978) suggests this plant may be West Indian and actually represent a hybrid between
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*Borrichia arborescens* and *B. frutescens*. I agree with Semple (1978) that this Dombey collection is most likely West Indian, but because he recognized *Borrichia peruviana* I am hesitant to place it in synonymy. Nevertheless, I do not recognize *Borrichia peruviana* and recognize *Borrichia* as containing only two species.

In the Yucatán Peninsula each species is commonly misidentified, rendering checklist untrustworthy, unless the cited vouchers are examined. Nash (1976) cited *B. arborescens* as occurring in Belize from where I have seen vouchers, but neither recognized species is known from Guatemala.


1. Outer phyllaries commonly glabrous or glabrate; inner phyllaries and paleae obtuse or rounded to less commonly acute; phyllaries chartaceous in fruit; leaf blade surfaces often glabrous or glabrate.

   1. *Borrichia arborescens*

   1. Outer phyllaries usually finely griseous-sericeous; inner phyllaries and paleae spinulose to spinose apically; phyllaries indurate in fruit; leaf blade surfaces rarely glabrate.

2. *Borrichia frutescens*


   Herbs to compact much-branched shrubs to 1(-1.5) m; stems several, thick with prominent leaf scares, decumbent to more commonly ascending to erect, glabrous or finely gray- to white-sericeous. Leaves: blade 2-6(-14) × 0.5-2 cm, typically oblanceolate or spatulate, finely sericeous to often one or both surfaces glabrous or glabrate, sometimes discolorous, base cuneate to narrowly so, sometimes subclasping, margins usually entire, apex acute to obtuse. Capitulescence of 1-3(-6) capitula; peduncles (1-)2-5 cm. Capitula 10-15(-18) mm; involucre (8-)10-14(-17) mm diam., hemispherical; phyllaries 10-16, subequal or less commonly unequal or obgraduate, 2-3-seriate, appressed, chartaceous in fruit, finely sericeous to more commonly glabrous or glabrate;
the outer series of phyllaries elliptic-ovate, apex acute to obtuse; the inner series of phyllaries oblanceolate, margins sometimes ciliolate, apex obtuse or rounded to less commonly acute; paleae usually shorter than associated floret, apices obtuse to less commonly acute. Ray florets (7-)12-20; corolla tube c. 3 mm, limb 5-8(-9) × 1.5-4 mm, oblong to obovate. Disk florets 20-50; corolla 5-6 mm, lobes 1-1.5 mm. Cypselae 3-4 mm. 2n = 28. Flowering year-round. Rocky seashores, marshy areas, lagoon margins, open scrub, duna costera. QR (Cowan 5063, MO); B (Balick et al. 1950, NY); H (Nelson 9142, MO). 0-10 m. (Estados Unidos [S. Florida], Mexico [Veracruz], Mesoamerica, Cuba, Jamaica, Hispaniola, Puerto Rico, Lesser Antilles, Cayman Islands, Bahamas, Bermuda.)

Semple (1978) and Howard (1989) listed Borrichia argentea DC. as a synonym of B. arborescens, and indeed the usage of Kunth and de Candolle equates to that of B. arborescens as recognized by Semple. However, Borrichia argentea is a homotypic synonym of Buphthalmum peruvianum, and thus the application of this name Borrichia argentea is similarly uncertain. Millspaugh (1930) and Semple (1978) cited material from Quintana Roo, but from no other Mexican localities in the Yucatán Peninsula. The citations of this species in Tabasco by Cowan (1983) and by Perez et al. (2005) are likely based on indeterminations, and one (Cowan 3198) of the two cited vouchers is redetermined here as B. frutescens. The citation by Nash (1976) of B. arborescens in "Yucatan" is presumably in reference to material of B. frutescens.


*Borrichia frutescens* var. *angustifolia* DC., *Diomedea bidentata* Cass.

Few-branched shrubs to 1.5(-2) m; stems usually erect, sometimes decumbent or arching, finely gray- to white-sericeous. Leaves: blade 4-8(-11) × 1-3 cm, oblanceolate or obovate to less commonly elliptic, typically villous to finely sericeous, rarely glabrate, base attenuate, margins, 1-2-(5-)dentate to subentire, dentations usually c. 0.5 mm, dentations sometimes spinose, apex acute to obtuse. Capitulescence of 1-5 capitula; peduncles (1-)2-6 cm. Capitula \8-12 mm; involucere 10-20 mm diam., hemispherical to globose, phyllaries 20-35, unequal or rarely the outer two as long as inner, 3-4-seriate, pyriform, appressed or spreading to the outer reflexed in fruit, indurate in fruit, apex spinose to spinulose, spines or spinules 1-2 mm, yellowish brown throughout or at least apically so; the outer series of phyllaries 2-4 mm, usually finely griseous-
sericeous; the inner series of phyllaries 3-6 mm, often glabrate; paleae rigid, typically longer than associated floret, apex spinulose to spinose. Ray florets 15-30; corolla limb 6-8 × 1.5-4 mm, oblong to obovate. Disk florets 20-75; corolla 5-6.5 mm, lobes 1.7-2.5 mm. Cypsela 3-4 mm. 2n = 28, rarely 42. Flowering Feb-Sep. Marshes, pastizal, mud flats, bosque de mangle, duna costera. T (Cowan 3198, MO); Y (Gaumer 1161, MO); C (Chan y Burgos 677, MO); QR (Gaumer 2209, F). 0-40 m. (Gulf and Atlantic coastal Estados Unidos, Mesoamerica, Bahamas, Bermuda; introduced in West Indies.)

The sole known locality in Quintana Roo is at Lago Chichkanab, in the center of the Peninsula near the southern border with Edo. Yucatán. I have seen no material from Bermuda, but this, the more temperate of the two species, was cited as occurring there by Semple (1978).

XII. E. Heliantheae subtribe Helianthinae Dumort.

Por J.F. Pruski.

Annual or perennial herbs to shrubs or infrequently trees; stems usually leafy. Leaves alternate or opposite; blade usually trinerved and non-dissected, surfaces often scabrous. Capitulescence usually terminal, usually monocephalous to open-cymose or corymbiform, typically of free pluriflorous capitula, rarely a synflorescence of aggregated uniflorous capitula. Capitula pluriflorous or very rarely uniflorous, radiate or discoid; involucre cylindrical to hemispherical; phyllaries typically free and not connate into an involucral tube, very rarely connate into an involucral tube, subequal to gradate, mostly 2-7-seriate, generally herbaceous at least apically; clinanthium flat or convex to sometimes hemispherical or low-conical, paleate or rarely epaleate; paleae not or only inconspicuously acrescent in fruit, bases not decurrent onto clinanthium, usually strongly conduplicate, rarely completely enclosing cypsela (or at anthesis disk ovary) and thus rarely at maturity deciduous with cypsela as a perigynia-like structure. Ray florets sterile, uniseriate; corolla limb adaxial surface papillose. Disk florets 1-numerous, typically bisexual or very rarely inner ones seemingly functionally staminate; corolla typically 5-lobed, throat veins without embedded fibers, resin ducts usually singled (sometimes paired) along veins, base of throat often rounded or bulging, lobes papillose within, often with nerves clearly intramarginal; anthers ; anthers ecaudate, filaments glabrous or rarely long-pilose, thecae typically black, appendages sometimes glandular or setulose; endotheicial pattern polarized; style trunk with resin ducts typically present only outside of the veins, resin usually yellowish, with a more or less continuous stigmatic surface, never obviously 2-banded, apex sometimes long-appendiculate. Cypsela typically free from paleae and typically not forming a perigynia-like structure, typically (except sometimes in Lagascea), usually biconvex to sometimes merely somewhat subquadrate, most typically at least somewhat compressed,
brown to black, carbonized, striatulate to striate, never tuberculate, glabrous to pubescent with trichomes less than 1 mm, margins never obviously long-ciliate-sericeous, carpopodium often of 2 short opposing lobes, never with a sclerified plate-like structure, typically without elaiosomes, apex broadly rounded to truncate or concave; pappus usually bilateral and 2-aristate, with or without squamellae in between, sometimes epappose. Usually x = 17, sometimes lower. Aprox. 21 gen. and 350 spp. Centered in tropical America. 10 gen., 40 spp. in Mesoamerica.

The circumscription of subtribe Helianthinae is that of Robinson (1981) and Panero (2007). The circumscription of the component genera basically follows Robinson (1981), Strother (1999), Rzedowski y Calderón de Rzedowski (2008), and Rzedowski et al. (2011), wherein \textit{Viguiera} is defined as containing 100+ species. Recently, however, Schilling y Panero (2011) proposed to recognize \textit{Viguiera} as monotypic, and expand \textit{Aldama} to include much of \textit{Viguiera} sensu Blake (1918).


1. Subscapose perennial herbs. 

1. Usually erect herbs to shrubs, sometimes trees, stems usually leafy.

2. Capitulescences a synflorescence of aggregated uniflorous capitula; phyllaries connate laterally for most of their length into an involucral tube. 

6. \textit{Lagascea}

2. Capitulescences of free pluriflorous capitula; phyllaries free and not connate into an involucral tube.

3. Capitulescences of subglomerate clusters of capitula; capitula discoid, 3-5- flowered; disk corollas greenish-white. 

2. \textit{Garcilassa}

3. Capitulescences usually monocephalous to open-cymose or corymbiform, when somewhat glomerate then capitula pluriflorous; capitula mostly radiate or infrequently discoid but then pluriflorous disk corollas usually yellow.

4. Paleae enclosing cypselae and at maturity deciduous with cypselae as a perigynia-like structure.

5. Phyllaries imbricate; ray corolla tubes moderately short, limbs typically oblong; disk corollas narrow-funnelform; anther appendages ovate; style branches
moderately flattened; mature marginal paleae chartaceous.

1. Aldama

5. Phyllaries basically eximbricate; ray corolla tubes elongate, limbs elliptic-ovate to orbicular; disk corollas tubular-funnelform, anther appendages lanceolate; style branches subterete to slightly flattened; mature marginal paleae thickened and sclerified.

7. Sclerocarpus

4. Paleae conduplicate but not wholly enclosing cypselae, paleae not deciduous with cypselae as a perigynia-like structures.

6. Peduncles typically dilated and fistulose distally.

9. Tithonia

6. Peduncles not fistulous and dilated distally.

7. Style branches long-appendiculate; paleae trifid; pappus caducous.

3. Helianthus

7. Style branches exappendiculate or short-appendiculate; paleae not trifid or sometimes inconspicuously trifid.

8. Cypselae typically strongly compressed and not plump-biconvex or sometimes somewhat laterally thickened and somewhat plump-convex; intermediate pappus squamellae usually absent; ray ovaries (2.3-)3.5-8.2(-10.2) mm.

8. Simsia

8. Cypselae compressed-biconvex to subquadrangular, somewhat plump; intermediate pappus squamellae often present; ray ovaries < 4 mm.

9. Leaf blades linear-lanceolate to ovate or rhombic-ovate, chartaceous, 1-veined; cypselae epappose; x = 8. 4. Heliomeris

9. Leaf blades usually triplinerved or trinerved from near base; pappus usually 2-aristate (or 2-squamose) with intermediate squamellae x = 17.

10. Viguiera

1. Aldama La Llave

Por J.F. Pruski.

Slender annual herbs; stems usually stiffly erect, dichotomous-branched or rarely opposite-branched nearly to apex, suberete, striate, strigose to pilose or hirsute, sometimes becoming glabrate, mid-stem internodes typically longer than leaves. Leaves opposite proximally to alternate distally, petiolate; blade mostly lanceolate, 3-nerved from base, surfaces pubescent, some adaxial surface trichomes with subsidiary cells moderately swollen, abaxial surface also
finely punctate-glandular, base (ours) slightly decurrent onto petiole, margins subentire to callose-denticulate or serrulate. Capitulescence terminal, solitary or 2-several-capitulate, open, mostly from distal few nodes, open; peduncles usually elongate. Capitula radiate or sometimes discoid but then pluriflorous; involucre campanulate to hemispherical; phyllaries 10-15, subequal or sometimes a few outer phyllaries shorter, the outer phyllaries much narrower than the broad inner phyllaries, loosely imbricate, 2-3-seriate, appressed, more or less flat, subherbaceous at least apically, at least the inner phyllaries mostly 5-9-striate; clinanthium convex to hemispherical or in fruit low-conical, paleate; paleae (ours) loosely but completely enclosing cypselae (or at anthesis disk ovary and proximal part of disk corolla), and at maturity deciduous with cypselae as a perigynia-like structure, mature marginal paleae chartaceous. Ray florets very rarely with an unbranched style; corolla yellow, tube moderately short, dilated, limb typically oblong to rarely ovate, abaxial surface usually glandular and often setulose-papillose; ovary linear-cylindrical. Disk florets bisexual; corolla narrow-funnelform, 5-lobed, mostly yellow throughout, tube moderately broad, much shorter than abruptly but very narrowly ampliate limb, 5-10-nerved, resin ducts brownish, lobe (ours) delate or triangular-lanceolate, with nerves intramarginal, papillose within; anthers black, filaments glabrous, theca base short-sagittate, appendage ovate-lanceolate; style with basal node (ours), branches moderately flattened, 2-banded, apex long-attenuate. Cypselae compressed-obovoid, black, glabrous, epappose or pappus low-coroniform, loosely but completely enclosed within a palea and deciduous together with it as a perigynium-like structure, perigynium-like structure papery-indurate, striate, rugulose-tuberculate between striae or the outer ones corrugated abaxially, glabrous, margins overlapping on adaxial face, apex rostrate-cucullate, inwardly deflecting the late-deciduous disk corolla. $x = 17$. 118 spp. SW.

United States, Mexico, Mesoamerica, South America.

*Aldama* was resurrected from synonymy of *Sclerocarpus* by Feddema (1971). *Aldama* is circumscribed narrowly here, more or less as in Feddema (1971), Robinson (1981), Strother (1999), Panero (2007), and Rzedowski y Calderón de Rzedowski (2008). It should be noted, however, that Schilling and Panero (2011) expanded *Aldama* to 118 species by including most species of *Viguiera* sensu Blake (1918) other than the type. If indeed the molecular phylogeny of Schilling and Panero (2011) holds up, as I suspect it would, it may prove worthwhile to conserve *Viguiera* with a new type to maintain usage more or less as in Blake (1918), in which case our species of *Aldama* would change names.

The South American populations of *Aldama dentata* have ray corolla limbs glandular, but not setulose-papillose abaxially, fewer disk florets, shorter-rostrate inner perigynia, and tend to have
smaller pluriseriate marginal erostrate perigynia that are less prominently flattened radially than
do collections from Mexico and Central America.


1. Capitula radiate; peduncles slender-cylindrical throughout; phyllaries obtuse to rounded, often
much shorter than disk florets, inner phyllary resin ducts purplish to blackish; disk corolla throats
appearing 10-nerved; anthers black. 1. A. dentata

1. Capitula discoid; peduncles narrowly fistulose; phyllaries acute, subequal to disk florets, inner
phyllary resin ducts orangish-brown; disk corolla throats 5-nerved; anthers yellow.

2. A. mesoamericana

1. Aldama dentata La Llave, Nov. Veg. Descr. 1: 14 (1824). Type: Mexico, Veracruz, La
Llave s.n. (G?, MA?). Illutr.: Nash, Fieldiana, Bot. 24(12): 504, t. 49 (1976). N.v.: Flor amarilla,
H.

Gymnolomia acuminata S.F. Blake, Gymnopsis dentata (La Llave) DC.,
Gymnopsis schiedeana DC., ?Sclerocarpus coffeicola Klatt, Sclerocarpus dentatus (La Llave)
Hemsl., Sclerocarpus elongatus (Greenm.) Greenm. et C.H. Thomps., Sclerocarpus kerberi E.
Fourn., Sclerocarpus schiedeanus (DC.) Benth. et Hook. f. ex Hemsl., Sclerocarpus schiedeanus
var. elongatus Greenm.

Herbs 0.3-1.5(-2.5) m, tap-rooted; stems dichotomous-branched, usually strigose with
appressed trichomes, sometimes hirsute with patent trichomes. Leaves (2-)3-12 × 0.5-4 cm,
linear-lanceolate to ovate-lanceolate or proximal leaves sometimes ovate, 3-nerved from
acumination, surfaces substrigose-hirsute, trichomes mostly < 1.2 mm or those of veins
sometimes longer, mostly antorse, base cuneate or obtuse to infrequently nearly truncate,
margins subentire to denticulate or sometimes serrulate, apex acute to long-acuminate; petiole
0.2-1.5 cm, pilose. Capitulescence several-capitulate, long-pedunculate; peduncles 4-10.5(-12)
cm, slender-cylindrical throughout, ebracteate, sometimes densely white-strigose or densely
white-hirsute, indistinctly heterotrichous with low granular indumentum. Capitula 5-10(-12) mm,
radiate; involucre 4.5-7.5(-9) × 5-9(-11) mm, much shorter than to about as long as disk florets,
campanulate; phyllaries 3-7.5(-9) × 1-4(-5) mm, moderately graduate with the outer about half as
long as the inner to more commonly subequal, lanceolate to obovate, hirsute-strigose throughout
or the inner phyllaries sparsely so, inner phyllaries also often scabrous-strigillose, bases stramineous-chartaceous, margins hirsute-ciliate; outer phyllaries acute to infrequently obtuse; inner phyllaries mostly obtuse to sometimes rounded, striate with resin ducts purplish to blackish; paleae 3.5-8, oblong-obovate in outline to inner ones tubular, sometimes outer ones obcompressed, the inner ones typically the longest. Ray florets 5-9(-11); corolla tube 1.3-1.5 mm, limb (4-)6-15 × 2.5-5 mm, 9-11-nerved. Disk florets (8-)20-50+; corolla 3.5-5.5 mm, hirtellous to sparsely so, tube 1-1.4 mm, dilated, throat appearing 10-nerved but often with paired resin duct closely bordering each of the five main veins, intermediate nerve sometimes faint, usually of a single duct or rarely ducts paired, lobes 0.7-1.1 mm, triangular-lanceolate, sometimes somewhat reddish; anthers 2.3-2.5 mm, yellow, appendage c. 0.7 mm, ovate, eglandular or sometimes glandular; style node c. 0.1-0.2 mm, broadly conical to bulbous, branches 1.2-1.3 mm, acuminate. Cypselae 2-4 × 1.1-1.3 mm, oblong to narrowly obovate in outline, compressed, carpopodium strongly asymmetric, curving inwardly; pappus usually low-coroniform, crown 0.1-0.2 mm; perigynium-like structure 4-8 mm, ovate in outline, the outer ones obcompressed and somewhat winged laterally, brownish, body 3-5 × 2-2.8 mm, rostrum 1-3.5 mm. 2n = 34. Flowering Jun-Mar. Clearings, disturbed areas, moist slopes, open pine-oak forests, roadsides, tierra caliente. T (Pruski y Ortiz 4233, MO); Ch (Pruski y Ortiz 4227, MO); C (Martínez et al. 31377, MO); QR (Cabrera 231, MO); Y (cited by Hemsley, 1881: 16 sub Sclerocarpus dentatus); B (Peck 26, GH); G (Heyde y Lux 3419, US); H (Molina y Molina 30890, MO). 25-2000 m. (Mexico, Mesoamerica, Venezuela.)


Herbs to 1.2 m; stems dichotomous-branched or opposite-branched, thinly pilose to glabrate. Leaves (2-)3-8 × 0.8-2.3 cm, lanceolate, 3-nerved from c. 0.5 cm above base, surfaces pilose, adaxial surface trichomes mostly 1-mm, basal c. 0.2 mm stoutly 2-3-celled, terminal cells long and filiform, adaxial surface trichomes mostly < 1 mm, base cuneate, margins callose-denticulate, apex acuminate to attenuate; petiole 0.2-1 cm, pilose. Capitulescence (1-)2-5-capitulate; peduncles 1-5 cm, often with bracteate leaf loosely subtending capitulum, costate, narrowly fistulose in distal 0.5-1 cm, heterotrichous, sparsely pilose and moderately hirtellous. Capitula 10-15 mm, discoid, pluriflorous; involucre 8-10 × 7-12 mm, about as long as disk florets, hemispherical; phyllaries 6-10 × 1.2-5 mm, moderately graduate with the outer about half as long as the inner, broadly bicostate basally, costae stramineous, apex acute to subacute; outer phyllaries linear-lanceolate, 1-3-striatulate, striae alternating with costae, margins long-ciliate;
inner phyllaries rhombic-obovate, striate with resin ducts orangish-brown, distally ciliate; paleae 5+ mm, broadly gibbous-ovate. Ray florets 0. Disk florets 15-30(-50); corolla 4.3-5 mm, minutely hirtellous especially on lower throat, tube 1-1.3 mm, greatly dilated with stout basal rim c. 0.8 mm, throat 5-nerved, resin ducts broad and single over veins, lobes 0.5-0.6 mm, deltate; anthers c. 2 mm, yellow, appendage c. 0.6 mm, ovate, eglandular; style node c. 0.2 mm, bulbous, branches c. 1.3 mm, acute. Cypselae 4-5 × 1.8-2 mm, obovate in outline, compressed, carpopodium strongly asymmetric, curving inwardly; pappus usually low-coroniform, crown c. 0.1 mm; perigynium-like structure 6-9.5 mm, obovate in outline, somewhat compressed, c. 3 angled-costate (1 abaxial 2 adaxial), becoming dark purplish but often with stramineous beak or stramineous margins, body 4-6 × 2.5-3.5 mm, rostrum 1.5-3.5 mm. Flowering Nov. Roadsides. N (Moreno 4523, MO). 300-1100 m. (Endemic.)

2. Garcilassa Poepp.

Por J.F. Pruski.

Annual herbs; stems erect, branched, strigose to densely so. Leaves simple, opposite to commonly alternate distally, petiolate; blade broad, chartaceous, venation 3-nerved from near base, surfaces eglandular, pubescent, margins serrate; petiole often elongate. Capitulescence corymbiform, of subglomerate clusters of capitula not much exserted above subtending leaves. Capitula discoid, 3-5-flowered; involucre weakly imbricate, cylindrical; phyllaries unequal to subequal, stiffly erect, strigillose; clinanthium small, paleate; paleae longer than phyllaries, strigillose, indurate, conduplicate, enveloping florets. Ray florets 0. Disk florets 3-5, bisexual; corolla campanulate, 5-lobed, greenish-white, densely short-puberulent throughout, throat with supernumerary veins or resin ducts, trichomes patent; anthers black, filaments glabrous, thecae basally sagittate, appendage slightly sculpted; style base slightly swollen, branches with a single stigmatic surface, slightly apically appendaged. Cypselae compressed-ovoid, strigillose; pappus coroniform, of a few lacerate scales. 1 sp. Mesoamerica, Colombia, Ecuador, Perú, Bolivia.

In a molecular study (Schilling y Panero, 2002), Garcilassa and Hymenostephiium were treated as synonymous. Garcilassa, which has nomenclatural priority over Hymenostephiium, is treated here as monotypic and circumscribed traditionally as in Robinson (1981) and Pruski (2010). Hymenostephiium is treated here as a synonym of Viguiera, as in D'Arcy (1975) and Strother (1999).

Slender annual herbs sometimes appearing subshrubby 0.6-1.5 (4) m; stems few-to several-branched, subterete, striate, branching typically opposite proximally, becoming alternate distally, branches strongly ascending; distal internodes typically longer than associated leaves. Leaves: blade (2.5-)4-10(-15) x (0.7-)1.1-4.5(-7.8) cm, elliptic-lanceolate to ovate, adaxial surface strigillose, abaxial surface strigose, base acute cuneate to obtuse, occasionally asymmetric, apex narrowly to attenuate, marginal teeth sometimes irregularly spaced; petiole (0.5-)1-3 (6) cm. Capitulescence several per plant, 1-2 cm diam., of 4-12 capitula; peduncles 1-6 mm, strigose-hirsutulous. Capitula 4.5-6 mm; involucre 1.5-2 mm diam., spreading with age; phyllaries 3-5, 2.5-3 × to c. 1 mm, subequal, weakly biseriate, lanceolate to pyriform, strigillose, apex narrowly acute to acuminate, margins entire to lacerate; paleae 3.7-4.6 × 2-3 mm, ovate to pyriform, strigillose, finely striate. Disk florets: corolla 1.8-2 mm, thick and stiff, tube c. 0.5-0.6 mm, throat c. 0.6 mm, lobes 0.7-0.8 mm, sometimes with a central vein, often less pubescent than tube and throat; style branches coiled, c. 0.3 mm, appendage inflated or indistinct when dry. Cypselae 2.5-3 mm; pappus crown 0.1-0.2 mm. Riverbanks, bosque de galería, moist tropical lowland forest, secondary growth areas, limestone cliffs, burned forest remnants, cultivated areas, potrero, disturbed forest. G (Standley 70609, F); H (Nelson y Cruz 9353, MO); N (Moreno 829, MO); CR (Kuntze 2060, NY); P (Killip 12163, NY). 40-1100 m. (Mesoamerica, Colombia, Ecuador, Perú, Bolivia.)

Both vouchers from Belize cited in Balick et al. (2000) as G. rivularis are determined here as Eleutheranthera ruderalis (Sw.) Sch. Bip. var. ruderalis; G. rivularis is thus excluded from the flora of Belize.

3. Helianthus L.

Por J.F. Pruski.

Annual or perennial herbs; stems branched mostly midstem or above; herbage usually pubescent. Leaves cauline or a few species basal, simple, opposite or alternate, sessile or petiolate; blade
linear to deltate or suborbicular, typically chartaceous, triplinerved. Capitulescence terminal and sometimes axillary, commonly corymbiform but varying from monocephalous to paniculate; peduncles not fistulous and dilated distally, pith solid. Capitula medium-sized to large, radiate (ours) or rarely discoid but then pluriflorous; involucre often hemispherical; phyllaries imbricate, subequal or unequal, 2-4(-5)-seriate, usually indurate basally with herbaceous apices, usually pubescent, often glandular; clinanthium flat to convex (short-conical in *H. porteri*), paleate; paleae conduplicate, usually trifid distally, apex sometimes reddish or purplish, persistent. Ray florets sometimes styliferous; corolla yellow or golden-yellow (rarely reddish), limb 3-denticulate, in bud often bent over the disk; ovary typically 3-awned. Disk florets (15-)30-150+, bisexual; corolla funnelform-campanulate, 5-lobed, yellow throughout or sometimes reddish or purplish distally, tube shorter than throat, lobes triangular; anthers thecae basally short-sagittate, appendage deltate-ovate, filaments glabrous; style branch stigmatic surfaces confluent, apex long-appendiculate. Cypselae obviously compressed, obovate in outline, often glabrous; pappus caducous, (sometimes broadly) 2-awned (absent in *H. porteri*), sometimes also with intermediate squamellae. \( x = 17 \). Aprox. 51 spp., 2 spp. (ours and perennial *H. tuberosus* L.) frequently cultivated. Native to North America and Mexico, but ours widely adventive.

Heiser et al. (1969) recognized 50 North American species of *Helianthus*. *Viguiera porteri* (A. Gray) S.F. Blake was recognized by Cronquist (1980), but because of long-appendiculate style branches Pruski (1998) treated it as *H. porteri* (A. Gray) Pruski, thus raising to 51 the number of species of *Helianthus* recognized. *Helianthus* is similar to formerly synonymous South American *Pappobolus* S.F. Blake, which Panero (1992) noted as differing by sometimes yellow anther thecae, exappendiculate style branches, and receptacular paleae always entire distally.


**Helianthus lindheimerianus** Scheele.

Tap-rooted annual herbs, 1-3(-4) m; stems solitary, erect, typically simple to few-branched distally, hispid, trichomes to 3 mm. Leaves cauline, alternate, long-petiolate; blade 10-35 \( \times \) 5-30, lanceolate-ovate to ovate, the larger sometimes drooping, glandular, adaxial surface scabrous,
abaxial surface hispid, trichomes usually < 0.5 mm, conical, sometimes trichomes on adaxial surface 1-2 mm, base cordate to distal ones cuneate, margins serrate, apex acute to acuminate; petiole 2-20 cm, often about as long as blade, base 5-15+ mm broad, dilated. Capitulecence monoecephalous to 9-capitulate and open-corymbiform; peduncle 2-20 cm, often nodding in fruiting cultivated plants. Capitula subglobose to crateriform, disk (2-)3-15(-30) cm diam.; phyllaries 10-20(-70) × 4-15(-30) mm, lanceolate to ovate, subequal, margins long-ciliate, apex abruptly attenuate to caudate, often reflexed, usually hirsute to hispid (rarely glabrous), often glandular, inner surface papillose-puberulent, inner phyllaries often plurincostate and indurate basally; paleae 9-12(-16) mm, often rigidly indurate, trifid, puberulent distally. Ray florets 17-34+; corolla tube 2-3.5 mm, limb 20-50(-75) × 5-15(-23) mm, elliptic-oblanceolate, 9-20+ -nerved, denticulations 0.2-1 mm, abaxial surface setose. Disk florets many to numerous; corolla 5-9 mm, setose proximally, tube c. 1 mm, throat bulbous-based, lobes 1-2 mm, often brownish-red; anthers 4-5 mm, exserted at anthesis; style branches to c. 3 mm, recurved, distally papillose. Cypselae 4-15 × 2.5-13 mm, black throughout to maculate or stramineous-streaked, broad-striate, often setulose; pappus awns 2-3.5 mm, squamellae 0-4, 0.5-1 mm. **Cultivated and sometimes ruderale.** 2n = 34. Y (Villaseñor, 1989: 65); C (Villaseñor, 1989: 65); B (Dwyer 15000, MO); G (Gil s.n., USCG); H (Clewell 1975: 198); ES (Standley et Calderón, 1941: 281); CR (Grayum y Grayum 10021, CR). 0-1500 m. (Canada, Estados Unidos, Mexico; cultivated and sometimes adventive in Mesoamerica, Colombia, Venezuela, Guyana, Surinam, Ecuador, Peru, Bolivia, Brazil, Argentina, West Indies; Europa, Africa, Asia, Australia, New Zealand, Pacific Islands.)

**Helianthus annuus** is native to North America, but is widely adventive elsewhere. The adventive nature of *H. annuus* is accentuated because of frequent use of its seeds in bird feed. The Linnaean protologue native distribution that includes Peru is in error. *Helianthus annuus* is widely grown ornamentally and cultivated for sunflower oil extracted from its seeds. Ornamental plants often are simple-stemmed, have broad-flat extremely large capitula, and large cypselae. In cultivation the well-known phototropic (flowers following the sun) and allopathic effects of the species are especially obvious. Full synonymy was given by Heiser et al. (1969).

### 4. Heliomeris Nutt.

**Viguiera sect. Heliomeris** (Nutt.) S.F. Blake

Por J.F. Pruski.

Annual or perennial herbs or subshrubs; stems erect, alternate-branched. Leaves simple, opposite or (especially distally) alternate, sessile or subsessile; blade linear-lanceolate to ovate or
rhombic-ovate, chartaceous, 1-veined (ours) to triplinerved, surfaces pubescent, glandular, margins entire or subentire, often revolute. Capitulescence monocephalous to openly corymbiform or paniculate, capitula pedunculate; peduncles often bracteate, not fistulous and dilated distally, pith solid. Capitula radiate; involucre hemispheric; phyllaries 12-19, imbricate, subequal to weakly graduated, c. 2-seriate, persistent, linear-lanceolate or lanceolate, herbaceous, few-striate, base not indurate; clinanthium convex to short-conical, paleate; paleae conduplicate, carinate, not trifid. Ray florets 8-16; corolla yellow, limb oblong to ovate; ovary < 4 mm. Disk florets usually 50-150, bisexual; corolla abruptly narrow-campanulate, 5-lobed, yellow, tube short, cylindrical, lobes triangular; anther thecae blackish, basally sagittate, appendage deltate-ovate, filaments glabrous; style branch apex basically exappendiculate, acute, papilllose. Cypsela obvoid, compressed-biconvex to subquadrangular, somewhat plump, usually black, glabrous; epappose. x = 8. Aprox. 5-6 spp. SW. United States, Mexico.

_Heliomeris_ was revised by Yates y Heiser (1979) who recognized 5 species. It was treated in synonymy of _Gymnolomia_ by Robinson y Greenman (1899: 87-104) and _Viguiera_ by Blake (1918). _Gymnolomia_ proves to be a synonym of _Eleutheranthera_ and _Viguiera_ differs by its typically pappose cypselae and usually unequal graduated basally indurate-costate phyllaries. Moreover, Yates y Heiser (1979) mention that the ray corolla limb bases of _H. multiflora_ Nutt. turn bright red (as do taxa with pollinator path guide patterns apparent when viewed with UV light) when exposed to the strongly basic desiccant KOH, whereas those of _Viguiera_ retain their yellow coloration throughout.


_Viguiera longifolia_ (B.L. Rob. et Greenm.) S.F. Blake.

Annual or rarely short-lived perennial, tap-rooted herbs 0.3-1(-1.5) m; stems strigose or substrigose. Leaves subsessile; blade 2-11(-15) × 0.4-1 cm, linear-lanceolate, essentially 1-nerved, surfaces strigose to strigillose, trichomes of adaxial surface with subsidiary cells slightly enlarged. Capitulescence 6-25-capitulate, branches alternate; peduncles 1.5-8(-12) cm. Capitula 5-7 mm; involucre 6-9(-13) mm diam.; phyllaries 4-5.5(-7) × 1-1.3 mm, 2-seriate, 3-striate, strigillose, apex acuminate; clinanthium to 3 mm; paleae 4-4.5 mm, oblong, stramineous with
midrib golden brown distally, sparsely villosulous, apex acute to cuspidate. Ray florets 12-15; corolla limb 10-17 × 2-3 mm, 7-10-nerved, abaxially sparsely glandular. Disk florets 50-100; corolla 2.5-3 mm, puberulent proximally, lobes c. 0.6 mm, spreading; anthers c. 1.5 mm. Cypselae 1.4-2 mm, carpopodium small and asymmetric. 2n = 16. Flowering Jun, Aug-Sep. 
*Meadows, pine-oak forests.* Ch (Breedlove 39900, MO). 2100-2500 m. (SW. Estados Unidos, Mexico, Mesoamerica.)

*Heliomeris longifolia* is most similar to *H. annua* (M.E. Jones) Cockerell, which differs basically by its smaller leaves and capitula, and also to perennial *H. multiflora* Nutt. By alternate abaxially glandular lanceolate leaves and by glabrous epappose cypselae, *H. longifolia* is similar superficially to *Tithonia hondurensis*, which differs by its clearly graduated phyllaries often with broad apices and ray corolla limbs c. 15-nerved and eglandular abaxially, as well as by the fistulous peduncle feature.

**5. Iostephane** Benth.

*Pionocarpus* S.F. Blake

Por J.F. Pruski.

Subscapose perennial herbs from thick rootstocks; stems erect. Leaves alternate, all rosulate or sometimes scape bracteate, usually winged-petiolate; blade narrowly lanceolate to ovate or spatulate, unlobed to pinnatifid, chartaceous to subcoriaceous, venation pinnate, surfaces pubescent to subglabrous, base cuneate to subcordate, apex acuminate to obtuse. Capitulecence monocophalous to openly cymose and 2-5(-12)-capitulate; peduncles often swollen and fistulous distally. Capitula radiate; involucre turbinate to hemispherical; phyllaries 12-26, subequal, 2-3-seriate, linear-lanceolate to ovate-lanceolate, herbaceous, base strong-costate but not indurate, surface strigose-pilose, apex acuminate to acute; clinanthium convex, paleate. Ray florets 5-21, sometimes styliferous, uniseriate; corolla white, yellow, orange, to purple, tube stout. Disk florets 15-100+, bisexual; corolla cylindrical-campanulate or narrowly campanulate, 5-lobed, yellow or lobes sometimes purplish, tube short, glabrous, limb setulose to setose; anther thecae minutely sagittate, blackish, filaments glabrous; style apex long-papilllose. Cypselae oblong to obovoid, subquadrate and slightly compressed, blackish, glabrous or strigose, truncate apically; epappose or with 1-2 fragile scales plus 0-4 lacerate squamellae. x = 17. Aprox. 4 spp. Mexico.


Herbs mostly 0.3-0.5 m. Basal leaves usually 5-10; blade 3-14 × 2-6 cm, usually pandurate, scabrous to strigose-pilose, lobe margins serrulate to serrate, terminal lobe ovate, petiole 3-17 cm; cauline leaves bracteate. Capitulescence (1-)2-5-capitulate, branches alternate; peduncles 3-16(-30) cm, strigose-pilose. Capitula c. 10 mm; involucre hemispherical to broadly campanulate; phyllaries 6-10 × 1-2 mm, linear-lanceolate to lanceolate, green or especially the inner with stramineous margins, apex acuminate; paleae 6-10 mm, green-streaked, especially distally on midvein, apex attenuate. Ray florets (5-)6-10; corolla yellow to orange, tube setose, limb 9-15 × 2-5 mm, oblong to broadly obovate, well-exserted from involucre, 7-9-nerved, abaxially setulose. Disk florets 15-40; corolla 4.2-6 mm, yellow, tube c. 1 mm, much shorter than throat, lobes < 1 mm, triangular; anther connectives and appendages stramineous. Cypselae 3-4.8 mm, glabrous; epappose. 2n = 34, 68. Flowering Jul-Nov. *Openings in cloud forests and pine-oak forests.* Ch (Ghiesbreght 561, MO). 1400-2600 m. (Mexico, Mesoamerica.)

6. **Lagascea** Cav., nom. et orth. cons.


Por J.F. Pruski.

Annual herbs or shrubs; stems ascending, branched, subterete, striate, glabrous to pilose, often stipitate-glandular. Leaves simple, opposite, petiolate to sessile; blade mostly lanceolate to ob lanceolate or ovate, chartaceous to subcoriaceous, venation 3-nerved from base or from above base, surfaces without punctate glands, subglabrous to tomentose or sericeous, base obtuse to nearly auriculate, margins typically serrate, apex acute to acuminate. Capitulescence syncephalous, synflorescence stalked, globose or campanulate, subtended usually by c. 5 leafy bracts, of 8-55 secondarily aggregated capitula. Capitula typically sessile, 1(-2-8)-flowered, discoid; involucre cylindrical; phyllaries generally few, uniseriate, connate laterally for most of their length into an involucral tube with free apical lobes, surrounding and laterally enclosing the cypselae(e), subglabrous to densely pilose, each striate with 1-3 resinous nerves, sometimes also stipitate-glandular; clinanthium epaleate, convex. Ray florets 0. Disk florets bisexual; corolla funnelform, 5-lobed, often yellow, throat and lobes generally pubescent; anthers yellow to black,
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thecae basally short-sagittate, filaments glabrous; style trunk with resin ducts also present inside the veins, resin branches exserted, typically hirtellous, spreading to recurved. Cypselae obconical to obovoid, sometimes compressed, often basally attenuate, carpopodium (ours) small and nearly obscure; pappus coroniform or of unequal barbellate awns. x = 17. 8 spp.; principally a Mexican genus of eight species distributed from S. Estados Unidos south to Nicaragua; 1 spp. occurs in the West Indies, Suramérica, and has been introduced into the Paleotropics.


1. Shrubs; leaves typically sessile and subauriculate; leafy bracts subtending synflorescence 20-30 mm; corollas 10.5-17 mm; cypselae c. 5-7 mm.

1. **L. helianthifolia**

2. **L. mollis**


Shrubs to 3 m; stems erect, often branched from base, simple or few-branched distally, branching in capitulescence opposite or less commonly alternate, subdistal internodes typically much shorter than leaves, pilose or hirsute to densely so, also often short stipitate-glandular. Leaves typically sessile, rarely petiolate; blade 4-26.5(-33) × 2-9(-12.5) cm, typically elliptic-pandurate to ovate-pandurate, subcoriaceous, venation pinnate, becoming 3-nerved from well above base near at the point of leaf widening, adaxial surface typically scabrid, hirsutulous or less commonly glabrate, abaxial surface typically pilose or tomentose to less commonly hirsutulous of subglabrate, base auriculate or rarely cuneate, margins serrulate to serrate, apex acute to
acuminate. Synflorescence 2-3 × 1-2.5(-4) cm, typically terminal and occurring singly or in threes and corymbiform, each 19-32-capitulate, campanulate, each loosely subtended by leafy bracts; bracts 4-7, 2-3 × 0.6-1 cm, elliptic-lanceolate or elliptic-oblancoate, sometimes spreading outward, commonly plinerved, surfaces sericeous-villous, sometimes short stipitate-glandular; branch subtending synflorescence 0.2-1.5 cm, pilose, often short stipitate-glandular. Capitula 10.5-23 mm including the style which at maturity is exserted 6-8 mm past corolla, 1-flowered; involucre 5-9 mm, tubular, connate but distally 4-6-lobed, greenish, long-pilose to long-villous, also elliptic-glandular, the surfaces somewhat obscured by indumentum, lobes usually 2-3.6 mm, unequal, lanceolate. Disk florets with corolla well-exserted from involucre 10.5-20 mm, typically with only tube held within involucre, cream-colored or greenish white, becoming reddish distally, setose at least distally, tube 3-5 mm, limb broadened, throat 6-7 mm, lobes 1.5-3 mm; anthers 4-6 mm, darkly brown to reddish; style often exerted 6-8 mm past corolla, branches 5-6 mm, hispidulous, erect or ascending to apically coiled. Cypselae (4-)5-7(-8) mm, ellipsoid to obovoid, slightly compressed, black, pilose at least distally, late-deciduous from involucre; pappus crown c. 0.4 mm, erose. 2n = 34. Roadsides, pastizal, pine-oak forests, campo, bosque premontano húmedo, low scrub vegetation, bosque húmedo subtropical, bosque seco subtropical. Ch (Matuda 1961, MO); G (Tuerckheim II 2049, MO); H (Williams y Molina 14804, MO); ES (Standley 19116, MO); N (Moreno 13996, F). 200-1600 m. (México, Mesoamerica.)

The morphologically variable species was treated by Stuessy (1978) as containing two varieties, with flora area plants referred by him to *L. helianthifolia* var. *helianthifolia*. The second variety *L. helianthifolia* var. *levior* (B.L. Rob.) B.L. Rob. supposedly differs by its sometimes petiolate leaves basally cuneate to rounded and by synflorescences several and typically distally aggregated, but these traits seem too variable for varietal recognition in most genera, and this taxon is treated here as a possible synonym. *Lagascea helianthifolia* var. *levior* was treated by Stuessy (1978) as endemic to north and western México (Chihuahua, Colima, Durango, Jalisco, Nayarit, Sinaloa, Sonora).


Frequent annual herbs to 1(-1.5) m; stems moderately branched distally, internodes often much longer than leaves, branching opposite to commonly alternate distally, hirtellous to glabrate proximally. Leaves: blade (1.3-)2-7.2 × (0.5-)1-4.5 cm, lanceolate to ovate, chartaceous, venation 3-nerved from near base, surfaces strigose to sericeous, somewhat grayish, base cuneate to obtuse, margins subentire to serrate, apex acute to acuminate; petiole (0.5-)1-2.7 cm, slender. Synflorescence generally c. 1.5 x 1.5 cm, 8-25-capitulate, campanulate to hemispherical; leafy bracts 5-16 × (1-)3-7 mm, lanceolate to ovate, commonly 3-nerved, surfaces strigose to sericeous, trichomes often stipitate-glandular but gland easily broken off; branch subtending synflorescence 1-7(-14) cm, hirsutulous to densely stipitate-glandular but gland easily broken off. Capitula to c. 8.5 mm, 1-flowered; involucre 4-6 mm, tubular, 4-6-lobed, piloce except on inner surface of tube, tube yellowish, lobes 1.3-2 mm, linear-lanceolate, greenish. Disk florets: corolla 4-6.3 mm, quickly deciduous, well-exserted from involucre, white to violet, tube 1-1.9 mm, limb broadened, throat 2-2.3 mm, lobes 1-2.1 mm, setose; anthers black; style branches c. 1 mm, spreading to strongly coiled, branches often seemingly connate for much of their length. Cypselae 3-3.2 mm, obovoid, slightly compressed, glabrous or apically villosulous; pappus crown c. 0.3 mm, erose. 2n = 34. *Selva baja caducifolia, selva mediana, bosque seco subtropical, bosque húmedo subtropical, waste land near stream, along dried up stream, coastal forests, grazed slopes, gallery forest, alluvial plain, low scrub forests, sabana inundada, abandoned farms. T (Cowan 2470, TEX); Ch (Breedlove 47147, CAS); Y (Gaumer 518, MO); C (Lundell 1105, US); B (Lundell 4924, MO); G (Standley 74643, F); H (Ordóñez 17, MO); N (Molina 23181, MO); CR (Weston 2860, MO). 0-1400 m. (Estados Unidos [Florida], México, Mesoamerica, Colombia, Venezuela, Ecuador, Perú, Bolivia, Brazil, Paraguay, Argentina, Cuba, Jamaica, Hispaniola, Puerto Rico, Virgin Islands, Lesser Antilles, Trinidad and Tobago; Africa, Asia, Islas del Pacífico.)

7. **Sclerocarpus** Jacq.

Por J.F. Pruski.

Mostly annual herbs (except 1 sp.), less commonly perennial herbs to rarely subshrubs; stems erect to infrequently decumbent, opposite-branched proximally to dichotomous-branched distally, suberete, strigose or hirsute to villous, glabrate proximally. Leaves opposite proximally to alternate distally, mostly petiolate (except 1 sp.) or distal ones sometimes subsessile; blade lanceolate to ovate, 3-nerved from near base, surfaces eglandular, scabrous-strigose to sometimes glabrous, either surface with some trichome subsidiary cells moderately swollen, base usually
cuneate to rounded and slightly decurrent onto petiole, margins irregularly coarsely dentate or sometimes nearly subentire, apex mostly acute. Capitulescence terminal, solitary to many-capitulate, open and leafy corymbiform-paniculate of singly borne capitula; peduncles usually elongate. Capitula radiate; involucre 12–20 mm diam., campanulate to hemispherical, phyllaries 3-9(-16), 1-2-seriate, basically eximbricate, ascending becoming reflexed with age, more or less flat, subherbaceous, green, persistent; outer phyllaries each subtending a ray floret; clinanthium convex to low-conical, paleate; paleae bulbous-based, margins overlapping adaxially, mostly glabrous, becoming indurate, sometimes rostrate, mature marginal paleae thickened and sclerified, inner paleae longer than the outer, ultimately tightly and completely enclosing cypselae (or at anthesis disk ovary and proximal part of disk corolla) and at maturity deciduous with cypselae as a perigynia-like structure. Ray florets 5-8; corolla yellow to orangish-yellow, usually quickly caducous, tube elongate, sometimes as long as phyllaries, limb elliptic-ovate to orbicular, often relatively thick and rigid (especially when dried), mostly 9-11-nerved, typically strigillose abaxially, adaxial surface elongate-papillose; ovary linear-cylindrical. Disk florets (3-)10-50+, bisexual or sometimes innermost noticeably smaller and seemingly functionally staminate; corolla tubular-funnelform, (4-)5-lobed, yellow (rarely purplish in distal half) or lobes sometimes purplish-pubescent, hirtellous, tube slender, not distinct from very gradually and slightly ampliate limb, 5-nerved, resin ducts brownish, lobes lanceolate, nerves nearly marginal, long-papillose within; anthers much shorter than limb, typically included (sometimes slightly exserted in S. papposus), yellow to sometimes black, filaments glabrous, theca base short-sagittate, appendage lanceolate; style basal slightly dilated, branches slender, subterete to slightly flattened, weakly 2-banded or nearly continuous, apex attenuate. Cypselae obovoid weakly compressed, carbonized, black, striatulate glabrous, epappose or pappus lacerate-corniform, tightly and completely enclosed within a palea and deciduous together with it as a perigynium-like structure (hereafter perigynium), perigynium thick-indurate, green to purplish, striate, otherwise smooth to tuberculate, glabrous to pubescent, typically, margins overlapping on adaxial face, apex sometimes rostrate. \( x = 11, 12 \) spp. SW. United States, Mexico, Mesoamerica, N. South America, West Indies; Africa, Asia.

The taxonomy and species circumscriptions followed here are those of (Feddema, 1966, 1972). Although the variation seen within S. uniserialis is used as the basis for recognition of infraspecies (Feddema, 1966, 1972), the variation appears parallel that seen in Aldama dentata and between S. africanus and S. phyllocephalus. It should be noted, however, that A. dentata is treated without infraspecies, whereas S. africanus and S. phyllocephalus are recognized as closely related species.
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1. Phyllaries ovate to obovate or suborbicular, broadly obtuse to cordate at the sessile to subsessile base; marginal 1-3 rows of perigynia erostrate; disk corolla lobes black-pubescent at mid-lobe.

1. *S. divaricatus*

1. Phyllaries linear-lanceolate to oblanceolate or spatulate, base narrow-petiolar; perigynia rostrate; disk corolla lobes yellow-pubescent or reddish-brown-pubescent.

2. Capitula leafy-bracteate, bracts and phyllaries sometimes 10+, at least some phyllaries or bracts longer than marginal perigynia; marginal perigynia with body striate to tuberculate.

2. *S. phyllocephalus*

2. Capitula not leafy-bracteate; phyllaries 5-8, usually shorter than marginal perigynia; marginal perigynia with body usually striate, not obviously tuberculate.

3. *S. uniserialis*


*Sclerocarpus orcuttii* Greenm., *Sclerocarpus triunfonis* M.E. Jones.

Annual tap-rooted herbs 0.3-0.8(-1.5) m; stems hispid-pilose to white-strigose. Leaves (1-)2-8(-11) × (0.6-)1-4.5(-7) cm, ovate to trullate-ovate, surfaces hispid-strigose, trichomes mostly 0.5-1 mm, base cuneate, margins coarse-serrate, apex acute to acuminate; petiole 0.5-3 cm, hispid-strigose. Capitulescence 10-15-capitulate; peduncles (1-)3-10(-13) cm. Capitula 8-18 mm, not leafy-bracteate; involucre 7-18 mm diam., usually longer than perigynium; phyllaries 5(-7), 6-11(-13) × 3-7(-8) mm, ovate to obovate or suborbicular, subequal, green, mostly strigose, broadly obtuse to cordate at the sessile to subsessile base; paleae 3-8 mm, strigose-hispidulous, outer paleae erostrate, inner paleae sometimes shortly prolonged apically into an abaxial lamina. Ray
florets 5(-7); corolla tube 4-8 mm, often nearly as long as phyllaries and visible as phyllaries spread, limb 8-16 × 6-15 mm, broadly ovate to suborbicular. Disk florets 10-32; corolla mostly 8-17 mm, lobes 2-3 mm, black-pubescent at mid-lobe, sometimes noticeably more pubescent than throat. Cypselae 3-4 mm, epappose; perigynia 3-5 mm, green becoming black at maturity, often tuberculate abaxially, hispid, marginal 1-3 rows of perigynia erostrate, inner perigynia with apex often with a tapered lamina 1-3 mm on abaxial side. 2n = 22. Flowering May-Feb. Clearings, cultivated areas, disturbed areas, dry hillsides, fields, lava flows, oak forests, openings in forests, thicket, thorn-scrub, roadsides, rocky areas, secondary forests, stream sides, swamp edges, volcanic cinders. T (Cowan 3164, MO); Ch (Soule y Brunner 2387A, MO); Y (Gaumer 771, NY); C (Cabrera y Cabrera 15900, MO); QR (Gaumer 1753, MO); G (King y Renner 7015, MO); H (West 3547, MO); ES (Carlson 5, F); N (Baker 2207, US); CR (Burger y Burger 7839, MO); P (Tyson et al. 3006, MO). 0-1100 m. (Mexico, Mesoamerica, Colombia, Venezuela.)


Annual herbs 0.2-1 m; stems hispid-pilose to white-strigose. Leaves 2-10 × 1-4.5 cm, lanceolate to trullate-ovate, surfaces hispid-pilose or abaxial surface strigose, base attenuate to cuneate, margins subentire to remotely serrate, apex acute to acuminate; petiole 0.3-2 cm, hispid-pilose. Capitulescence branches 1-2-capitulate; peduncles 1-12 cm. Capitula 6-15 mm, leafy-bracteate, bracts and phyllaries sometimes 10+, at least some bracts or phyllaries longer than marginal perigynia; involucre subtended by 1-3 leafy bracts 1-5 cm; phyllaries 6-8, 5-15 × 1-3 mm, subequal to unequal, spatulate, pilose-hirsute, base narrow-petiolar, spreading in fruit with perigynia typically fully visible; paleae 6-11 mm, rostrum, rostrum often bent inward. Ray florets 3-7; corolla tube 2-3 mm, limb 4-7 × 3-6 mm, suborbicular; ovary sparsely pubescent. Disk florets 7-20; corolla 5-8.5 mm, lobes 1.2-2 mm, yellow-pubescent. Cypselae 3-4.6 mm, epappose; perigynia rostrate, marginal perigynia 6-8 mm, with body obovoid, widest near distal 2/3, striate to tuberculate, pilose and hirtellous, rostrum 3-6 mm, half as long as about as long as body, rostrum usually slightly directed inwards, inner perigynia to 11 mm. Flowering May-Feb. Disturbed areas, dry hillsides, fields, thicket, thorn-scrub, roadsides, rocky areas. Ch (Breedlove 42362, MO); G (Croat 41895, MO); H (Standley 18999, NY); ES (Rosales 1527, MO); N (Neill 2149, MO). 0-1200(-1500) m. (Endemic.)
Blake (1922) described *Sclerocarpus phyllocephalus* without comparing it to the similar *S. africanus* Jacq., which four years before was reported in the Americas by Britton (1918). Britton y Wilson (1925) provided a full account of *S. africanus* in the Virgin Islands. Nearly concurrently, *S. columbianus* Rusby y S.F. Blake was described in Blake (1924), and given as differing from *S. phyllocephalus* by shorter disk corollas with shorter teeth. *Sclerocarpus columbianus* was reduced by Blake (1930) to synonymy under *S. baranguillae* (Spreng.) S.F. Blake, who stated that although *S. baranguillae* and *S. africanus* may eventually prove synonymous, the cypselae of the Colombian material appeared to be 4-5.5 mm and the paleae 5-7 mm, whereas in the otherwise similar *S. africanus* they are 6.5-7 mm and 9-10 mm, respectively. Subsequently, Feddema (1966) circumscribed leafy-bracteate *S. africanus* as having cypselae 4-8 mm, reduced *S. baranguillae* to synonymy, and in the Americas reported *S. africanus* from Colombia, Venezuela, and the Virgin Islands.

*Sclerocarpus phyllocephalus* is provisionally recognized here as distinct from West Indian and South American material. Leafy-bracteate material from the United States appears to be distinct and was referred to *Sclerocarpus uniserialis* var. *uniserialis* (Feddema, 1966, 1972), which differs by disk corollas 7-13 mm. Should further study show the tropical American plants to be conspecific yet distinct from *S. africanus*, the name *S. baranguillae* has priority and would need to be resurrected including *S. phyllocephalus* in synonymy. In this scenario, *S. africanus* would be excluded from the flora of the Americas. On the other hand, the African and American plants are so similar that I am uneasy maintaining them as distinct, but do so as in Feddema (1966).


*Aldama uniserialis* (Hook.) A. Gray, *Sclerocarpus major* Small.

Four vars. United States [Texas], Mexico, Mesoamerica.


Herbs (0.3-)0.5-1(-1.5) m, sometimes persisting with a much-thickened base; stems strigose-hirsute. Leaves 1.5-6(-8) × 0.4-2.5(-4) cm, lanceolate to occasionally trullate or ovate, adaxial
surface sparsely strigose, abaxial surface more densely strigose, base narrow-petiolar, margins
subentire to few-coarse serrulate, apex acute to acuminata; petiole 0.3-1.2(-1.5) cm.
Capitulescence 1-several-capitulate; peduncles 2.5–7.5(-9) cm. Capitula 9-15 mm, not leafy-
bracteate; involucre often very short; phyllaries 5-8, (3-)4-7 × 0.5-1.3 mm, usually shorter than
marginal perigynia, linear-lanceolate to oblanceolate, strigose, base narrow-petiolar, reflexed post
anthesis; clinanthium 2-5 mm, conical; paleae 5-9 mm, greenish to infrequently purplish in bud,
rostrate. Ray florets 5-7(-9); corolla tube 2.5-4.5 mm, limb 6-20 × 4-12 mm, obovate to
suborbicular. Disk florets (5-)12-30; corolla 6-9 mm, lobes 2-3.5 mm, lanceolate, yellow-
pubescent or reddish-brown-pubescent. Cypselae 3-4.5(-6) mm, pappus ≤ 1.1 mm, usually low-
coroniform; perigynia 5-9 mm, obovoid, rostrate, marginal perigynia with body usually striate,
not obviously tuberculate, at least the rostrum moderately strigillose, rostrum (especially of inner
perigynia) about as long as body, erect. 2n = 24. Flowering Jul-Oct. Disturbed areas, oak forests,
roadsides, selva mediana subperennifolia shrubby slopes. Ch (Stuessy y Gardner 4296, MO); Y
(Feddema, 1972: 207); C (Martinez et al. 28197, MO); QR (Spellman et al. 264, MO); B (Nash,
1976: 308); G (Steyermark 51425, US). 100-1400 m. (United States, Mexico, Mesoamerica.)

name *S. uniserialis* var. *frutescens* for our material, whereas Strother (1999) and Villaseñor y
Hinojosa-Espinosa (2011) recognized *S. uniserialis* without infrataxa.


_Armania_ Bertero ex DC., _Barrattia_ A. Gray et Engelm., _Encelia_ sect. _Simsia_ (Pers.) A. Gray
Por D.M. Spooner y J.F. Pruski.

Erect or ascending, tap-rooted, annual or subshrubby perennial herbs or shrubs, usually erect or
ascending, rarely decumbent and rooting at the nodes; stems glabrous to harshly pubescent,
glandular or eglandular; herbage often heterotrichous with both elongate non-glandular and
shortly stipitate-glandular (rarely subsessile). Leaves simple and unlobed to deeply 3-5-lobed,
rarely pinnatifid, typically opposite becoming alternate distally, all petiolate or the distal ones
sessile, rarely perfoliate, often with nodal disks; blade cordiform to linear, usually chartaceous, 3-
nerved from base, surfaces glabrous to scabrous to sericeous, glandular to eglandular, abaxial
surface variously pubescent but rarely sericeous, margins crenulate to coarsely dentate or rarely
entire. Capitulescence typically open and few-headed, monocephalous to corymbiform or
paniculate, sometimes divaricately branched; peduncles usually short-stipitate-glandular, often
scabrous to strigose or hispid, not fistulous and dilated distally, pith solid. Capitula radiate or
rarely discoid (*S. eurylepis*) but then pluriflorous; involucre campanulate to urceolate; phyllaries unequal or subequal, 2-4-seriate, appressed to reflexed, ovate to linear, scabrous to hispid to sericeous, glandular or eglandular, margins ciliate, apex acute or acuminate to caudate; clinanthium low-convex, paleate; paleae rigid, conduplicate, distal portions often carinate, often mottled, glabrous or midrib and margins pubescent, apex typically acute to acuminate and not trifid. Ray florets (0-)5-45; limb light lemon-yellow to orange-yellow, sometimes pink to purple, rarely white (*S. sanguinea*), abaxial surface short-stipitate-glandular, ovaries (2.3-)3.5-8.2(-10.2) mm, linear, trigonous, with or without awns. Disk florets 12-172, bisexual; corolla orange-yellow or white but often turning purple apically, 5-lobed, cylindrical with a constricted base, tube short, short-stipitate-glandular, lobes triangular, sparingly to densely pubescent, sometimes with sclerified cells, sometimes glandular, inner surface papillose; anther thecae yellow to black, sometimes darkened only apically, appendages typically stramineous, filaments glabrous; style branches papillose, exappendiculate or short-appendiculate. Cypsela obovate to elliptic in outline with apical shoulders, typically strongly compressed and not plump-biconvex (sometimes somewhat laterally thickened and somewhat plump-biconvex in *S. ghiesbreghti* and *S. ovata*), light brown to black or mottled, glabrous or hirsute; epappose or pappus more commonly persistent-2-aristate (aristae sometimes somewhat fragile), awns often basally flared, intermediate squamellae usually absent, rarely with 4-12 shorter intermediate squamellae. \(x=17\). Aprox. 22 species, distributed from the SW United States to N Argentina.

*Simsia* was resurrected from the synonymy of *Encelia* by Blake (1913), who recognized 22 species and noted a strongly compressed cypsela character. Robinson y Brettell (1972) recognized 35 species in *Simsia*, 24 of these in Mexico and Central America, but Spooner (1990) recognized only 18 species. It should be noted that several species of *Simsia* are known to vary in cypsela pubescence, have both pubescent and glabrous cypselae. It is presumed that this variation may exist in each species, thus cypsela pubescence is mostly not included in the species descriptions that follow. One comparatively minor post-Spooner (1990) change followed here is recognition of somewhat plump-biconvex-fruited *V. ovata* (and two extra-Mesoamerican species) from near or within *Viguiera* ser. *Grammaatoglossae* as *Simsia*, as suggested by Spooner (1990), Panero y Schilling (1992), Strother (1999) and Schilling y Panero (2010).

1. Ray corolla limbs light pink to deep purple, rarely light lemon-yellow or white; anther appendages nearly black throughout or stramineous and black on margins; petioles usually winged; nodes without disks.  
**11. S. sanguinea**

1. Ray corolla limbs light lemon-yellow to orange-yellow; anther appendages stramineous throughout; petioles winged or unwinged; nodes with or without disks.

2. Leaf blade abaxial surface sericeous.  
**6. S. ghiesbrehtii**

2. Leaf blade abaxial surface variously pubescent but not sericeous.

3. Phyllaries subequal in length, the outer series usually 3/4 or more the length of the inner.

4. Leaves usually eglandular; anther thecae usually yellow proximally, usually purple (often drying bronze) distally.  
**1. S. amplexicaulis**

4. Leaves densely glandular; anther thecae yellow or rarely blackish distally, never purple distally.

5. Involucre urceolate.  
**3. S. chaseae pro parte**

5. Involucre campanulate to ovoid-campanulate.

6. Leaf surfaces pilose to subsericeous, with intermixed glandular-puberulent vesture; cypselae 3.1-5.1 mm; Panama.  
**5c. S. foetida var. panamensis**

6. Leaf surfaces setose to hispid, with intermixed glandular-puberulent vesture; cypselae 3.5-6.6 mm; Mexico to Costa Rica.

7. Ray corolla limbs lemon-yellow; capitula 20-30 mm wide (including ray corollas), phyllaries 13-26; disk florets 20-76.  
**5a. S. foetida var. foetida**

7. Ray corolla limbs orange-yellow, sometimes lemon-yellow; capitula 25-45 mm wide (including ray corollas), phyllaries 21-66; disk florets 66-172.  
**5b. S. foetida var. grandiflora**

3. Phyllaries unequal in length, usually the middle and outer series progressively shorter, the outer few phyllaries usually 2/3 or less the length of the inner.

8. Capitula discoid.  
**4. S. eurylepis**

8. Capitula radiate.

9. Anther thecae yellow, usually purple or bronze distally; nodes sometimes long-pilose; phyllaries usually purple.  
**8. S. lagascaeformis**
9. Anther thecae yellow to brown to black throughout (rarely yellow proximally and 
blackish distally in *S. chaseae*); nodes glabrous to scabrous or puberulent or pubescent 
but not long-pilose; phyllaries purple to green, yellow, brown, or green-black.

10. Nodal disks absent.

11. Leaf blades glandular-puberulent; anther thecae usually yellow throughout; 
cypselae setulose, sometimes pappose.

3. *S. chaseae* pro parte

11. Leaf blades eglandular; anther thecae black; cypselae glabrous, epappose.

10. *S. ovata*

10. Nodal disks usually present (absent in *S. santarosensis*, leaves sometimes 
perfoliate in *S. ghiesbreghtii*).

12. Nodal disks absent; leaves unlobed, subsessile or with petioles to 1 cm, 
blades subcoriaceous.  
12. *S. santarosensis*

12. Nodal disks present at most nodes or leaves perfoliate; leaves lobed or 
unlobed, petioles 0.5-14 cm, blades subcoriaceous to chartaceous.

13. Leaves subcoriaceous and thick, unlobed.  
14. *S. villasenorii*

13. Leaves chartaceous, lobed to unlobed.

14. Leaves commonly perfoliate when opposite, petioles winged or only 
partly winged to the base.  
2. *S. annectens* var. *grayi*

14. Leaves commonly not perfoliate, with petioles generally unwinged, 
except at the very base where attached to the nodal disk.

15. Phyllaries usually purple or sometimes green; ray corolla limbs 
5-7 mm; anther thecae yellow.  
7. *S. holwayi*

15. Phyllaries yellow-green to brown or green to green-black; ray 
corolla limbs 8-19.5 mm; anther thecae yellow to black.

16. Capitulescence open, corymbiform, peduncles to 6 cm; 
cypselae 4.2-6.1 × 2.5-3.5 mm.  
9. *S. molinae*

16. Capitulescence corymbiform-glomerulate, peduncles 0-2 cm; 
cypselae 3.2-4.2 × 1.8-2.5 mm.  
13. *S. steyermarkii*

Tap-rooted annuals 0.1-3 m; stems sometimes decumbent basally and rooting at the nodes, scabrous to hirsute, also short-stipitate-glandular. Leaves narrowly to deeply 3-lobed or unlobed, petiolate, not perfoliate, without nodal disks; blade 2.18-1.14 cm, ovate to deltate, chartaceous, surfaces scabrous and strigose, sometimes hirsute, usually eglandular, base cordate to cuneate, margins serrulate to dentate, apex acute to acuminate; petiole 1-11 cm, often winged throughout and auriculate to unwinged. Capitulescence corymbiform to paniculate, loosely branched; peduncles 1-12 cm, short-stipitate-glandular, scabrous, and hirsute. Capitula 12-14 mm, radiate; involucre 10-12 × 7-13 mm, ovoid-campanulate; phyllaries 15-22, usually nearly subequal, dark green to black, rarely purple, the outer phyllaries usually slightly shorter than the inner, 2-3-seriate, moderately to greatly reflexed, scabrous and hirsute, sometimes short-stipitate-glandular, acute to rarely caudate apically; outer phyllaries 5-14 × 1-2.5 mm, lanceolate; inner phyllaries 6.1-14 × 1.3-2.2 mm, lanceolate to linear; paleae 6.7-10.2 mm, stramineous, usually flecked with black, especially distally, rarely purple. Ray florets 8-14; corolla tube 0.7-1.7 mm, limb 8-16 × 3-7.5 mm, orange-yellow. Disk florets 23-55; corolla 5.2-7 mm, tube 0.8-1.3 mm, lobes 0.8-1.3 mm; anther thecae yellow proximally, usually purple (often drying bronze) distally, appendage stramineous. Cypselae 3.5-5.5 × 1.8-3 mm, usually 2-awned; awns 2.2-3.8 mm, rarely absent. 2n = 34. *Openings in oak-pine forests, roadsides, irrigation ditches, agricultural fields, wet upland meadows*. Ch (Stuessy y Gardner 4304, MO); G (Spooner y Dorado 2751, OS); H (Sauer 1582, WIS). 1300-3000 m. (Mexico, Mesoamerica.)

This species is distinguished by its annual habit, nodes without disks, eglandular or nearly eglandular leaves, subequal phyllaries, and anther thecae yellow proximally and usually purple distally. It is sometimes confused with *S. foetida*, but *S. amplexicaulis* has no or few glands and no spicy odor.


Phyllaries unequal or subequal. (Mexico, Mesoamerica.)

This species is recognized as having two varieties. The typical variety is distinguished by its subequal phyllaries.

Subshrubs to shrubs 1.5-3 m; stems usually hispid, sometimes merely hirsute or pubescent, sometimes glandular, nodes not long-pilose. Leaves unlobed to deeply 3-5-lobed, petiolate, commonly perfoliate with base of opposite leaves fused to form nodal disks 0-5.5 × 0.5-5.5 cm; blade 3-25 × 2-30 cm, ovate to deltate, chartaceous, surfaces usually scabrous and hirsute, especially adaxially, sometimes glandular-puberulent, especially abaxially, base cordate to cuneate, margins crenate to dentate, apex acute or acuminate; petiole 1-14 cm, often winged throughout or some petioles winged only partly to the base, wings to 1.5 cm diam. Capitulescence corymbiform, of tightly clustered capitula or more lax; peduncles 0.5-7 cm, sometimes widely divaricately branched, usually hirsute, sometimes intermixed glandular-puberulent and pubescent. Capitula 11-18 mm, radiate; involucre 9-12 × 6-15 mm, campanulate; phyllaries 14-29, unequal, 2-3-seriate, green to yellow-green, green-black, or rarely tinged with purple, appressed to only slightly reflexed at the very apex, short-puberulent to scabrous, sometimes glandular, acute to acuminate apically; outer phyllaries 3.7-6 × 1.6-2.8 mm, ovate to lance-ovate; inner phyllaries 7.5-9.1 × 1.5-2.4 mm, lanceolate to linear and linear-obovate; paleae 7.2-10 mm, stramineous, sometimes subglabrous. Ray florets 8-14; corolla tube 0.8-2.2 mm, limb 6.5-14 × 2-7 mm, light lemon-yellow. Disk florets 21-67; corolla 5.5-7.1 mm, tube 0.7-2.1 mm, lobes 0.6-1.2 mm; anther thecae yellow to black throughout, appendage stramineous. Cypselae 3.5-7 × 1.7-3.6 mm; awns absent or 1.9-3.6 mm. 2n = 34. *Open pine-oak forests, often in shallow soil of volcanic and limestone rocks*. Ch (Breedlove y Strother 47040, CAS). 800-1000 m. (Mexico [Guerrero, Oaxaca], Mesoamerica.)

*Simsia annectens* usually is easily recognized by its distinctive perfoliate leaves or conspicuously winged petioles. The typical variety of *Simsia annectens* occurs only in Mexico, and differs from that of the Flora Area by densely setose, subequal, and often greatly reflexed phyllaries.

Tap-rooted annuals to sometimes subshrubs 0.3-3 m; stems glandular and hispid, nodes not long-pilose. Leaves unlobed to 3-lobed half way to the midrib, petiolate, not perfoliate, without nodal disks; blade 3-18 × 2-15 cm, broadly to narrowly ovate to deltate, chartaceous, surfaces glandular-puberulent, sometimes with thinly scattered scabrous or hirsute vesture, base cordate to cuneate, margins crenate to dentate, apex acute to acuminate; petiole 1-7 cm, unwinged.

Capitulescence corymbiform, loosely branched; peduncles 1-6.5 cm, glandular-puberulent and hirsute. Capitula 12-16 mm, radiate; involucre 11-15 × 7-12 mm, urceolate; phyllaries 16-32, unequal to almost subequal, 3-seriate, green to yellow or brown, glandular-puberulent and hispid, apex appressed to slightly reflexed, acute to acuminate; outer phyllaries 5-9.5 × 1.1-2 mm, ovate to lance-ovate; inner phyllaries 7.8-10.2 × 1.2-2.2 mm, lanceolate; paleae 7.5-9.3 mm, stramineous, sometimes flecked greenish black apically. Ray florets 6-13; corolla tube 1-1.6 mm, limb 4.2-9 × 1.5-3.2 mm, light lemon-yellow. Disk florets 21-67; corolla 5.3-6.3 mm, tube 0.8-1.6 mm, lobes 0.4-0.8 mm; anther thecae usually yellow throughout or rarely blackish distally, appendage stramineous. Cypselae 4.2-6.1 × 2.5-3.8 mm, setulose; epappose or pappose with awns 1.8-3.2 mm. 2n = 34. *Roadside, borders of agricultural fields, disturbed areas.* Y (Gaumer 910, MO); C (Spooner 2802, OS); QR (Spooner 2811, OS). 0-400 m. (Mexico [Veracruz], Mesoamerica.)


*Simsia submollicoma* S.F. Blake.

Tap-rooted annuals 0.5-3 m; stems glabrous to sparsely pilose; herbage eglandular to petioles sparsely glandular-puberulent, intermixed with non-glandular short and long trichomes. Leaves unlobed to deeply 3-lobed, petiolate, often with nodal disks to 3.2 cm; blade 3-15 × 2-13 cm, broadly to narrowly ovate, chartaceous, surfaces puberulent, sometimes intermixed with hispid vesture and longer pubescent vesture, base cordate to cuneate, margins dentate to crenate, apex acute to acuminate; petiole 1-8 cm, unwinged or rarely narrowly winged, often long-pilose basally. Capitulescence corymbiform to paniculate, tightly to loosely branched; capitula subsessile or pedunculate; peduncles to 10 cm, sparsely to moderately pilose and puberulent. Capitula 13-16 mm, discoid; involucre 10-13 × 6-12 mm, urceolate; phyllaries 19-32, unequal, 3-seriate, purple and green, appressed, moderately to densely sericeous to pilose; outer phyllaries 3.7-6.5 × 1.6-2.5 mm, ovate; inner phyllaries 8.7-10.7 × 1.5-2.6 mm, ovate to lanceolate; paleae 7.4-9.8 mm, stramineous to purple. Ray florets 0. Disk florets 19-41; corolla 6.3-8.5 mm, orange-yellow, tube 1.5-2.5 mm, lobes 1.5-1.8 mm; anther thecae yellow, appendage stramineous.
Cypselae 4.2-5.8 × 2.2-3.6 mm; awns absent or 0.3-5 mm. 2n = 34. *Roadsides and old fields.* C (Spooner 2799, OS). 10-100 m. (Gulf coastal Mexico.)


*Encelia foetida* (Cav.) Hemsl., *Simsia ficifolia* Pers., *Ximenesia foetida* (Cav.) Spreng.

Tap-rooted annuals 0.5-4 m, occasionally persisting and woody at base; stems setose or pilose, sometimes hispid, usually also dense-glandular. Leaves unlobed or narrowly to more rarely deeply 3-lobed, petiolate, not perfoliate, rarely with nodal disks; blade 3-18 × 2-16 cm, ovate to deltate, chartaceous, surfaces hirsute to sericeous, intermixed stipitate or subsessile glandular-puberulent, base cordate to cuneate, margins crenate-dentate, apex acute to acuminate; petiole 1-10.5 cm, unwinged or winged, sometimes auriculate-clasping. Capitulescence loosely corymbiform, few-headed or much less commonly of solitary capitula; peduncles 1-14 cm, densely glandular-puberulent and hirsute. Capitula 10-20 mm, radiate; involucre 8-17 × 8-22 mm, campanulate to ovoid-campanulate; phyllaries 11-66, subequal, 2-4-seriate, yellow-green to light-green, reflexed throughout to appressed proximally and reflexed only at the very apex, linear to linear-ovate, hirsute or velutinous and densely glandular-puberulent, margins usually sinuate, caudate to rarely acute apically, with a single sinuate constriction near the apex; outer phyllaries 6-20 × 1.2-3.5 mm; inner phyllaries 7.1-20 × 0.5-3.2 mm; paleae 6.5-14 mm, stramineous. Ray florets 7-45; corolla tube 1.1-2.1 mm, limb 3.8-12 × 1.5-7 mm, light lemon-yellow to orange-yellow. Disk florets 20-172; corolla 5.2-8.7 mm, tube 0.6-2.5 mm, lobes 0.5-1.5 mm; anther thecae yellow or rarely black, appendage stramineous. Cypselae 3.1-7.5 × 1.7-4.1 mm; awns 1.7-7.4 mm, squamellae rarely present. 2n = 34. (Mexico, Mesoamerica, disjunct in Bolivia, Venezuela, and Jamaica.)

*Simsia foetida* is easily distinguished by its densely glandular vesture and subequal phyllaries, typically with caudate tips and a sinuate constriction near the apex. *Simsia foetida* is highly variable and interpreted as containing five varieties. Three varieties occur within the flora region and two are extra-territorial (var. *jamaicensis* in Jamaica and var. *megacephala* in Oaxaca).

*Simsia foetida* is similar to the densely glandular *S. chaseae*, but differs campanulate to ovoid (vs. urceolate in *S. chaseae*) involucres. *Simsia foetida* is sometimes confused with *S. amplexicaulis*, but the highly glandular, spicy-smelling leaves of *S. foetida* are easily distinguished from *S. amplexicaulis*. Additionally, *S. foetida* has yellow anther thecae, while those of *S. amplexicaulis* are yellow proximally and have a purple (drying bronze) band distally.


Leaf surfaces setose or sometimes hispid, also dense stipitate-glandular. Capitula 11-16 × 20-30 mm (including ray corollas); involucre 8-17 × 8-13 mm; phyllaries 13-26, 2-3-seriate, hirsute and glandular-puberulent. Ray florets 7-14; corolla limb 5.5-11 mm, light lemon-yellow. Disk florets 20-76; corolla 5.2-8.2 mm, lobes with intramarginal nerves. Cypselae 3.5-6.6 × 1.8-4 mm; awns 1.7-5.6 mm. 2n = 34. *Open grassy fields, dry weedy thickets, streamside, roadsides*. Ch (Spooner 2787, OS); G (Pruski et al. 4527, MO); ES (Molina y Montalvo 21576, NY). 300-1700(-2200) m. (Mexico, Mesoamerica.)


*Encelia grandiflora* (Benth.) Hemsl., *Encelia polycephala* (Benth.) Hemsl., *Simsia polycephala* Benth.

Leaves sometimes auriculate-clasping, surfaces setose to hispid, also moderate to dense subsessile-glandular. Capitula 13-19 × 25-45 mm (including ray corollas); involucre 9-13 × 10-22 mm; phyllaries 21-66, 3-4-seriate, hirsute and glandular-puberulent. Ray florets 11-45; corolla limb 7.6-12 mm, mostly orange-yellow, sometimes lemon-yellow in central and eastern Guatemala. Disk florets 66-172; corolla 6.1-7.4 mm. Cypselae 4-6.2 × 2.5-3.4 mm; awns 2.7-6 mm. 2n = 34. *Dry weedy thickets, streamside, open remnant pine forests, fields, roadsides*. G (Spooner y Dorado 2740, OS); H (Molina y Molina 24566, MO); ES (Williams y Molina 15188, F); N (Baker 2419, MO); CR (Janzen 10652, MO). 0-1700 m. (Endemic.)


Leaf surfaces pilose to subsericeous, also glandular. Capitula 12-16 × 25-35 mm (including ray corollas); involucre 9-13 × 9-18 mm; phyllaries 30-44, 3-seriate, pilose and glandular-
puberulent. Ray florets 12-25; corolla limb 5.1-11 mm, predominantly orange-yellow, but varying to light lemon-yellow. Disk florets 40-151; corolla 5.2-6.9 mm. Cypselae 3.1-5.1 × 1.7-2.5 mm; awns 2.2-5 mm. 2n = 34. Roadsides, tidal flats, savannas, old fields. P (Spooner 2904, OS). 0-800 m. (Panama, disjunct in Venezuela, Bolivia.)


Subshrubs to shrubs 1-2 m; stems puberulent to pilose, nodes not long-pilose. Leaves unlobed, petiolate, typically perfoliate or with conspicuous nodal disks, nodal disks 0-1.5 × 0-1.5 cm, usually attached to the base of the petioles; blade 4-15 × 1.5-8 cm, ovate to deltate, chartaceous, surfaces eglandular, puberulent or hispid to pubescent adaxially, sericeous abaxially, base cordate to cuneate, margins subentire to crenate to dentate, apex acute to acuminate; petiole 1-3 cm, generally unwinged, except at the very base where attached to the nodal disk. Capitulescence corymbiform, loosely branched; peduncles 1-6 cm, puberulent, sometimes intermixed short-pubescent and glandular. Capitula 10-15 mm, radiate; involucre 8-13 × 7-11 mm, campanulate; phyllaries 15-20, unequal or less commonly subequal, 2-3-seriate, dark green to green-black, usually appressed except slightly reflexed apically or less commonly greatly reflexed, puberulent to pilose, rarely glandular; outer phyllaries 3.6-7.7 × 1-2 mm, lance-ovate; inner phyllaries 6.7-12 × 1.5-2.5 mm, lanceolate; paleae 5.5-8.8 mm, stramineous proximally, green-black apically, sometimes glandular apically, apex sometimes aristate. Ray florets 7-11; corolla tube 1-1.7 mm, limb 8-15 × 3-6.6 mm, light orange-yellow. Disk florets 31-50; corolla 4.9-6.7 mm, tube 0.7-1.6 mm, lobes 0.7-1.4 mm; anther thecae black throughout, appendage stramineous. Cypselae 2.6-3.5 × 1.2-1.9 mm, sometimes becoming somewhat laterally thickened and somewhat plump-biconvex; awns absent or 1-2.7 mm, squamellae (0-)4-12, 0.4-0.7 mm. 2n = 34. Openings, steep wet mountain slopes, dry roadside thickets. Ch (Breedlove 9507, MICH); G (Spooner y Linder 2753, OS). 1600-2500 m. (Endemic.)

This species is easily distinguished by its leaves sericeous abaxially and its relatively small cypselae (2.6-3.5 mm), which are the smallest in the genus.

Subshrubs to shrubs 0.5-4 m; stems hirsute and pubescent, also glandular, nodes not long-pilose. Leaves unlobed to 3-lobed 1/2 way to midrib, petiolate, not perfoliate, with nodal disks 0-1 cm high and wide; blade 3-8 × 2-6 cm, ovate to deltate, chartaceous, surfaces glandular, short-hispid and pilose adaxially, longer pilose abaxially, base cordate to cuneate, margins crenate to dentate, apex acute or acuminate; petiole 1-4 cm, unwinged. Capitulescence corymbiform, loosely branched; capitula subsessile or pedunculate; peduncles to 8 cm, glandular-puberulent and short-hirsute. Capitula 10-13 mm, radiate; involucre 9-11 × 6-7 mm, campanulate to ovoid; phyllaries 18-27, unequal, 3-seriate, usually purple or sometimes green, appressed, puberulent, sometimes glandular and pubescent, acute to acuminate apically; outer phyllaries 3-4.5 × 1.5-2.2 mm, ovate; inner phyllaries 7.2-9.5 × 1.2-1.8 mm, lanceolate to linear; paleae 8-9.2 mm, stramineous proximally, purple or green-black apically. Ray florets 8-9; corolla tube 0.8-1 mm, limb 5-7 × 2.5-2.9 mm, light orange-yellow. Disk florets 20-31; corolla 5.7-6.7 mm, tube 0.9-1.2 mm, lobes 0.7-1.1 mm; anther thecae yellow throughout, appendage stramineous. Cypselae 4.7-5.6 × 2.3-3 mm; awns 3.6-4.2 mm. 2n = 34. Dry tropical deciduous forests. G (Spooner y Dorado 2746, NY). 600-900 m. (Endemic.)


Encelia pilosa Greenm., Encelia purpurea Rose, Simsia exaristata A. Gray, Simsia exaristata var. epapposa S.F. Blake, Simsia exaristata var. perplexa S.F. Blake.

Tap-rooted annuals to occasionally subshrubs 0.2-4 m; stems sometimes decumbent at the base and rooting at the nodes, glandular, also sometimes pilose or strigose, nodes sometimes long-pilose. Leaves usually unlobed, rarely narrowly to deeply 3-lobed, petiolate, typically without nodal disks; blade 2-21 × 1-16 cm, ovate to deltate, chartaceous, indumentum variable, surfaces often scabrous and thinly hirsute, or sometimes puberulent to pilose, usually eglandular, base cordate to cuneate, margins crenate to dentate, apex acute or acuminate; petiole 1-7 cm, unwinged or very rarely ampliate basally. Capitulescence corymbiform, tightly to loosely branched; peduncles 0.5-10 cm, glandular-puberulent and hirsute, sometimes eglandular. Capitula 10-14 mm, radiate; involucre 8-12 × 5-10 mm, campanulate; phyllaries 13-19, unequal, 2-3-seriate, usually purple, varying from light green to yellow with purple margins or totally purple, appressed or slightly reflexed apically, usually glandular-puberulent and pilose, sometimes eglandular, acute to acuminate apically; outer phyllaries 2.2-6.7 × 1.5-2.5 mm, ovate to lance-
ovate; inner phyllaries 4.6-9.5 × 1.5-2.7 mm, lanceolate; paleae 5.5-9.4 mm, stramineous and purple apically or purple throughout, apex often nearly truncate with a mucro. Ray florets 5-10; corolla tube 1-1.7 mm, limb 5.1-12 × 2.3-5.3 mm, orange-yellow. Disk florets 13-27; corolla 5.8-6.7 mm, tube 0.8-1.2 mm, lobes 0.8-1.2 mm; anther thecae yellow proximally, usually purple (often drying bronze) distally, appendage stramineous. Cypselae 4.2-6 × 2-3.5 mm; awns 2.5-4.6 mm or rarely absent. 2n = 34. Deserts, tropical deciduous forests, roadsides, open fields, agricultural field borders. G (Standley 58037, F). 1400-2200 m. (SW United States, Mexico, Mesoamerica.)

This widespread species usually is easily distinguished by its typically annual habit, unwinged petioles often long-pilose at the base, unequal phyllaries, orange ray corolla limbs, and anther thecae yellow proximally and with a purple band (often drying bronze) distally. It is similar to S. eurylepis, which has discoid capitula and lacks the purple anther band, and by purplish phyllaries to S. holwayi, which is a perennial with nodal disks.


Subshrubs to shrubs 1-3.5 m; stems puberulent to weakly hispid, nodes not long-pilose. Leaves unlobed to deeply 3-lobed, petiolate, not perfoliate, with nodal disks 0-2 × 0-2 cm; blade 3.5-11 × 2.5-14 cm, ovate to deltate, chartaceous, surfaces glandular-puberulent to short-pilose, sometimes with intermixed hispid trichomes, base cordate to cuneate, margins crenate-dentate, apex acute to acuminate; petiole 1-4 cm, unwinged. Capitulescence open, corymbiform, loosely branched, capitula subsessile or pedunculate; peduncles to 6 cm, glandular-puberulent with intermixed short-pubescent trichomes. Capitula 13-17 mm, radiate; involucre 10-13 × 8-15 mm; campanulate, phyllaries 18-37, unequal, 3-seriate, yellow-green to brown, appressed except slightly reflexed apically, glandular-puberulent and short-pubescent, acute to acuminate apically; outer phyllaries 3-8.3 × 1-2.9 mm, ovate to ovate-lanceolate; inner phyllaries 9.5-14 × 1-1.9 mm, lanceolate; paleae 8-11.1 mm, stramineous to sometimes flecked purple or green-black at the apex. Ray florets 8-24; corolla tube 1-2 mm, limb 10-19.5 × 3-6.5 mm, light orange-yellow. Disk florets 29-85; corolla 6-8 mm, tube 1-1.8 mm, lobes 1-1.5 mm; anther thecae yellow to black throughout, appendage stramineous. Cypselae 4.2-6.1 × 2.5-3.5 mm; awns 3.5-5.5 mm. 2n = 34. Moist thickets, roadsides, along streams. H (Molina 23020, CAS); N (Spooner y Dorado R. 2714, MO); CR (Spooner 2901, OS). 0-1000 m. (Endemic.)

This species is superficially most similar to S. lagascaeformis, but that species is annual and lacks nodal disks.

Gymnolomia liebmannii Klatt, Viguiera ovata (A. Gray) S.F. Blake.

Perennial herbs 0.3-0.8 m from thin rootstock; stems often virgate, simple to few-branched, hirsute, eglandular, nodes not long-pilose; herbage with trichomes 0.1-1 mm, the longer trichomes fewer. Leaves simple, mostly opposite or infrequently distal few alternate, short-petiolate, without a nodal disk; blade 2.5-5 × 1.5-4 cm, deltate-ovate, trinerved from c. 2 mm above base, surfaces concolorous or discolorous, eglandular, adaxial surface hispid-scabrous, trichome subsidiary cells enlarged, abaxial surface pilose-hispid to densely so, base rounded to truncate, margins crenate-serrate, apex acute to obtuse; petiole c. 0.3 cm, exalate. Capitulescence c. 3 cm diam., 3-8-capitulate, branches alternate; peduncles 1-10 cm. Capitula 9-11 mm, mid-sized, radiate; involucr 5-8 × 10-15 mm, campanulate-urceolate; phyllaries (3-)5-8 × 1-1.3 mm, the inner reaching to ray limb mid-point, unequal or slightly unequal with outer series of a few phyllaries about 1/2-2/3 as long as inner phyllaries, 2-3-seriate, 2-costate proximally, pilose-hispid, apex c. 0.3 mm diam., attenuate; paleae 6-7 mm, strongly conduplicate, stramineous with darker midrib, apex pungent. Ray florets 8-14; corolla tube c. 0.9 mm, limb 5-8 × 2-4 mm, elliptic, pale yellow, darkly 5-nerved; ovaries 3.5-4 mm. Disk florets 25-50; corolla 4-5 mm, puberulent proximally, tube c. 0.5 mm, throat elongate, puberulent basally, lobes c. 0.9 mm, puberulent; anthers c. 2.5 mm, thecae black; style branches c. 1.5 mm, appendage c. 0.3 mm, abruptly narrowed. Cypselae c. 3 × c. 1.5 mm, sometimes becoming somewhat laterally thickened and somewhat plump-biconvex, striatulate, glabrous, carpododium narrow and asymmetric, base not bordered by a cupular disk; epappose. 2n = 34. Flowering Sep-Nov. Wooded slopes, pine-oak forests. Ch (Breedlove 40979, MO). 1500-2500 m. (Mexico [Oaxaca], Mesoamerica.) Although Blake (1918) and Strother (1999) treated this species as Viguiera ovata, Spooner (1990), Panero y Schilling (1992), Strother (1999) and Schilling y Panero (2010) mentioned this species appears to be a Simsia.


Aspilia grosseserrata M.E. Jones, Cosmos hintonii Sherff, Encelia sanguinea (A. Gray) Hemsl., Encelia sanguinea var. palmeri A. Gray, Helianthus hastatus Sessé et Moc., Simsia
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_sanguinea_ subsp. _albida_ S.F. Blake, _Simsia sanguinea_ var. _palmeri_ (A. Gray) S.F. Blake, _Simsia triloba_ S.F. Blake.

Perennial herbs to subshrubs 0.3-1.5 m; stems erect or rarely decumbent, typically hispid and short-stipitate-glandular. Leaves extremely variable, unlobed or more commonly narrowly to deeply 3-lobed from the base or proximal 1/3 of blade, rarely deeply bipinnatifid, without nodal disks; blade 1.5-16 × 0.5-18 cm, ovate to linear-ovate to linear, chartaceous, surfaces usually rough scabrous intermixed rough whitish hispid vesture especially on veins, glandular or eglandular, base cuneate, margins subentire to more commonly dentate, apex acute to long-acuminate; petiole 0-6 cm, usually winged, wings to 3 cm diam., sometimes auriculate. Capitulescence corymbiform, loosely branched, often forming the distal 1/2 of the plant; peduncles (1-)3-12 cm, puberulent to more commonly hirsute and glandular. Capitula 9-16 mm, radiate; involucre 8-14 × 6-10 mm, campanulate; phyllaries 15-25, unequal to nearly subequal, 2-3-seriate, usually green to greenish black, rarely tinged with purple, appressed to reflexed, strigose and hirsute, sometimes also short-stipitate-glandular, acutate to long-acuminate apically; outer phyllaries 3.8-11 × 1-2.2 mm, lanceolate-ovate; inner phyllaries 6.2-13 × 1.2-2.5 mm, lanceolate to linear; paleae 6.6-10.5 mm, stramineous. Ray florets 6-15; corolla tube 1.2-2.3 mm, limb 7.3-13.5 × 3.7-5.5 mm, light pink to deep purple, rarely light lemon-yellow or white. Disk florets 17-44; corolla 5.5-7.5 mm, white (lemon-yellow when the rays are lemon-yellow), turning purple with age, tube 0.7-1.6 mm, lobes 0.7-1.5 mm; anther thecae mostly yellow, appendage nearly black throughout or stramineous and black along the margins. Cypselae 3.2-6.5 × 1.9-3.7 mm; awns absent or 2.3-4.3 mm, squamellae rarely present. 2n = 34. _Open meadows, shallow rocky soil in rocky areas, cliffs, roadsides, open tropical deciduous forests, oak-pine forests_. Ch (Cronquist y Sousa 10461, NY); G (Spooner 2767, OS); ES (Calderón 998, US). 400-2500 m. (Mexico [Jalisco to C. Veracruz and Oaxaca], Mesoamerica.)

This species exhibits the greatest range of morphological diversity of any species in the genus, but it is usually readily distinguished by its pink to purple ray corolla limbs and generally rough scabrous pubescence. The presumed isosyntype (_Ghiesbreght 305, GH_) cited by Spooner (1990) and Strother (1999) as the lectotype is not original material cited in the protologue. This attribution of the GH sheet as lectotype conflicts with Art. 9.2 in Greuter et al. (2006) and cannot be followed.

Subshrubs, 0.3-1.5 m; stems weakly strigose and canescent, later glabrate, nodes not long-pilose. Leaves unlobed, subsessile or petiolate, without nodal disks; blade 1-5 × 1-2 cm, ovoid, subcoriaceous, surfaces scabrous, adaxial surface trichomes with unusually large subsidiary cells, usually eglandular, base cuneate, margins subentire-crenate, apex acute to acuminate; petiole 0-1 cm, unwinged. Capitulescence corymbiform, loosely branched; peduncles 1-14 cm, puberulent, sometimes scabrous and glandular. Capitula 13-15 mm, radiate; involucre 11-13 × 5-10 mm, campanulate; phyllaries 19-29, unequal, 3-seriate, green to green-black, turning brown, appressed or slightly reflexed apically, canescent, sometimes scabrous, acute to acuminate apically; outer phyllaries 3-6 × 1.5-2.5 mm, ovate to lance-ovate; inner phyllaries 8.5-11.5 × 1.4-2.5 mm, lanceolate, linear, or oblanceolate; paleae 9-10.8 mm, stramineous. Ray florets 8-13; corolla tube 1-1.4 mm, limb 10.5-11.5 × 3.2-3.8 mm, light orange-yellow. Disk florets 17-25; corolla 6-6.6 mm, tube 0.7-1 mm, lobes 0.9-1.3 mm; anther thecae yellow to black throughout, appendage stramineous. Cypselae 4.2-6.7 × 2-2.7 mm; awns 3.8-4.6 mm. 2n = 34.  

Sandy volcanically derived soils. CR (Liesner et al. 2661, MO). 0-500 m. (Endemic.)

This species resembles *S. villasenorii* by firm unlobed leaves, but clearly differs by lack of nodal disks and light orange-yellow (vs. light-yellow) ray corolla limbs.


Subshrubs to shrubs 1-4 m; stems puberulent and mildly scabrous, nodes not long-pilose. Leaves unlobed, petiolate, not perfoliate, with nodal disks 0-2 × 0-2 cm; blade 3-15 × 2-9 cm, ovate to deltate, chartaceous, surfaces short-hispid and puberulent, sometimes glandular adaxially, glandular-puberulent abaxially, base cordate to cuneate, margins subentire to crenate, apex acute to acuminate; petiole 1-7 cm, unwinged. Capitulescence corymbiform-gloerulate; capitula usually subsessile in tight clusters of up to 5 capitula, less commonly short-pedunculate; peduncles 0-2 cm, glandular-puberulent and hispid. Capitula 11-13 mm, radiate; involucre 10-12 × 6-11 mm, campanulate; phyllaries 18-21, unequal, 3-seriate, green to green-black to black, appressed except slightly reflexed apically, scabrous, sometimes puberulent and glandular, acute to acuminate apically; outer phyllaries 2-5.9 × 0.7-2 mm, ovate to lance-ovate; inner phyllaries 7.5-9.7 × 1.3-1.7 mm, lanceolate; paleae 7.8-9.5 mm, stramineous or sometimes speckled green-black apically. Ray florets 8; corolla tube 1.2-1.6 mm, limb 8-10 × 3.5-4.5 mm, light lemon-yellow. Disk florets 15-34; corolla 5.8-7.2 mm, tube 0.8-1 mm, lobes 0.7-1.2 mm; anther thecae yellow to black throughout, appendage stramineous. Cypselae 3.2-4.2 × 1.8-2.5 mm; awns absent
or 1.9-2.7 mm. 2n = 34. Pine or pine-oak forests. G (Spooner y Dorado R. 2748, OS). 1300-1500 m. (Endemic.)

This species is most easily distinguished by its aggregated capitulescences and relatively small cypselae (3.2-4.2 cm).


Subshrubs to shrubs 0.5-2 m; stems puberulent and scabrous, nodes not long-pilose. Leaves unlobed, petiolate, with nodal disks 0-2 × 0-2 cm; blade 3-10 × 2-7 cm, ovate to deltate, subcoriaceous and thick, surfaces puberulent and scabrous, sometimes glandular, base cordate to cuneate, margins crenate-dentate, apex acute; petiole 0.5-6 cm. Capitulescence corymbiform, tightly to more loosely branched; capitula subsessile or pedunculate; peduncles to 7 cm, glandular-puberulent and scabrous. Capitula 15-18 mm, radiate; involucre 14-15 × 8-11 mm, campanulate; phyllaries 19-28, unequal, 3-seriate, green to purple or brown, appressed, scabrous, sometimes glandular, acute to aristate apically; outer phyllaries 3.2-5.5 × 1.2-2.3 mm, ovate; inner phyllaries 10-13 × 1.5-2.1 mm, linear-lanceolate, linear to linear-obovate; paleae 10-13.4 mm, stramineous proximally, purple apically. Ray florets 11-16; corolla tube 1.7-3.5 mm, limb 7.4-14 × 2.5-4.5 mm, light lemon-yellow. Disk florets 21-39; corolla 6.5-6.7 mm, tube 0.7-1.1 mm, lobes 1.1-1.3 mm; anther thecae yellow to black throughout, appendage stramineous. Cypselae 5.5-7.3 × 2.5-3.5 mm; awns 4.5-6.5 mm, squamellae absent or 0.5-1 mm. 2n = 34. Open areas of tropical deciduous forest and oak-pine woods, including recently burned oak-pine woods. Ch (Breedlove 52914, CAS). 800-1000 m. (Mexico [Oaxaca], Chiapas.)


Por J.F. Pruski.

Coarse annual or perennial herbs, shrubs, or trees; stems erect, branching, leafy, subterete, striate, glabrous to pubescent. Leaves simple to deeply palmately 3(5)-lobed, alternate (on nearly all herbarium specimens) or sometimes opposite proximally, petiolate or subsessile; blade deltate or pentagonal to less commonly lanceolate or linear, chartaceous, venation subpalmately 3(5)-
nerved from above base, surfaces pubescent or sometimes subglabrous, also finely glandular or less commonly eglandular abaxially, base cordate to attenuate, often decurrent onto petiole, sometimes auriculate, distal margins serrate or crenate to sometimes subentire, apex acute to acuminate; petiole often winged. Capitulescence terminal, monocephalous to open few-capitulate and loosely cymose; peduncles elongate, stout, naked, typically dilated and fistulose distally. Capitula typically large and showy, radiate, many- to numerous-flowered; involucre campanulate to hemispherical; phyllaries 12-28+, imbricate, graduated or subequal, 2-5-seriate, linear-lanceolate to broadly obovate, persistent in fruit, stiffly chartaceous or bases sometimes indurate, apices acuminate to rounded; clinanthium hemispherical or convex, paleate; paleae persistent, stiff, conduplicate, striate, mostly stramineous or at least basally so, sometimes toothed, acute or acuminate to aristate. Ray florets 8-30, corolla limbs often overlapping; corolla yellow or orange, 15+-nerved, typically obtuse and tridenticulate or tridentate apically, typically setulose and glandular abaxially. Disk florets many to numerous, bisexual; corolla 5-lobed, tubular-funnelform, yellow, slightly exserted from involucre, outer florets sometimes broadly tubular and only 2/3 as long as inner, tube much shorter than throats, throat typically dilated basally and setose, lobes deltate; anther thecae black, basally obtuse, connectives and appendages stramineous, appendages ovate to sometimes lanceolate; style branches abaxially papillose, stigmatic surfaces continuous, apex penicellate to attenuate. Cypselae black or brown, oblong in outline, compressed, often 3-4-angled, elaiosomes usually absent (or poorly developed in *T. hondurensis* and *T. longiradiata*); pappus present or absent, when present low and coroniform, also with (0-)1-2 sometimes fragile awns. $x = 17$. 11 spp. Native to North America, but 3 cultivated and introduced into the Paleotropics or subtropics.

For more than 100 years the common *T. rotundifolia* was known as *Tithonia tagetiflora* Lam, but Blake (1921) in his monograph of typically showy *Tithonia* corrected the name to *T. rotundifolia*. Blake (1921) also recognized each *T. pittieri* and *T. scaberrima*, whereas he (Blake, 1926) later replaced *T. scaberrima* with the earlier *T. longiradiata*. LaDuke's (1982) subsequent monograph gave *T. pittieri* as a synonym of *T. longiradiata* and recognized the segregate *T. hondurensis*, material of which had generally been determined using the name *T. pittieri*.

*Tithonia hondurensis* is a Mesoamerican endemic, whereas *T. tubiformis* is much more common in extra-Flora Area México than within the Flora Area. The three other species are more or less equally distributed in extra-Flora Area México and within our Flora Area. Historically, three species have been widely cultivated, but orange-flowered forms of the annual *T. rotundifolia* are now becoming most prevalent in horticultural use, especially in extra-Flora Area zones.
1. Phyllaries subequal or obgradient; phyllaries apically acute or acuminate; disk floret pappus a ring of squamellae and 0-2 awns.

2. Leaf blades sometimes 3-lobed; phyllaries with trichomes usually 0.2-1 mm, subappressed or matted, rarely glandular; paleae usually slightly shorter than associated floret, abruptly acuminate.

4. **T. rotundifolia**

2. Leaf blades simple and never 3-lobed; phyllaries with trichomes elongate and patent, 1-3 mm, also typically glandular; paleae usually longer than associated floret, gradually long-aristate.

5. **T. tubiformis**

1. Phyllaries distinctly graduated; phyllaries sometimes apically rounded; disk florets pappose or epappose.

3. Phyllaries glabrous or less commonly sparsely appressed-hispidulous; some or all disk florets pappose; cypselae setulose, without an elaiosome.

1. **T. diversifolia**

3. At least outer phyllaries villous, pilose, or hirsute-pilose; all disk florets epappose; cypselae glabrous, with an elaiosome.

4. Leaves linear to narrowly lanceolate, 0.4-1.5(-2.8) cm diam., margins revolute; disk florets c. 60-80.

2. **T. hondurensis**

4. Leaves lanceolate to ovate, (1.8-)2.6-13.5 cm diam., margins not revolute; disk florets 100+.

3. **T. longiradiata**


Perennial herbs or (fide some herbarium labels) shrubs 1-4(-5) m; stems puberulent or infrequently villosulous to glabrare with age. Leaves simple or palmately 3- or 5-lobed, alternate, petiolate; blade 7-20(-32) × 7-12(-22) cm, delate to pentagonal, distal-most typically elliptic to
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lanceolate and not lobed, adaxial surface puberulent to glabrous, abaxial surface glabrous to villous, also glandular, base attenuate to cuneate, decurrent onto petiole, margins serrate or crenate, apex acuminate; petiole 2-6 cm. Capitulescence monocephalous to less commonly few-capitate and corymbiform; peduncles 7-24 cm, pilose or distally villous. Capitula to 2 cm; involucre 2-3.5 cm diam.; phyllaries distinctly graduated, 3-4-seriate, oblong to ovate, rounded to acute, glabrous or less commonly sparsely appressed-hispidulous, scarious or the outer ones herbaceous-tipped, outer ones 6-10 × (3-)4-7 mm, grading to inner ones 10-20 × 3-10 mm; paleae 9-12 mm, mucronate to aristate, glabrate or midrib hispidulous distally. Ray florets 7-14; corolla yellow, tube 2-2.5 mm, limb 40-69 × 9-16 mm, oblong to ob lanceolate, 20-30+-nerved. Disk florets 80+; corolla 6.5-9.5 mm, yellow, 10-20-nerved, setulose, tube ≤ 1 mm, throat 4.5-7 mm, lobes 1-1.5 mm, lobe veins intramarginal. Cypselae 4-6 mm, setulose, without an elaiosome; some or all disks with a pappus of 2 subequal awns 3-4 mm and a ring of squamellae. 2n = 34.

This species has often been cultivated for its large showy flowers. Weedy material from Campeche originally attributed to *T. diversifolia* is redetermined here as *T. rotundifolia* (distinguished by its subequal pubescent narrow-tipped phyllaries and orangish corollas). It thereby seems likely that this species is known only in Campeche and Quintana Roo from cultivated material, although the species has become established in parts of tropical Asia.


Infrequent shrubs to 0.5-4 m; stems hispid to glabrate. Leaves simple, alternate, subsessile with petiolariform base to 4 mm; blade 4-12(-23) × 0.4-1.5(-2.8) cm, linear or narrowly lanceolate, faintly trinerved, adaxial surface scabrous to hirsute, trichome subsidiary cells enlarged, abaxial surface pilose, also glandular, base attenuate, margins subentire to serrate or crenate, slightly revolute, apex acuminate. Capitulescence monocephalous; peduncle 4-11(-25)
cm, hispid. Capitula 0.8-1.4 cm; involucre (1)1.3-2 cm diam.; phyllaries distinctly graduated, 4-seriate, linear to spatulate, apex rounded or obtuse, sometimes glandular, outer ones 4.5-8 × 2-4 mm, mostly herbaceous, hirsute-pilose, grading to inner ones 7-11 × 2-4 mm, mostly scarious; paleae 6-9 mm, minutely puberulent apically. Ray florets 13-15; corolla yellow, tube 1-1.5 mm, limb 15-40 × 6-10 mm, narrowly lanceolate, c. 15-nerved. Disk florets 60-80; corolla 5-7 mm, yellow, 5-nerved, setulose, tube 0.5-1 mm, throat 3.5-5 mm, lobes c. 1 mm. Cypselae c. 3.5 mm, glabrous, with a poorly developed elaiosome; epappose. Base of sandy cliffs, pine forests, rocky slopes, stream banks. B (Spellman 1412, MO); H (Molina 23298, MO). 500-1300 m. (Endemic.)

By alternate abaxially glandular lanceolate leaves and by glabrous epappose cypselae, Tithonia hondurensis is similar superficially to Heliomeris longifolia, which differs by its subequal to weakly graduated apically acuminate phyllaries and ray corolla limbs 7-10-nerved and glandular abaxially.


Isoneotype (designated by La Duke, 1982): Guatemala, Webster et al. 12844 (MO!). Illustr.: Nash, Fieldiana, Bot. 24(12): 560, t. 105 (1976). N.v.: Muk'ta sun, sun, Ch; flora amarillo, mirasol, sun, yumo, G; pulagaste, mirasol, ES.

Gymnolomia decurrens Klatt, Gymnolomia pittieri Greenm., Gymnolomia platylepis A. Gray, Gymnolomia scaberrima (Benth.) Greenm., Mirasolia scaberrima (Benth.) Benth. et Hook. f. ex Hemsl., Tithonia pittieri (Greenm.) S.F. Blake, Tithonia scaberrima Benth.

Shrubs or less commonly treelets to 3(-4) m; stems long-pilose to sparsely so. Leaves simple, alternate to opposite proximally, subsessile or short-petiolate with petioliform base to 10 mm; blade 6-21(-30) × (1.8-)2.6-13.5 cm, lanceolate to ovate, trinerved from well above base, adaxial surface scabrous or pilose, trichome subsidiary cells enlarged, occasionally glandular, abaxial surface densely pilose, also glandular, base usually abruptly contracted and attenuate-decurrent to sometimes rounded, margins subentire to serrate or crenate, not revolute, apex acuminate. Capitulescence monocephalous to few-capitulate corymbiform; peduncles 2.5-11 cm, pilose or distally villous. Capitula to 1.8 cm; involucre 1.5-2.5(-3.5)cm diam.; phyllaries distinctly graduated, 4-seriate, broadly spatulate, outer ones 8.5-11 × 3-6.5 mm, mostly herbaceous, apex acuminate to acute, villous to pilose, grading to inner ones 11-19 × 2.5-6 mm, mostly scarious, broadly acute to more commonly obtuse or rounded; paleae 8-10 mm, glabrate to hispidulous distally. Ray florets 13-30; corolla yellow, tube 1.5-2 mm, limb 25-40 × 4.5-8 mm, oblong to oblanceolate, c. 15-nerved. Disk florets 100+; corolla 4.5-6 mm, yellow, setulose especially
proximally, tube ≤ 1 mm, throat 2.5-4 mm, lobes c. 1 mm. Cypselae 3-4.5 mm, glabrous, with a poorly developed elaiosome; epappose. 2n = 34. Open forests, forest edges, lava flows, roadsides, pine-oak forests, rocky areas, sabana, secondary growth, thickets, volcano slopes. Ch (Pruski et al. 4215, MO); G (Tuercckheim II 2053, NY); H (Williams y Molina R. 11987, MO); ES (Tucker 730, NY); N (Oersted 141, K); CR (Pittier 3735, GH); P (D’Arcy 9916, MO). (200-)700-3500 m. (C. + S. México, Mesoamerica.)


Annual herbs 1-4 m; herbage with trichomes usually 0.2-1 mm; stems puberulent. Leaves simple or sometimes proximal ones palmately 3- or 5-lobed, alternate, petiolate; blade 6-30(-38) × 7-15(-30) cm, cordiform or deltate to pentagonal, surfaces hispid-pilose, abaxial surface also glandular, base cordate or rounded then attenuate and decurrent onto petiole, margins serrate or crenate, apex acuminate; petiole 3-10(-14) cm, winged at least distally. Capitulescence monoecephalous to less commonly 2(-3)-capitulate and corymbiform; peduncles 10-25 cm, villosulous to sometimes glabrate. Capitula 1.2-2 cm; involucre 1.5-2.5(-3) cm diam.; phyllaries 13-28 × 4-7.5 mm, elliptic-lanceolate to sometimes lanceolate, subequal or obgraduate, 2-4-seriate, herbaceous with scarious base, short-canescent to pilosulous, rarely glandular, trichomes usually 0.2-1 mm, subappressed or matted, inner surface also sometimes setulose distally, apex acute to acuminate, often reflexed; paleae 11-15 mm, usually slightly shorter than associated floret, abruptly acuminate, glabrous or finely villosulous distally. Ray florets 8-13; corolla orange to less commonly golden-yellow drying orange, adaxial surface of limb often noticeably darker than abaxial surface, tube 1.5-2.5 mm, limb 20-30 × 6-17 mm, lanceolate-ovate to oblong, c. 20-nerved. Disk florets 60-90; corolla 7.5-9 mm, yellow, tubular, 5-10(-15)-nerved, tube 1-1.5 mm, densely setulose sometimes in lines, throat 4.5-6.5 mm, lobes c. 1 mm, setulose. Cypselae 5-7
mm, appressed setulose, without an elaiosome; disk pappus of 2 easily deciduous awns 4-6 mm and a ring of squamellae. 2n = 34. Disturbed areas, lagoon edges, old fields, tropical evergreen forests, open tropical deciduous forest, roadsides, secondary vegetation. Ch (Breedlove 28040, MO); Y (Gaumer et al. 23524, MO); C (Cabrera y Cabrera 15261, MO); QR (cited by Sousa y Cabrera, 1983); B (Bartlett 12029, US); G (Pruski et al. 4528, MO); H (Molina y Molina 34313, MO); ES (Calderón 135, MO); N (Greenman y Greenman 5619, MO); CR (Wussow y Pruski 148, NY); P (Duchassaing s.n., GOET-6136). 0-1100(-1500) m. (C. y S. México, Mesoamerica; also cultivated and perhaps sometimes escaping in Estados Unidos, Colombia, Venezuela, Perú, Bolivia, Brazil, Argentina, Cuba, Jamaica, Hispaniola, Puerto Rico, Lesser Antilles; Europa, África, Asia, Islas del Pacífico.)

Tithonia rotundifolia was reintroduced into cultivation in the mid-1900s, today is the most commonly cultivated Tithonia. Tithonia rotundifolia may become adventive, leading to the many reports of this species occurring outside of its native range of México and Central America.


Helianthus tubiformis Ortega, Tithonia helianthoides Bernh., Tithonia tubiformis var. bourgaeana Pamp., Urbanisol tubiformis (Jacq.) Kuntze.

Weedy annual herbs 1-2(-3) m; herbage often with elongate trichomes, trichomes patent, usually 1-3 mm; stems villosulous-pilosulose. Leaves simple and never 3-lobed, alternate, petiolate; blade 5-12(-20) × 4-9(-15) cm, deltate to rhombic, adaxial surface strigose-hirsute, adaxial surface hirsute to villous, also glandular, base cuneate to attenuate, margins subentire to serrate or crenate, apex acuminate; petiole 2-6 cm. Capitulescence monoecephalous; peduncles (5-)10-20 cm, villosulous-pilosulose to densely villous-pilose. Capitula 1.2-2 cm; involucre 1-2.5 cm diam.; phyllaries 15-25 × (1.5-)3-7 mm, subequal, 2(-3-)seriate, linear-lanceolate to elliptic-lanceolate or narrowly oblanccolate, herbaceous or inner ones with scarios base, villosulous-pilosulose to densely villous-pilose, trichomes usually 1-3 mm, elongate and patent, also typically glandular, apex acute; paleae 10-18 mm, usually longer than associated floret, and often projected from fruiting capitula, gradually long-aristate, glabrous or setulose distally, inner surface also sometimes setose distally. Ray florets 11-18; corolla golden-yellow, tube 1.5-3 mm, limb 15-30(-40) × 5-15 mm, lanceolate-ovate to oblong, c. 15-nerved. Disk florets 60-120; corolla 6-7.5 mm,
yellow to orange-yellow, tubular, 5-nerved, tube ≤ 1 mm, densely setulose to glabrous, throat 4-5.5 mm, lobes c. 1 mm, setulose. Cypselae 4-6 mm, appressed setulose, without an elaiosome; disk pappus of a ring of squamellae and 0-2 easily deciduous awns 1-2(3.5) mm. 2n = 34. Brushy slopes, disturbed areas, dry limestone ridges, fallow fields, pastures, quebradas, riverbanks, roadsides, secondary vegetation, swampy areas. Ch (Reyes-García et al. 4499, MO); B (cited by Balick et al., 2000); G (Standley 61365, MO); H (Williams y Molina 10985, MO); ES (Rosales JMR00878, MO). (100-)200-1800(-2500) m. (C. + S. México a Mesoamerica; occasionally cultivated and adventive in Bolivia, Argentina, Hispaniola, Bahamas; once cultivated in Europa.)

Although some plants of _T. tubiformis_ from Chiapas have narrow phyllaries and ray corolla limbs moderately abaxially glandular (as noted by Strother, 1999), they nevertheless match the species in essential characters of non-lobed leaves and glandular, subequal phyllaries with patent trichomes. _Tithonia tubiformis_ was often cultivated formerly, but has now fallen out of favor. Nevertheless, it has persisted from cultivation and become adventive in scattered areas. Cowan (1983) reported _T. tubiformis_ for Tabasco (based on Cowan 1965), a large disjunction but this report is based on a misidentification. Pérez et al. (2005) perpetuated the Cowan report, although Strother (1999) had previously clearly excluded _T. tubiformis_ from Tabasco. La Duke (1982) plotted this species in Belize, Costa Rica, and Nicaragua, but neither he nor Blake (1921) cited vouchers from these areas. No materials from Belize, Costa Rica, or Nicaragua were seen in this study, and thus _T. tubiformis_ is thus excluded from their respective floras.

10. _Viguiera_ Kunth

_Hymenostephiu_m Benth.

Por J.F. Pruski.

Herbs or shrubs; stems erect or ascending, unbranched or branched, subterete, striate, usually pubescent. Leaves simple or infrequently pinnatifoliated, opposite or alternate, sessile or more commonly petiolate; blade linear-filiform to ovate or rhombic-ovate, chartaceous or less commonly subcoriaceous, usually triplinerved or trinerved from near base, surfaces often glandular, margins entire or serrate; petiole rarely winged throughout. Capitulescence usually openly corymbiform or sometimes monocephalous, capitula pedunculate; peduncles not fistulous and dilated distally, pith solid, distal-most leaves sometimes bracteate. Capitula radiate or very rarely discoid but then pluriflorous; disk usually weakly convex; involucre hemispheric or campanulate, less commonly subcylindrical; phyllaries unequal or less commonly subequal, 2-7-seriate, imbricate or loosely so, persistent, linear-lanceolate to elliptic-ovate, usually indurate
basally with herbaceous apices, striate or costate; usually pubescent, apex narrowed (ours) to broadly rounded; clinanthium flat to convex, palinate; paleae resembling phyllaries and somewhat transitional from them, conduplicate, sometimes subcarinate, often pluristriate, stiff-scarious or apex sometimes subherbaceous, persistent, sometimes inconspicuously trifid. Ray florets (0-)5-32, rarely styliferous; corolla yellow or golden-yellow, rarely white, tube pubescent, limb usually 2-3-denticulate, usually strict in bud, abaxially pubescent, eglandular or infrequently glandular; ovary < 4 mm, c. 2-4x long as broad but not linear. Disk florets bisexual; corolla usually funnelform to sometimes narrowly campanulate, infrequently tubular, 5-lobed, yellow, tube shorter than throat, lobes usually triangular, tube and lobes typically pubescent; anthers basally sagittate, thecae black, appendage deltate-ovate, sometimes glandular, filaments glabrous or rarely pubescent; style branch apex acute to obtuse (never long-tapered), exappendiculate or short-appendiculate, papillose. Cypselae compressed-biconvex to subquadrangular, somewhat plump, apex truncate or rounded, usually black, often strigillose or strigose to less commonly glabrous; epappose or usually persistent-2- aristate (or 2-squamose) with 2-4(-6) intermediate squamellae, sometimes caducous. x = 17. Aprox. 100-150 spp. American, mostly neotropics.

_Viguiera_, monographed by Blake (1918), is recognized broadly here as in other floristic accounts (e.g., D’Arcy, 1975; Nash, 1976; Strother, 1999; Rzedowski et al., 2011), and as also in systematic works of Robinson (1981) and Panero (2007). However, Panero (1992) noted that _Viguiera_ as traditionally defined is paraphyletic. Nevertheless, Pruski (1998) characterized the style branches of _Viguiera_ as acute to obtuse (never long-tapered) with small or no appendages, and thus _Hymenostephium_ is treated here as a synonym of _Viguiera_, as in Strother (1999).

_Garcilassa_ is treated as monotypic and circumscribed traditionally as in Robinson (1981) and Pruski (2010).

It should be noted, however, that in molecular studies (Schilling y Panero, 2002) treated _Garcilassa_ and _Hymenostephium_ as congeneric and that Schilling y Panero (2011) transferred most species of _Viguiera_ (except the type) to an expanded _Aldama_. If indeed the molecular phylogeny of Schilling and Panero (2011) holds up, as I suspect it shall in order to minimize potential name disruption and to maintain usage as nearly to that of Blake (1918) as possible, it may prove useful to conserve _Viguiera_ with a new type from among names in the most speciose generic segregate. Here, the non-monophyly of _Viguiera_ is tolerated in order to achieve some nomenclatural continuity. If indeed _Viguiera_ is ultimately be conserved with a new type, it should be noted, however, that flora area _V. dentata_ would need a name change. It should also be noted that among our species of _Viguiera_, Schilling and Panero (2011) placed variously a few flora area species in _Dendroviguiera_, _Hymenostephium_, or _Sidneya_. One comparatively minor change
followed here is recognition of flat-fruited *V. ovata* from *Viguiera* ser. *Grammatoglossae* as *Simsia*, as suggested by Spooner (1990), Strother (1999) and Schilling y Panero (2010).


1. Leaves usually pinnatifid.  
2. Leaves simple.  
3. Shrubs to trees, 4-10(-15) m; capitula 15-25 mm, very large; leaves glandular, winged-petiolate, petiole winged to base; cypselae 2-squameose and squamellose, scales flat, smooth-margined.  

6. *V. puruana*  
3. Annual or perennial herbs to weak shrubs, 0.2-4 m; capitula 6-11 mm, mid-sized; leaves eglandular; leaves subsessile or with petiole exalate; cypselae epappose, squamellose, or 2-atristate and squamellose.  
4. Annual herbs, 0.2-0.8 m; leaves subsessile, margins denticulate; ray corolla limbs ≤ 5 mm; cypselae pappus 2-atristate and squamellose.  
10. *V. tenuis*  
4. Perennial herbs to weak shrubs 1-4(-?15) m; leaves long-petiolate, margins serrate or dentate; ray corolla limbs 5-12(-14) mm; cypselae usually fully epappose or sometimes only squamellose.  

7. *V. stenoloba*  
1. Leaves usually pinnatifid.  
2. Leaves opposite or mostly opposite; cypselae 2-aristate (or 2-squameose) or exaristate.  
3. Shrubs to trees, 4-10(-15) m; capitula 15-25 mm, very large; leaves glandular, winged-petiolate, petiole winged to base; cypselae 2-squameose and squamellose, scales flat, smooth-margined.  

6. *V. puruana*  
3. Annual or perennial herbs to weak shrubs, 0.2-4 m; capitula 6-11 mm, mid-sized; leaves eglandular; leaves subsessile or with petiole exalate; cypselae epappose, squamellose, or 2-atristate and squamellose.  
4. Annual herbs, 0.2-0.8 m; leaves subsessile, margins denticulate; ray corolla limbs ≤ 5 mm; cypselae pappus 2-atristate and squamellose.  
10. *V. tenuis*  
4. Perennial herbs to weak shrubs 1-4(-?15) m; leaves long-petiolate, margins serrate or dentate; ray corolla limbs 5-12(-14) mm; cypselae usually fully epappose or sometimes only squamellose.  

1. *V. cordata*  
2. Leaves alternate or commonly alternate, sometimes opposite proximally; cypselae 2-aristate (or 2-squameose).  
5. Leaves glandular abaxially.
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6. Capitulescences monocephalous, terminal on strongly ascending simple branches from distal few nodes; cypsela sparsely subtrigillose, bases not bordered by a symmetric cupular disk; involucre 20-28 mm diam.; phyllaries 11-12 mm; paleae c. 12 mm; Guatemala.  
4. V. mima

6. Capitulescences corymbiform; cypsela strigose-pilose, bases bordered by a symmetric cupular disk; involucre 5-12 mm diam.; phyllaries 4-10 mm; paleae 4.5-6.8 mm; Costa Rica, Panama.

7. Ray florets c. 5, corollas yellow, limbs c. 6 mm, ovate, c. 5-nerved, disk florets with anthers included; phyllaries 4-5.5 mm.  
8. V. strigosa

7. Ray florets 5-8, corollas ochroleucous, limbs (6-)8-14 mm, elliptic-ovate, (8-)11-13-nerved; disk florets with anthers fully exserted; phyllaries 6-10 mm.

9. V. sylvatica

5. Leaves eglandular.

8. Anther filaments long-pilose in distal ½; perennial herbs or shrubs, 1-2(-3) m; leaves with adaxial surfaces scabrous to hirsute-subtrigillose, trichomes subequal, abaxial surfaces sometimes pilose-canescient; capitula 7-12 mm; involucre 6-13 mm diam.; ray florets 8-14, corolla limbs ≥ 6.5 mm; disk florets 50-100+.

2. V. dentata

8. Anther filaments glabrous; leaves with adaxial surfaces scabridulous and strigose, trichomes unequal, abaxial surfaces strigose; capitula 7-8 mm; involucre 5-8 mm diam.; ray florets 0-5, corolla limbs 2-3 mm; disk florets ≤ 21.

9. Capitula radiate; ray florets 5.  
3. V. gracillima

9. Capitula pauciradiate or discoid; ray florets 0-1. 5. V. molinae

Common perennial herbs to weak shrubs, 1-4 m (rarely lianas to 15 m); stems erect or subscandent to less commonly trailing, opposite-branched throughout or often alternate-branched distally, usually strigillose to strigose, internodes sometimes much longer than leaves. Leaves simple, mostly opposite, long-petiolate; blade (2-)5-13(-16) × (1-)2-7(-12) cm, ovate to broadly so, trinerved from above base, surfaces concolorous, eglandular, adaxial surface scabrid and often strigose, trichomes various-sized and often markedly unequal, subsidiary cells slightly enlarged, abaxial surface strigose or less often pilose or rarely tomentose, base cordate to rounded or less commonly cuneate, margins serrate or dentate, apex acute to acuminate; petiole 0.5-2.7(-5) cm, exalate. Capitulescence few-many-capitulate, open, branches each 3-7-capitulate, opposite to distal ones alternate, spreading at >45° to ascending; peduncles 1-4 cm, typically densely white-strigillose. Capitula 6-9 mm, mid-sized, radiate; involucre (2-)4-7 mm diam., campanulate, shorter than the disk florets; phyllaries (8-)12-18, (2-)3-7 × 1-1.3(-2) mm, subequal or slightly graduated with outer phyllaries c. 2/3 as long as inner ones, 2(-3)-seriate, lanceolate or less commonly outer ones ovate, 3(-5)-striate, margins and veins subherbaceous to infrequently distal c. 1/3 subherbaceous, strigose, appressed or sometimes apex reflexed, apex long-attenuate; paleae 3-4.5(-6) mm, usually longer than inner phyllaries, conduplicate, pluristriate, subglabrous to strigillose, apex abruptly acute to mucronate. Ray florets 5-13; corolla yellow or sometimes golden-yellow, tube 0.6-1 mm, limb 5-12(-14) × (2-)3-4.5(-6) mm, lanceolate to ovate, 5-9-nerved, apex minutely denticulate to rarely deeply bilobed with lobes 1-3 mm; ovary 2-2.5 mm, linear-stipitate, epappose. Disk florets 12-43(-50); corolla (3-)3.5-5.5 mm, narrowly funnelform, yellow to golden-yellow, tube c. 0.7-0.8 mm, slightly dilated, throat often finely setulose proximally and along nerves, lobes 0.5-0.8 mm, triangular, strigose, often (in southern Mesoamerica) reddish internally; anthers 1.2-2.5 mm, distal 1/3-2/3 exserted, filaments glabrous, appendage deltate-ovate, eglandular; style base bulbous, branches 1-1.3 mm, appendage c. 0.3 mm, acuminate. Cypselae 2-2.5 mm, oblong, glabrous or less commonly pilose-strigose apically or throughout, carpodium asymmetric, base not bordered by a cupular disk; exaristate and usually esquamous, usually fully epappose or sometimes only squamelllose, squamellae (when
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By its exaristate (albeit sometimes squamellose) cypselae, *Viguiera cordata* was treated as *Gymnolomia* by Robinson y Greenman (1899: 87-104) and as *Hymenostephium* by Blake (1918) and Nash (1976d). However, the distinction between the exaristate condition of *V. cordata* and more typical biaristate Viguieras with glabrous filaments (e.g., *V. sylvatica, V. tenuis*), for example, is lessened by presence of short-aristate cypselae in *V. mucronata* Blake. *Viguiera cordata* further matches *Viguiera* by basally costate phyllaries. Nevertheless, the variation allow here in *Viguiera cordata* cypselae features (fully epappose to squamellose and glabrous to commonly pilose-strigose) is striking and as variable as within some other genera. The protologue of *Gymnolomia microcephala* described it as discoid, but rather it is radiate, typical of the genus.

Throughout much of its range, the morphologically plastic *V. cordata* may be diagnosed by its mostly opposite leaves and branching, long-petiolate broad-based leaves with strigose vestiture, less commonly with patent trichomes, relatively short phyllaries that are subherbaceous on margins and veins, but only occasionally apically so, ray corolla limbs 5-9-nerved, and exaristate, generally fully epappose (sometimes squamellose) cypselae that are usually glabrous, but which may be pilose-strigose apically or occasionally throughout. At the species level I also treat broadly *V. cordata* by including in synonymy *H. guatemalense* and *H. pilosulum* (with pilose leaves), *Gymnolomia microcephala* (with small capitula), and plants from Nicaraguan south to Panama with cypselae sometimes pilose-strigose (e.g., *Gymnopsis costaricensis*) or squamellose (e.g., *Gymnolomia subflexuosa*). The leaves of some Panamanian plants are occasionally tomentose, yet despite this and other occasional extremes I find among specimens in front of me continuous variation in *V. cordata* and thus I neither recognize segregates nor infraspecies. Because of the high chromosome ploidy level reported for *V. cordata*, however, it seems possible that incipient species or well-marked regional races within our broadly defined *V. cordata* may be present, study of which is beyond the scope of this floristic treatment.

The common *V. dentata* is similar in gestalt to the equally common *V. cordata*. *Viguiera dentata* has leaves commonly alternate distally and can usually be diagnosed without dissection by its adaxial pappus awns slightly longer than the paleae, whereas *V. cordata* tends to have leaves mostly opposite, smaller capitula with tightly imbricate phyllaries, and longer and
narrower disk corollas. The report Villaseñor (1989: 110) of *V. cordata* in Belize is based on misidentifications.


Common perennial herbs or shrubs, 1-2(-3) m; stems several-much-branched, glabrous to pilose or strigose, often distally canescent. Leaves simple, commonly alternate or sometimes opposite proximally, petiolate; blade 4-12(-15) × 2-8 cm, lanceolate to more commonly ovate or rhombic-ovate, trinerved, surfaces discolorous or concolorous, eglandular, adaxial surface scabrous to hirsute-substrigose, trichomes subequal, basal +/- subsidiary cells enlarged, abaxial surface strigillose to densely pilose-canescent, base cuneate to decurrent, margins serrate or serrulate to infequently subentire, apex acute to acuminate; petiole 1-3(-5) cm. Capitulescence 3-9(-12)-capitulate, open, branches alternate, ascending or spreading at c. 45°; peduncles 2-8(-12) cm, sulcate-costate. Capitula 7-12 mm, radiate, disk convex; involucre 6-13 mm diam., campanulate; phyllaries 12-20, 6-10(-14) × 1-1.5(-2) mm, loosely imbricate, subequal or less commonly slightly truncate or obovulate, 2-3-seriate, linear-lanceolate to pyriform or spatulate, 2-3-costate proximally, pilose-substriose to canescent, distal c. 1/3(-2/3) herbaceous, apex acute to acuminate, outer phyllaries spreading to reflexed; clinanthium convex maturing to short-conical; paleae 5-7.5 mm, conduplicate, pilose throughout or distally glabrous, apex punctate and especially apparent in bud when disk florets are much shorter. Ray florets 8-14; corolla yellow, tube c. 1 mm, limb 6.5-15(-20) × 2-3.5(-8) mm, elliptic-oblong or less commonly ovate, 8-13-nerved. Disk florets 50-100+; corolla 3-4 mm, yellow, puberulent proximally, pilosulose in proximal c. 1/3 and only distal 2/3 of lobes, tube 0.7-1 mm, lobes c. 1 mm, typically much shorter than throat; anthers 1.8-2.1 mm, thecae black or brown, endothelial cell wall very thick, nodular thickenings polarized, appendage tan, filaments long-pilose in distal 1/2, trichomes uniseriate, c.
2-septate; style branches 1.3-1.8 mm, appendage deltoid, c. 0.3 mm, abruptly acuminate.
Cypselae 2.3-3.6 × 0.9-1.3 mm, oblong, densely strigose, carpododium broad and asymmetric,
base not bordered by a cupular disk; pappus 2-atristate and squamelllose, somewhat fragile in
fruit, awns 1.7-2.9 mm, reaching to middle of disk corolla throat, the adaxial ones slightly longer,
squamellae 0.5-0.8 mm, shorter than to about as long as disk corolla tube. 2n = 34. Flowering
Year-round. *Acahual*, disturbed areas, pastures, roadsides, secondary vegetation, *selva baja*,
thickets. Ch (Pruski et al. 4179, MO); Y (Gaumer 502, F); C (Cabrera y Cabrera 2366, MO); QR
(Téllez y Cabrera 1468, MO); B (Lundell 4968, NY); G (Williams et al. 41271, MO); H (Nelson
et al. 7219, MO). 0-1800 m. (SW. Estados Unidos, Mexico, Mesoamerica, Cuba.)

Blake (1918) recognized four varieties basically because of leaf pubescence differences, but at
least as with regards to Mesoamerican materials the varieties intergrade and are thus not
recognized. Much low-elevational material from the Yucatan Peninsula has large less pubescent
concolorous leaves and relatively broad ray corolla limbs, however, thus resembling Cuban
material. The common *Viguiera dentata* is similar in gestalt to the equally common but more
southern *V. cordata*. *Viguiera dentata* can usually be diagnosed without dissection by its adaxial
pappus awns slightly exserted from the paleae, whereas *V. cordata* tends to have smaller capitula
with tightly imbricate phyllaries and longer and narrower disk corollas.


*Hymenostephium gracillimum* (Brandegee) E.E. Schill. et Panero.

Annual herbs, to c. 0.5 m; stems laxly branched, strigose throughout; herbage with trichomes
0.2-1.5 mm. Leaves simple, commonly alternate or sometimes opposite proximally, petiolate;
blade 2-4(-12) × 1-1.8(-4) cm, lanceolate to rhombic-ovate, indistinctly trinerved from 1-2 mm
above base, surfaces eglandular, adaxial surface scabridulous and strigose, trichomes unequal,
mostly c. 0.2 mm, scattered others to 1.5 mm, abaxial surface strigose, base cuneate to attenuate,
margins subentire to denticulate, apex acute; petiole 0.4-1.4 cm. Capitulescence open, several-
many-capitulate, much-alternate-branched; peduncles 1.5-5(-8) cm, strigose, usually ebracteolate.
Capitula 7-8 mm, radiate; involucre 5-8 mm diam., campanulate; phyllaries 4-5 × 1-1.3 mm,
lanceolate, loosely imbricate, subequal with the outer phyllaries nearly as long as the inner, 2-
seriate, strigose, margins and veins subherbaceous, apex attenuate; paleae c. 4 mm, tightly
conduplicate, sparsely setose, apex apiculate. Ray florets 5; corolla pale yellow, tube c. 1 mm,
sometimes setulose, limb 2-3 mm, elliptic-ovate, 2-4-nerved, apex emarginate; ovary 2-3 mm,
linear-stipitate, epappose. Disk florets 12-21; corolla 3-4.2 mm, narrowly funnelform, tube 0.8-1
mm, 1/3-1/2 as long as throat, lobes 0.3-0.5 mm, deltate, setulose; anthers included, filaments glabrous. Cypselae 2-2.2 × c. 0.9-1.1 mm, densely strigose, carpopodium asymmetric, base not bordered by a cupular disk; pappus 2-atristrate and squamellose, awns 3-4 mm, about as long as disk corolla and slightly exserted from the paleae, squamellae c. 1.2 mm. Flowering period unknown. *Cornfields, roadsides.* G (Nash, 1976d: 348). 300 m. (Mexico [Oaxaca], Mesoamerica.)

*Viguiera gracillima* is similar to, but may be consistently separated by vegetative characters from *V. tenuis*, whereas the two collections of *V. molinae* known to me differ from *V. gracillima* basically only by capitula that are discoid or radiate with only a single ray floret. Such capitular variation exists within *V. tenuis* as circumscribed by Blake (1918), and if additional collections of *V. gracillima* show it too displays such variations, *V. molinae* would presumably be best be relegated to synonymy of the earlier *V. gracillima*.


Herbs?; stems striatulate, pilose. Leaves simple, alternate, petiolate; blade 4-9.5 × 1.5-3 cm, elliptic-lanceolate, indistinctly trinerved, both surfaces glandular, adaxial surface substrigillose, abaxial surface pilosulose, base cuneate to obtuse, thence slightly decurrent, margins crenate-serrate, apex acuminate; petiole 0.6-1.5 cm. Capitulescence monocephalous, terminal on strongly ascending alternate simple branches from distal few nodes; peduncles 3-6(-11) cm. Capitula 13-18 mm, radiate (c. 5 cm diam. including rays), hemispherical; involucre 20-28 mm diam.; phyllaries 10-11 mm, lanceolate or oblong, subequal, 2-seriate, 2-costate proximally, griseous-pilosulose, apex broadly acute to obtuse; paleae c. 12 mm, stiff, apex acuminate. Ray florets 10-16; corolla tube c. 0.8 mm, limb 16-23 × 6-8.5 mm, lanceolate to narrowly elliptic, 11-13-nerved, apex obtuse. Disk florets 50-100; corolla c. 6.5 mm, tube and throat indistinct, puberulent proximally, lobes 0.8-1 mm, triangular, puberulent; anthers with filaments glabrous. Cypselae c. 4 × 1.8 mm, sparsely substrigillose, base not bordered by a cupular disk; pappus 2-atristrate and squamellose, awns c. 3 mm, squamellae to c. 1 mm. Flowering Dec. *Hábitat desconocido.* G (*Bernoulli y Carlo* 1520, GOET). 200-300 m (Endemic.)

As noted by Blake (1918), by subequal phyllaries *Viguiera mima* is vaguely similar to *Simsia foetida* (Cav.) S.F. Blake, which differs by its much shorter ray corolla limbs.

*N.v.:* none.

**Hymenostephium molinae** (H. Rob.) E.E. Schill. et Panero.

Annual herbs, 0.8-2 m; stems laxly branched, strigose. Leaves simple, commonly alternate or sometimes opposite proximally, petiolate; blade 4-8 × 1-4 cm, lanceolate to ovate, trinerved, surfaces eglandular, adaxial surface scabridulous and strigose, trichomes unequal, mostly c. 0.1 mm, others to 1 mm, scattered, abaxial surface strigose, base cuneate to attenuate, margins denticulate, apex acuminate; petiole 0.5-1 cm. Capitulescence open, several-many-capitulate, much-alternate-branched; peduncles 1.5-3 cm, strigose, usually ebracteolate. Capitula 7-8 mm, pauciradiate or discoid; involucre 5-7 mm diam., campanulate; phyllaries 8-10, 4-5 × 1-1.2 mm, lanceolate, loosely imbricate, subequal or nearly so, 2-seriate, strigose, subherbaceous distally, apex acuminate-attenuate; paleae 5-5.8 mm, tightly conduplicate, sparsely setose, apex aciculate. Ray florets 0-1; corolla pale yellow, tube c. 1.2 mm, setulose, limb c. 2.5 × c. 1.8 mm, elliptic-ovate. Disk florets 14-20; corolla 3.2-4.2 mm, tubular, tube 0.9-1.2 mm, 1/3-1/2 as long as throat, lobes 0.5-0.6 mm, deltate, setulose; anthers c. 1.5 mm, filaments glabrous; style branch appendage aciculate. Cypselae 2.6-3.6 × c. 1 mm, densely strigose, carpopodium asymmetric, base not bordered by a cupular disk; pappus 2-atristrate and squamellose, awns 2.5-3.5 mm, slightly shorter than disk corolla and slightly exserted from the paleae, squamellae 0.7-1.2 mm. Flowering Nov-Dec. *Forests along rivers.* N (Seymour 2548, MO). 200-700 m. (Endemic.)

*Viguiera molinae* is a provisionally recognized narrow segregate of *V. gracillima*, which differs basically only by radiate capitula with 5 ray florets. These two species are similar in habit and adaxial leaf surfaces scabridulous and strigose with unequal trichomes. Both species, in turn, are most similar to *V. tenuis*, a species as conceptualized by Blake (1918) having a similarly bimodal distribution (similar to the *V. molinae-V. gracillima* complex) and capitula that are variously radiate to discoid.


Shrubs to trees, 4-10(-15) m; stems striate, crisped puberulent, also longer (0.5-0.8 mm) patent trichomes sometimes present. Leaves simple, opposite, winged-petiolate; blade 10-25(-30) × 6-20(-25) cm, ovate to deltate-ovate, trinerved, adaxial surface scabrous, trichome subsidiary cells
prominent, sparsely glandular, abaxial surface pilosulose, moderately glandular, base broadly
cuneate to truncate, margins serrate, apex acute to acuminate; petiole 2-7 × 1-1.5 cm, winged to
base, subamplexicaul, wing undulate. Capitulecence 5-12-capitulate, branching opposite or
ultimate node alternate; peduncles 2-10(-15) cm, spreading from main axis at nearly right angles,
the lateral peduncles much longer than central one. Capitula 15-25 mm, very large, radiate (8-12
cm diam. including rays), hemispherical, acrescent in fruit; involucre 15-25 mm diam.; phyllaries
6-14 × 1.5-3 mm, lanceolate, graduated, 3-5-seriate, indurate and c. 4-costate proximally,
gradually attenuate, villosulous-puberulent, apex subherbaceous, spreading to recurved; paleae 9-
14 × c. 2 mm, stiff, apex apiculate, puberulent distally. Ray florets 13-24; corolla tube 2-3 mm,
limb 25-40 × 6-13 mm, oblong to oblong, 11-13-nerved, apex obtuse; ovary c. 3 mm,
triquetrous. Disk florets 100-150; corolla 9-13 mm, yellow-orangish, tube 2-3 mm, puberulent,
throat narrow, lobes 1-1.5 mm, triangular-lanceolate, puberulent; anthers c. 4 mm, yellowish,
filaments glabrous; style branches c. 3 mm, apex acute. Cypselae 4-6 × 2-2.5 mm, compressed,
setulose distally and marginally, carpopodium small and asymmetric, base not bordered by a
cupular disk; pappus 2-squamous and squamelllose, scales 5-8 × 1-1.5 mm, oblong, often about as
broad as cypselae, flat, stiff, smooth-margined, squamellae 0.1-0.6 mm, often minute. 2n = 34.
(W.C. Mexico, Mesoamerica.)

This species is one of only two winged petiolar species in Viguiera sect. Maculatae (Panero y
Schilling, 1988) and in Mesoamerica is known only from forests near Motozintla, thence disjunct
to Guerrero and environs.

Gray, Mem. Amer. Acad. Arts, n.s. 4: 84 (1849), non Viguiera tenuifolia Gardner (1848).
Syntype: Mexico, Coahuila, Gregg 21 (NY, photo en MO!). Illust.: DeWitt Ivy, Fl. Pl. New

Gymnolomia tenuifolia (A. Gray) Benth. et Hook. f. ex Hemsl, Sidneya tenuifolia (A. Gray)
E.E. Schill. et Panero.

Shrubs, 0.6-1 m; stems much-branched, glabrous or more commonly strigillose. Leaves
usually pinnatifid or distal ones sometimes subentire, opposite becoming alternate distally,
with narrow petiolariform base; blade 2-6(-10) × 1-3 cm, ovate in outline or distal ones
sometimes linear, usually divided into 3-5(-7) linear to linear-lanceolate lobes, adaxial surface
strigillose to sparsely so, abaxial surface canescent-strigillose, often glandular, midrib sometimes
green and subglabrous abaxially, lobes 1-5 mm diam. and about as broad as rachis, margins
revolute, apex acuminate. Capitulescence monoecephalous or loosely corymbiform with few alternate branches; peduncles 2-10(-15) cm. Capitula 6-10 mm, radiate, hemispherical to globose; involucre 7-15 mm diam.; phyllaries 5-10 mm, lanceolate, graduated or more commonly obgraduate, 3-seriate, indurate and 2-costate proximally, grading in distal 1/3-1/2 to an abruptly attenuate subherbaceous apex, margins and apex typically strigillose; paleae 4-5 mm, apex abruptly acuminate, puberulent distally. Ray florets 12-18; corolla tube 0.7-1 mm, limb 7-14 × 2-4 mm, lanceolate to oblong-lanceolate, (7-)9-13-nerved. Disk florets 100+; corolla 3.5-4 mm, papillose-setulose, lobes 0.6-1 mm, triangular, recurved; anthers 1.5-2 mm, thecae black, filaments glabrous; style branch apex acute. Cypselae 2-3 mm, glabrous, carpopodium indistinct, base not bordered by a cupular disk; epappose. 2n = 34, 68. Hábitat desconocido. ES (Weberling y Lagos, 1960: 201). 400-500 m. (SW. Estados Unidos, NE. Mexico, Mesoamerica.)

The occurrence of *Viguiera stenoloba* in El Salvador was not verified by me, and the species remains reported in Mesoamerica solely by González 1678, the voucher cited by Weberling y Lagos (1960). Among Compositae from El Salvador, by pinnatifid leaves and long-pedunculate capitula *Viguiera stenoloba* is vaguely similar to *Melampodium linearilobum* DC. and *M. sericeum* Lag., both of which differ by being annual herbs.


*Hymenostephium strigosum* (Klatt) E.E. Schill. et Panero.

Much like *V. sylvatica*: Perennial herbs, 1-2 m; stems several-branched, sparsely pilose. Leaves simple, mostly alternate; blade 3.5-10 × 1.5-2.5 cm, lanceolate to rhombic-ovate, surfaces concolorous, adaxial surface +/- sparsely hispid-strigose, abaxial surface minutely glandular, also sparsely strigillose, base cuneate; petiole 2-3 cm. Capitulescence corymbiform, branches each 1-3-capitulate; peduncles 1.7-5.7 cm, densely pilose, typically ebracteolate. Capitula 7-8 mm; involucre 5-10 mm diam.; phyllaries 4.5-5.5 × 2-2.5 mm, subequal, elliptic-ovate to ovate-pyriform, apex often abruptly acuminate, finely strigillose-puberulent; paleae 4.5-6 mm, sparsely glandular distally, otherwise subglabrous. Ray florets c. 5; corolla yellow, limb c. 6 mm, ovate, c. 5-nerved, sparsely glandular abaxially. Disk florets c. 42; corolla 3.8-4.5 mm, golden-yellow, tube c. 0.5 mm, throat 5-nerved; lobes 0.7-1 mm, triangular-lanceolate, veins submarginal; anthers included, appendage eglandular. Cypselae 2.1-3.2 mm, strigose-pilose, base bordered by a symmetric cupular disk, cupular disk 0.2-0.3 mm; pappus 2-squamose and squamelllose, scales 1.2-3 mm, unequal, squamellae 0.5-1 mm, about as long as disk corolla tube. Flowering Nov-Jan. *Roadsides, rocky slopes, stream sides*. CR (*Hammel 19365*, MO). 50-1200 m. (Endemic.)

*Dendroviguiera sylvatica* (Klatt) E.E. Schill. et Panero.

Much like *V. strigosa*: Common perennial herbs to shrubs, 1-5 m; stems several-much-branched, striate, pilose to strigose. Leaves simple, mostly alternate (sometimes most proximal opposite), petiolate; blade 4-14(-21) × 1.5-8(-16.5) cm, ovate or less commonly lanceolate, trinerved from above basal acumination, surfaces concolorous, adaxial surface scabridulous to hirsutulous, trichome subsidiary cells typically enlarged, abaxial surface minutely glandular, also pilosulose or less commonly hirtellous, base cuneate or less commonly obtuse then decurrent, margins crenate-serrate, apex acuminate; petiole 0.5-4 cm. Capitulescence corymbiform, open, terminal on several distal branches, branches each 3-12-capitulate, alternate, ascending; peduncles 1-7 cm, villosulous, sparsely glandular below tomentum, sometimes subtended by a single basal linear bracteole 5-10 mm. Capitula 8-13 mm, radiate; involucre 6-12 mm diam., campanulate to hemispherical; phyllaries 6-10 × 1.6-2.8 mm, imbricate to loosely so, subequal or sometimes obgraduate, 2-seriate, lanceolate to pyriform, 5-7 striate, apex long-attenuate, subherbaceous, pilosulose-hirsutulous, phyllaries especially the outer ones spreading to reflexed apically; paleae 5.1-6.8 mm, tightly conuplicate, pluristriate, strigillose distally, apex long-mucronate. Ray florets 5-8; corolla ochroleucous, tube c. 1 mm, limb (6-)8-14 × (3.5-)5-6(-7.5) mm, elliptic-ovate, (8-)11-13-nerved, nerves sometimes divaricating, apex minutely 2-3-denticulate, occasionally glandular abaxially; ovary 2-4 mm. Disk florets 50+; corolla 4.7-5.5 mm, narrowly funnelform, yellow-green, tube 0.8-1 mm, dilated basally, throat sometimes with supernumerary veins or resin ducts, lobes 1-1.4 mm, lanceolate, obviously longer than tube and c. 1/3 as long as throat, veins submarginal to intramarginal, lobes strigillose distally; anthers 2.5-3 mm, fully exserted with distal ends of the glabrous filaments visible, appendage lanceolate, typically glandular; style base bulbous with nectary especially visible, branches c. 1.5 mm, appendage c. 0.3 mm, abruptly acuminate. Cypselae 2.5-3.4 × 1.2-1.4 mm, oblong, densely strigose-pilose, carpopodium broad and asymmetric, base bordered by a symmetric cupular disk, cupular disk c. 0.2 mm; pappus 2-squamose and intermediate squamellose, scales 1.5-2.4 mm, reaching to proximal 1/3-1/2 of disk corolla throat but usually not longer than palea, the abaxial (outer) one often slightly longer, squamellae 0.5-0.7 mm, shorter than to about as long as disk corolla tube. Flowering Oct-Jan, Mar-Apr. *Disturbed areas, potreros, roadsides, secondary vegetation.* CR (*Croat* 46777, MO); P (*Allen* 1495, MO). 700-2000 m. (Endemic.)
Blake (1918) drew attention to the cupular disk at the base of the cypsela of *Viguiera sylvatica*. In the southern Flora Area, *V. sylvatica* is often mistaken for *V. cordata*, which differs by eglandular leaves and by exaristate cypselae lacking a basal cupular disk.


Annual herbs, 0.2-0.8 m; stems simple to the capitulescence or diffusely few-branched, hispid proximally to strigose distally; herbage with trichomes 0.8-1.5 mm. Leaves simple, opposite to the capitulescence, subsessile, remote; blade 2-4(-7) × 0.5-1.2(-2.5) cm, lanceolate to ovate, indistinctly trinerved, surfaces pilose-strigose, eglandular, trichomes elongate and subequal, those of adaxial surface with subsidiary cells enlarged, base rounded to subcordate, margins denticulate, apex acute to acuminate; petiole c. 0.2 cm, exalate. Capitulescence about 1/3 of plant height, few-capitulate, open, branches alternate, spreading at c. 45°; peduncles 6-15 cm, strigose, sometimes with 1-2 alternate bracteoles; bracteoles linear, to c. 1 cm. Capitula 6-9 mm, mid-sized, radiate to infrequently disciform or discoid; involucre 6-9 mm diam., hemispherical; phyllaries 20-30+, 2-8 × 0.3-0.7 mm, linear (outer ones) to linear-lanceolate (inner ones), loosely imbricate, graduate with the outer usually about half as long as the inner, 3-seriate, strigose, distal 1/3 herbaceous, apex attenuate; paleae 5.5-7 mm, tightly conduplicate, strigose, apex apiculate. Ray (marginal) florets (0-)5-13; corolla usually present, pale yellow, tube 1-2 mm, sometimes setulose, limb 2-5 mm, elliptic-ovate, 2-4-nerved, apex emarginate; ovary 2-3 mm, linear-stipitate, epappose. Disk florets 20-70; corolla (3.5-)4-5 mm, tubular, tube c. 0.3-0.5 mm, < 1/5 as long as throat, lobes 0.4-0.7 mm, deltate, setulose; anthers with filaments glabrous, thecae c. 1.5-2.2 mm, collar elongate; style branches c. 1.5 mm. Cypselae 1.8-2.3 × c. 0.8 mm, densely strigose, carpodium broad and asymmetric, base not bordered by a cupular disk; pappus 2-atristate and squamulose, awns 3.7-5.3 mm, about as long as disk corolla and slightly exerted from the paleae, squamellae 1-1.5 mm. 2n = 24. Flowering Oct-Dec. Pastures, pine-oak forests, roadsides. Ch (Breedlove y Strother 46544, MO); CR (Morales 3148, MO); P (Blum y Tyson 1876, MO). 50-1100 m. (SW. Mexico, Mesoamerica.)

*Viguiera tenuis* is disjunct from Chiapas to Costa Rica and Panama, as noted by Blake (1918). *Viguiera tenuis* is closely related to *Viguiera gracillima*, which differs conspicuously by short-petiolate commonly alternate leaves with adaxial surface trichomes unequal and by narrowly funnelform disk corollas with tubes about 1/3-1/2 as long as throats. *Viguiera tenuis* as
circumscribed by Blake (1918) has discoid to sometimes inconspicuously radiate capitula with marginal florets sometimes without corollas, such florets thereby represented only by the naked gynoecium.

**XII. F. Heliantheae** subtribus **Montanoinae** H. Rob.

Por J.F. Pruski.

Shrubs or trees, sometime vining. Leaves simple, opposite, petiolate; blade mostly ovate, often lobed, chartaceous, 3(-7)-plinerved from well above base. Capitulescence terminal, usually corymbiform to paniculate. Capitula radiate(-discoid); involucre mostly hemispherical; phyllaries 1-2(-3)-seriate, subequal; clinanthium convex, paleate; paleae longer than cypselae, conduplicate and completely enclosing cypselae at maturity, obviously acrescent post-anthesis, rarely slightly carinate. Ray florets sterile; corolla white, tube cylindrical, limb exserted, deciduous, veinlets often clearly anastomose-reticulate between larger nerves, papillose adaxially, glandular abaxially. Disk florets bisexual; corolla 5-lobed, usually white to yellow, glandular and hirtellous-setulose at least distally, throat without fibers embedded in nerves, lobes papillose within; anthers ecaudate, filaments glabrous, not densely long-papillose distally, thecae black or sometimes yellow, endothecial pattern polarized, appendage ovate, glandular; style appendiculate, vascular strands without evident color, branches with stigmatic surfaces 2-banded, apex deltate with linear appendage. Cypselae quadrangular-obpyramidal, brown-black to reddish-brown, carbonized, surface microstriatulate but otherwise typically smooth; epappose. \( x = 19 \). 1 gen., aprox. 25 spp. Andean Peru northwards in Mexico. 1 gen., 11 spp. in Mesoamerica.

1. **Montanoa** Cerv.

*Eriocarpha* Cass., *Eriocoma* Kunth, non Nutt.

Por V.F. Funk y J.F. Pruski.

Shrubs or trees, sometime vining; herbage with pubescence usually c. 1 mm. Leaves: blade usually highly variable in shape, ranging from ovate to pentagonal, adaxial surface sparsely to densely pubescent or less commonly glabrous, abaxial surface glandular and glabrous or sparsely to densely pubescent, margins entire to irregularly dentate, unlobed to (3-)5(-9)-lobed. Capitulescence monocephalous to pluricapitulate and corymbiform; capitula erect or pendulous at fruiting, persistent on peduncle or rarely deciduous post fruit. Capitula radiate or very rarely discoid; phyllaries 4-16(-22), 1-2(-3)-seriate; paleae persistent or deciduous with cypsela at fruiting, indurate to chartaceous. Ray florets 3-15; corolla limb obovate to
oblanceolate, sometimes puberulent. Disk florets (3-)8-16; corolla yellow to gray-green or black. Cypselae all maturing or rarely only 1 or 2 maturing per capitulum, cypselae surfaces typically smooth, convoluted-amorphous only in *M. hexagona* and *M. hibsicifolia*, apex with a ring-shaped collar. \( x = 19. \) 25 spp. Andean Peru northwards in Mexico.

An overview of *Montanoa* recognizing 32 species was given by Robinson y Greenman (1899). More recently, *Montanoa* was revised by Funk (1982), who recognized 25 species and 5 non typical infraspecies, for a total of 30 taxa. Robinson y Greenman (1899) and Funk (1982) recognized infragenera defined by paleae features, but Plovanich y Panero (2004) showed these infragenera to be non-monophyletic.

The name *Montagnaea* is an orthographic variant of *Montanoa*. In coining this substitute name *Montagnaea* Candolle (1836) stated "Nomen ... emendavi ... Montaña (pronunt. Montagna) nec Montano". *Montanoa* is one of our few regional conspicuously white-rayed Compositae. It is occasionally confused with *Podachaenium eminens* (subtribe Verbesininae), which it much resembles in gestalt and white ray corollas, but which differs from *Montanoa* by pappose typically compressed cypsela.


1. Paleae at fruiting with bodies and apices indurate, at anthesis usually longer than disk florets; capitula always erect at fruiting.

2. Capitula 0.3-1.2 cm diam.; paleae at fruiting conspicuously long-sericeous; ray florets 3-6; peduncles 0.1-0.4 cm.

10. **M. tomentosa**

2. Capitula 1-3 cm diam.; paleae at fruiting pubescent-pilose or glabrous, sometimes glandular; ray florets 5-15; peduncles 1-11 cm.

3. Capitulescences monochephalous or capitula few-headed; phyllaries c. 12, 9-18 mm; paleae apex at fruiting gradually long-acuminate. **2. M. echinacea**

3. Capitulescences with several to many capitula; phyllaries 5-9, 3-8 mm; paleae apex at fruiting abruptly narrowly tapered.
4. Stems densely pubescent distally; leaf blade abaxial surfaces densely glandular and griseous-pubescent.  
   **3. M. guatemalensis**
4. Stems glabrous to weakly puberulent distally; leaf blade abaxial surfaces glabrous or subglabrous.  
   **9. M. standleyi**

1. Paleae at fruiting with chartaceous bodies, and in *M. hibiscifolia* with a single indurate apical spine, at anthesis shorter than disk florets; capitula pendulous or at least sometimes slightly so at fruiting.

5. Leaves winged to bases and sometimes perfoliate.
   6. Capitulescences 7-60-capitulate; phyllaries 4-5 mm; ray corolla limbs 10-12 mm.  
      **7. M. pteropoda**
   6. Capitulescences 1-5 capitulate; phyllaries 7-12(-20) mm; ray corolla limbs 15-30+ mm.  
      **8. M. speciosa**
5. Leaves never winged to bases nor perfoliate
   7. Leaf blades usually deeply 3-5 lobed, petioles usually prominently 2-auricled distally at insertion of blades.  
      **5. M. hibiscifolia**
   7. Leaf blades unlobed or shallowly 3-5-lobed, petioles not auricled distally to infrequently slightly 2-auricled distally at insertion of blades.

8. Paleae at fruiting with apices recurved.  
   6. M. leucantha
8. Paleae at fruiting with apices erect.
   9. Leaf blades trinerved from near bases; shrubs to 3 m or vines to 15 m; disk florets 85-120, corollas c. 2 mm, style appendages yellow throughout; cypsela surfaces smooth.  
      **1. M. atriplicifolia**
   9. Leaf blades trinerved from above bases; trees to 20 m; disk florets 40-60, corollas 3.5-4.5 mm, style appendage yellow with two black areas; cypsela surfaces convoluted-amorphous.  
      **4. M. hexagona**


Shrubs to 3 m tall or vines to 15 m; stems puberulent distally. Leaves variably shaped, sometimes with basal acumen or slightly auriculate but never winged to base nor perfoliate; blade 4.5-14.5 × 1.5-15 cm, ovate to pentagonal, unlobed to less commonly deeply 3-lobed, trinerved from near base, adaxial surface moderately pubescent, abaxial surface densely glandular and pubescent with clear trichomes; petiole 1.5-11.5 cm, usually partially winged, not auricled distally to infrequently slightly 2-auricled distally at insertion of blade, densely glandular and pubescent. Capitulescence open, capitula few to many, capitula pendulous at fruiting; peduncles 1.5-7.5 cm, densely glandular and pubescent. Capitula 0.6-0.8 cm diam. at anthesis, 1.7-2.7 cm diam. in fruit; phyllaries 5-6, 4-5 × 1-1.25 mm, 1-seriate, reflexed; paleae deciduous, venation reticulate, paleae at anthesis c. 2.2 × c. 2 mm, obtrullate, shorter than disk florets, paleae at fruiting 10-14 × 3-4 mm, obdeltoid, chartaceous, stramineous or purple, apical sinus apiculate, apex erect. Ray florets 8-15; corolla limb 12-24 mm, apex acute to 2-notched. Disk florets 85-120; corolla c. 2 mm, yellow; anther thecae brown, appendage yellow; style yellow, branch appendage yellow throughout. Cypselae c. 2.5 × c. 1.5 mm, surface smooth. 2n = 38. *Forests, hedges, dry roadsides.* T (cited by Strother, 1999: 76); Ch (Matuda 18603, MEXU); Y (Gaumer 2108, MO); C (Lundell 1093, MO); QR (Rzedowski 36620, MO); B (Bartlett 11421, MO); G (Funk y Ramos 2638, MO); H (Thieme 5324, MO); ES (Standley 20018, NY); N (Williams y Molina 10943, MO); CR (Pittier 1454, US). 10-2000 m. (Endemic.)

The habit of this species is more vine-line at lower elevations and in drier environments. Funk (1982) described the paleae at anthesis as indurate. Robinson y Greenman (1899) treated *Montanoa atriplicifolia* as a doubtful species, but their treatments of species 25-27 correspond to it as circumscribed here. Nash (1976d) called the species *M. pauciflora*.


Shrubs 1-4 m; stems glandular and pubescent distally. Leaves more or less uniformly shaped; blade 7-15 × 3-12 cm, ovate to cordate, 3 or 4 lateral small secondary veins proximal to largest secondary veins, unlobed, adaxial surface densely pubescent, abaxial surface densely glandular and pubescent; petiole c. 1.6 cm, densely hispid, trichomes 1-2 mm. Capitulescence open, monocephalous to few-headed, capitula erect at fruiting; peduncles 2-11 cm, hispid and short stipitate-glandular. Capitula c. 2 cm diam. at anthesis, c. 3 cm in fruit; phyllaries c. 12, 9-18 × 3-5 mm, 2-seriate, reflexing in fruit; paleae persistent, paleae at anthesis 6-8 × c. 1.2 mm,
longer than disk florets, triangular, paleae at fruiting 15-22 × 3-4.5 mm, triangular, erect or slightly recurved, body and apex indurate, stramineous, veins parallel and prominent, surface sparsely glandular and sparsely pubescent, trichomes 1-2 mm, apex gradually long-acuminate. Ray florets (12-)14(-15); corolla limb 9-16 × 2-4.5 mm, apex acute to rounded to 2-notched. Disk florets 100-150; corolla 7-8 mm, yellow and gray-black; anther thecae black, appendage black; style yellow, appendage black. Cypselae 4.5-5 × c. 1.5 mm, all maturing. *Pine-oak forests, steep slopes, thickets.* Ch (Breedlove 29677, MO); G (Molina 21279, MO); H (Nelson, 2008: 184). 1700-3100 m. (Mexico [Oaxaca?, Chiapas], Mesoamerica.)

Although Strother (1999) reported the species also in Oaxaca, this distribution was not verified by us.

### 3. Montanoa guatemalensis


Trees 4-15 m; stems densely pubescent distally. Leaves variable in shape; blade 5-19 × 3-18 cm, ovate to pentagonal, unlobed to 3-lobed, adaxial surface puberulent to usually glabrous, abaxial surface densely glandular and griseous-pubescent; petiole 1-14.5 cm. Capitulescence dense, capitula several to many, capitula erect at fruiting; peduncles 1-2.5 cm, densely hispid. Capitula 1-1.5 cm diam. at anthesis, c. 2 cm diam. in fruit; phyllaries 5-9, 3-8 × 2-4 mm, some typically noticeably longer than disk florets, sometimes obgraduate and weakly imbricate, 2-seriate; paleae persistent, paleae at anthesis 4.5-5.5 × 2-2.5 mm, longer than disk florets, ovate, paleae at fruiting 9-11 × 2.5-3 mm, ovate to triangular, stramineous, body and apex indurate, veins parallel and prominent, not carinate, surface sparsely pubescent-pilose, moderately glandular near the center, trichomes 0.5-1 mm, apex abruptly narrowly tapered, recurved. Ray florets 6-10; corolla limb 20-26 × 6-9 mm, apex acute to 2-notched. Disk florets 70-100; corolla 3.5-4.5 mm, yellow; anther thecae brown, appendage yellow; style yellow, appendage yellow. Cypselae 3.5-4 × c. 2 mm, all maturing, with four rounded edges. 2n = c. 228. *Montane forests, thickets, rocky ledges.* G. (Williams y Molina 11828, F); H (Nelson 1313, MO); ES (Sandoval y Chinchilla 199, MO); N (Stevens et al. 29363, MO); CR (Godfrey 66223, MO). 1000-2000 m. (Endemic.)
Montanoa guatemalensis is among the largest-trunked regional tree Compositae, and Stevens et al. 29363 is given as having a trunk 40 cm diam. Funk (1982) incorrectly cited NY as holotype. Nash (1976) treated M. hexagona as a synonym of M. guatemalensis.

Trees to 20 m; stems quadrangular, puberulent distally. Leaves variable in shape, never winged to base nor perfoliate; blade 6-26 × 4-36 cm, ovate-lanceolate to pentagonal, unlobed to shallowly 3-5 lobed, adaxial surface glabrous to moderately pubescent, abaxial surface moderately to densely glandular and pubescent; petiole 2-17 cm, aturicled distally to infrequently slightly 2-aturicled distally at insertion of blade, moderately to densely glandular and pubescent. Capitulescence with few to many capitula, capitula pendulous at fruiting; peduncles 1-5 cm, densely glandular and pubescent. Capitula 1.2-1.4 cm diam. at anthesis, 2.5-3.5 cm diam. in fruit; phyllaries 5-7, 2.5-4.5 × 1.5-2 mm, c. 1-seriate, reflexed in early fruiting; paleae deciduous, venation reticulate, paleae at anthesis 3-4 × 2-3 mm, shorter than disk florets, obtrullate, paleae at fruiting 13-17 × 5-7 mm, more or less obdeltoid, chartaceous, stramineous, apical sinus apiculate, apex erect. Ray florets 8-10; corolla limb 13-17 mm, apex rounded to 2-notched. Disk florets 40-60; corolla 3.5-4.5 mm, green turning yellow; anther thecae brown, appendage yellow; style yellow, appendage yellow with two black areas on abaxial surface. Cypselae 3-4 × c. 2 mm, cypselae surface convoluted-amorphous. $2n = c. 152$.
Cloud forests, montane forests, base of cliffs, streamsides, steep slopes. Ch (Funk y Landon 2909, MO); G (Tuerckheim II, 1513, MO). 1300-3000(-3300) m. (Endemic.)

Montanoa hexagona is occasionally grown as a fence row. Nash (1976d) treated M. hexagona in synonymy of M. guatemalensis. Funk (1982) described the apices of the paleae in M. hexagona as indurate at anthesis.

Eriocoma hibiscifolia (Benth.) Kuntze, Montanoa pittieri B.L. Rob. et Greenm., Montanoa samalensis Coulter.

Shrubs 1-6 m; stems essentially glabrous. Leaves more or less uniform in shape, never winged to base nor perfoliate; blade 7-40 × 2.5-30 cm, ovate to pentagonal, usually deeply 3-5 lobed and usually prominently 2-auiicled at insertion of petiole, adaxial surface moderately pubescent, abaxial surface moderately to densely glandular and pubescent, trichomes white giving the surface a light green to gray color; petiole 1-6.5(-12) cm, essentially glabrous. Capitulescence open, capitula pendulous at fruiting; peduncles 2-6 cm, densely glandular and pubescent. Capitula c. 1 cm diam. at anthesis, 2-2.5 cm diam. in fruit; phyllaries 5-7, 4.5 × 1-2 mm, c. 1-seriate, reflexed in early fruit; paleae deciduous, venation reticulate, paleae at anthesis 3-3.5 × c. 2 mm, shorter than disk florets, obtrullate, paleae at fruiting 9-15 × 4.5-6 mm, more or less obtrullate, mostly chartaceous proximally, stramineous or purple, apical sinus apiculate with an indurate spine, apex erect. Ray florets 7-8; corolla limb 15-17 mm, apex acute. Disk florets 85-105; corolla 2.5-3 mm, yellow; anther thecae yellow to brown, appendage yellow; style yellow, appendage yellow with two black spots. Cypselae c. 3 × c. 1.5 mm, cypselae surface convoluted-amorphous (viz Funk, 1982: fig. 9), apex with a mass of gland-like structures. 2n = 38. Banana plantations, forests, hillsides, near lakes, pine-oak forests, roadsides, streamsides, thickets. Ch (Matuda 723, MO); G (Funk y Landon 2921, OS); H (Pruski et al. 4538, MO); ES (Calderon 1414, MO); N (Zelaya y Moore 2148, MO); CR (Wussow y Pruski 159, LSU); P (cited D'Arcy, 1976: 1120). 200-2500 m. (Mesoamerica; widely cultivated pantropically, naturalized and weedy in Africa, Hawaii.)

Funk (1982) described the paleae at anthesis as indurate.


Leaf blade ovate-lanceolate to rhombic or pentagonal, unlobed to occasionally 3-5 lobed. Paleae 8-17 mm at fruiting. Disk corollas 3.5-4.5 mm. Mexico, Mesoamerica. 2 subspp.

Funk (1982) described the paleae at anthesis as indurate.


Shrubs 1-7 m; stems puberulent to glabrous distally. Leaves never winged to base nor perfoliate; blade 2.5-24 × 2-24 cm, pentagonal, unlobed or shallowly 3-5 lobed, adaxial surface moderately pubescent, abaxial surface moderately to densely glandular and pubescent; petiole 1.5-12 cm, sometimes partially winged, not auricled distally to infrequently slightly 2-auricled distally at insertion of blade, puberulent to densely pubescent. Capitulescence with many to numerous capitula, capitula pendulous at fruiting; peduncles 1-4 cm, sometimes tinged with purple, moderately to densely glandular and pubescent. Capitula 0.8-1.2 cm diam. at anthesis, 1.8-3 cm diam. in fruit; phyllaries 5-7(-9), 4-6 × 1-2 mm c. 1-seriate, reflexed at anthesis; paleae deciduous, venation reticulate, paleae at anthesis 3.5-4.5 × 2-4 mm, obtrullate to pentagonal, shorter than disk florets, paleae at fruiting 8-15 × 4-6 mm, obtrullate to obovate or subrhombic, chartaceous, stramineous or purple, apical sinus acuminate, recurved. Ray florets usually 8; corolla limb 13-18 × 5-8 mm, apex acute to 2-notched. Disk florets 30-60; corolla 3.5-4.3 mm, yellow, tube glabrous, limb pubescent; anther thecae yellow to brown, appendage yellow; style yellow, appendage yellow throughout. Cypselae 2-3 × 1.2-2 mm. 2n = 38. Fields, forest margins, montane forests, roadsides, riverbanks, steep slopes. Ch (Funk y Ramos 2561, MO); G (Williams et al. 25317, US). 1000-2400 m. (Mexico, Mesoamerica.)


Shrubs or vines to 4 m+; stems moderately to densely pubescent distally. Leaves variable in shape, broadly winged to base and often perfoliate; blade 5-21 × 2-21 cm, ovate to triangular, unlobed to 3-lobed, adaxial surface moderately pubescent, abaxial surface moderately to densely pubescent and glandular; petiole 2-6.5 cm, sometimes with basal auricles, densely pubescent. Capitulescence open, 7-60-capitulate, capitula pendulous at fruiting; peduncles 1.5-
3 cm, densely glandular and pubescent. Capitula c. 1 cm diam. at anthesis, 2-3 cm diam. in
fruit; phyllaries 5-6, 4-5 × 1.5-1.75 mm, 1-seriate; paleae deciduous, venation reticulate, paleae
at anthesis c. 3 × c. 2.5 mm, shorter than disk florets, pentagonal, paleae at fruiting 8-14 × 4-5
mm, obtrullate, chartaceous, stramineous or purple, apical sinus apiculate with small spine,
apex erect. Ray florets 8; corolla limb 10-12 × 2.5-3.5 mm, white, apex acute. Disk florets 90-
110; corolla c. 3 mm, green to gray-black; anther thecae yellow, appendage dark green to gray-
black; style yellow and black, appendage dark green. Cypselae c. 2.5 × c. 1.5 mm. 2n = 38.
Montane forests, open forest, Pine-oak forests, thickets. Ch (Funk y Ramos 2569, US); G (King
7203, MO). (1400)2000-3800 m. (Endemic.)
The report by Berendsohn y Araniva de González (1989) of M. pteropoda in El Salvador is based
on Montalvo 6101, which was determined by Pruski (en sched.) as M. speciosa. Funk (1982)
described the paleae at anthesis as indurate.

8. Montanoa speciosa DC., Prodr. 5: 565 (1836) as "Montagnaea". Isotype: Mexico,
71 (1982). N.v.: Teresita, Y; margarita, C; arnica, B; alcanfor, charavasca, dalia, flor de
Octubre, santa catarina, santa teresita, siete hermanas, teresita, H; flor de Octubre, siete
hermanas, teresita, ES.

Eriocoma speciosa (DC.) Kuntze.

Shrubs to less commonly small trees 1-4(-6) m; stems subquadrangular, occasionally with
alternate branching distally, pilose to hirsute. Leaves abruptly narrow-winged to base and
typically perfoliate; expanded portion of blade of vegetative leaves 7-17 × 5-20 cm, pentagonal
to ovate in outline, typically deeply pinnatifoliated with 1-3 triangular-lanceolate lobes per side,
sometimes unlobed, adaxial surface moderately to densely pilose-villous(-hirsute), trichome
subsidiary cells not tuberculated or infrequently with subsidiary cells very weakly bulbous,
abaxial surface densely villous to canescent and glandular, sometimes whitish or grayish by the
dense indumentum, winged petiolate to base, broadly cuneate to truncate, lobes 1-3 lobed per
side, the basal pair of marginal lobes usually 5-7 × 2-3 cm, typically the largest and cut more
than halfway to midrib, triangular-lanceolate, lobes margins entire to infrequently serrulate,
lateral and terminal lobe apices acuminate; petiole 2-12 × 0.3-2.5 cm, entire or often sinuous
lobed, auriculate or perfoliate. Capitulescence loose and open, 1-5 capitulate, typically held
slightly above subtending leaves, capitula sometimes slightly pendulous at fruiting, branching
opposite or alternate; peduncles 4-10 cm, hirsute to densely so and glandular. Capitula 2-4 cm
diam. 70-150+-flowered; involucre campanulate to hemispherical; phyllaries 9-16(-22), 7-12(-
20) × 2-3 mm, subequal, lanceolate to elliptic-lanceolate, 2-3-seriate, spreading in fruit, densely pilose; paleae 2.5-3 × c. 2 mm at anthesis and 11-17 × 5-6 in fruit, at anthesis shorter than disk florets, obtrullate, subdeciduous, venation reticulate, at fruiting stramineous, venation reticulate, at anthesis shorter than disk florets, body chartaceous, glandular and/or puberulent, apex subindurate-spinose, ciliate. Ray florets 10-13(-50); corolla tube c. 1 mm, limb 15-30+ mm, white, abaxially glandular, apex acute to 2-dentate; in cultivated forms several series of disks are modified into exserted ray-like corollas, these shorter than the true ray corollas. Disk florets 60-140+; corolla 6.5-7.5 mm or sometimes elongating and becoming ray-like in cultivated plants, yellow, setose throughout, tube sometimes slightly glandular-papillose, lobes 1-1.5 mm; anthers to 3 mm, thecae yellow, appendage yellow, often glandular; style and appendage yellow, branches c. 1.8 mm. Cypselae 2.5-3.5 mm, glabrous or sometimes sparsely setulose apically. Flowering mostly Sep-Jan(+ May, Jul). 2n = 38. Cultivated, forest borders, mixed forests, roadsides, selva subcaducifolia. T (cited by Villaseñor, 1989: 77 as M. grandiflora); Ch (Mendez [aka Ton] 4540, MO); Y (cited by Villaseñor, 1989: 77 as M. grandiflora); C (Martinez 8187, MO); B (Balick 2091, NY); H (Molina et al. 33652, MO); ES (Renderos 346, MO); N (Rueda 12181, MO). 100-1300 m. (Mexico, Mesoamerica; widely cultivated elsewhere.)

Montanoa speciosa is widely cultivated but was treated as naturalized in Chiapas by Strother 1999). Although an ornamental, it has also become naturalized elsewhere in Mesoamerica. The plants from Honduras and El Salvador typically have shallow-lobed leaves. Montanoa speciosa is diagnosed by leaves adaxially pilose-villous with trichomes not strongly tuberculate-based (as noted by McVaugh, 1984) and by reticulate veined paleae. Material referable to Montanoa speciosa has often been reported in literature (e.g., Berendsohn y Araniva de González, 1989; Villaseñor, 1989; Nelson, 2008) as M. grandiflora, but following Strother (1999) all naturalized Mesoamerican material that I have examined is here referred to M. speciosa. Indeed, M. speciosa is similar to the similarly cultivated M. grandiflora DC., which differs by leaves adaxially sparsely hirsute with tuberculate-based trichomes. The leaf adaxial surface trichome subsidiary cell tuberculation feature does not usually vary within an individual genus and may be age-influenced. Nevertheless, this feature is used and M. speciosa and M. grandiflora are here recognized as distinct, although they may ultimately prove synonymous. These two names have equal priority, and if ultimately reduced to a single taxon, it seems prudent to adopt the name M. speciosa, which as now recognized is more widespread in nature and has capitula size and floret number matching the larger-capitulate cultivated forms. Both species have cultivated forms with double flowers, and on occasion plants with
densely long-pilose adaxial leaf surfaces show some trichome subsidiary cell tubercul-ations; such plants are referred to *M. speciosa* on basis of their dense pilose-villous tomentum on the adaxial leaf surfaces.


Shrubs c. 4 m; stems glabrous to weakly puberulent distally. Leaves more or less uniform in shape; blade 7-12 × 3.5-10 cm, ovate-lanceolate to pentagonal, sometimes shallowly 5-lobed, adaxial surface sparsely pubescent, abaxial surface glabrous or subglabrous; petiole 1.5-7 cm. Capitulescence with several to many capitula, capitula erect at fruiting; peduncles 1-3.5 cm, moderately puberulent. Capitula c. 1 cm diam. at anthesis, c. 1.5 cm diam. in fruit; phyllaries c. 5, 5-6 × 1-1.5 mm, 1-seriate; paleae persistent, paleae at anthesis 3.5-4 × c. 2 mm, longer than disk florets, ovate-triangular, paleae at fruiting c. 8 × c. 1.5 mm, triangular, slightly carinate, body and apex indurate, stramineous, veins parallel and prominent, surfaces glabrous, apex abruptly narrowly tapered, recurved. Ray florets 5-10; corolla limb 18-22 × 6-8 mm, apex acute. Disk florets 35-50; corolla 5-6 mm, yellow; anther thecae yellow or brown, appendage yellow; style yellow, appendage yellow. Cypselae c. 2.2 × c. 1.2 mm, all maturing, prominently 4-edged. *Mixed pine-oak forests, granitic areas*. Ch (*Matuda 2235*, MICH). 2000-3000 m. (Mexico [Oaxaca], Mesoamerica.)

In addition to the palea feature, *M. standleyi* differs from the otherwise similar *M. atriplicifolia* by glabrous or subglabrous (vs. densely glandular and pubescent) abaxial leaf surfaces.


Leaves with petiole winged to base or unwinged. Disk florets (3-)8-9(-17). Mexico to Costa Rica, 4 subsp.
The species contains four subspecies (Funk, 1980), with only the following variety in Flora Area. 

**Montanoa tomentosa** subsp. *microcephala* (Sch. Bip. ex K. Koch) V.A. Funk from Oaxaca has petioles winged to base; it should be looked for in Mesoamerica.


Much branched shrubs to small trees 1-3 m; stems moderately to densely pubescent distally. Leaves highly variable in shape; blade 3-20 × 1.5-15 cm, usually as broad as long, often deltoid or ovate, adaxial surface moderately to densely pubescent, abaxial surface sparsely glandular to densely pubescent, margins unlobed to 3-5 lobed, base sometimes with distinct acumen; petiole 1.5-4 cm, partially winged or unwinged, moderately to densely glandular and pubescent. Capitulescence with numerous capitula, capitula erect at fruiting, entire capitulum deciduous post fruit; peduncles 0.1-0.4 cm, moderately to densely glandular and pubescent. Capitula 0.3-0.8 cm diam. at anthesis, 0.5-1.2 cm diam. in fruit; phyllaries 4-6, 2.5-5 × 1-2 mm, 1-seriate; paleae persistent, paleae at anthesis 2-6 × 1-4 mm, more or less pentagonal to triangular, usually longer than disk florets, paleae at fruiting 4.5-10 × 1-4 mm, obturrulate to obtangular, stramineous, body and apex indurate, venation inconspicuously parallel, surface moderately to densely glandular and conspicuously moderately to densely long-sericeous, trichomes 1-2(-4) mm, apex tapering, sometimes recurved. Ray florets 3-6; corolla limb 3-5(-9.5) × (1.2-)2-4(-5) mm, apex truncate to rounded, 1-2-notched or entire. Disk florets (3-)9-12(-17); corolla 2.5-4.5 mm, light to deep yellow; anther thecae yellow to brown, appendage yellow; style yellow, appendage yellow. Cypselae 2.5-3.5 × 1-1.5 mm, only 1(-2) maturing per capitulum. 2n = 38. *Thorn forests, dry areas, roadsides, mesic hillssides, rocky slopes, stream banks, thickets*. Ch (Seler y Seler 1965, MO); G (Pruski et al. 4516, MO); H (Edwards 505, F); ES (Rosales 1643, MO); N (Williams y Molina 10963, MO); CR (Wussow y Pruski 134, LSU). 100-1800 m. (Mexico, Mesoamerica.)
XII. G. Heliantheae subtribe Rojasianthinae Panero

Por J.F. Pruski.

Shrubs or trees. Leaves opposite; blade palmately lobed. Capitulescence open-cymose. Capitula radiate; involucre hemispherical; phyllaries imbricate, gradate, c. 3-seriate, herbaceous, typically persistent; clinanthium convex, paleate; paleae conduplicate, margins sclerified-lacerate-pectinate with 5-6 sclerified awns per margin, conduplicate, obviously acrescent post-anthesis, spreading, the capitulum a spinescent subhemisphere in fruit. Ray florets several, 1-seriate, well-exserted, sterile; corolla white to limb suffused with pink or purple abaxially, abaxially glandular. Disk florets numerous, bisexual; corolla deeply 5-lobed, white proximally and black distally, veins of the throat without embedded fibers, lobes glabrous; anthers ecaudate, filaments densely long-papillose distally, thecae and appendage black; style white with blackish stigmas, base glabrous, branches with stigmatic surfaces 2-banded and not confluent apically, densely long-papillose, apex exappendiculate, acute to acuminate, vascularized basically to tip. Cypselae compressed-subquadrate, obovoid, purplish to brown, carbonized; pappus of c. 10 short caducous stramineous barbellate awns. x = 19. 1 gen, 1 sp., endemic to Mesoamerica.

1. Rojasianthe Standl. et Steyerm.

Por J.F. Pruski.

Shrubs or trees; stems simple proximally, subterete. Leaves opposite, long-petiolate; blade chartaceous, palmately 3-7-lobed, palmately 3-7-veined, abaxial surface glandular. Capitulescence open-cymose, mostly 3-6-capitulate, not held well above leaves. Capitula large, showy, long-radiate, many-flowered; involucre hemispherical; phyllaries imbricate, gradate, c. 3-seriate, herbaceous, typically persistent, outer few reflexed at anthesis, inner 8-10 phyllaries subequal, broad; clinanthium convex, paleate; paleae conduplicate, margins sclerified-lacerate-pectinate with 5-6 sclerified awns per margin, acrescent and folded around cypselae, spreading, the capitulum a spinescent subhemisphere in fruit. Ray florets 12-16, 1-seriate, sterile; corolla white to limb suffused with pink or purple abaxially, corolla tube much shorter than limb, limb well-exserted, abaxially glandular; ovary with pappus of several caducous awns. Disk florets 150-200+, bisexual; corolla funnelform, deeply 5-lobed, bicolored, white proximally and black distally, tube puberulent, shorter than limb, veins of the throat without embedded fibers, lobes glabrous; anthers ecaudate, filaments densely setulose distally, thecae and appendage black; style
white with blackish stigmas, base glabrous, branches with stigmatic surfaces 2-banded and not confluent apically, densely long-papillose, apex acute to acuminate. Cypselae compressed, obovoid, purplish to brown, carbonized, often epappose at maturity; pappus of c. 10 short caducous stramineous barbellate awns. x = 19. 1 sp. Endemic to Chiapas and Guatemala.

**Rojasianthe** was placed in Ecliptinae by Robinson (1981) and Strother (1999), treated as Verbesininae in Bremer (1994), but here is treated as the sole member of Rojasianthinae, as in Panero (2007).


Shrubs or trees 2.5-6 m; stems striate, densely hirtellous, usually fistulose. Leaves: blade 8-22 × 5-22 cm, ovate or suborbicular to broadly triangular-ovate in outline, easily wilting, adaxial surface scabridulous, abaxial surface puberulent as well as glandular, base truncate to cordate, often auricled, marginal lobes 1-5 cm, triangular, irregularly crenate to serrate, apex acute to obtuse; petiole 2-10 cm. Capitulescence: peduncles 2-7+ cm. Capitula 1.3-5 cm, 162+-flowered; involucre 2.5-3.5 cm diam.; outer 5-6 phyllaries 8-11 × 5-8 mm, lanceolate-ovate to ovate, subherbaceous, strigillose-villosulous, quickly grading to inner phyllaries 10-20 × 10-15 mm, ovate to orbicular, chartaceous with scarious margins, finely striatulate, strigillose to glabrate; paleae 5-10+ mm, spines 3-5 mm in fruit, stiff. Ray florets: corolla tube 1-2 mm, limb 25-40 × c. 10 mm, elliptic, with 9-11 larger nerves and several thinner intermediate nerves, adaxially setulose and glandular; sterile ovary with pappus awns 1.5-2 mm, about as long as ray corolla tube. Disk florets: corolla tube 2.5-3.5 mm, densely puberulent, throat shorter than lobes, lobes 2.5-3.5 mm linear-lanceolate; style branches 2-2.5 mm. Cypselae 4-6 mm, strigillose, 2-2.5 mm broad at the broadly rounded apex, evenly tapering to a narrowly annular carpododium; pappus awns 1-2.5 mm, about as long as disk corolla tube. 2n = 38. *Cloud forests, streamsides, volcano slopes.* Ch (Matuda 2860, MO); G (Gereau y Martin 1868, MO). (1300-)1700-3300(-3900) m. (Endemic.)

**Matuda 2860** (MO) is presumably the same collection that Strother (1999) cited as **Matuda 2850** (LL). **Rojasianthe superba** is known in Mexico from only in the environs of Volcán Tacaná.
Decumbent to erect annual or perennial herbs, rarely scandent shrubs; stems sometimes rooting at the nodes. Leaves simple, opposite; blade linear to ovate or sometimes reniform, venation trinervate, surfaces eglandular (Mesoamerica). Capitulescence terminal or axillary, monocephalous or cymose. Capitula radiate or discoid; involucre usually hemispherical or campanulate; phyllaries subequal or less commonly graduate, 1-5-seriate, mostly herbaceous; clinanthium paleate, conical (Mesoamerica) to convex; paleae bases decurrent onto clinanthium. Ray florets (when present) pistillate. Disk florets bisexual; corolla 4-5-lobed, glabrous or pubescent, throat veins without embedded fibers; anthers brown to black, ecaudate, endothecial pattern polarized; style trunk with 2 vascular strands, branches with a basically continuous stigmatic surface with stigmatic surfaces nearly confluent, apex exappendiculate. Cypselae brown to black, carbonized, margins ciliate, sometimes corky-winged, rays triquetrous or obcompressed, disks cypselae compressed to compressed-biconvex or sometimes quadrate, faces glabrous to pubescent, carpopodium indistinct; pappus coroniform or (1-)2-3-aristate, sometimes with squamellae in between. $x = 12, 13, 16, 18$. 5 gen. and aprox. 58-60 spp. Subtropical and tropical America, a few species of *Spilanthes* paleotropical. 3 gen., 13 spp. in Mesoamerica.

By solitary capitula and often conical clinanthia, *Acmella*, *Salmea*, and *Spilanthes* were treated by Karis y Ryding (1994b) as Zinniinae, and although lacking embedded fibers in disk floret corolla throats, these three genera (along with *Zinnia*) were placed in subtribe Ecliptinae Less. by Robinson (1981). Here, I follow Panero (2007-HEL), who recognized Spilanthinae as distinct from each Ecliptinae and Zinniinae.


1. Erect or scandent shrubs; capitula discoid; corollas mostly ochroleucous. 2. *Salmea*
1. Annual or perennial herbs; capitula radiate or discoid; corollas yellow or sometimes white.

2. Leaves petiolate or infrequently subsessile in *A. lundellii* and *A. poliolepidica*, but then with capitula conspicuously radiate.

1. *Acmella*

2. Leaves sessile or subsessile; capitula discoid.

3. *Spilanthes*


Annual or perennial herbs; stems erect or decumbent, often rooting at nodes, glabrous to pilose. Leaves simple, opposite, petiolate; blade typically chartaceous, palmately trinerved from near base or less commonly venation pinnate, both surfaces eglandular, glabrous to sparsely pilose, the margins subentire to serrulate. Capitulescence terminal or occasionally axillary, of 1-few capitula, typically long-pedunculate; peduncles slender, ascending, several-ribbed or sometimes noticeably sulcate, glabrous to pubescent. Capitala radiate or discoid, 25-200+-flowered; involucre hemispherical; phyllaries subequal, or obgraduate 1-3-seriate, slightly imbricate, flat, few-striate; outer phyllaries typically herbaceous and longer than the inner phyllaries; clinanthium long-conical, typically fistulose, paleate; paleae elliptic-lanceolate, conduplicate, deciduous, decurrent onto clinanthium surface with clinanthium thereby often appearing to have numerous short longitudinal ridges. Ray florets (0-)3-22, pistillate, uniseriate; corolla usually yellow or white, the tube often pilose, the limb ob lanceolate to obovate, sometimes inconspicuous. Disk florets 23-175+, bisexual; corolla funnelform or with limb campanulate, usually greenish white or yellow-orange, glabrous, shortly 4-5-lobed, lobes deltate, papillose within; anthers 4-5, thecae commonly dark brown, basally rounded-sagittate. Cypselae often slightly dimorphic, dark brown to black with stramineous margins, marginal cypselae triquetrous, obcompressed, inner cypselae strongly compressed or compressed-biconvex, margins non-winged, commonly ciliate, commonly light-colored, sometimes cory, faces glabrous to sparsely pilose, trichomes sometimes arising from weakly developed tubercles, apex often with small shoulders, when pappose shoulders supporting pappus bristles; pappus bristles (0-)2-3, fragile awn-like, shorter than cypselae and corollas, the cilia (when present) and pappus grading into one another. x = 12, 13. 30 spp.; 26 spp. neotropical, 5 spp. pantropical weeds.

The Mesoamerican species of *Acmella* were monographed by Moore (1907) as *Spilanthes*, and were treated similarly by D'Arcy (1975) and Nash (1976) as *Spilanthes*. Jansen (1985) resurrected *Acmella* from synonymy within *Spilanthes*, and subsequently Pruski (1997),
Strother (1999), and Robinson (2006) accepted *Acmella* as distinct from *Spilanthes*. As circumscribed by Jansen (1985) some individual species of *Acmella* are variable in elsewhere usually reliable critical features of capitula condition (having both radiate and discoid individuals) and 4-merous vs. 5-merous disk florets, making species identifications difficult. Often mature fruits are needed for identifications, and identifications of immature individuals are often suspect (e.g., immature plants of non-corky margined *A. brachyglossa* and *A. uliginosa* are often misdetermined as corky margined *A. ciliata*). The awn-like pappus bristles are fragile and mature individuals of normally pappose species are often misidentified as belonging to epappose species.

Applications of names used by Nash (1976), who said she was unsure if "correctly named," for our two of our most common species have changed, with Nash's Mesoamerican material of *Spilanthes americana* now called *Acmella repens* and that of *S. ocytipifolia* now called *A. radicans*. Similarly, none of the four *Spilanthes* name usages in D'Arcy (1975) are maintained in *Acmella*, with D'Arcy (1975: 1142) aware that some of his name applications are "not without question." The present treatment defers to that of Jansen (1985) and his in sched. annotations, differing basically only by not using infrataxa and by replacing the name *A. oppositifolia* used by Jansen (1985) with *A. repens*.

The names *S. americana* (L.f.) Hieron., *S. oppositifolia* (Lam.) D'Arcy, and *A. oppositifolia* (Lam.) R.K. Jansen have been applied to plants in our area, but Pruski (2000) noted that these names are synonyms of *Heliopsis buphthalmoides* (Jacq.) Dunal [non *H. oppositifolia* (L.) Druce]. *Acmella oleracea* (L.) R.K. Jansen is widely cultivated and should be looked for as an escape in Mesoamerica. In Amazonia *A. oleracea* is known as "jambu" and chewed capitula and roots of it (and also of Mesoamerican *A. brachyglossa*, *A. ciliata*, and *A. repens*) are used widely to relieve toothaches.


1. Capitula discoid or inconspicuously to somewhat inconspicuously radiate.
2. Corollas greenish-white to cream-colored; capitula discoid (very rarely inconspicuously radiate).  

**8. A. radicans**

2. Corollas pale yellow to less commonly yellow or yellow-orange; capitula usually inconspicuously radiate (less commonly discoid).

3. Phyllaries 5-6, uniseriate; leaf blades lanceolate to elliptic.  

**10. A. uliginosa**

3. Phyllaries 7-11, 2-seriate; leaf blades broadly elliptic to ovate.

4. Margin of mature cypselae typically not noticeably thickened or corky; corollas yellowish or cream colored.  

**1. A. brachyglossa**

4. Margin of mature cypselae noticeably thickened or corky; corollas yellow to yellow-orange.

**2. A. ciliata**

1. Capitula conspicuously radiate.

5. Mostly erect annuals; phyllaries 1-2-seriate; margins of mature cypselae sometimes noticeably thickened or corky.

**3. A. filipes**

5. Erect to decumbent or repent perennials; phyllaries 2-3-seriate; margins of mature cypselae never noticeably thickened nor corky.

6. Leaves linear-lanceolate or lanceolate to oblanceolate (infrequently elliptic).

7. Stems often strongly repent, rooting at nodes.  

**4. A. lundellii**

7. Stems erect or decumbent, generally not rooting at nodes.  

**7. A. poliolepidica**

6. Leaves typically lanceolate-ovate or elliptic to ovate or cordiform.

8. Leaves basally truncate or cordate; petiole unwinged; phyllaries c. 3-seriate; stems and leaves pilose.

**6. A. pilosa**

8. Leaves basally attenuate; petiole winged; phyllaries 2-seriate; stems and leaves glabrous to strigose or pilose.

9. Leaves apically acuminate; cypselae faces pilose, margins ciliate, apex with shoulders typically bearing pappus bristles.

**5. A. papposa**

9. Leaves apically acute to obtuse; cypselae faces typically slightly pilosulose distally or sometimes glabrous, margins ciliate or less commonly eciliate, apex often truncate, typically epappose.  

**9. A. repens**


Low annual herbs to c. 60 cm; stems erect to ascending or occasionally decumbent, sometimes rooting at nodes, glabrous to sparsely pilose. Leaves petiolate; blade 1.8-4.5(-10) × 0.9-2.5(-6.5) cm, broadly elliptic to ovate, glabrous to sparsely pilose, the base attenuate, the margins serrulate, often ciliate, the apex acute to more commonly acuminate; petiole 0.4-2.5(-3.7) cm, sometimes narrowly winged, generally sparsely pilose. Capitulescence few-capitulate; peduncles 4-12 cm, glabrous to sparsely pilose. Capitula 6-13 mm, inconspicuously to somewhat inconspicuously radiate; involucre 6-9 mm diam.; phyllaries 7-11, 3-5 × 1-3 mm, lanceolate-ovate, 2-seriate, subequal, inner series commonly narrower than the outer series, glabrous or sparsely puberulent; clinanthium 5-11 mm; paleae 3.2-3.9 mm. Ray florets 5-8, inconspicuous and only about as long to slightly less than twice as long as phyllaries, typically with part to most of limb exserted from tips of phyllaries; corolla 1.5-3.7 mm, pale yellow, tube 0.9-1.5 mm, pilose, sometimes merely slightly so, limb 0.6-2.2 × 0.5-2 mm, oblong to obovate, typically longer than the tube, 3-5-nerved, apically slightly emarginate or 3-dentate. Disk florets 100-220; corolla 1.5-2.1 mm, 4(-5)-lobed, pale yellow, tube 0.4-0.6 mm, lobes c. 0.3 mm; anthers c. 0.8 mm. Cypselae 1.8-2.4 mm, the faces sometimes pilose distally, the margins densely ciliate, not corky; pappus of two (disks) or three (rays) generally subequal bristles 0.3-1.1 mm, that of the rays often merely slightly longer than the marginal cilia. 2n = 78. Flowering year-round. Thickets, disturbed areas, montane forest, Pinus-Quercus forests, roadsides, seepage areas. Ch (Pruski et al. 4197, MO); G (Skutch 2034, NY); N (Stevens 19849, MO); CR (Skutch 3938, NY); P (Fendler 166, MO). 0-1300 m.

(Mesoamerica, Colombia, Venezuela, Surinam, French Guiana, Ecuador, Peru, Bolivia, Brazil, Paraguay, Cuba.)

As defined by Jansen (1985), Acmella brachyglossa is one of the more common species of Acmella in the neotropics. It was listed in synonymy of Spilanthes ciliata by Moore (1907), which is resembles in critical features except for its non-corky cypselae margins. Acmella brachyglossa also closely resembles fairly uncommon A. uliginosa, but differs from it by broader leaves, more phyllaries, larger cypselae, and by sometimes 5-lobed disk corollas.


Perennial herbs to 60 cm; stems decumbent to ascending, rooting at nodes, glabrous to slightly pilose. Leaves petiolate; blade 2.5-9.5 × 1.5-8 cm, ovate, glabrous to slightly pilose, the base broadly obtuse to truncate, the margins serrulate to coarsely serrate, the apex acute; petiole 0.7-4.5 cm, sometimes narrowly winged, glabrous to slightly pilose or ciliolate. Capitulescence commonly 3-capitulate cymes; peduncle 1.5-10 cm, ribbed, slightly pilosulous. Capitula 6-10.5 mm, inconspicuously radiate; involucre 5-8 mm diam.; phyllaries 7-10, 3-5.5 × 1-3 mm, lanceolate to elliptic-ovate, 2-seriate, subequal, glabrous to more commonly slightly pilose with ciliate margins, apically acute to rounded; clinanthium 4-7.5 mm; paleae 3-4.5 mm, 3-striate, sometimes apically papillose, commonly apically obtuse to truncate. Ray florets 5-10, inconspicuous and only about as long as the phyllaries, typically with limb weakly exserted from tips of phyllaries; corolla 2.5-4 mm, yellow to yellow-orange, tube 0.9-1.1 mm, pilosulous, limb 1.6-2.9 × 1.1-1.9 mm, 3-6-nerved, apex shortly 3-lobed to occasionally moderately bilobed. Disk florets 90-180; corolla 1.5-1.9 mm, (4-)5-lobed, yellow to yellow-orange, tube 0.3-0.5 mm, slightly basally broadened, lobes c. 0.3 mm. Cypselae 1.6-2.3 mm, the faces typically slightly pilosulous distally, the margins ciliate, margins of mature cypselae noticeably thickened or corky, the corky margin typically obscuring the apical shoulders; pappus typically present, of 2 subequal bristles 0.2-0.9, the bristles erect, longer and more rigid than the marginal cilia. 2n = 78. Flowering mostly Jun-Aug, Dec. Streamsides, disturbed areas, low thickets. P (Duke 4901, MO). 0-500 m. (Mesoamerica, Colombia, Venezuela, Guyana, Ecuador, Peru, Bolivia, Brazil, Argentina; Asia.)

Jansen (1985) gave the length of the ray corollas as "2.5-6.5 mm" and that of its limb "1.2-4.7 mm." Also, Jansen (1985) and Pruski (1997) reported the pappus to often be absent, but I find the pappus to be typically present, albeit reduced. Although Jansen (1985) gave the disk corollas as being 5-lobed, several South American sheets annotated by him as *A. ciliata* have 4-lobed disk corollas. The corky-margined material cited by D'Arcy (1975) as paleotropical *S. paniculata* Wall. ex DC. is treated here as *A. ciliata*.

Acmella filipes var. cayensis R.K. Jansen, Acmella filipes var. parvifolia (Benth.) R.K. Jansen, 
?Calea savannarum Standl. et Steyerm., Ceratocephalus parvifolius (Benth.) Kuntze, Spilanthes americana fo. parvifolia (Benth.) A.H. Moore, Spilanthes pammicrophylla A.H. Moore, 
Spilanthes parvifolia Benth. non Acmella parvifolia Raf.

Annual herbs to 45(-90) cm; stems mostly erect to less commonly proximally decumbent and spreading with ascending tips, not rooting at nodes, simple to few-branched, pilose to slightly so. Leaves petiolate; blade 0.8-5 × (0.2-)0.8-2.7 cm, lanceolate to more commonly elliptic-ovate (infrequently triangular-ovate), glabrous to pilose, the base typically attenuate to rarely nearly truncate, the margins sinuate to serrate, the apex acute to acuminate; petiole 0.2-3.1 cm, narrowly winged, pilose. Capitulescence typically monocephalous or less commonly 2-capitulate; peduncle 2.5-13.5 cm, ebracteolate, glabrous to pilose. Capitula 4-12 mm, conspicuously radiate; involucre 3-7.5 mm diam.; phyllaries 4-12, 1.7-4 × c. 0.5-2.4 mm, 1-2-seriate, subequal, elliptic, slightly pilose; clinanthium 2.5-7 mm; paleae 2.5-4 mm, apically acute to rounded. Ray florets 3-10, limb exserted from involucre; corolla 2.5-6 mm, yellow, tube 0.6-1 mm, pilose, limb 1.9-5 × 0.8-2.7 mm, typically 5-nerved, apex shortly 2-3-lobed, rarely rounded. Disk florets 40-170; corolla 1.3-1.8 mm, 5-lobed, yellow, tube c. 0.5 mm, lobes 0.2-0.4 mm. Cypselae 1.13-2 mm, the faces slightly pilosulose, the margins densely ciliate, margins of mature cypselae sometimes noticeably thickened or corky; apex sometimes with small shoulders; pappus typically present, of 2 subequal bristles 0.2-1.4 mm, rarely absent. 2n = 24. Flowering year-round. Among volcanic rocks, bosques enanos, disturbed areas, disturbed forests, forest edges, limestone hills, open or brushy plains and hillsides, pastures, Pinus-Quercus forests, river bluffs, roadsides, sandy soil, savannas, selva baja subcaducifolia, streamside, wet areas. Y (Gaumer 2305, NY); C (Martinez et al. 28719, MO); QR (Chater 32, MO); B (Bartlett 11520, MO); G (Standley 85789, F); H (Williams 16880, MO); N (Wright s.n., US); CR (Williams et al. 26655, NY). 0-1500 m. (Endémica.)

This small-leaved annual species may be generally recognized by its usually erect habit with generally small capitula on slender peduncles. Jansen (1985) recognized three allopatric varieties within this species, but the characters separating the varieties are not strong and seem clinal. Nevertheless, the plants in the Yucatán do indeed tend to be simple-stemmed until the capitulescence, whereas the higher elevation plants tend to be somewhat weak-stemmed and branched proximally.

Low perennial herbs to 30 cm; stems decumbent or often strongly repent, rooting at nodes, glabrous to pilose. Leaves subsessile or petiolate; blade 1-3 × 0.3-1.5 cm, lanceolate to oblanceolate or infrequently elliptic, venation pinnate but secondary veins strongly arching apically, glabrous to sparsely pilose, the base long-attenuate, the margins subentire, the apex acute to rounded; petiole (0-0.1)-0.5 cm, narrowly winged, glabrous to slightly ciliate. Capitulescence monoecephalous or less commonly 2-capitulate; peduncle 4-14 cm, glabrous to slightly pilose. Capitula 3.5-6 mm, conspicuously radiate; involucre 3-4 mm diam.; phyllaries 8-10, 1.5-2.5 × c. 0.6-1.2 mm, elliptic, subequal, 2-seriate, glabrous or essentially so; clinanthium 2.5-4 mm; paleae 1.9-2.8 mm. Ray florets 5-8, limb exserted from involucre; corolla 3.2-4.6 mm, yellow, tube 0.7-1.1 mm, slightly pilose, limb 2.5-3.5 × 1.2-1.8 mm, 4-6-nerved, apex shortly 2-3-lobed. Disk florets 50-85; corolla 1.3-1.8 mm, often shorter than disk cypselae, 5-lobed, yellow, tube and throat cylindrical, not well-differentiated from each other, lobes 0.2-0.4 mm. Cypselae 0.8-1.2 mm, the faces slightly pilositose, the margins densely ciliate, not thickened nor corky; pappus absent, but annulus typically ciliate, cilia to c. 0.5 mm, sometimes mistaken for pappus bristles. Flowering year-round. Roadsides, savannas, secondary thickets, wet areas. C (Martínez et al., 2001: 23); B (Lundell 584, MO); G (Contreras 1260, LL). 0-30 m. (Endemic.)

The leaves petiolate in *Acmella* vs. subsessile in *Spilanthes* trait breaks down in this species, as the leaves in *A. lundellii* and *A. poliolepidica* are sometimes subsessile as are those in typical *Spilanthes*.


Robust perennial herbs to 100 cm; stems decumbent to more commonly erect, occasionally rooting at nodes, glabrous to pilose. Leaves short-petiolate or sometimes subsessile; blade 2-9(-12.5) × 1.2-4.2 cm, lanceolate-ovate to ovate, glabrous to slightly pilose, the base cuneate to obtuse, attenuate onto petiole, the margins crenulate to serrulate, the apex acuminate to nearly attenuate; petiole 0.5-2 cm, narrowly winged nearly to base, slightly pilose or ciliate. Capitulescence monoecephalous to more commonly of 3-5-capitulate cymes; peduncle 4-17 cm, ribbed, slightly pilose. Capitula 6-12.5 mm, conspicuously radiate; involucre 5.5-9 mm diam.; phyllaries 9-17, 3.3-6.5 × 1-1.7 mm, lanceolate to elliptic-lanceolate, 2-seriate, subequal, slightly pilose, margins ciliate,
apically acuminata to rounded; clinanthium 3.5-9 mm; paleae 3-4 mm, 1-3-nerved, commonly apically acute. Ray florets 6-12, limb well-exserted from involucre; corolla 5-11 mm, yellow to yellow-orange, tube 1-1.5 mm, pilosulose, limb 4-9.5 × 2-3 mm, 5-7(-9)-nerved, apex shortly 2-3-lobed. Disk florets 100-200; corolla 1.5-2.3 mm, 5-lobed, yellow to yellow-orange, tube 0.5-0.6 mm, basally broadened, lobes 0.3-0.5 mm. Cypselae 1.8-2.5 mm, the faces typically slightly pilosulose distally, the margins ciliate, not thickened nor corky, typically black or stramineous, apex with shoulders typically bearing pappus bristles, the carbonized shoulders thus often higher than the stramineous annulus; pappus typically present, of (0-)2 subequal bristles 0.2-1.3 mm, the bristles fragile, erect, typically slightly to much longer than the marginal cilia. 2n = 52. Flowering tear-round. Streamsides, disturbed areas, roadsides, pastures, near cultivated areas, margins of Pinus-Quercus forests. G (Standley 69181, MO); H (Jansen y Harriman 546, MO); N (Molina y Williams 31214, MO); CR (Pittier 10546, US); P (Partch 69-11, MO). (200-)900-2500 m. (Endémica.)

In Costa Rica and Panama the species tends to be represented by more erect individuals not rooting at the nodes and with longer internodes and peduncles. These growth forms were given taxonomic rank of variety as Acmella papposa var. macrophylla by Jansen (1985) but Acmella papposa is here treated broadly with the variety ariety not recognized. The species is most common in Nicaragua, where a few collections, however, were made at elevation as low as 200 meters. Most plants called S. oppositifolia by D'Arcy (1975) have shouldered cypselae and prove to be A. papposa.


Perennial herbs to 50 cm; stems decumbent, rooting at nodes, pilose or more commonly densely so. Leaves petiolate; blade 1.3-6.7 × 0.8-5 cm, broadly ovate to cordiform, chartaceous or much less commonly subcarnose, palmately 3-nerved from base or less commonly nearly so, pilose, the base truncate or cordate, the margins crenate to serrate, rarely deeply serrate, the apex acute to broadly so; petiole 0.5-4 cm, unwinged, pilose, often reddish. Capitulescence monocephalous or less commonly in 3-capitulate cymes; peduncle 3-15 (18) cm, sulcate, pilose. Capitula 7-10.5 mm, conspicuously radiate; involucre 5.5-8 mm diam.; phyllaries 15-21, 3.5-5.7 × 1-2 mm, lanceolate to elliptic-lanceolate, c. 3-seriate, subequal, pilose to pilosulose, margins typically ciliate, apically rounded to acuminate; clinanthium 3-6 mm; paleae 2.5-3 (3.6) mm. Ray florets 9-21, limb exserted from involucre; corolla 3.7-6.8 mm, yellow, tube 0.7-1.3 mm, pilose to pilosulose, limb 3-5.5 × 1.5-2.3
mm, 5-8-nerved, apex shortly 2-3-lobed. Disk florets 150; corolla 1.4-2.2 mm, 5-lobed, yellow, tube 0.4-0.6 mm, sometimes noticeably basally broadened, lobes 0.2-0.5 mm. Cypselae 0.9-1.5 mm, the faces typically slightly pilosulose distally, the margins ciliate, not thickened nor corky; pappus absent. 2n = 26. Flowering year-round. Bosques húmedos, disturbed areas, lake shores, limestone pyramids, marshy area, pastures, lawns, Pinus-palmetto scrublands, roadsides, savannas, secondary vegetation, selvas bajas inundables, selvas bajas subcaducifolias, selvas medianas, selvas medianas subcaducifolias, selvas medianas subperennifolias. T (Novelo y Ramos, 2005: 139); C (Jansen y Harriman 653, MO); QR (Téllez et al. 3608, MO); B (Balick et al. 2127, MO); G (Tún Ortíz 400, MO). 0-600 m. (Endemic.)

Téllez et al. 3608 was cited as Acmella repens (sub S. americana) by Sousa y Cabrera (1983).


Low perennial herbs to 60 cm; stems erect to decumbent, generally never rooting at nodes, glabrous to pilose or strigillose. Leaves subsessile or petiolate; blade 1-5 × 0.2-1.2 cm, linear-lanceolate to lanceolate, venation subpalmately 3-nerved from above base, strigillose to pilose, the base long-attenuate, the margins subentire to denticulate or serrulate, the apex acute to acuminate; petiole (0-)0.2-0.6 cm, narrowly winged, glabrous to ciliate. Capitulecence monocephalous or in few-capitulate cymes; peduncle 3.5-20 cm, pilose. Capitula 3.5-9.5 mm, conspicuously radiate.; involucre 4-6 mm diam.; phyllaries 7-9, 2-4 × 0.7-1.5 mm, lanceolate to elliptic-ovate, 2-seriate, subequal to unequal, often strigillose, margins typically ciliate, apically rounded to acuminate; clinanthium 1.5-6 mm; paleae 3-3.8 mm, sometimes puberulent distally. Ray florets 5-9, limb exerted from involucre; corolla 4.5-7.6 mm, yellow, tube 1-1.6 mm, pilose to densely so, limb 3.5-6 × 1.2-1.8 mm, 4-6-nerved, apex sinuate to short-3-lobed. Disk florets 50-90; corolla 1.7-2.2 mm, 5-lobed, yellow, tube 0.3-0.5 mm, lobes 0.3-0.4 mm. Cypselae 1.4-1.9 mm, the faces slightly pilosulose, the margins ciliate, not thickened nor corky; pappus typically absent, when present 1- or 2-awned, awns 0.5-1 mm. 2n = 48. Flowering mostly Nov-Jul. Bosques húmedos subtropicales, bosques tropicales secos, pinares, savannas, streamsides. G (Steyermark 43162, F); H (Jansen y Harriman 536, MO); CR (Bioley 7240, US). 800-1800 m. (Endemic.)

The nomen in Spilanthes using the epithet "merrillii" as in Clewell (1975) is mostly in reference to this species.


Annual herbs to 50 cm; stems erect to ascending, rarely rooting at nodes, glabrous to pilose. Leaves petiolate; blade 1-7.5(-9) × 1-4.5(-6.5) cm, ovate, glabrous to pilosulose, the base attenuate, the margins serrulate to serrate, the apex acute to short-acuminate; petiole 0.4-3.7 cm, narrowly winged, pilose. Capitulescence commonly of 3-capitulate cymes; peduncle (0.2-)1.5-6 cm, ribbed, slightly pilosulose to glabrous. Capitula (5-)7-11 mm, discoid (rarely inconspicuously radiate); involucre 4.5-7.5 mm diam.; phyllaries 6-9, (3-)4-6.3 × 1-2(-3) mm, lanceolate to elliptic-lanceolate, subequal, 1-2-seriate, glabrous to pilosulose, margins typically eciliate or with a few apical cilia, apically obtuse to acute; clinanthium 3.5-7 mm; paleae 3-4.5 mm, apex typically obtuse to truncate, less commonly acuminate or mucronate. Ray florets typically 0. Disk florets 60-150; corolla 1.4-2 mm, 4-lobed, greenish-white to cream-colored, tube 0.4-0.7 mm, lobes 0.2-0.4 mm. Cypselae 1.9-2.5(-2.7) mm, the faces typically slightly pilosulose distally, the margins ciliate, not corky (rarely corky), apex often with shoulders; pappus typically present, of 2 subequal bristles 0.4-1.6 mm, bristles erect or sometimes bent. 2n = 78. Flowering mostly Aug-Mar. Bosques enanos, bosques húmedos subtropicales, coconut plantations, disturbed areas, dry forests, fields, matorrales, mixed forests, moist thickets, Pinus-Quercus forests, potreros, roadsides, secondary vegetation, steep hillsides, stream sides, volcano slopes. Ch (Jansen y Harriman 502, MO); G (Pruski y MacVean 4500, MO); H (Pruski et al. 4532, MO); ES (Standley 19377, MO); N (Atwood y Seymour 772, MO); CR (Cooper 5807, US); P (Duke 9509, MO). 10-2100 m. (Mexico, Mesoamerica, Colombia, ?Venezuela, ?Peru, ?Bolivia, Cuba, ?Hispaniola, ?Lesser Antilles;; Africa, Asia.)

Acmella radicans is a common weed, and falsely resembles Isocarpha, an unusual paleate genus of tribe Eupatorieae. The original collection locality of Venezuela cited by Jacquin is likely
erroneous. D'Arcy (1975) used the name *S. alba* L.’ Hér. and Nash (1976) the name *Spilanthes ocymifolia* (Lam.) A.H. Moore for Mesoamerican material, but both names are synonyms of South American endemic *A. alba* (L’Her.) R.K. Jansen. The citation of a Guatemalan Hartweg collection by Hemsley (1881) as *S. alba* is in reference to material I would determine as *A. radicans*. *Acmella radicans* var. *debilis* was treated by Strother (1999) in synonymy, but is here treated as a questionable synonym.


Perennial herbs to 60(-100) cm; stems decumbent to repent, typically rooting at nodes, glabrous or more commonly slightly pilose. Leaves petiolate; blade 1.5-7(-10) × 0.7-3.5 cm, lanceolate-ovate to ovate, less commonly lanceolate, glabrous to slightly pilose, the base cuneate to obtuse, then attenuate onto petiole, the margins crenulate to serrulate, the apex acuminate to nearly attenuate; petiole 0.4-3.5 cm, narrowly winged nearly to base, typically slightly pilose or ciliate. Capitulescence monocephalous to more commonly of 3-5-capitulate cymes; peduncle 4-25 cm, ribbed, glabrous to strigillose-pilose. Capitula 6-14 mm, conspicuously radiate; involucre 3-6 mm diam.; phyllaries 7-16, 2.5-6.5 × 0.8-2(-3) mm, lanceolate to elliptic-lanceolate, 2-seriate, subequal, glabrous to puberulent, margins generally eciliate, apically acute to rounded, less commonly acuminate; clinanthium 3-10 mm; paleae 3-4.2 mm, faintly 1-3-nerved, apically acuminate to obtuse. Ray florets 8-16, limb well-exserted from involucre; corolla 4-9 mm, yellow to yellow-orange, tube 0.8-1.5 mm, pilosulose to pilose, limb 3.2-7.5 × 2-2.5 mm, 5(-6)-nerved, apex 2-3-lobed. Disk florets 70-200 or more; corolla 1.7-2.2 mm, 5-lobed, yellow to yellow-orange, tube 0.3-0.5 mm, basally broadened, lobes 0.4-0.5 mm. Cypselae 1.8-2.5 mm, the faces typically slightly pilosulose distally or sometimes glabrous, the margins ciliate or eciliate, not thickened nor corky (very rarely corky-
margined), black or thinly stramineous, apex often truncate with annulus present; pappus typically absent, when present of 1(2-) unequal bristles to c. 0.5 mm, the bristles fragile, erect, only slightly longer than (when present) the marginal cilia. $2n = 26, 52, 78$. Flowering year-round. Wet areas, along streamsides, disturbed areas, roadsides, pastures. T (Jansen y Harriman 664, MO); Ch (Pruski y Ortiz 4254, MO); G (Pruski y MacVeaz 4488, MO); H (Molina y Molina 25458, MO); ES (Montalvo 4735, MO); N (Moreno 14305, MO); CR (Pruski et al. 3819, MO); P (Strother, 1999: 15). 0-2600(?-3000) m. (United States, Mexico, Mesoamerica, Colombia, Venezuela, Ecuador, Peru, Bolivia, Paraguay, Cuba.

This widespread species is the most variable species of *Acmella*, and occurs in both temperate and tropical America. Much of the variation in leaf forms and length of ray corolla limbs found the genus are expressed in *A. repens*, leading to rampant misidentifications. It is possible that the segregates *A. lundellii* and *A. pilosa* are merely growth forms of *A. repens*, and as such may be eventually reduced to synonymy. For example, lanceolate-leaved collections closely resembling *A. lundellii* found in Chiapas, but occurring at more than 1500 meters elevation, are not uncommon in Chiapas and occasional nearly cordate-leaved collections from Chiapas resembling *A. pilosa* have been referred to *A. repens*. Most material referred to *S. oppositifolia* by D'Arcy (1975) has ciliate-margined cypselae with shoulders and is determined here as *A. papposa*.

*Acmella repens* has a confused nomenclatural and taxonomic histories with names often applied to it proving to mostly be homotypic synonyms of each other and taxonomic synonyms of *Heliopsis buphthalmodes* (Jacq.) Dunal. For most of the 1900s *A. repens* was called *S. americana* (e.g., Moore, 1907; Nash, 1976), but this is a superfluous homotypic synonym of *Anthemis oppositifolia* Lam, and a taxonomic synonym of *Heliopsis buphthalmodes*. More recently, *Acmella repens* was called *S. oppositifolia* by D'Arcy (1975) and *A. oppositifolia* by Jansen (1985), both synonyms of *Heliopsis buphthalmodes* (Jacq.) Dunal (Pruski, 2000). The reports by Sousa y Cabrera (1983, sub *S. americana*) and Villaseñor (1989, sub *A. oppositifolia*) of *A. repens* occurring in Campeche, Yucatan, and Quintana Roo are presumably in reference to material of the more recent segregate *A. pilosa* or to occasionally large-leaved plants of *A. filipes*. Robinson (2006) incorrectly described *A. repens* as always having discoid capitula, but the accompanying illustration in Robinson (2006) correctly shows a plant with radiate capitula.


Ceratocephalus acmella var. depauperata Kuntze, Coreopsis acmella var. uliginosa (Sw.) K. Krause, Jaegeria uliginosa (Sw.) Spreng., Spilanthes acmella var. uliginosa (Sw.) Baker, Spilanthes charitopis A.H. Moore, Spilanthes iabadicensis A.H. Moore, Spilanthes lundii DC., Spilanthes salzmannii DC., Spilanthes uliginosa var. discoidea Aristeg.

Low annual herbs to 75 cm; stems erect to ascending or occasionally decumbent, rarely rooting at nodes, sparsely pilose to subglabrous. Leaves petiolate; blade 2-5 × 0.5-2.5 cm, lanceolate to elliptic, (rarely broadly elliptic), glabrous to sparsely pilose, the base attenuate, the margins serrulate, the apex narrowly acute to acuminate; petiole 0.2-1.5(-3.1) cm, sometimes narrowly winged, sparsely pilose to subglabrous. Capitulescence several-capitulate; peduncles 1.5-6.5 cm, sparsely pilose. Capitula 4.5-8 mm, inconspicuously radiate or less commonly discoid; involucre 4-6 mm diam.; phyllaries 5-6, 2-3.4 × 1-2 mm, elliptic-ovate, uniseriate, subequal, slightly ciliate; clinanthium 3-6 mm; paleae 2.5-3 mm. Ray florets (0-)4-7, inconspicuously and only about as long as long as phyllaries, typically with limb weakly exserted from tips of phyllaries; corolla 1.1-2.8 mm, yellow to less commonly yellow-orange, tube 0.5-1 mm, pilose, limb 0.6-1.8 × 0.4-1 mm, lanceolate, typically slightly longer than the tube, 2-(3-)nerved, apex entire or very short-lobed. Disk florets 70-150; corolla 1-1.6 mm, often shorter than disk cypsela, broadly campanulate, 4-(5-)lobed, yellow to less commonly yellow-orange, tube c. 0.3 mm, lobes 0.2-0.3 mm; anthers c. 0.5 mm. Cypsela 1.2-1.8 mm, the faces sometimes slightly pilosulose distally, the margins densely ciliate, not corky; pappus of 2 subequal bristles 0.2-0.7 mm, about as long as to about twice as long as marginal cilia. 2n = 52. Flowering Feb-Mar. Wet soil in disturbed areas. H (Standley 56001, F); P (Cowell 392, NY). 75-1100 m. (Mesoamerica, Venezuela, Guyanas, Brazil, Bolivia, Jamaica, Hispaniola, Lesser Antilles, Trinidad and Tobago; Africa, Asia, Pacific Islands.)

The occurrence of Acmella uliginosa in the Flora Area has not been verified by me, as to date I have seen only a photograph of Standley 56001 (F), one of two Mesoamerican vouchers cited by Jansen (1985). The elevation and geography of the two vouchers cited by Jansen (1985) are not similar: the Honduran voucher from Siguatepeque occurs at about 1080 m elevation, whereas the Panamanian voucher is from the Canal Zone at about 75 m elevation. It should be noted, however, that D'Arcy (1975) specifically excluded A. uliginosa from Panama. The determination of the voucher in Fig. 19 by Jansen (1985) as showing A. uliginosa occurring in the Guayana Highland near Mount Roraima was changed by Pruski (1997) to A. ciliata.

Hemsley (1881: 194) cited this species (sub Spilanthes) as occurring in Veracruz, Nicaragua, Costa Rica and Panama, but I could not confirm these reports. Because I have redetermined as A. brachyglossa the one voucher I've seen cited by Hemsley (Fendler 166) and because Acmellas are frequently misidentified, we should not follow Hemsley's reports until confirmed. Similarly,
the determination of *Seler* 3976 from Yucatán as *A. uliginosa* (sub *S. uliginosa* in Standley, 1930) could not be verified and Millspaugh y Chase (1904) cited Seler's specimen as "depauperate."

2. *Salmea* DC.

*Fornicaria* Raf., *Hopkirkia* Spreng., *Salmeopsis* Benth.

Por M.R. Bolick y J.F. Pruski.

Erect to scandent shrubs to 10 m; stems striate, glabrous to densely tomentose, nodal ridge sometimes present, branching typically at c. 45° angles, ultimate branches usually straight. Leaves opposite (infrequently capitulescence leafy bracts alternate), petiolate to subsessile; blade chartaceous or subcoriaceous, venation typically 3-nerved, ours eglandular (extremely rarely -- one extra-Mesoamerican collection of a possibly intergeneric hybrid-- glandular), adaxial surface glabrous, somewhat nitidous, abaxial surface glabrous to densely tomentose; petiole base typically moderately broad-based and nearly subclasping. Capitulescence corymbiform-paniculate with rounded tops or sometimes monoecephalous and long-pedunculate, typically held above subtending leaves, often somewhat clustered at the ends of branches; peduncles often 1-3-bracteolate. Capitula discoid; involucre hemispherical to narrowly obconical; phyllaries 5-36, subequal to graduated, 2-3(4)-seriate, striate, often green with purplish apex, apex sometimes herbaceous, inner phyllaries somewhat resembling outer paleae; clinanthium conical, paleate; paleae indurate, oblong, conduplicate, sometimes carinate, persistent. Ray florets 0. Disk florets bisexual, slightly longer (ours) than paleae; corolla tubular-funnelform, 5-lobed, mostly ochroleucous, eglandular (ours) or sometimes glandular, tube shorter than throat, veins in throat somewhat darkened; anthers brown to black (sometimes yellow pre-anthesis but quickly darkening), basally short-sagittate, apical appendage navicular, deltate-ovate, sometimes glandular, apex usually obtuse or sometimes acute; style branches exappendiculate, apex blunt to acute, papillose. Cypselae compressed, oblanceolate in outline, brown to black, faces glabrous to pubescent, margins ciliate or rarely glabrous, rarely corky, apically truncate or sometimes with minute shoulders supporting awns; pappus of 2(-3) slender subequal awns or coarse bristles, these typically shorter than the corolla, squamiform bristles sometimes present between awns or bristles. $x = 16, 18$. 10 spp.; West Indies, México south to Brazil and Argentina.

Blake (1915) recognized a single species of *Salmea* in Mesoamerica, but described *S. scandens* var. *pubescens* from México and Guatemala. Nash (1976) recognized four species of *Salmea* in Guatemala, but Bolick (1991) treated two of these (*S. pubescens* and *S. tomentosa*) as synonyms of *S. scandens*. Bolick (1991) noted much variation in phyllary pubescence and apex
shapes of *S. scandens*, especially in pubescent Guatemala-centered forms represented by the types of *S. scandens* var. *pubescens* and *S. tomentosa*, which, however, never apex truncate phyllaries typical of a narrowly defined *S. orthocephala*. Strother (1999) stated that *S. orthocephala* is "perhaps conspecific with" *S. scandens*. Species of *Salmea* often resemble the white-flowered discoid species of *Otopappus*, each of which differ most obviously in their adaxially pubescent and abaxially glandular leaves.


1. Involucre turbinate to narrowly campanulate; mid-series and inner phyllaries truncate-rounded, margins and apex white-puberulent.  
   1. *S. orthocephala*

1. Involucre mostly campanulate; all phyllaries with apices acute to obtuse, margins and apex not white-puberulent.  
   2. *S. scandens*


Shrubs 1.5-3.5 m; stems erect to subscandent, infrequently vining; stems glabrate to pubescent, internodes about as long as to shorter than subtending leaves. Leaves: blade 5-12(-13) × 2-6 cm, ovate to obovate, venation 3-nerved, abaxial surface hirsute especially on veins or rarely glabrous, base obtuse to rounded, sometimes obliquely so, often decurrent onto petiole, margins subentire to serrate-dentate, apex acuminates; petiole 0.5-0.8 cm. Capitulescence mostly (2) 10-20(-30)-capitulate, mostly 2-10 cm diam.; peduncles to 8 mm, typically glabrous to strigillose-hirsutulous to less commonly glabrous. Capitula 4-8 mm; involucre 3-5.5 × 4-7 mm, turbinate to narrowly campanulate; outer phyllaries ovate, 1-2.5 mm, glabrous to slightly puberulent, apex acute to obtuse; mid-series and inner phyllaries 3-5.5 mm, lanceolate, margins and apex white-puberulent, apex truncate-rounded, sometimes obviously hyaline; palea hirsute, apex obtuse to truncate. Disk florets 15-25, sometimes slightly longer than palea; corolla 2-3 mm, generally ochroleucous, or rarely pinkish, lobes c. 0.6 mm, sometimes hirsutulous; anther apical appendage eglandular. Cypselae 2-3 × c. 0.8-1 mm, faces commonly hirsutulous; pappus 2(-4)-awned plus many irregular smaller bristles between awns, awns to c. 1 mm. 2n = 32.

Flowering Oct-Jan. *Forests, shrubby or wooded slopes, damp to dry thickets, open rocky Pinus-


Frequent shrubs to 10 m; stems erect to commonly scendent; stems glabrate, internodes sometimes longer than subtending leaves. Leaves: blade 3.5-11(-15) × 1.3-6(-8) cm, lanceolate to ovate, venation typically 3-nerved from near base or sometimes from above base (pinnate in the Antilles, infrequently so in Mesoamerica) with 1-5 pairs of larger secondary veins, abaxial surface glabrous to slightly hirsute or less commonly tomentose, base cuneate to truncate, rarely subcordate, sometimes decurrent onto petiole, margins entire to dentate, apex acute to acuminate; petiole (0.1-)0.5-1.5(-3) cm. Capitulescence mostly 5-12(-40)-capitulate, mostly 3-17 cm diam., branchlets widely spreading; peduncles 3-22 mm, typically glabrous to strigillose-hirsutulous. Capitula 5-7(-10) mm; involucre 3-5 × 5-9 mm, mostly campanulate; phyllaries with apex acute to obtuse; outer phyllaries 1.5-3 mm, lanceolate-ovate, glabrous to slightly puberulent; inner phyllaries 3-5 mm, lanceolate, slightly to densely puberulent over distal half, not white-puberulent; paleae sometimes ciliolate, apex acute or less commonly obtuse. Disk florets 15-35, typically as long as paleae; corolla 1.5-3 mm, generally ochroleucous, to yellowish, less commonly pinkish, lobes 0.5-0.6 mm, usually widely spreading; anther apical appendage eglandular. Cypselae 2-3.5 × c. 0.7 mm; faces glabrous or sometimes distally hirsutulous; pappus 2(-3)-awned plus 0-10 irregular smaller bristles between awns, awns 1-2(-3.5) mm, smooth to barbellate. 2n = 32, 64. Flowering mostly Oct-Apr. *Forest and thicket slopes. Pinus-Quercus*
forests, streams or wet areas, rocky hillsides, secondary growth, volcano slopes. Ch (Pruski et al. 4252, MO); Y (Villaseñor, 1989: 90); B (Bartlett 12921, MO); G (Jansen y Harriman 522, MO); H (Bados 103, MO); ES (Wilbur et al. 16263, MO); N (Seymour 5089, MO); CR (Rodriguez 7548, MO); P (Croat 34537A, MO). 0-2400(-3000) m. (México, Mesoamerica, Colombia, Venezuela, Ecuador, Perú, Bolivia, Brazil, Paraguay, Argentina, Cuba, Jamaica, Hispaniola, Puerto Rico, Virgin Islands, Lesser Antilles).

Some lowland collections, especially those from Guatemala and Panamá, have inner phyllaries densely puberulent over distal half, whereas more typically they are glabrous to slightly puberulent. The South American collections have great variation in number of squamiform bristles between awn, which are sometimes lacking. The description in D'Arcy (1975[1976]) of the corollas "lobed about halfway down" is in error.


Per J.F. Pruski.

Perennial herbs; stems 1-several from base, erect to more commonly prostrate, subterete, striate, glabrous to pilose, generally rooting at the nodes. Leaves opposite, sessile or subsessile; blade linear to elliptic, chartaceous, subpalmately 3- or 5-veined from near base, eglandular, glabrous to weakly strigose or pilose, base attenuate, margins entire to sinuate, apex acuminate to rounded. Capitulescence terminal or axillary, of 1-few long-pedunculate capitula; peduncle glabrous to puberulent. Capitula discoid, globose; involucre hemispherical or crateriform; phyllaries 8-16, lanceolate to obovate, loosely imbricate, 2-5-seriate, subequal or weakly graduate, acuminate to rounded; outer phyllaries herbaceous; inner phyllaries herbaceous or chartaceous; clinanthium tall-conical, paleate; paleae loosely enfolding cypselae. Ray florets 0. Disk florets 45-240, bisexual; corolla tubular-funnelform, 5-lobed, white to purplish white, often glabrous, throat usually well-differentiated from tube, lobes triangular; anthers black, appendage navicular, basally short-sagittate; style base bulbous, branches recurved. Cypselae ellipsoid to obovoid, strongly compressed, faces green to black, glabrous to pubescent, at maturity commonly with a massive stramineous cork-like margin, apex often with small shoulders supporting pappus bristles; pappus of 1-3 awn-like bristles, bristles unequal to subequal, fragile. $x = 16$. 6 spp. Pantropics, 4 in the neotropics.

Moore (1907) treated *Spilanthes* as including *Acmella*, and recognized 39 species. Jansen (1981) excluded *Acmella* from the synonymy of *Spilanthes*, which he restricted to six species. Pruski (1997a) followed Jansen by recognizing only six species, but incorrectly gave the
distribution of *Spilanthes* as also "Southern U.S.A." This treatment is adopted from that of Pruski (1997).


Herb to 60 cm; stems prostrate, few-branched, glabrous to strigillose or pilose with trichomes < 1 mm, roots not fascicled basally but rather rooting at the nodes, apex ascending, internodes often longer than leaves. Leaves sessile; blade 1.5-8(-9.7) × 0.3-2(-5.5) cm, lanceolate to oblanceolate, reticulation not prominent, surfaces typically glabrous, less commonly pilose, base attenuate and slightly connate, margins entire to crenate, apex acute to rounded. Capitulescence typically monocephalous; peduncles 2.5-20 cm, typically much less than half of plant height, prominently striate, glabrous to strigillose or pilose. Capitula 7-10.5 mm; involucre 8-12 mm diam.; phyllaries 7-12, typically 4-6 mm, typically greatly spreading post anthesis, 2-seriate, subequal, glabrous to pilose, apically rounded to outer ones sometimes acute; paleae c. 4 mm, apex rounded, sometimes fimbriate. Disk florets 100-200, typically well-exserted from involucre; corolla 1.8-2.5 mm, typically cream-colored, tube 0.2-0.4 mm, shorter than throat, sometimes basally pilose, lobes 0.4-0.6 mm, reflexed; anthers partly exserted; style branches 0.5-0.8 mm, weakly exserted. Cypselae 2-3 mm, obovoid, faces black, smooth, glabrous to pubescent, margins corky, stramineous, ciliate; pappus of 2 subequal bristles 1-1.4 mm. *Sandy areas by coastal beaches; roadsides.* CR (Córbo 452, MO); P (Hamilton y Stockwell 3690, MO). 0-100 m. (México, Mesoamerica, Colombia, Venezuela, Brazil, Cuba, Jamaica, Hispaniola, Lesser Antilles.)

This species is similar to widespread South American endemic *Spilanthes nervosa* Chodat, which differs by its erect pilose stems with trichomes > 1 mm, fasciculate roots, and peduncle often more than half of plant height.

XII. I. *Heliantheae* subtribe *Verbesininae* Benth. et Hook. f.

Por J.F. Pruski.
Annual herbs to trees, never vines (Mesoamerica). Leaves cauline or rarely in rosettes, opposite to alternate, sessile to petiolate; blade various, unlobed to pinnatifid, typically chartaceous, venation trinerved or pinnate, surfaces variously pubescent, infrequently glandular or stipitate-glandular. Capitulescence terminal, monocephalous to paniculate. Capitula radiate or discoid to rarely disciform; involucre cylindrical to hemispherical; phyllaries graduated to obgraduate, usually 1-few-seriate, outer phyllaries sometimes herbaceous, the inner mostly chartaceous; clinanthium usually flat to convex or sometimes short-conical, paleate; paleae not fused at base. Ray florets 1(-3)-seriate, pistillate or sterile; corolla yellow to white, infrequently orange. Disk florets bisexual; corolla usually shortly (4-)5-lobed, without fibers embedded in nerves, typically without colored resin in the ducts; anthers yellow or black, ecaudate; style branches with stigmatic surfaces 2-banded, exappendiculate, apex rounded to attenuate, sometimes minutely papillose. Cypselae typically compressed, apex erostrate, surfaces carbonized, winged or wingless; pappus of awns or squamellae at angles, never with intermediate squamellae. 4 genera, aprox. 215-315+ spp. Largely Neotropics. 4 gen., 41 spp. in Mesoamerica.


1. Cypselae alate, bases not stipitate. 4. Verbesina
   1. Cypselae exalate, bases narrowed and stipitate.
      2. Cypselae quadrangular; pappus usually of only 4 equal scales. 3. Tetrachyron
      2. Disk cypselae somewhat compressed; pappus of 2 awns or of unequally developed scales.
         3. Capitula globose; ray corollas white; phyllaries erect through anthesis.
            1. Podachaenium
            3. Capitula turbinate-narrow campanulate; ray corollas yellow; phyllaries reflexed after anthesis.
               2. Squamopappus

1. Podachaenium Benth.

Altamirania Greenm. (25 Sept 1903) non Altamiranoa Rose (12 Sept 1903), Aspiliopsis Greenm. (25 Sept 1903)
Shrubs or trees to 8(-10) m; stems subterete to subhexagonal, unwinged, tomentose to sometimes glabrous. Leaves opposite or sometimes alternate distally in capitulescence, petiolate; blade broadly pentagonal to elliptic-ovate or sometimes elliptic-lanceolate, chartaceous or subcoriaceous-carnose, venation palmate or trilinerved to trinerved from well above base, surfaces tomentose to glabrous. Capitulescence terminal, corymbiform to corymbiform-paniculate, 10-60+-capitulate, branching opposite to mid-capitulescence then usually ultimately alternate; peduncles typically much longer than capitula. Capitula radiate, heterochromous, post-anthesis broadly campanulate to globose; involucre short with disks well-exserted, hemispherical to globose; phyllaries 16-25, loosely imbricate, moderately to weakly graduated or subequal, 3-4-seriate, stiff-herbaceous, spreading to post-anthesis reflexed; clinanthium convex to globose or conical, paleate; paleae shorter than disk floret, oblong, conduplicate and slightly carinate, usually obtuse apically, persistent. Ray florets 8-21, 1-seriate, pistillate; corolla white, tube 1-1.5 mm, setulose, limb 8-18 mm, oblong, often glandular abaxially, apex entire to 2-3-denticulate. Disk florets 100-150+, bisexual; corolla narrow-funnelform, shortly 5-lobed, ochroleucous to yellow, tube shorter than limb, setulose or pillose-glandular, lobes deltapetate to ovate, shorter than throat, sometimes purplish distally, glandular; anthers stramineous to black, appendage glandular or eglandular; style branches ca. 1 mm, apex broadly acute to rounded, minutely appended, minutely pillose. Cypselae black with paler margins and base, base narrowed and stipitate, glabrous or the abaxial margin setulose, the rays triquetrous, the disks somewhat compressed and biconvex; pappus usually of 2 fimbrillate to erose awn-tipped scales (1-3 in rays) on angles, shorter than cypsela, faces with 0-few intermediate shorter fragile squamellae. \( x = 19 \). 3-4 spp.

\textbf{Podachaenium, Squamopappus, Tetrachyron, and Verbesina} are placed in Heliantheae subtribe Verbesininae, but most species of \textit{Podachaenium} (except for traditionally recognized \textit{P. eminens}), \textit{Squamopappus}, and \textit{Tetrachyron} were historically placed in \textit{Calea} (Neurolaeninae). Nash (1976) recognized \textit{Podachaenium}, as monotypic, and treated in different genera \textit{Calea skutchii} and \textit{Verbesina standleyi}.

has species with either white, yellow, or orange ray corollas, the yellow ray corolla character in *Squamopappus skutchii* was accurately used by Jansen et al. (1982) to partly distinguish *Squamopappus* from consistently white-rayed *Podachaenium*. Turner y Panero (1992) recognized four species of *Podachaenium*, and provided a key to species.


1. Leaf blades mostly (3-)5(-7)-angled, palmately 3-veined from near basal acumen, abaxial surface tomentose.  

1. **P. eminens**  

1. Leaf blades elliptic-oblong or elliptic-ovate, non-lobed, venation trinerved from well above base, abaxial surface subglabrous or veins sometimes substribose.  

2. **P. standleyi**


**Podachaenium andinum** André, *P. paniculatum* Benth.  

Vigorously growing often soft-woody shrubs or small trees to 8(-14) m; stems pluristriatulate, densely soft-tomentose, pluristriatulate; herbage with trichomes stramineous to grayish. Leaves: blade (6-)10-30 × (6-)10-31 cm, mostly (3-)5(-7)-angled or sometimes ovate, often broader than long, distal ones sometimes elliptic-lanceolate, chartaceous, palmately 3-veined from near basal acumen, tertiary venation reticulate but not prominent, adaxial surface hirtellous-pilose to tomentose, often sparsely glandular, abaxial surface usually tomentose to sometimes merely tomentellous, glandular below the crisped tomentum, base cuneate to truncate, thence attenuate into short basal acumen, margins shallowly angulate-lobate, subentire between lobes, distal leaves often unlobed, apex obtuse to acute; petiole (3-)4-27 cm, tomentose, somewhat winged distally by decurrent leaf blade. Capitulescence mostly 10-30 cm diam., broadly corymbiform-paniculate, nearly flat-topped, 30-60(-90)-capitulate; peduncle mostly 1.5-4.5 cm, usually tomentose. Capitula mostly 5-7 mm, post-anthesis hemispherical to globose, disk dome-shaped, green before disk floret elongation; involucre 3-4 mm, hemispherical; phyllaries lanceolate to oblange, moderately to weakly graduated, c. 3-seriate, tomentellous and sometimes glandular, appressed, apex acute to obtuse; paleae 3-4.5 mm, conduplicate. Ray florets 12-20; corolla limb 8-15(-18) × 2-5 mm, often deflexed, 7-9-nerved, the 2 support veins larger. Disk florets 100-200; corolla 1.5-2.8 mm, yellow; anther thecae stramineous to brown, appendage
eglandular. Cypselae 1.5-2 mm; pappus scales 0.7-1.5 mm, the stramineous scales and paleae with a color contrasting with the more darkly drying disk corollas. $2n = 38$. Flowering mostly (Aug-)Dec-June. *Barrancas, cloud forests, montane forests, pine-oak forests, ravines, roadsides, secondary vegetation, thickets*. Ch (Matuda 2956, MO); G (Türckheim II 2124, NY); B (Gentle 2347, NY); H (Molina 24207, MO); ES (Molina et al. 16953, NY); N (Neill 71, MO); CR (Oersted 86, K). (200-)600-2600 m. (Mexico, Mesoamerica, Colombia; occasionally cultivated in subtropical areas.)


*Podachaenium chiapanum* B.L. Turner et Panero, *Verbesina standleyi* (Steyerm.) D.L. Nash.

Shrubs or small trees 2-5 m; stems subhexagonal, hirsute-pilose distally, glabrate proximally; herbage with trichomes stramineous to brownish. Leaves: blade 7-20 × 3-8 cm, elliptic-oblong or elliptic-ovate, unlobed, chartaceous, venation trinerved from well above base with proximal 1(-2) pairs of arching secondary veins reaching past mid-blade, reticulate tertiary venation obvious, adaxial surface glabrous, abaxial surface subglabrous or veins sometimes substrigose, eglandular, base narrow-cuneate to attenuate, margins serrulate to serrate, apex acuminate; petiole 1.5-7 cm, unwinged. Capitulescence 8-40 cm diam., corymbiform-paniculate, broad and nearly flat-topped, 10-30-capitulate; peduncle 1.5-7 cm, moderately to densely hirsute-pilose. Capitula to c. 10 mm, hemispherical post-anthesis; involucre 6-10 × 7-15 mm, broadly campanulate or hemispherical; phyllaries weakly graduated to subequal, c. 3(-4)-seriate; outer phyllaries herbaceous, flat, sparsely puberulent, oblong-lanceolate, apex obtuse, sometimes spreading or reflexed; inner phyllaries resembling paleae, somewhat navicular, paler then outer phyllaries, somewhat carinate; paleae 3.5-4.5 mm, conduplicate, pale with midrib darker and puberulent. Ray florets 8-13(-19); corolla limb 10-15(-18) × 2-5 mm, c. 9-nerved, puberulent and glandular abaxially. Disk florets c. 100; corolla c. 3 mm, yellow; anther thecae black with connective and appendage stramineous, eglandular or nearly so. Cypselae 2-3 mm, usually hirtellous distally with margins ciliolate; pappus awns 0.9-1.3 mm. Flowering Nov-June. *Cloud forests, montane forests, volcano slopes*. Ch (Breedlove 71479, MO); G (Williams et al. 26269, NY). 2000-2500 m. (Endemic.)

The protologue of *Podachaenium standleyi* gave the stems as glabrous, but instead the stems of the holotype are hirsute-pilose distally, prompting the present reduction of *P. chiapanum*. Wussow y Urbatsch (1978) treated *P. standleyi* in synonymy of a broadly defined *Verbesina*
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*pachyphylla* (Klatt) Wussow et Urbatsch, but acknowledged that the species was anomalous in *Verbesina*. Jansen et al. (1982) recognized this taxa as *Podachaenium*, but as the still broadly defined *P. pachyphyllum* (Klatt) R.K. Jansen, N.A. Harriman et Urbatsch. Turner y Panero (1992) resurrected *P. standleyi* from synonymy by recognizing *P. pachyphyllum* (the type not seen by me) as extra-Mesoamerican (Oaxaca and southern Puebla) and differing by subcoriaceous-carnose short-petiolate leaves without a pronounced tertiary vein reticulum.

### 2. Squamopappus R.K. Jansen, N.A. Harriman et Urbatsch

Por J.F. Pruski.

Shrubs or trees; stems subterete to subhexagonal, striatulate. Leaves opposite or sometimes alternate distally in capitulescence, petiolate; blade lanceolate to ovate, chartaceous, venation 3(-5)-nerved from well above base, surfaces pubescent. Capitulescence terminal, closely (infrequently openly) corymbiform-paniculate, convex to nearly flat-topped, usually 30-60+capitulate. Capitula radiate, homochromous; involucre short with disks well-exserted, turbinate-narrow campanulate; phyllaries 10-15, imbricate, moderately graduated, c. 3-seriate, the outer usually subherbaceous at least distally, the inner stramineous-yellow and concolorous with paleae, all appressed post-anthesis; clinanthyum convex, paleate; paleae shorter than disk floret, conduplicate, stiff, pilosulose distally especially along keel, apex obtuse to apiculate. Ray florets 1-seriate, pistillate; corolla yellow, tube sometimes papillose-glandular, limb ovate, shortly exserted, sparsely setulose and usually eglandular or less commonly sparsely glandular abaxially. Disk florets bisexual; corolla funnelform, shortly 5-lobed, yellow, typically setulose and/or papillose-glandular, tube shorter than limb, lobes deltate, much shorter than throat; anther thecae black, appendage stramineous, eglandular; style branch apex acute. Cypselae brown, base stipitate-tapered, hirsute-pilose especially distally, the rays triquetrous, the disks compressed and biconvex; pappus of 4-10 unequal lacerate aristate scales, stiffly persistent and sometimes connate basally, shorter than cypsela, scales of angles usually longer. x = 19. 1 spp. Mexico, Guatemala.

Robinson (1978) transferred yellowed-flowered *Calea skutchii* from *Calea* (Neurolaeninae) to *Podachaenium* (Verbesininae), stating that at best it may be only subgenerically distinct from *Podachaenium eminens*. Jansen et al. (1982) transferred *Calea standleyi* to white-flowered *Podachaenium*, but placed *C. skutchii* in newly described monotypic *Squamopappus*.


N.v.: Bilil, G.

*Podachaenium skutchii* (S.F. Blake) H. Rob.

Shrubs or small trees 2-10(-15) m; stems densely crisped-pilosulose to tomentellous distally; herbage with sordid trichomes. Leaves: blade 6-18 × 2.5-7 cm, tertiary reticulate prominulous, adaxial surface scabridulous, abaxial surface moderately to densely pilosulose, minutely glandular (at 30×), base long-cuneate and somewhat decurrent onto petiole, margins serrulate to infrequently serrate, apex acuminate; petiole 0.6-3(-4) cm, short-winged distally from decurrent blade. Capitulescence 6-28 cm diam., branching mostly opposite; peduncle mostly 0.4-2 cm, densely pilosulose to tomentellous. Capitula 7-10.5 mm; involucre 3.5-6 × 4.5-6.5 mm, typically distinctly shorter than paleae; phyllaries oblong to lanceolate, apex acute to obtuse; outer phyllaries 2-3.5 × c. 1.5(-2) mm, pilosulose or infrequently tomentellous, the inner phyllaries slightly longer and subglabrous or midzone hirtellous distally; paleae 5-7 mm, usually 1+ mm longer than involucre, apex sometimes membranous-scarious, inflexed in bud. Ray florets 8(-11); corolla limb 3.5-5 × 2-3 mm, (5-)7-9-nerved. Disk florets 25-32; corolla 3.5-5 mm, tube c. 1 mm, lobes 0.4-0.5 mm; style branches 1-1.2 mm. Cypselae 3-4.2 mm (rays often shorter); pappus scales 0.5-1.5 mm. 2n = 38. Flowering (Sep-)Nov-Mar(-Apr). *Cloud forests, montane forests, pine-oak forests, volcano slopes.* Ch (*Breedlove* 42771, MO); G (*Pruski y Ortiz* 4287, MO). (1300-)2100-3200 m. (Mesoamerica.)


Por J.F. Pruski.

Shrubs to 6 m; stems moderately branched, glabrous to tomentose. Leaves opposite, petiolate to subsessile, sometimes pseudostipulate; blade linear-lanceolate to ovate, chartaceous to subcoriaceous, venation trinerved from near base to pinnate, surfaces glabrous to tomentose, sometimes also stipitate-glandular, margins entire to serrate. Capitulescence terminal, monocephalous or cymose to corymbiform-paniculate; peduncles 0.3-2 cm. Capitula radiate, 30-
150-flowered, homochromous; involucre 4-14 mm, turbinate to hemispherical; phyllaries triangular to elliptic or obovate, imbricate, weakly graduated, 2-3-seriate, herbaceous-chartaceous, glabrous to tomentose, margins often scarious, apex acuminate to obtuse; clinanthium convex to low-conical, paleate; paleae 3-6 mm, shorter than disk floret, elliptic to oblong, conduplicate, chartaceous-scarious, usually obtuse apically. Ray florets 4-25, 1-seriate, pistillate; corolla yellow, tube c. 1 mm, glabrous to sparsely setose, limb 2-14 mm, elliptico-oblong, apex 2-denticulate. Disk florets bisexual; corolla funnelform, shortly 5-lobed, yellow, tube much shorter than limb, glabrous to sparsely setose, lobes triangular, shorter than throat; anthers yellow, appendage eglandular or glandular; style branches 0.5-1 mm, often resinous-glandular, apex acute to rounded. Cypselae obpyramidal, not compressed, blackish, base narrowed and stipitate, glabrous to setose; pappus of 4 stout awn or scales on angles, shorter than cypsela, faces with 0-few alternating shorter squamellae. \( x = 16 \). 5-8 spp. Mexico, Guatemala.


1. **Tetrachyron orizabense** (Klatt) Wussow et Urbatsch, **Syst. Bot.** 4: 312 (1979[1980]).


*Calea guatemalensis* Donn. Sm., *C. rupestris* Brandegee.

Shrubs or small trees 1-6 m; stems subhexagonal, striatulate, glabrous to sparsely hirtellous. Leaves not pseudostipulate, often drying dark; blade 6-15 × 1.5-7 cm, elliptic to ovate, somewhat thickly chartaceous, venation pinnate, adaxial surface glabrous or subglabrous, abaxial surface subglabrous to pilose-hirsute especially along midrib, base attenuate, margins usually serrulate, apex acute to acuminate; petiole 0.5-2.7 cm. Capitulescence mostly 5-25 cm diam., corymbiform-paniculate, convex, 10-40+-capitulate, the sessile and narrow bracteoles 5-10 mm and about half has long as subtending branchlet; peduncle 1-2 cm, hirtellous to pilose-hirsute. Capitula mostly 5-7 mm, 26-50-flowered; involucre 4-5 × 4-5 mm, campanulate; phyllaries c. (2-)3-seriate, distal margins broadly scarious, green or stramineous, glabrous or margins ciliate; outer phyllaries 2-4 × c. 0.7 mm, narrowly oblong; inner phyllaries 4-5 × 1.2-2.5 mm, obovate, apex broadly obtuse to rounded; paleae 3.5-4.5 mm, glabrous or nearly so. Ray florets 6-13; corolla limb 4-8 × 2-3 mm, elliptic-ovate, 5-6-nerved with the 2 support nerves often pronounced, glabrous or subglabrous abaxially. Disk florets 20-37; corolla 2.5-3.2 mm, lobes 0.6-0.9 mm. Cypselae 2.5-3 mm, margins ciliolate; pappus scales and squamellae 0.5-1.7 mm. \( 2n = 32 \). Flowering (Aug +)Dec-Mar. Cloud
forests, montane forests, pine-oak forest. Ch (Breedlove y Smith 31815, MO); G (Pruski y Ortiz 4265, MO). 2000-3500 m. (S. Mexico, Mesoamerica.)

4. **Verbesina** L.


Por J.F. Pruski and J. Olsen.

Annual herbs to shrubs or trees, often simple-stemmed; stems usually erect, simple-stemmed or branched in distal half, sometimes winged from decurrent leaf margins, pith solid. Leaves simple and unlobed to pinnatifid, alternate or opposite, sessile or petiolate; blade mostly chartaceous to thickly so, pinnately veined or sometimes trinerved or palmate, surfaces usually green and concolorous to slightly discolorous, infrequently obviously discolorous with abaxial surface densely white-pubescent or densely gray-pubescent, typically eglandular, adaxial surface often scabrous, base sometimes decurrent or clasping, margins dentate or subentire. Capitulescence usually of many-numerous pedunculate capitula, terminal, mostly of corymbiform-panicles, but occasionally monocephalous on long peduncles. Capitula radiate or sometimes discoid to infrequently disciform; involucre (cylindrical-)turbinato-campanulate to hemispherical, sometimes subtended by bracteoles, sometimes much shorter than the disc flowers; phyllaries mostly 9-21, subimbricate or imbricate, subequal to obviously graduate in 1-several series or sometimes obgraduate, the inner typically the longest, much shorter than to about as long as paleae and/or disk florets; the outer phyllaries sometimes herbaceous, usually not squarrose or when squarrose appendage and the phyllary more or less subequal, the squarrose appendage usually not obviously several times longer than phyllary body; the inner mostly chartaceous; receptacle mostly convex to short-conical, paleate; paleae navicular or conduplicate, folded around the outer edge of the laterally compressed disk cypselae. Ray florets mostly 0-15, pistillate or less commonly sterile and not styliferous, 1(-3)-seriate, in more compact capitulescence (especially those within sect. _Ochtractinia_) the ray floret limbs are sometimes always directed outward from central axis; corolla yellow to white, occasionally orange, glabrous to more commonly pilose especially on the tube, the tube commonly shorter than the limb, the limb inconspicuous to showy, flat or very rarely cupulate, 3-dentate or entire. Disk florets usually 8-150+, bisexual; corolla actinomorphic, funnelform, typically shortly 5-lobed, orange-yellow to white, tube short, dilated basally, glabrous to more commonly papillose especially on the tube,
throat usually much longer than tube, lobes typically much shorter than throat (rarely lobes longer than throat, in Mesoamerica only in *V. trichantha*), papillose within; anthers rounded at base, thecae typically black, apical appendages and connectives often cream-colored; style base slightly dilated and immersed within nectary, ranches often with evident paired stigmatic lines, apex commonly pilose, acute to attenuate. Cypselae strongly compressed radially, oblanccolate to obovate-cuneate in outline, both margins winged at maturity or less commonly one or both margins wingless, glabrous or upwardly pubescent, sometimes tan-tuberculate, apex often somewhat concave-emarginate, wings cartilaginous and not fused throughout length of pappus awns; pappus mostly 2(0-3)-awned, awns, deciduous or more commonly persistent, usually scabridulous or scabrid, apices straight or very rarely uncinate. 200-300 spp. New World, mostly Neotropical, few temperate or weedy in the Old World.

*Verbesina* (Linnaeus, 1753) has been circumscribed by Robinson y Greenman (1899), Blake (1925), Blake et al. (1926), Nash (1976), Turner (1985), Olsen (1985, 1989), Pruski (1997), Strother (1999), and Robinson (2006) and characterized by them as mostly having compressed winged cypselae with 2 straight subequal pappus awns and 1-seriate ray florets with flat corolla limbs. Amongst the ten original names validated in Species Plantarum (ed. 1), only *V. virginica* L. agrees with this generic concept and has been treated unambiguously within *Verbesina*. The nine other original Linnaean names of *Verbesina* have at times each been removed from *Verbesina*.

*Verbesina alata* was given by Linnaeus (1753: 901, 1763: 1270) as differing from all other Verbesinas. *Verbesina alata* was removed from *Verbesina* and treated as the lectotype of *Tepion* Adans. and as the type of *Hamulium* Cass. (Adanson, 1763; Britton, 1917, 1918; Britton y Wilson, 1925–1926; Cassini, 1821, 1829; and Schultz-Bipontinus, 1861). *Verbesina alata* differs from *Verbesina* sensu auct. by 2-3-seriate ray florets with cymbiform corolla limbs, pale anthers, and strongly unequal smooth stout uncinate pappus awns. Cassini (1829) proposed the later described *V. serrata* Cav. as the type of *Verbesina*.

Unaware of and/or unconcerned with its removal from *Verbesina*, *V. alata* was proposed subsequently by Hitchcock y Green (1929) as the generitype, by Jarvis et al. (1993) as the conserved type, and ruled by a misinformed ICBN (2006) as conserved generitype of *Verbesina*. However, because it appears that *V. alata* (and the two other species recognized in *Verbesina* sect. *Verbesina* by Olsen, 1986) and *Verbesina* sensu auct. do not form a monophyletic clade, it seems wise to not recognize *V. alata* (or *V. serrata*) as generitype. Here, I apply the name *Verbesina* to the 200-300 species centered around *V. virginica* L. (at present placed in *Verbesina* sect. *Ochractinia*) and proposed formally that it be adopted as the true conserved type of
Verbesina. A conserved type of *V. virginica* would maintain current usage of *Verbesina* and negate the potential transfer of approximately 200+ species from *Verbesina* to *Platypteris*, the next available name.

The most useful treatments including Mesoamerican taxa of *Verbesina* include the synopsis by Robinson y Greenman (1899), treating the then known 109 species, Blake et al. (1926) treating a dozen+ species that stretch from Mexico into Mesoamerican, and the floras by Nash (1976) and Strother (1999). Revisions of sections containing Mesoamerican species are by Blake (1925) who treated section *Lipactinia* (*V. trichantha*), Olsen (1985) who provided a synopsis of white-flowered taxa then called section *Ochractinia* (*including V. gigantea, V. guatemalensis, V. holwayi, V. hypsela, V. lanata, V. minarum, V. myriocephala, V. pallens, V. petzalensis, V. scabriuscula, and V. turbacensis*), Turner (1985) who revised opposite-leaved section *Pseudomontana* (*including V. breedlovei, V. cronquistii, and V. fastigiata*), and Olsen (1988) who revised quadrangular-stemmed section *Platypteris* (*including V. fraseri and V. ovatifolia*).

Among the many confused names attributions, that of *V. abscondita* Klatt stands out for at one time or another referring to four putative Mesoamerican entities, but is treated circumscribed as a fifth entity and here excluded from Mesoamerica. Blake (1926) used the name *V. abscondita* for Guatemalan material of the common subsequently described *V. agricolarum*, whereas Nash (1976) in her yellow-flowered 8-14-rayed small-capitate lead recognized three putative taxa (*including of V. abscondita, but excluding V. agricolarum*) for what Strother (1999) basically called *V. perymenioides*. A second used, but now excluded, name is *V. crocata*, which at its zenith was applied to only two Mesoamerica taxa. *Verbesina gigantoides* has been applied variously, but now rests in synonymy of a Mesoamerican taxon. The applications of the names *V. lanata* and *V. oerstediana* have basically reversed, albeit always in reference to Mesoamerican material.

1. Disk corolla lobes longer than throat.  
2. Disk corolla lobes shorter than throat.
3. Corollas mostly white or ochroleucous.
4. Leaves long-petiolate, petioles not winged to base; stems neither winged nor leaves auriculate; stems glabrous or subglabrous below capitulescences; capitula sometimes with only 1 ray floret.  
5. Leaves usually with petiole-like bases winged (at least narrowly so) to stem or leaves auriculate; stems glabrous to tomentulose below capitulescences; capitula with ≥ 3 ray florets.
6. Stems below capitulescences puberulent to tomentulose.  
7. Stems below capitulescences glabrous to puberulent.
8. Leaf margins decurrent onto stem as wings; ray florets styliferous but sterile.  
9. Leaves typically auriculate but not (or rarely) decurrent onto stem as wings; ray florets pistillate and fertile.  

36. V. trichantha

37. V. turbacensis

13. V. gigantea

15. V. holwayi

29. V. petzalensis
9. Stems glabrous or substrigillose; abaxial leaf surfaces substri-gillose on veins and glabrous or subglabrous in areoles.  
   26. V. pallens

8. Stems exalate.
10. Leaves sessile and with winged petiole-like bases to stem or nearly so.
   14. V. guatemalensis

10. Leaves petiolate, petioles exalate.
11. Leaf blades 4.5-11 cm; ray corolla limbs 1.5-2 mm.
   20. V. minarum

11. Leaf blades 12-50 cm; ray corolla limbs 3-10 mm.
12. Leaf blade adaxial surfaces smooth; involucres 4.5-7 × 4-6 mm; phyllary apices obtuse; ray corolla limbs 6-10 × 2-3 mm, oblong.
   19. V. lanata

12. Leaf blade adaxial surfaces scabrous to scabridulous; involucres 2.8-3.5 × 3-3.5 mm; phyllary apices acute to acuminate; ray corolla limbs 3-4.5 × 1-2(-2.5) mm, ovate.
   31. V. scabriuscula

2. Corollas mostly yellow or orange.
13. Leaves opposite.
15. Leaf surfaces obviously discolorous, abaxial surfaces typically densely close canescent-substrigillose.
   17. V. hypoglauca
15. Leaf surfaces concolorous or nearly concolorous, abaxial surfaces not white-sericeous.
16. Pappus 2-cornudate, awns 0.3-0.7 mm.
   34. V. strotheri
16. Pappus of 2 awns ≥ 2 mm.
17. Capitula (4-)5-15-flowered; involucres cylindrical-turbinate; phyllaries strongly graduated, apices acute to acumin-ate; outer phyllaries scarious with thinly herbaceous apices.
   24. V. oligantha
17. Capitula 25+-flowered; involucres campanulate to hemispherical; phyllaries weakly graduated to obgraduate, apices obtuse to rounded; outer phyllaries herbaceous throughout.
18. Leaf blades denticulate; petioles 0.1-0.4 cm; ray corolla limbs 12-15(-20) mm.
18. Leaf blades serrate; petioles 1-3 cm; ray corolla limbs 4-6 mm.

32. V. serrata

19. Capitula discoid; corollas orange; stems quadrangular.
20. Phyllaries obgraduate to subequal; outer phyllaries squarrose to fully reflexed, obovate to spatulate, 8-12 × 3-6 mm, typically longer than the inner.

11. V. fraseri
20. Phyllaries unequal or slightly so; outer phyllaries appressed, triangular-lanceolate 2.5-5 × 1.3-3.5 mm, often only about half as long as inner.

25. V. ovatifolia
19. Capitula usually radiate; corollas yellow; stems subterete-angulate to angulate.
21. Leaves unlobed, blade margins coarsely serrate; capitulescences loosely corymbiform, 5-10-capitulate; phyllaries subequal or slightly unequal, outer series herbaceous.

7. V. cronquistii
21. Leaves usually 3-9 lobed, lobe margins subentire to denticulate; capitulescences corymbiform-paniculate, many-capitulate; phyllaries unequal and graduate, mostly chartaceous.
22. Leaves unlobed to deeply 3-lobed, petiolate; ray florets (0-)1-2 per capitulum.
4. V. breedlovei
22. Leaves coarsely 3-lobed to 5-9-pinnatifolied, winged to petiole-like bases; ray florets 5-13(-21) per capitulum.
10. V. fastigiata

13. Leaves alternate.
23. Annual herbs.
8. V. encelioides

23. Perennial herbs to trees to 25 m.
24. Stems winged at least distally.
22. V. neriifolia

25. Leaf surfaces usually strongly and obviously discoloruous, abaxial surface usually densely gray-strigillose.

16. V. hypargyrea
25. Leaf surfaces concolorous or slightly(-moderately) discolorous with abaxial surface densely gray-strigillose.
26. Outer phyllaries long-squarrose with the elongate narrowly lanceolate acuminate-tipped squarrose appendage 3-4+ × longer than phyllary body.

9. V. eperetma
26. Outer phyllaries not squarrose or when squarrose the phyllary body and squarrose appendage more or less subequal or the appendage much shorter than body, appendage ovate to spatulate with apex acute to rounded.

27. Capitula usually with 25-50 ray florets.

28. Leaf bases mostly truncate or subcordate; disk corollas purplish-yellow.  

3. V. baruensis

28. Leaf bases cuneate, then attenuate into an acumen; disk corollas yellow; paleae stramineous.  

33. V. sousae

27. Capitula with 3-21 ray florets.

29. Leaves subsessile or with elongate petiole-like bases winged to stems or nearly so.

30. Leaf blades glabrous adaxially; outer phyllaries oblong to spatulate, apices broadly obtuse to rounded; ray corolla limbs 6-8 mm, oblanceolate.  

12. V. fuscasicicans

30. Leaf blades hirsutulous-scabrous, hirsutulous, scabridulous, or sometimes glabrate adaxially; outer phyllaries lanceolate to infrequently oblong to spatulate, apices acute to obtuse; ray corolla limbs 2.5-6 mm, obovate.

31. Ray corolla limbs 3.5-6 mm; capitula 26-36+-flowered; leaf blade adaxial surface hirsutulous to glabrate, infrequently scabridulous.  


31. Ray corolla limbs 2.5-3.2 mm; capitula (38-)43-54(-62)-flowered; leaf blade adaxial surface hirsutulous-scabrous.

35. V. tapantiana

29. Leaves petiolate, petioles unwinged at least proximally.

32. Ray florets sterile, usually not styliferous or rarely a few florets styliferous; phyllaries typically indurate, brownish.

33. Ray florets 7-12.  

2. V. apleura


30. V. pleistocephala

32. Ray florets pistillate and fertile; phyllaries not brownish-indurate, base sometimes indurate-costate.

34 Ray corolla limbs 12-15(-20) mm.


34 Ray corolla limbs 2-8 mm.

27. *V. persicifolia*

35. Capitulescences (20-)30-200-capitulate.

36. Leaf blades usually lanceolate.

37. Leaf blades with secondary venation greenish and not prominulous abaxially; capitula hemispherical becoming globose in fruit; phyllaries subherbaceous; ray corolla limbs 5-8 mm.

6. *V. chiapensis*

37. Leaf blades with secondary venation stramineous and prominulous abaxially; capitula turbinate-campanulate; phyllaries thinly chartaceous or membranous; ray corolla limbs 2-3 mm.

28. *V. perymenoides*

36. Leaf blades ob lanceolate or oblong to broadly rhombic-ovate or obovate.

38. Leaf blades broadly rhombic-ovate to obovate, adaxial surface scabrous-hirsutulous; paleae acute to acuminate or sometimes apiculate or cuspidate apically.

1. *V. agricolarum*

38. Leaf blades ob lanceolate or oblong to elliptic or narrowly ovate, adaxial surfaces hirsutulous to glabrate, infrequently scabridulous; paleae acute apically.

23. *V. oerstediana*


Shrubs 1-3 m; stems erect or sometimes ascending, subterete-striate, exalate, pilose-villous. Leaves alternate, unlobed, petiolate(-subsessile in the capitulescence); blade 4-12.5 × 1.5-8 cm, broadly rhombic-ovate to obovate, chartaceous, venation pinnate, main secondary veins 4-6 per side, prominulous, strongly arching towards apex, adaxial surface scabrous-hirsutulous, trichomes broad-based, abaxial surface pilose-hirsute especially along veins to sparsely so, base cuneate and abruptly decurrent on the petiole, margins subentire to serrate or crenate, apex acute to obtuse;
petiole 0.5-2(-2.5) cm, unwinged at least proximally, not auriculate, distal capitulescence leaves sometimes subsessile. Capitulescence 7-15 cm broad, usually somewhat closely corymbiform-panciliolate from 2-4 distal branchlets, convex to more or less flat-topped, branchlets 7-15 cm and each subtended by mature leaves, usually (40-)55+-capitulate, less typically open-corymbiform and paucicephalous on well-spaced elongate branches 15-40 cm; peduncles 4-10 mm, pilose to villous, sometimes 1(-2)-bracteolate; bracteole 2-2.5 mm, lanceolate to oblanceolate. Capitula 5-7 mm, small, radiate; involucre 3-5 × 2.5-4.5 mm, turbinate-campanulate to less typically campanulate in fruit; phyllaries c. 1 mm diam., lanceolate, unequal, moderately graduated, c. 3-seriate, not brownish-indurate, the inner somewhat navicular; outer phyllaries 1.5-3 mm, pilose, proximal 1/3-2/3 green-chartaceous, apex subherbaceous dark-green, spreading but usually not distinctly squarrose at anthesis, less typically squarrose in fruit or in populations in Nicaragua with squarrose oblong appendage shorter than to sometimes more or less subequal to body, obtuse to rounded(-acute), apiculate; inner phyllaries 3.5-5 mm, appressed, chartaceous, pale, pilosulose, apex more or less acute; palesae 4.5-5.5 mm, oblanceolate, stramineous, pilosulose distally, apex acute to acuminate or sometimes apiculate or cuspidate. Ray florets 8-12, pistillate; corolla yellow, tube 1-1.3 mm, sparsely pilose, limb 2-4.5(-5) × 1.4-2(-2.5) mm, obovate(-oblong), 5-8-nerved. Disk florets 15-30(-35), bisexual; corolla 2.8-4 mm, narrowly funnelform, yellow, tube 0.5-0.6 mm, sparsely pilose, lobes 0.5-0.7 mm. Cypsela 1.5-2.5(-3,2) mm, cuneate, very tardily winged, glabrous to late-papillose, wings to 0.2(-0.6+) mm diam.; pappus 2-awned, awns (0.7-)1-2.5 mm, somewhat thin and indistinct. Flowering mostly July-Feb(-May). Cloud forests, montane forests, pine-oak forests, roadsides, seasonal evergreen forests, thickets, volcanic slopes, wooded slopes. Ch (Breedlove 29108, MO); G (Nee et al. 47343, MO); H (Rodríguez 80, MO); N (Neill 1174, MO). (50-)400-1900(-2300) m. (S. Mexico, Mesoamerica.)

There is a general tendency for more southeasterly material to have open paucicephalous capitulescences of campanulate capitula with squarrose outer phyllaries and oblong ray corolla limbs, which were not for the abruptly decurrent leaf base, if labeled as from Costa Rica would probably pass under the umbrella of Verbesina oerstediana. Blake (1926) used the name V. abscondita Klatt for material from Guatemala, but material from Guatemala was later described as V. agricolarum. Verbesina abscondita Klatt is here taken as an extra-Mesoamerican and endemic to Mexico.


Verbesina apleura var. foliolata Standl. et Steyerm.
Shrubs or trees 1-6(-12) m; stems erect or less commonly subscandent, exalate, angulate, brownish, hirsutulous to pilose or infrequently densely pilose. Leaves alternate, unlobed, petiolate; blade 5-27+ × 1.7-11+ cm, ovate or sometimes lanceolate to oblong, stiff-chartaceous, venation pinnate, main secondary veins usually 4-6 per side, surfaces concolorous or nearly so, adaxial surface usually scabridulous (trichomes broad-based) to pilose or sometimes subglabrous, abaxial surface subglabrous or strigillose to tomentulose or densely soft-pilose, base gradually cuneate then often abruptly narrowed into an acumen, margins subentire to serrate, apex usually acuminate; petiole (0.7-)1-6 cm, unwinged, neither dilated nor auriculate. Capitulescence 6-22 cm broad, typically corymbiform-panciulate, convex, mostly 20-40+-capitulate and not held well above leaves, rarely open cymose and paucicapitulate; peduncles 0.3-2(-5) cm, strigillose to tomentulose, often 1-bracteolate. Capitula 6.5-11 mm, radiate; involucre 4-6 × 5-10 mm, turbinate-campanulate to campanulate; phyllaries 12-15, 2-6 × 1.5-2(-4) mm diam., triangular-lanceolate to oblong or infrequently outer 4-8 leafy-spatulate and as long as or longer than inner, appressed-ascending, moderately graduated or infrequently subequal or obgraduate, c. 3-seriate, flat or the inner ones somewhat carinate, subherbaceous to herbaceous, typically indurate, brownish, pilosulous-strigillose; outer phyllaries mostly oblong or rarely obovate and leafy, apex obtuse to rounded(-acute); inner phyllaries becoming lanceolate, often immediately subtending a ray floret, apex acute to obtuse, grading into paleae; paleae 5.5-8 mm, sparsely pilose to nearly as sordid-pilosulous distally as the phyllaries, trichomes antrorse, apex obtuse to truncate(-acute), cuspidate. Ray florets 7-12, sterile and usually not styleriferous or rarely a few florets styleriferous, spreading laterally at about distal 3/4 of paleae; corolla yellow, tube 1-1.9 mm, pilose, limb 4-10 × 2.5-5.5 mm, ovate to oblong. 5-9-nerved, sometimes setose abaxially. Disk florets mostly 20-30+, bisexual; corolla 4-5.5 mm, narrowly funnelform, yellow (tube sometimes green), tube 1-1.5(-2) mm, pilose, lobes 0.7-1.3 mm, triangular-lanceolate. Cypselae 3.5-6 mm, narrowly cuneate, broadly winged when mature, glabrous or distal half sparsely pilose, body 1.2-1.6 mm diam., wings 0.5-1+ mm diam.; pappus awns 1-2, (2-)3-4 mm, sometimes fragile. 2n = 34. Flowering Sep-Mar (+ Jun). Cloud forests, montane forests, pine-oak forests, thickets. Ch (Breedlove y Smith 31849, MO); G (Pruski y Ortiz 4293, MO); H (Holst 872, MO). 1600-3100 m. (?Oaxaca, Mesoamerica.)

Trees 10-25 m; stems angulate, exalate, white to sordid-hirsute. Leaves alternate, long-petiolate, unlobed; blade 14-36(-60) × 6-22(-30) cm, usually ovate, thick-chartaceous, venation pinnate with 6-8 secondary veins per side, surfaces slightly discolorous to often nearly concolorous, adaxial surface scabridulous-puberulent, abaxial surface densely pilosulose to tomentellous, base mostly truncate or subcordate or sometimes capitulescence leaves cuneate, margins subentire to serrulate, apex acute to acuminate; petiole 4-12 cm, exalate, tomentose-lanate. Capitulescence openly cymose, 5-15-capitulate; peduncles 2-10 cm, densely hirsute. Capitula very large, 10-15 × 15-20 mm., globose, 75+-flowered, radiate; involucre to c. 10 mm, hemispherical; phyllaries stiff-subherbaceous, subequal, c. 2-seriately, spreading, puberulent; outer phyllaries 4-5 mm diam., oblong, green, squarrose, the phyllary body and squarrose appendage more or less subequal, appendage oblong, apex obtuse; inner phyllaries narrower than the outer phyllaries, lanceolate, darker and less pubescent than the outer phyllaries, apex acute; paleae 10-12 mm, darkened distally. Ray florets c. 25, pistillate; corolla bright yellow, tube 2-3 mm, pubescent, limb 14-17 × 3-4 mm, oblong-oblanceolate. Disk florets 50-70; corolla 6-7 mm, purplish-yellow, glabrous or tube papillose, tube 1.5-1.8 mm, lobes 1-1.7 mm, lanceolate; anthers 2-3 mm, black. Cypselae 6-7 mm, faces glabrous, one of the wings ciliate; pappus awns 2 (sometimes lacking in rays), 4.5-5.5 mm, subequal. Flowering Nov-May. Montane forest on Volcán Barú. P (Monro y Knapp 5334, MO). 3000-3100 m. (Endemic.)


Shrubs or small trees 3-6 m; stems angulate, finely black-streaked, (usually narrowly) winged from decurrent leaf margins, subglabrous to hirtellous distally, wings c. 1 mm wide, interrupted over much of internode length. Leaves simple to deeply 3-lobed, opposite, petiolate; blade 15-30 × 10-18 cm, deltate to ovate-lanceolate, reticulations often prominent, surfaces scabrous-hirsutulous, trichomes broad-based, base cuneate to truncate with acumen decurrent onto petiole, margins lobed, lobes 1-6(-10) cm, subentire to denticulate, sinuses rounded, apex acute; petiole (1-)3-10 cm, winged distally. Capitulescence to 30 cm broad, corymbiform-paniculate, slightly rounded on top, many-capitulate, relatively dense; peduncles 0.3-1.5(-2) cm, densely hirtellous. Capitula 9.5-12.5 mm, radiate or sometimes discoid; involucre 3-5 mm wide, turbinate; phyllaries 9-12, 2-5 × 1-1.4 mm, lanceolate, unequal and strongly graduate, 2-3-seriately, mostly chartaceous, outer abruptly grading to inner ones, flat or the inner slightly navicular, apex slightly herbaceous; paleae 7-9 mm, pluristriate. Ray florets (0-)1-2, without styles; corolla yellow, tube setulose, limb
7-9.5 × 3-4 mm, 7-9-nerved. Disk florets 12-15; corolla 5-6 mm, yellow, glabrous or nearly so, lobes 1.2-1.7 mm, lanceolate; style branches c. 1.5 mm. Cypselae 6-8 mm, black, body 2.5-3 mm wide, wings c. 1(-1.5+) mm wide, body sericeous to sparsely so; pappus awns 2, 2-4 mm, scabrid. 2n = 34. Flowering Oct. Seasonal evergreen forest, tropical deciduous forest. Ch (Cronquist 9678, NY). 700-1700 m. (S. Mexico, Mesoamerica.)


Shrubs to small trees 2-6 m; stems exalate, hispidulous. Leaves simple and unlobed, alternate, short-petiolate; blade (3-)5-12 × 1-4.5 cm, oblanceolate to oblong, chartaceous to subcoriaceous, venation pinnate, usually with 6-9 pairs of thin secondary veins, obviously reticulate, surfaces concolorous, adaxial surface scabrous, trichomes broad-based, smooth or rugulose, abaxial surface glabrate or sparsely hispidulous to rarely subtomentose; base cuneate(-obtuse), margins serrulate(-subentire), apex acuminate to acute; petiole 0.1-0.4 cm, stout, unwinged, neither dilated nor auriculate. Capitulescence 12-17 cm broad, open-corymbiform, 10-20+-capitulate, convex; peduncles 1-4 cm, slender(-stout), hispidulous. Capitula 8-11 mm, long-radiate; involucre 7.5-10 × 8-10 mm, campanulate to hemispherical; phyllaries 7.5-10 mm, subequal, c. 3-seriate, not brownish-indurate, hirsutulous; outer phyllaries 2-4.5 mm diam., oblanceolate to subspatulate, herbaceous, spreading to reflexed, apex usually obtuse; inner phyllaries 1-2 mm diam., lanceolate, stiffly scarious, drying black in distal half, apex usually acute; paleae 6-8 mm, acute. Ray florets 8-14, pistillate, limbs of adjacent florets not overlapping to obviously overlapping proximally; corolla yellow, tube 1.5-2 mm, pilose, limb 12-15(-20) mm, well-exserted from involucre, 7-11-nerved, sometimes abaxially setose. Disk florets c. 40-50+; corolla yellow, c. 5 mm, tube c. 1.2 mm, pilose, lobes c. 1 mm, triangular-lanceolate. Cypselae c. 4 mm, narrowly-winged, glabrous to sparsely setulose distally, wings to c. 0.3 mm diam.; pappus awns 2, 3.5-4 mm Flowering Nov-Mar. Montane forests, oak-pine forest, wooded slopes. G (Pruski y Ortiz 4267, MO). (2400-)2900-3400(-3700) m. (Endemic.)


Shrubs 2-4 m; stems suberete-striate, exalate, strigillose to sometimes hirsutulous, internodes usually much shorter than leaves. Leaves alternate, unlobed, petiolate; blade 10-30 × 2.7-7 cm, lanceolate, chartaceous, venation pinnate, main secondary veins usually 8-12 per side,
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prominulous, surfaces more or less concolorous and green or abaxial surface sometimes paler green, adaxial surface glabrous or sometimes sparsely strigillose, abaxial surface finely strigillose with minute appressed trichomes or less typically hirsute, but never densely gray-strigillose or with surface obscured by indumentum, base narrowly cuneate to attenuate and short-decurrent onto petiole, margins subentire to inconspicuously serrulate, apex attenuate; petiole 1-4 cm, unwinged, neither dilated nor auriculate. Capitulescence 15-25 cm broad, openly corymbiform, convex to nearly flat-topped, 20-40+ -capitulate, held moderately well above leaves; peduncles 1-4 cm, often 1-bracteolate, hirsutulous to strigillose. Capitula 6-9 mm, radiate, globose in fruit; involucre 3.5-4.5 × 5-7 mm, hemispherical to crateriform; phyllaries c. 12, obovate to ovate, objugate to nearly subequal, 2-3-seriate, subherbaceous, often squarrose or somewhat leafy and reflexed, not brownish-indurate, subglabrous to sparsely puberulent apically, apex obtuse to nearly acute; paleae 3-4.5 mm, darkening in fruit, apex indurate, acute to aciculate. Ray florets 12-15, pistillate; corolla yellow, tube c. 0.5 mm, limb 5-8 mm, narrowly oblong. Disk florets c. 50; corolla 3.4-4.1 mm, narrowly funnelform, yellow drying dark brown, tube 0.5-0.7 mm, hirsutulous, throat drying pluristriatulate, lobes 0.5-0.6 mm, triangular, inner margins sometimes obviously pubescent; style branches 1-1.4 mm. Cypselae 1.5-2(-2.5) mm, strigillose, body black, 2-3-winged, wings to c. 0.5 mm diam.; pappus awns 2-3, 1-1.5(-2) mm. Flowering Aug-Feb. 

Openings in evergreen forest, lower montane forest, secondary vegetation, thickets. Ch (Pruski et al. 4241, MO); G (expected). 200-1700 m. (?Oaxaca, Mesoamerica.)

Specimens from Oaxaca cited as Verbesina chiapensis mostly prove to be V. neriifolia. Similarly, the voucher (House 1010) for the citation of V. chiapensis in Honduras by Nelson (2008: 202) was misdetermined and proves to be V. lanata.


N.v.: none.

Weak shrubs 1-2 m; stems subterete to weakly angulate, hirsute, (usually narrowly) winged from decurrent leaf margins, wings continuing proximally for about half an internode, 1.5-3 mm wide. Leaves opposite, sessile, unlobed; blade 12-17 × 7-9 cm, ovate, weakly 3-nerved from above leaf acumination, adaxial surface sebaceous, trichomes broad-based, abaxial surface hirsute, trichomes not broad-based, base cuneate to broadly obtuse then attenuate onto broadly winged acumen to base, margins coarsely serrate, apex acute. Capitulescence 5-10 cm broad, loosely corymbiform, 5-10-capitulate; peduncles 1-3 cm, densely pilose-tomentose. Capitula radiate, 10-15 mm; involucre campanulate to hemispherical, 10-12 mm wide; phyllaries c. 21, 8-12 mm,
linear-oblanceolate, subequal or slightly unequal, 2-3-seriate, flat or the inner slightly naviculare, apex acute, outer series herbaceous, nearly as long as inner scarious series; paleae 8-11 mm, pluristriate. Ray florets 4-6, pistillate; corolla yellow, tube setose, limb 8-10 × 2-3 mm. Disk florets 30-50; corolla 6.5-8 mm, yellow, tube setose, lobes 1-1.4 mm, triangular-lanceolate; style branches c. 2 mm. Cypselae 6-8 mm, dark brown, mid-region becoming white-corky, body 2-3 mm wide, wings 1-2 mm wide, body sparsely strigillose to pilosulose; pappus awns 2, 3-5 mm, scabrid. 2n = 34. Flowering Oct. *Calcareous outcrops in tropical deciduous forest*. Ch (Breedlove y Strother 46985, MO). 800-1100 m. (Endemic.)


Tap-rooted annual herbs 0.2-1(-1.3) m; stems erect, striate with striations paler than intercostae, exalate, densely substrigillose or sordid-hirsutulous. Leaves alternate (on most herbarium specimens), (winged-)petiolate, unlobed; blade 2.5-14 × 1.5-5.5(-7) cm, triangular-ovate to rhomboidal, triplinerved from near base, adaxial surface laxly strigillose-pilosulose, abaxial surface strigose to sericeous, usually appearing silvery, trichomes white, basally truncate to cuneate and often decurrent onto petiole, margins coarse-serrate(-subentire), apex acute to acuminate; petiole 1-3(-5) cm, often winged or auriculate. Capitulescence openly and loosely cymose, 1-4(-8)-capitulate; peduncles 1-15 cm, strigose. Capitula 10-15 mm, very large, 60+-flowered, radiate; involucre 10-15(-20) × 12-20 mm, hemispherical; phyllaries c. (15-)20, 6-15(-20) × 1-2 mm, often longer than the disk florets, narrowly lanceolate, 1-2-seriate, subequal or obgraduate, ascending to loosely ascending at anthesis, apex acuminate; outer phyllaries subherbaceous, strigose-sericeous; inner phyllaries often scarious and glabrous; paleae 6-8 mm, often pubescent distally. Ray florets 10-21, pistillate; corolla yellow, limb 10-20 mm, oblanceolate. Disk florets 50-100+; corolla 4.5-5.5 mm, yellowish, tube c. 1.5 mm, pilose, tube and throat densely hirsutulous, lobes c. 0.7 mm. Cypselae 4-7 mm, strigillose; pappus awns (0-)2, sometimes lacking in rays, 0.5-2 mm, subequal. 2n = 34. Flowering time unknown. *Ruderale*. Y (Gaumer s.n., F). 15-20 m. (Estados Unidos, Mexico, Mesoamerica, Ecuador, Bolivia, Uruguay, Paraguay, Chile, Argentina, Cuba, Hispaniola, Puerto Rico, Lesser Antilles; Asia, Australia, Pacific Islands.)
Verbesina encelioides is presumably only an occasional waif in Mesoamerica, and does not appear to become well-established. Verbesina scabra Benth. is usually listed in synonymy but is winged-stemmed.


Shrubby herbs about 3 m; stems exalate but costate from leaf base, glabrous, internodes 1-2 cm, much shorter than leaves. Leaves alternate, unlobed, subsessile; blade (4-)13-16 × (1-)1.5-1.8 cm, linear-lanceolate, firm-chartaceous, venation indistinctly pinnate, midrib prominent, stramineous, secondary veins very thin and not more prominent that the prominulous dense third order reticulations, surfaces glabrous or nearly so, base narrow-cuneate, margins subentire to remotely serrulate, revolute and mostly obscuring serrulations, apex acuminate and subfalcate; petiole 0.1-0.2 cm, stout, unwinged, neither dilated nor auriculate. Capitulescence to c. 17 cm broad, open cymose from distal four nodes, more or less flat-topped with lateral branchlets overtopping central axis, c 13-capitulate, each branchlet 4-14 cm, 1-5-capitulate, thinly appressed-pubescent; peduncles (0.3-)1.5-4 cm, striate, thinly appressed-pubescent, sometimes 1-bracteolate; bracteoles to 12 mm, linear-lanceolate. Capitula 10-12 mm, possibly radiate; involucre 10-12 × 15-21 mm, broadly campanulate; phyllaries unequal, somewhat graduated, 3-4-seriate; outer phyllaries 8.1-10.8 mm, linear-lanceolate, herbaceous, long-squarrose with the elongate narrowly lanceolate acuminating-tipped squarrose appendage 3-4+ × longer than phyllary body, body 1.1-1.8 mm, appendage 7-10 mm; inner phyllaries 10-12 × 3-4 mm, ovate, appressed, somewhat thickened, firm, green with pale margins, glabrous with ciliolate margins, apex acute to acuminate; paleae c. 12 mm, midrib finely stipitate-glandular, greenish distally, apex acute or acuminate. Ray florets possibly present; corolla possibly yellow. Disk florets 40+, bisexual; corolla c. 7.5 mm, yellow, tube c. 2 mm, papillose-glandular, lobes c. 1.5 mm. Cypselae 5-7 mm, narrowly winged, finely hispidulous, body c. 2 mm diam., wings c. 0.3 mm diam.; pappus of outer (possibly ray) cypselae 1-awned, inner cypselae 1-2-awned, awns 4-5.5 mm, somewhat unequal, fragile. Late fruit Jan. Trailsides of Serra da Las Minas. G (Steyermark 42933, US). Aprox. 1000-1500 m. (Endemic.)

Verbesina ampla M.E. Jones, V. grandis M.E. Jones, V. greenmanii Urb., V. pinnatifida Cav. (non Sw.), V. pinnatifida var. undulata DC.

Shrubs or small trees 2-7 m; stems angulate, narrowly to broadly winged from decurrent leaf margins, subglabrous to densely tomentulose, wings 1(-)3-10 mm wide, about as long as internodes. Leaves coarsely 3-lobed to 5-9-pinnatifolobed, opposite, winged to petiole-like base; blade 15-32(-45) × 6-22(-30) cm, ovate to rhombic, adaxial surface scabrous, trichomes broad-based, abaxial surface hirtellous to hirsute, trichomes not broad-based, basally cuneate to obtuse then attenuate onto broadly winged acumen to base, sometimes auriculate, margins lobed, lobes to c. 5(-7) cm, subentire to denticate, sinuses rounded, apex acute. Capitulescence corymbiform-paniculate, flat-topped, many-capitulate, somewhat dense; peduncles 0.5-1.2(-3) cm, villous. Capitula radiate, 6-8 mm; involucre 4-6 mm wide, turbinate to narrowly campanulate; phyllaries 15-20, 1.5-4.5 mm, lanceolate, unequal and graduated, 3-5-seriate, mostly chartaceous, flat or the inner slightly navicular, often strigillose, ciliate; paleae 5-6 mm, few-striate. Ray florets 5-13(-21), pistillate; corolla yellow, tube villosulous, limb 3-6 × 2-3 mm, ovate to suborbicular, 3(-5)-nerved. Disk florets 12-30; corolla 4-5 mm, yellow, tube villosulous, lobes 0.7-1.1 mm, long-triangular, sometimes sparsely strigillose; style branches 1.5-2 mm. Cypselae 4-5 mm, blackish becoming white-corky, body 2.5 mm wide, wings 1-2 mm wide, body glabrous; pappus awns 2, 2-4 mm. 2n = 34. Flowering Oct. Seasonal evergreen forest, pine-oak forests. T (Cowan, 1983: 27); Ch (Breedlove y Strother 46789, TEX). 500-1300 m. (W. + S. Mexico, Mesoamerica.)

Robinson y Greenman (1899) and Blake (1926) described and keyed Verbesina fastigiata as alternate-leaved, but as noted by Turner (1985) the species is opposite-leaved and an earlier name for V. greenmanii.


Clambering herbs to slender shrubs 1-3 m; stems quadrangular, winged from each leaf margin thus internodes 4-winged, glabrous or hispidulous distally, wings c. 3 mm wide to often dilated proximally and c. 7 mm wide near next-proximal node. Leaves opposite, petiolate, unlobed (at least distal ones) to moderately 3-5(-7)-lobed; blade 4-25 × 3-14 cm, ovate to deltate, adaxial surface scabrous, trichomes broad-based when in areoles, abaxial surface hirsutulous, eglandular, base truncate to cordate with attenuate acumen in proximal leaves to distal leaves acute, margins
irregularly serrulate or serrate to sometimes lobate, sinuses rounded, lobes infrequently to c. 5 cm, apex acuminate; petiole 1-6 cm, winged distally. Capitulescence open, monocephalous to 3(-5)-capitulate and corymbiform; peduncles 4-12 cm, hispidulous. Capitula 10-15 × 15-30 mm, discoid, globose; involucre hemispherical, florets well-exserted; phyllaries obgraduate to nearly subequal, c. 4-seriate, herbaceous, both surfaces hirsutulous; outer phyllaries 8-12 × 3-6 mm, about 2× as long as broad, obovate to spatulate, flat, squarrose to fully reflexed; inner phyllaries to c. 10 × 2-3 mm, oblanceolate, mostly appressed, slightly navicular proximally, apex usually acute to broadly obtuse; paleae 7-8.5 mm, hirsutulous, acute. Ray florets 0. Disk florets 150-200+; corolla 6-8 mm, outermost series with limbs deflected outward, orange, funnelform, sparsely setulose, nerves of limb thickened, lobes c. 0.7 mm, long-triangular, recurving; anthers c. 2.5 mm, yellow, mostly exserted; style branches 1-1.5 mm. Cypselae 5.5-6.5 mm, obovate in outline, body glabrous, wings 1.5-2 mm wide, attached to awns to about 1/3 their lengths; pappus awns 2, 3-4 mm, subequal. Flowering Nov-Jan. Bosque humedo, cafetal, fields, matorrales, open deciduous forests, thickets. G (Pruski y MacVean 4501, MO); H (Clewell, 1975: 235); ES (Montalvo 6351, MO). 300-2000 m. (Endemic.)

The citation by Nash (1975) of Verbesina fraseri in Costa Rica is in reference to material I determine as V. ovatifolia.


Slender shrubs or trees 2-10 m; stems single to few from base, striate-subterete, exalate, branched in capitulescence, tan-stramineous, dense-white villosulous-tomentulose, leaf scars 5-8 mm diam., prominent. Leaves alternate, typically subsessile with elongate petiole-like base winged to stem, infrequently strictly sometimes sessile, unlobed; blade 10-38 × 2.5-12 cm, oblanceolate or obovate, chartaceous, drying dull greenish-brown and contrasting in color with stems, venation pinnate, secondary nerves of expanded portion of blade 8-10 per side, surfaces nearly concolorous, adaxial surface glabrous or midrib sometimes minutely strigillose, smooth, abaxial surface often glabrous, sometimes hirtellous or minutely strigillose on veins, infrequently sparsely strigillose throughout, trichomes all appressed, base long-attenuate and decurrent as narrow wings onto petiole-like base (about 1/4 leaf length) very nearly to stem, not auriculate, margins subentire to denticulate, weakly revolute, apex acuminate; true petiole (0-)0.2-0.4 cm, extremely short, about as broad as long, stout. Capitulescence of c. 5 distal branches 5-20 cm, each branch terminated by a 8-15 cm diam. leafy-bracteate convex 15-25-capitulate corymbiform
to corymbiform-paniculate flower cluster, branchlets bracteolate, branchlets progressively less densely pubescent that main axis; bracteoles 5-15 mm, linear-oblancoate, substrigillose; peduncles 1-4 cm, white-villosulous-hirtellous. Capitula 8-12 mm, 42-48-flowered, radiate; involucre 7-8.3 × 9-12 mm, campanulate; phyllaries 3-4-seriate, slightly graduated or outer 2-3 series often leafy and nearly subequal to inner phyllaries, flat, stiff, margins ciliolate; outer phyllaries 3.5-8 × 1.5-2.8 mm, oblong to spatulate, often constricted in the middle, subherbaceous, spreading-reflexed from bud to fruit, typically short-squarrose with body and appendage more or less subequal and moderately differentiated, green but often drying dark, sparsely hirtellous-substrigillose, appendage oblong, apex broadly obtuse to rounded; inner phyllaries 6.8-3 × 1-1.5 mm, oblancoate, appressed, chartaceous with subherbaceous apex, usually glabrous, apex dark, acute to obtuse; paleae 8-9 mm, scarious with subherbaceous apex, striate, dark distally, midrib ciliate, apex acute to obtuse. Ray florets 8-10, pistillate; corolla yellow, tube 1.5-2.5 mm, pilose, limb 6-8 × 2.2-2.8 mm, oblancoate, c. 7-nerved. Disk florets 34-38; corolla 6-7 mm, narrow-funnelform, yellow, tube c. 1.2 mm, dilated and indurate at base, pilose, throat slightly broader than tube, glabrous, lobes 0.5-0.7 mm, deltate; anthers 2.5-3 mm, thecae and appendage black; style base nectary c. 0.5 mm. Cypselae 3-5(-7) mm, black, tardily winged, wings to 0.7(-1.2) mm diam.; pappus awns 2, 3-4.5 mm, subequal to slightly unequal, base v-shaped in cross-section. Flowering: Jan-Feb, Apr, Jun-Oct. Cloud forest, open hillsides, premontane forest, most commonly encountered on Cerro Jefe. P (Kirkbride y Crebbs 17, MO). 600-1000 m. (Endemic.)

By its tardily winged cypselae and pappus awn bases v-shaped in cross section, immature material of *Verbesina fuscascicans* is reminiscent of *Lasianthea*, and by its outer spatulate, short-squarrose outer phyllaries it is reminiscent of *Otopappus verbesinoides*. However, both *Lasianthea* and *Otopappus* are opposite-leaved and differ further by prominent fiber sheaths in their disk corolla veins, marking them as members of subtribe Ecliptinae.


*Verbesina pinnatifida* Sw.

Erect robust herbs to shrubs 2-4 m, unbranched below capitulescence; stems leafy, subteret-striate, exalate or rarely short decurrent (and then with irregularly incised ray limbs) or with short winglets where damaged, sometimes reddish, glabrous to puberulent below capitulescence or
very rarely hirtellous in leafy midstem internodes. Leaves alternate, deeply pinnately 2-5-lobed, with petiole-like base winged to stem; blade 9-40(-51) × 4-20(-25) cm, elliptic-ovate to obovate in outline, adaxial surface scabrous, trichome subsidiary cells enlarged, abaxial surface tomentulose to sericeous, base long-attenuate and petiole-like (2-10 cm), typically dilated and auriculate, but not decurrent onto stem as wings, margins deeply lobed, sinuses usually round, lobes usually 2.5-11 × 0.6-4 cm, lanceolate or oblanceolate, lobe margins subentire to serrate, apex acute to acuminate or less commonly obtuse. Capitulescence 12-40 cm broad, corymbiform-paniculate, convex to rounded to flat-topped, many-numerous-capitulate, branchlets few-bracteolate, bracteoles to 6 mm, oblanceolate, hirsutulous; peduncles 0.2-1.2 cm, tomentulose to pilose. Capitula 5-8 mm, radiate; involucre 3.5-5 × 3-4 mm, narrowly campanulate; phyllaries 13-16, 2-5 × 0.4-1.4 mm, linear-lanceolate, unequal, graduated, c. 3-seriate, outer ones with apex thin-herbaceous, pilosulous to hirsutulous, inner ones ciliolate; paleae 4.5-6 mm, hirsutulous distally, acute to acuminate. Ray florets 3-5, pistillate; corolla white, tube pilose, limb 2-3(-4) × 1-1.5 mm, elliptic-ovate, 5-9-nerved, apically 3-denticate to rarely irregularly incised. Disk florets 15-22; corolla 2-3-3.5 mm, white, proximal half pilose, lobes 0.8-1.1 mm, lanceolate; style branches c. 1 mm. Cypselae 2.5-3 mm, body to c. 1.2(-1.5) mm wide, black, strigose or sometimes glabrate, wings to c. 1 mm wide, late-developing, base attenuate-stipitate; pappus awns 2, 1.8-2.5 mm. 2n = 34. Flowering mostly Sep-Feb and May-Jul. Disturbed areas, fields, hillside, lugares secos, roadsides, secondary forests, selva mediana subperennifolia, thickets. Ch (Martinez S. 10739, MO); Y (Darwin y White 2227, NO); C (Lundell 999, MO); QR (Flores 10373, MO); B (Gentle 1074, NY); G (Greenman y Greenman 5840, MO); H (Saunders 945, MO); CR (Heithaus 479, MO); P (Burch et al. 1371, MO). 0-1400 m. (S. México, Mesoamérica, Colombia, Venezuela, Cuba, Jamaica, Lesser Antilles.)

Nash (1975) treated *Verbesina myriocephala* in synonymy of *V. gigantea*, but because Olsen (1985) and Strother (1999) recognized *V. myriocephala* as distinct, common names and elevational ranges from literature cannot always be applied to either species with certainty. The vouchers for the report by Dodson y Gentry (1978) of *V. gigantea* in Ecuador are now determined as *V. minuticeps* S.F. Blake.


Isotype: Guatemala, *Donnell Smith 2860* (USI). Illust.: none. N.v.: Juronero blanco, G; chimaliote blanco, contraraña, cube, tabaquillo, toquillo, vara blanca, vara de san José, H; chimaliote, chimaliote negro, imaliote ramificado, suquinay, tatascamite blanco, ES.
Verbesina guatemalensis var. glabrata Standl. et Steyerm., V. medullosa B.L. Rob., V. salvadorensis S.F. Blake.

Weak shrubs to small trees (1.2-)1.5-5 m; stems subangulate, exalate, strigillose to pilosulose-tomentose with trichomes whitish and mostly appressed to ascending, infrequently glabrate. Leaves alternate, sessile and with petiole-like bases winged to stem or nearly so, unlobed; blade 12-25 × 3-5(-5) cm, lanceolate or oblanceolate to oblong(-obovate), chartaceous, venation pinnate, prominulous abaxially, secondary nerves usually 8-12, adaxial surface sparsely scabrellous or pilosulose, trichomes often broad-based, abaxial surface subglabrous to densely pilosulose, base usually abruptly attenuate and decurrent into petiole-like base about 1/4 length of leaf, typically subauriculate, margins subentire to undulate-serrulate, apex acute to acuminate(-attenuate). Capitulescence mostly 6-22 cm diam., corymbiform-paniculate, pluricapitulate, the proximal few branches subtended by mature leaves; peduncles (0.1-)0.2-1 cm, strigillose to pilosulose-tomentose, often with 1(-2) narrow bracteoles sometimes about as long as involucre. Capitula mostly 7-10 mm, 18-35-flowered, short-radiate; involucre 6-8 × 4.5-6(-10) mm, campanulate; phyllaries c. 3-seriate, moderately graduated, navicular, chartaceous-scarious, green or stramineous but sometimes inner ones purple-tipped, pilosulose or glabrate, often strongly ciliate, apex acute or obtuse; outer phyllaries mostly linear-lanceolate, inner ones mostly oblong to obovate; paleae c. 7 mm, apex acute, sometimes inflexed. Ray florets 3-5, pistillate; corolla white, limb 2-4 × c. 2 mm, ovate, 6-9-nerved. Disk florets 15-30; corolla 3-4.5 mm, white, throat pilosulose proximally, lobes c. 0.5 mm. Cypselae 4-5 mm, glabrous or less commonly faces hispidulous; pappus awns 2, 1.5-2.8 mm, subequal. Flowering Sep-May. Lugaress secos, muddy roadside ditches, pinares, pine-oak forests, rocky slopes, secondary vegetation, thickets. Flowering Jun-Feb. Ch (Breedlove 41595, MO); G (Deam 6250, MO); H (Molina y Molina 24575, MO); ES (Calderón 1206, US); N (Molina 23104, MO); CR (Rodriguez 2491, MO); P (Croat 15133, MO). 200-1600 m. (Endemic.)


Verbesina holwayi var. megacephala Olsen.

Erect robust herbs to shrubs 1-3 m, unbranched below capitulescence; stems purplish, exalate, subglabrous below capitulescence. Leaves shortly pinnately 1-3-lobed per margin or distal ones simple and oblong, alternate, with petiole-like base winged to stem; blade 12-32 × (3-)7-13 cm, ovate to triangular-ovate in outline, adaxial surface scabrous to hirsutulous, trichomes conical and subsidiary cells enlarged, abaxial surface tomentulose or pilosulose, long-attenuate to petiole-like
base to 15 cm, dilated and auriculate basally but not decurrent onto stem as wings, margins usually lobed, sinuses round, lobes 3-8 × 1-4 cm, lanceolate to ovate, entire to denticulate, apex obtuse to rounded or acute and apiculate in immature leaves. Capitulescence 10-25 cm broad, corymbiform-paniculate, flat-topped or somewhat convex, many-capitulate, sometimes distal branches 1-bracteolate, bracteole to c. 7 mm, linear-oblancoate; peduncles 0.2-0.8 cm, hirsutulous to subtomentulose. Capitula radiate, 6-8 mm; involucre 4-6 mm wide, turbinate to narrowly campanulate; phyllaries c. 16, 1.5-4 × 0.6-1.2 mm, unequal, graduated, c. 3-seriate, hirsutulous; outer phyllaries linear-lanceolate, most herbaceous distally, apex acute; inner phyllaries oblanceolate, herbaceous distally, apex acuminate and ciliolate; paleae 5-6 mm, acuminate to attenuate, hirsutulous. Ray florets 7-13, pistillate; corolla white, tube pilose, limb 2-3 × 1-1.5 mm, elliptic, c. 5-nerved. Disk florets 12-20; corolla c. 3 mm, white, tube pilose, lobes c. 0.5 mm, deltoid, reflexed; style branches c. 0.8 mm. Cypselae 3-4 mm, body brown, strigillose, wings narrow to broad, thin, base attenuate-stipitate; pappus awns 1.5-3 mm, scabrid. Flowering Aug-Nov. Oak forests, open hillsides, thickets, steep volcano slopes. G (Breedlove 11476, MO).

Verbesina holwayi was described from fruiting material and Blake saw no evidence of ray florets. All subsequent material referred to this taxon, however, has rays with white corollas. Verbesina holwayi has 7-13 rays, thus in this regard resembling V. turbacensis.


Shrubs to trees 2-5 m; stems exalate, leafy distally, strigillose. Leaves alternate, unlobed, subsessile or short-petiolate; blade (4-)6-15(-23) × (1-)1.5-3(-6) cm, lanceolate or narrowly elliptic to sometimes oblanceolate, venation pinnate, main secondary veins usually 12-14 per side, directed forward and thence sometimes arching apically, surfaces usually strongly and obviously discolorous, adaxial surface sparsely strigillose, abaxial surface usually densely gray-strigillose or occasionally concolored and merely moderately strigillose, trichomes minute, appressed, basally attenuate and decurrent onto petiole or into a petiole-like base, margins subentire to serrate, apex acute to attenuate. Capitulescence 3-15(-22) cm broad, corymbiform, several-many-capitulate, held slightly above subtending leaves; peduncles 5-25 mm, substrigillose. Capitula 6.5-9 mm, globose, discoid or radiate; involucre broadly hemispherical, 3-4 × 9-12 mm; phyllaries 9-12, subequal or slightly unequal, c. 3-seriate, to c. 2 mm wide, the outer 1-2 series ovate to obovate, herbaceous becoming indurate, strigillose, apex rounded, reflexed, the inner series elliptic-ovate, acute at apex; paleae 4-5 mm, yellow in bud turning
greenish-brown in fruit, apiculate. Ray florets 0 or 7-10, pistillate; corolla yellow, tube short, pilosulose, limb 4-6.6 × 1-2 mm wide, oblong, c. 5-nerved, support-nerves 2. Disk florets 40-88; corolla yellow, 3-4 mm, tube pilosulose, throat drying pluristriatulate, lobes c. 0.5 mm, triangular, inner margins often obviously densely pubescent; style branches c. 1 mm. Cypselae 2-2.5 × 1-1.5 mm, black, wings to c. 0.2 mm wide, these sometimes enlarged apically to c. 0.5 mm above annulus and the sometimes persistent corolla bases, sparsely strigillose distally; pappus awns 2, c. 1.5 mm, weakly scabridulous, adnate basally with wings. Flowering Sept-Feb. Disturbed forest, moist forest, oak forests, pine-oak forests, rocky areas, secondary vegetation, Tropical deciduous forest, wooded slopes. Ch (Pruski et al. 4200, MO); G (Williams et al. 41348, MO). (300-)800-1800(-3400) m. (Endemic.)

Verbesina hypargyrea is similar by exalate stems, alternate simple leaves, and relatively short ray yellow corollas to V. chiapensis, and outside of Mesoamerica to V. oaxacana DC. and V. guerreroana B.L. Turner. Verbesina oaxacana may be distinguished from V. hypargyrea by its broader serrate leaves, whereas V. guerreroana differs from V. hypargyrea by its pubescence of patent trichomes and setulose disk corolla limbs.


Encelia conzattii Greenm.

Shrubs to small trees 1-4(-6) m; stems exalate, white-tomentulose, often leafy only apically where the internodes are much shorter than leaves. Leaves simple, opposite (rarely alternate), petiolate; blade (2-)4-15 × (0.8-)1.5-3.8 cm, lanceolate to oblanceolate, secondary veins 8+ per side, surfaces obviously discolorous, adaxial surface green, subglabrous to strigillose, abaxial surface typically densely close canescent-substrigillose to much less commonly sparsely so, base cuneate, margins serrulate, apex acuminate; petiole 0.1-0.6 cm. Capitulescence 5-15 cm broad, corymbiform to corymbiform-paniculate, more or less flat-topped, main branches usually 7-13-capitulate; peduncles 0.7-3(-4) cm, sericeous. Capitula 7-10 mm, radiate; involucre 6-8(-11) mm wide, campanulate to hemispherical; phyllaries 7-12, more or less subequal or obgraduate with the outer ones much longer than the inner, 2-3-seriate; outer phyllaries 4-10(-15) × 1.1-2.4(-3) mm, linear-lanceolate to spatulate-obovate, more or less flat, herbaceous, sericeous to thinly so, apex acute to obtuse; inner phyllaries 3-6 mm, lanceolate, stiff-chartaceous, slightly navicular, often darkened distally, often subglabrous; paleae 4-6.6 mm, often oblong, sometimes blackening distally, apex often obtuse. Ray florets 7-13, typically sterile and without styles; corolla yellow, tube pilose, limb 10-15 × (3-)4-6 mm, oblong, 7-9-nerved, sometimes abaxially glandular, the
three central support veins much darker and sometimes setulose abaxially; ovary 2-awned. Disk florets 30-40+; corolla 4-5 mm, greenish-yellow or sometimes lobes reddish apically, usually setose throughout, lobes 0.6-0.9 mm, long-triangular, recurving; anther thecae often separating; style branches 1-1.3 mm. Disk cypselae 3-5 mm, maturing slowly thus wings infrequently seen in flowering specimens, blackish or faces few white-corky, cuneate, body to c. 1.3 mm wide, sometimes sparsely setulose, wings to c. 0.3 mm wide, ciliate; pappus awns 2, 2-3.5 mm, subequal, fragile and not fused with wings. 2n = 32, 32+1, 34. Flowering Aug-Jun. Evergreen cloud forest, mixed forests, pine forests, secondary forests, steep volcano slopes, thickets. Ch (Breedlove y Almeda 58189, MO); G (Williams et al. 41715, MO). 1200-3600 m. (S. Mexico, Mesoamerica.)


Erect robust herbs to shrubs to 3 m, unbranched below capitulescence; stems winged from decurrent leaf margins, striate, purplish, usually glabrous or subglabrous below capitulescence, wings 2-5 mm wide. Leaves pinnately 3-6-lobed per margin, alternate, with petiole-like base winged to stem; blade (10-17)-35+ × 8-20 cm, obovate in outline, adaxial surface pilosulose to glabrate, abaxial surface densely and finely pilose-sericeous to scabrous with age, long-attenuate to base, margins lobed, decurrent onto stem as wings, lobes, to c. 10 × c. 3 cm, lanceolate or oblanceolate to sometimes triangular entire to denticulate, apex acute to acuminate. Capitulescence 15-30 cm broad, corymbiform-paniculate, slightly convex to flat-topped, many-capitulate; peduncles 0.3-1.5 cm, hirsutulous. Capitula radiate or rarely discoid, 6-8(-9) mm; involucre turbinate to narrowly campanulate, 3-4 mm wide; phyllaries 15-20, unequal, graduated, 3-4-seriate, lanceolate to oblanceolate, 2-5.5 × 0.4-1 mm, the outer herbaceous distally, sparsely setulose, the inner sometimes herbaceous distally, ciliolate distally; paleae 5-6 mm. Ray florets styliferous but sterile, 3-5; corolla white, tube pilose, limb oblanceolate, 2-4(-6) × to c. 1 mm, 3-7-nerved. Disk florets 18-25; corolla white, 2.5-3.5 mm, setose-pilose proximally, lobes triangular, recurving, 0.5-1 mm; style branches c. 1 mm. Cypselae 3.5-5 mm, body brownish, strigillose, in well-mature material sometimes with trichome subsidiary cells great enlarged and imparting a tan-tuberculate appearance to surface, wings to c. 1 mm wide, attenuate-stipitate basally; pappus awns 2, 2-2.4 mm. Flowering Nov-Jan. Pine-oak forests, streamsides, thickets. Ch (Breedlove y Thorne 30195, MO); G (King 7168, MO); ES (Calderón 1311, MO). (200-1000-1500(-2800) m. (Endemic.)

Large shrubs or trees (2-)3-13 m; stems subangulate, exalate, usually densely sericeous to tomentose with trichomes mostly sordid and appressed. Leaves alternate, large and long-petiolate, unlobed; blade 15-30(-50) × 6-15(-25) cm, elliptic to oblong, thin-chartaceous, venation pinnate, secondary nerves usually 8-12 per side, tertiary venation finely reticulate, surfaces usually sparsely strigillose to thinly pilosulose (sometimes glabrate), adaxial surface smooth, base cuneate or attenuate and gradually narrowed and decurrent onto distal portion of petiole, not auriculate, margins subentire to remotely denticulate, apex acute to acuminate; petiole 2-8 cm. Capitulescence mostly 14-35 cm diam., corymbiform-paniculate, pluricapitulate, the proximal few branches subtended by reduced leaves; peduncles mostly 0.5-3 cm, densely sericeous to tomentose. Capitula mostly 8-12 mm, 28-35-flowered, radiate; involucre 4.5-6.7 × 4-6 mm, turbinate-campanulate; phyllaries to c. 1 mm wide, outer triangular-lanceolate to inner lanceolate or oblanceolate, at least the inner somewhat navicular, 3-4-seriate, strongly graduated, flat, subherbaceous, indurate, brownish, sordid-pilosulose, apex obtuse; paleae 5-7.5 mm, navicular proximally mostly nearly as sordid-pilosulose distally as the phyllaries, apex obtuse, erect, flat. Ray florets 7-10, pistillate; corolla white, tube 1.7-2.5, limb 6-10 × 2-3 mm, oblong, 5-7-nerved. Disk florets 20-25; corolla 3.5-4.8 mm, ochroleucous, tube 0.7-1 mm, pilose, lobes c. 0.6 mm, setulose. Cypselae 3.5-5 mm, subglabrous to sparsely appressed-pilosulose; pappus awns 2, 3-4.3 mm, subequal (or unequal in rays). 2n = 34. Flowering Nov-Jun. *Cloud forests, montane forests, pine-oak forests, secondary vegetation*. Ch (*Breedlove y Dressler 29620*, MO); B (*Schipp 479, NY*); G (*Tuerckheim II 1512*, MO); H (*MacDougal 3204, MO*). 200-1900 m. (Endemic.)

*Verbesina lanata* was originally described as having affinities with yellow-flowered *Verbesina* sect. *Saubinetia*, but Olsen (1985) noted that by its white ray corollas it is a member of *Verbesina* sect *Ochractinia*. Consequently, most yellow-flowered material called *V. lanata* by D'Arcy (1976) is mostly referred instead to a broadly defined *V. oerstediana*. Conversely, the citation of white-flowered individuals called *V. oerstediana* in Belize is instead in reference to material of *V. lanata*.


Shrubs to small trees 2.5-4.5 m; stems exalate, densely branched, leafy distally, densely strigillose to glabrate, internodes much shorter than leaves. Leaves simple and unlobed, alternate,
short-petiolate; blade 4.5-11 × 1-4 cm, oblanceolate, subcoriaceous, venation pinnate, usually with 4-8 pairs of secondary veins, adaxial surface glabrous, abaxial surface glabrous or minutely strigillose when young, base long-attenuate, margins entire or few-serrulate, apex acute to obtuse; petiole 0.4-1.3 cm, stout, unwinged, neither dilated nor auriculate. Capitulescence to c. 6 cm broad, corymbiform, not held well-above subtending leaves, flat-topped; peduncles to c. 12 mm. Capitula 5.5-6.5 mm, short-radiate; involucre 4-4.5 × to c. 3 mm, turbinate-campanulate; phyllaries 2-4.5 × to c. 1 mm, oblanceolate, unequal, graduated, c. 3-seriate, herbaceous distally, minutely puberulent, acute to obtuse; paleae c. 4 mm. Ray florets 6-8, pistillate; corolla white, limb 1.5-2 mm. Disk florets bisexual; corolla c. 3.5 mm, white, tube pilose, lobes shorter than throat. Cypselae (immature) glabrous, margins ciliolate; pappus awns 1.2-2 mm. Damp montane forests. ?Ch (Parker, 2008: 205, but unlikely and unverified); G (Steyermark 43030, F). 2000-3000 m. (Endemic.)


Verbesina costaricensis B.L. Rob., V. gigantoides B.L. Rob.

Erect robust herbs to shrubs 1-3 m, unbranched below capitulescence; stems sometimes several from single rhizome, leafy, exalate, suberete-striate, purplish, glabrous or subglabrous below capitulescence. Leaves deeply pinnately 3-8-lobed per margin or those in the capitulescence unlobed, alternate, long-petiolate; blade 15-40 × 10-25 cm, obovate in outline, adaxial surface pilosulose to glabrate, abaxial surface moderately to slightly tomentulose with subappressed trichomes, base cuneate and short-decurrent onto petiole, margins lobed, sinuses rounded and sometimes broad, lobes 2-10(-17) × 2-2.5(-5) cm, lanceolate or oblanceolate to falcate, apex acuminate to acuminate; petiole 5-13(-16) cm, not winged to base, without auricles. Capitulescence 15-30+ cm broad, corymbiform-paniculate, rounded to flat-topped, many-numerous-capitulate; peduncles 0.1-0.8(-1.5) cm, tomentulose to hirsutulous. Capitula 5-7.5 mm, radiate to sometimes very inconspicuously so, 13-26-flowered; involucre 3.5-4(-5) × 3-4 mm, turbinat-campanulate; phyllaries 9-15, 1.5-4(-5) × 0.6-1.5 mm, unequal, graduated, c. 3-seriate, hirtellous to hirsutulous, apex acute to obtuse; outer phyllaries linear-lanceolate, flat, thin-herbaceous apically or throughout; inner phyllaries oblanceolate to oblong, somewhat navicular; paleae 4-6 mm, ciliolate, sparsely setulose, acuminate to attenuate. Ray florets 1-5, styliferous and fertile; corolla white, tube pilose, limb 2-4(-5) × 1-2 mm, elliptic to oblong, 5-7-nerved, apex 3-denticulate or some rays seemingly transitional with disks and deeply 1-3-lobed. Disk florets
12-21; corolla 2-3.2 mm, white, pilose proximally or sometimes tube and throat pilose throughout, lobes 0.6-0.8 mm, triangular-lanceolate; style branches c. 1 mm. Cypselae 2.5-4(-5) mm, body 0.8-1.2 mm wide, black, strigose, in well-mature material sometimes with trichome subsidiary cells great enlarged and imparting a tan-tuberculate appearance to surface, wings to 1 mm wide, thin, base attenuate-stipitate; pappus awns 2, 1.5-2(-2.5) mm. Flowering mostly Sep-May. T (Peréz et al., 2005: 85); Ch (Nelson 3423, US); G (Contreras 9333, MO); H (Molina R. 2677, MO); ES (Montalvo y Villacorta 6447, MO); N (Molina R. 23029, MO); CR (Tonduz 7068 [9833], MO). Brushy slopes, cafetales, limestone ridges, open forests, open rocky hillsides, pine-oak forests, roadsides, steep rocky slopes, streamsides, thickets, tropical deciduous forest. 30-1600 m. (S. México, Mesoamérica.)

*Verbesina myriocephala* was placed by Nash (1975) in synonymy of *V. gigantea*, which differs by its biauriculate leaves with petiole-like base winged to the stems. The citation by Standley (1930) of *V. myriocephala* in Yucatán was based on material I refer to *V. gigantea*. The Panamanian common names attributed by Standley (1931) to *V. myriocephala*, are instead presumably in reference to *V. gigantea*, as evidenced by absence of *V. myriocephala* from Panama and because Standley elsewhere (e.g., Standley, 1930) mistakenly applied the name *V. myriocephala* to plants of *V. gigantea*.

On the other hand, the Honduran common names attributed by Standley (1931) to *Verbesina myriocephala*, may possibly refer to either *V. myriocephala* or *V. gigantea*, despite the fact that Nelson (2008) applied them only to for *V. gigantea*. Aristeguieta (1964) reported *V. myriocephala* in Venezuela based on misdetermined materials. The synonymous *V. costaricensis* B.L. Rob. was described as discoid, but the type material has 1-rayed capitula.


*Verbesina phyllolepis* S.F. Blake.

Shrubs, 1-3 m; stems few-several-branched, narrowly winged at least distally (rarely exalate), wings 0.5-1(-2) mm wide, leafy distally, strigillose. Leaves simple and unlobed, alternate, subsessile or short-petiolate; blade 5-15(-25) × 1-2(-3) cm, lanceolate to narrowly elliptic, pairs of secondary veins usually 5-7, directed forward, surfaces discolorous, adaxial surface glabrous or strigillose, abaxial surface densely gray-strigillose or occasionally concolored and merely moderately strigillose abaxially., trichomes minute, appressed, base attenuate and decurrent onto petiole or petiole-like base, then auriculate and decurrent onto stem as wings, margins subentire to serrulate-denticulate, apex acuminate. Capitulescence terminal, corymbiform, 3-12-capitate,
not held well above subtending leaves, 3-10 cm broad; peduncles often winged, 5-30 mm, strigillose, often 1-2-bracteolate, wings often broader than peduncle; bracteoles lanceolate, to 10 mm. Capitula radiate, 8-15 mm; involucre campanulate to broadly hemispherical, 6-12 × 7-12 mm; phyllaries c. 15, 6-12 mm × 1-2 mm, subequal or the outer herbaceous ones longer, linear-lanceolate to oblanceolate, c. 3-seriate, strigillose, spreading to reflexed especially in fruit, apex usually acute; paleae 5-7 mm, apiculate. Ray florets 15-20, pistillate; corolla yellow, tube short, pilosulose, limb 9-17 × 2.5-4.5 mm, narrowly oblong, c. 7-nerved. Disk florets 60-110; corolla yellow, 3.5-4.5 mm, glabrous or tube sparsely pilosulose, lobes 0.5-0.7 mm, lanceolate, style branches c. 1.5 mm. Cypsela unwinged, black, 2.5-3 × c. 1 mm, faces sometimes 1-ridged, sparsely strigillose distally, margins ciliolate, corolla bases sometimes persistent; pappus awns 1.5-2.3 mm, fragile, scabridulous. Flowering Oct-Apr, Jul-Aug. Open hillsides, openings in montane rain forests, openings in evergreen seasonal forest, openings in tropical deciduous forest, pine forests, pine-oak forests, woody borders of marshes, wooded slopes. Ch. (Matuda 3953, US). 700-2500 m. (Mexico [Oaxaca], Mesoamerica.)

*Verbesina nerifolia* is similar by leaf shape and capitulescence structure to *C. chiapensis* and *V. hypargyrea*, but differs from both by its longer pointed phyllaries. By winged stems and discolorous leaves, *V. nerifolia* is similar to *V. sericea* Kunth et Bouché of Oaxaca, but *V. sericea* differs most obviously by its few and shorter ray florets.


*Verbesina oerstediana* var. *glabrior* S.F. Blake, *V. vicina* S.F. Blake.

Shrubs to trees 2-12 m; stems subangulate proximally to striate-subterete distally, exalate, brownish, white to sordid tomentulose to tomentose with crisped-ascending trichomes or subtrigose with appressed sordid trichomes. Leaves alternate, unlobed, typically obviously petiolate or with elongate petiole-like base winged to stem or nearly so; blade 10-30(-35) × 6-12(-14) cm, oblanceolate or oblong to elliptic or narrowly ovate, chartaceous, more or less concolorous with each other and with stems, venation pinnate, secondary nerves 6-7 per side, prominulous abaxially, surfaces concolorous, adaxial surface hirsutulous to glabrate, infrequently scabridulous, abaxial surface pilosulose to pilose or tomentulose to lanose on larger veins, base cuneate, less commonly attenuate and decurrent with elongate petiole-like base winged nearly to stem, not auriculate, margins subentire or denticulate to serrulate, apex acuminate; petiole (0-)1.5-3 cm or with broadly winged petiole-like base about 1/4 leaf length, that of larger leaves 1.5-4 cm
diam. Capitulescence to 30+ cm diam., convex to nearly flat-topped, corymbiform-paniculate, mostly 50-200+-capitulate, branches and branchlets stout, pubescent to tomentose, sordid-pilose-villous, internal bracteate leaves 5-15 cm, spatulate, the narrowly winged petiole-like base about half the length of these bracteate leaves; peduncles 1-1.5 cm, sordid-pilose-villous, sometimes minutely bracteolate immediately below capitulum. Capitula 6-9 mm, 26-36+-flowered, radiate; involucre 4-5 × 3-4 mm, campanulate to nearly hemispherical in fruit, phyllaries triangular-lanceolate to spatulate, 2-3-seriate, moderately graduated to obgraduate, not brownish-indurate, substrigose to pilosulous, apex acute to obtuse; outer phyllaries herbaceous, squarrose; inner phyllaries chartaceous; paleae c. 5 mm, apex acute. Ray florets 8-11, pistillate; corolla yellow, tube 1-2 mm, pilose, limb 3.5-6 × c. 1.5 mm, obovate. Disk florets 18-25+; corolla 5-7 mm, funnelform, yellow, tube pilose, lobes 0.5-0.6 mm, deltate; anthers c. 2 mm, connectives often stramineous, thecae black, appendage blackish. Cypselae 3.5-7 mm, strigose distally to glabrous; pappus awns 2, 2-4 mm. 2n = +/- 34. Flowering year-round. 

Evergreen forest, montane forests, roadsides, wooded slopes, volcano slopes. H (Yuncker et al. 5907, US); N (Molina 22893, MO); CR (King 6819, MO); P (Croat 26997, MO). (50-)200-2900 m. (Endemic.)

I saw the holotype of *Verbesina vicina* about 20 years ago, but then did not examine it closely. *Verbesina vicina* can only be listed here only as a questionable synonym, but *V. vicina* seems to have smaller outer phyllaries than typical *V. oerstediana*, which may prove to be a valid specific distinction.


Shrubs to trees 3-8 m; stems exalate, hirtellous to glabrate. Leaves simple, opposite, petiolate; blade (4-)7.5-20 × (-1)3-7 cm, ovate to rhombic-ovate, weakly 3-nerved from above leaf acumen, surfaces concolorous, adaxial surface scabrous, trichomes broad-based, abaxial surface hirsute to hirsutulous, trichomes moderately broad-based, base obtuse to acuminate thence decurrent onto petiole sometimes to near base, margins serrulate or sometimes mildly lobed, apex acute to acuminate; petiole 1-3 cm, winged distally or sometimes to near base. Capitulescence 3-8(-20) cm broad, corymbiform-paniculate, flat-topped, many-numerous-capitulate, somewhat dense; peduncles 0.4-1.5 cm, hirsutulous. Capitula usually 8-12 mm, radiate or sometimes discoid, (4-)5-15-flowered; involucre to c. 4.5 × 3-4 mm, cylindrical-turbinate; phyllaries 8-12, 2-4.5 × 1-1.5 mm, ovate to lanceolate, unequal, strongly graduated, c. 3-seriate, appressed, at least the inner somewhat navicular, scarious proximally, apex thinly herbaceous, acute to acuminate; paleae 6-8(-10+) mm, much longer than phyllaries, but texturally similar to them. Ray florets (0-)1-4,
usually sterile and without styles; corolla yellow, tube setulose, sometimes elongate, limb (2-)4-6 × c. 3 mm, ovate, 5-9-nerved.; ovary 2-awned. Disk florets 4-11; corolla 5-7 mm, yellow, glabrous, lobes c. 1 mm, lanceolate; style branches 1.5-2 mm. Disk cypselae 5-7 mm, black or sometimes few white-corky, body 1.5-2 mm wide, wings 1-2 mm wide, body setulose; pappus awns 2, 3-5(-6) mm, subequal. Flowering Jan. Tropical deciduous forest. Ch (Matuda 798, MO). 700-1800 m. (S. Mexico, Mesoamerica.)


*Verbesina fraseri* var. *nelsonii* Donn. Sm., *V. tonduzii* Greenman.

Perennial herbs to slender treelets 1-5(-7) m; stems clambering, quadrangular, winged from each leaf margin thus each internode 4-winged, glabrous or hirsutulous, wings 0.5-2 mm wide. Leaves opposite, petiolate, simple or sometimes proximal ones moderately (-deeply) 5-7-lobed, sinuses rounded, lobes 1-6 cm; blade 6-12(-17) × 4-8(-15) cm, ovate to deltate, adaxial surface scabrous, trichomes broad-based, abaxial surface scabridulous, eglandular, base truncate to acute thence with acuminate acumen, margins denticulate or irregularly serrate to sometimes lobate, apex acuminate; petiole 0.5-1.5(-4) cm, gradually winged to near base. Capitulescence open, corymbiform, 3-5-capitulate; peduncles 1-8(-14) cm, hispidulous. Capitula 15-20 × 20-35 mm, discoid, globose; involucre hemispherical, florets well-exserted; phyllaries many, unequal to slightly so, outer phyllaries often only about half as long as inner ones, graduate, appressed or outer ones sometimes spreading, at least the inner slightly navicular, herbaceous or inner ones only apically so, surfaces hirsutulous to inner ones glabrate basally and laterally, 3-4-seriate; outer phyllaries 2.5-5 × 1.3-3.5 mm, triangular-lanceolate, grading to inner ones; inner phyllaries to c. 8 × 1.5 mm, lanceolate, apex acute, grading into paleae; paleae 6.5-11 mm, acuminate, hirsutulous. Ray florets 0. Disk florets 100-150; corolla 6-9 mm, funnelform, orange, outermost series with limbs deflected outward, nerves of limb thickened, lobes c. 0.9 mm, lanceolate, spreading to recurved, setulose; anthers 2.5-3 mm, yellow-orange, mostly exerted; style branches 1.5-2 mm, recurving. Cypselae 5.5-8 mm, obovate in outline, body glabrous or rarely sparsely setulose, becoming tan-tuberculate, wings 1.5-2.5 mm wide, entire or margins sinuous, attached to awns basally; pappus awns 2, 1.5-3.7 mm, subequal. 2n = 34. Flowering nearly year-round. Cafetales, disturbed areas, dry hillsides, matorrales, open deciduous forests, roadsides, secondary vegetation, thickets, tree falls. Ch (Pruski et al. 4199, MO); G (Nelson 3551, US); H
Nash (1975) and Nelson-Sutherland (2008) used the name *Verbesina crocata* for material I refer to *V. ovatifolia* and Strother (1999) treated *V. fraseri* and *V. ovatifolia* as synonyms of *V. crocata*, but I follow Olsen (1988) by recognizing each of the three as distinct. The citation by Hemsley (1881) of *V. crocata* in Costa Rica is in reference to material I determine as *V. ovatifolia*. Extra-Mesoamerican *V. crocata* is characterized by its linear-lanceolate phyllaries in 4-7 distinctly graduated series with the outer phyllaries about 3× smaller than the inner.


*Verbesina punctata* B.L. Rob. et Greenm.

Erect coarse herbs to slender shrubs, 1-3(-4) m, unbranched below capitulence or sometimes few-branched; stems broadly winged distally, thick and pithy, striate, glabrous or substrigillose, leaves gradually diminishing in size or less commonly densely leafy apically, wings often longer than one internode and often as broad as or broader than stem, wings infrequently indistinct. Leaves simple and unlobed, alternate, with narrowly winged petiole-like base 3-10 cm, decurrent to stem then very broadly auriculate and continuing proximally as wings; blade 5-43 × 1-15(-20) cm, narrowly oblanceolate to obovate, adaxial surface scabrous to scabridulous, trichome subsidiary cells spreading laterally, abaxial surface substrigillose on veins glabrous or subglabrous in areoles, proximal portion attenuate, margins serrulate to serrate, apex obtuse to acuminate. Capitulence terminal, thyrsoid-paniculate, somewhat rounded to nearly flat-topped, many-capitulate, 6-25 cm broad, proximal branches sometimes shortly winged, lateral branches to 30 cm , usually obviously winged; peduncles 3-14 mm, unwinged, hirtellous to substrigillose, bracteolate; bracteoles 2-4 mm, linear-lanceolate, sometimes 1-2 closely subtending capitula. Capitula 5.5-7.5 mm, radiate involucr 4.2-6 × 3.5-5.5 mm, campanulate; phyllaries somewhat unequal, slightly graduated to sometimes obgraduate, 2-3-seriate, hirtellous-pilosulose to subglabrous; outer ones 3-4(-6) × to c. 0.5 mm, lanceolate, subherbaceous at least distally; inner ones 4.2-6 × 1-1.5 mm, oblong, slightly navicular-carinate, pale green, apex obtuse to acuminate; paleae 4.5-6.5 mm. Ray florets 7-13, pistillate; corolla white, tube sparsely pilosulose, limb 3-4.2 × 1.5-2.5 mm, elliptic or oblong or obovate. Disk florets 30-68; corolla 2.8-4 mm, white, finely setulose proximally, lobes deltate to triangular-lanceolate, 0.5-1 mm, style branches 0.8-1 mm, apex triangular then mucronulate. Cypselae 3-4 mm, black, body to 1.2 mm
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wide, strigillose, wings narrow; pappus awns 2-2.5 mm. Flowering Oct-Mar. 
Grassy hillsides, limestone outcrops, lugares secos, mixed forests, oak forests, pine-oak forests, roadsides, secondary thickets, selva mediana subperennifolia. Ch (Breedlove 41519, MO); G (Pruski et al. 4502, MO); ES (Sermeno et al. 7, MO); N (Neill 2960, MO); CR (Wilbur et al. 15882, MO). 
500-1800(-2000) m. (Endemic.)

Although each *Verbesina pallens* and *V. punctata* is white-flowered, they were placed in different sections by Robinson y Greenman (1899). There is a general tendency for northwestern material (that typified by *V. punctata*) to have acute to acuminate phyllaries and for the southeastern material (the typical form) to have obtuse phyllaries, but this variation appears clinal, indeed material from El Salvador seems intermediate. Olsen (1985) treated these all as conspecific and in *Verbesina* sect. *Ochraactinia*, albeit under the name *V. punctata*. Material from Chiapas is sometimes determined as *V. virginica* of the SE United States, which differs by leaves densely pubescent abaxially and 1-5-rayed capitula. Material cited by Molina (1975) as *V. punctata* is exalate and has been redetermined *V. guatemalensis*, but nevertheless *V. pallens* should be expected in Honduras.


Shrubs to 4 m; stems exalate, glabrous to puberulent. Leaves simple and unlobed, alternate, petiolate; blade 5-15(-25) × 1-6.5(-9) cm, lanceolate to narrowly ovate, chartaceous, venation pinnate, usually with 5-7 pairs of secondary veins, reticulate, surfaces concolorous to sometimes grayish abaxially, adaxial surface strigillose, trichomes broad-based, abaxial surfaces glabrous or pilosulose to tomentulose, adaxial faces, base narrowly cuneate, forming short acumen, margins subentire to serrulate(-serrate), apex usually acuminate to acute; petiole 0.7-2 cm, unwinged, neither dilated nor auriculate. Capitulescence 7-12(-25) cm broad, open-corymbiform, 5-20+capsulate, convex; peduncles 1-2.5 cm, stout, bracteolate, finely hirsutulous to dense pilose. Capitula 7.5-11 mm, radiate; involucre 5-7 × 7-12 mm, campanulate to hemispheric; phyllaries 3-7 mm, oblong or outer sometimes spatulate, moderately graduate to subequal, c. 3-seriate, base few-costate, indurate, but phyllaries not brownish-indurate throughout, ciliolate, distally subherbaceous or inner scarious, apex obtuse or inner ones acute; paleae 5-8 mm, scarious to chartaceous and somewhat indurate, stramineous, apex obtuse to acute. Ray florets 13-21,
pistillate; corolla yellow, tube c. 1.5 mm, pilose, limb 4-6 mm, ovate to oblong. Disk florets 80-120; corolla yellow, c. 4 mm, tube c. 0.7 mm, pilose, lobes c. 0.7 mm, triangular; anthers c. 2 mm; style branches c. 1.5 mm. Cypselae 3-3.5 mm, narrowly-winged, glabrous to sparsely setulose distally, wings to c. 0.8 mm diam.; pappus awns 0-1 in rays, disks 1-2, 1.5-2 mm. 2n = 34. Flowering Jun-Sep. Montane forests, oak-pine forest, wooded slopes. Evergreen seasonal forest, tropical Deciduous forests, thorn woodlands. T (Ventura 20638, MO); Ch (Breedlove 39933, MO). 5-900 m. (C y S Mexico, Mesoamerica.)


Verbesina steyermarkii Standl.

Shrubs or small trees 2-4(-6) m; stems suberete-striate, exalate, yellowish to pale brown, sparsely strigillose or sericeous but soon glabrate. Leaves alternate, unlobed, short-petiolate; blade 6-25 × 1-4(-9) cm, lanceolate(-oblanceolate or narrowly elliptic), chartaceous, venation pinnate and prominent abaxially, surfaces each green, adaxial surface glabrous to sometimes sparsely strigilloose, abaxial surface subglabrous to finely strigilloose(-densely pilose-strigillose), base attenuate and decurrent on the petiole, margins subentire to crenate-serrulate, apex attenuate; petiole 0.5-2 cm, unwinged, neither dilated nor auriculate. Capitulescence 6-16 cm diam., closely corymbiform-paniculate, convex to nearly flat-topped, closely 30-100+capitulate, held moderately well above leaves; peduncles 0.1-1.6 cm, densely hirsutulous. Capitula 6-8 mm, radiate; involucre 3-4 × 2.5-4 mm, turbinate-campanulate; phyllaries 7-14, ovate to oblong, unequal, c. 3-seriate, thinly chartaceous or membranous, not brownish-indurate, stramineous to pale green, glabrous or subglabrous, margins ciliolate, apex usually broadly obtuse to nearly truncate(-acute); paleae 3-4 mm, navicular, scarious, stramineous, midvein setulose, acute(-obtuse). Ray florets 8-15, pistillate; corolla yellow, tube c. 1 mm, pilose, limb 2-3 mm, ovate. Disk florets 20-30; corolla c. 3 mm, very narrowly funnelform, yellow drying dark brown, tube c. 0.5 mm, pilose, lobes c. 0.5 mm, triangular-lanceolate; style branches c. 1.2 mm. Cypselae 1.5-3 × 0.7-1 mm, glabrous, body dark brown to black, narrowly winged, margins or wings ciliolate; pappus awns (0-)2, 1-2 mm. 2n = 34. Flowering Oct-Feb. Deciduous forest, pine-oak forests, thickets. Ch (Cronquist 9671, MO); G (Steyermark 30698, F); ?H (Strother, 1999: 139). 600-2100 m. (S. Mexico, Mesoamerica.)

The record in Honduras was not verified, and the presumed voucher has been redetermined as Verbesina apleura.

Coarse shrubs, 2-3.5 m; stems winged, thick and pithy, hispid-velutinous, trichomes usually sordid. Leaves simple and unlobed, alternate, with winged petiole-like base to c. 7 cm, decurrent onto stem as wings, broadly oblanceolate to obovate, 16-40(-50) × 4-11(-30) cm, adaxial surface scabridulous to densely scabrous, abaxial surface green or gray, densely pilosulose with short, sometimes sordid, patent to subappressed trichomes, proximal portion cuneate thence long-decurrent, margins subentire or denticulate, apex acute to acuminate. Capitulescence terminal, thyrsoid-paniculate, somewhat rounded to more or less flat-topped, many-capitulate, 7-18+ cm broad; peduncles unwinged, 5-10 mm, densely villosulous-hispidulous, often short-bracteolate. Capitula radiate, 5.5-6.5 mm; involucre 4-4.5 × c. 4 mm, campanulate; phyllaries 0.9-1.4 mm diam., nearly subequal, c. 2-seriate, pale, linear-lanceolate to oblanceolate, pilosulous, apex obtuse to somewhat rounded, apiculate; paleae c. 4.5 mm. Ray florets 8-15, pistillate; corolla white, limb 3-5(-7) × c. 1.5 mm, elliptic-ovate. Disk florets 20-35; corolla 2.5-3.5 mm, greenish white, pilosulous proximally, lobes deltate, c. 0.4 mm; style branches c. 1 mm. Cypselae blackish, 2.5-3 mm, glabrous to stigillose, minutely tan-tuberculate, wings relatively narrow, base long-stipitate; pappus awns 1.5-2 mm. Flowering mostly Dec-Jan. *Bosques mesófilo de montaña*, damp hillside thickets, cornfields, wooded slopes along stream. Ch (Strother, 1999: 139); G (*Standley 82921*, F). (300-)600-1800 m. (Endemic.)

*Verbesina petzalensis* is reported only from southwest and northwest of the Cuchumatanes Range, and this species is similar to simple-leaved forms of *V. turbacensis*. Olsen (1985) treats *V. petzalensis* as similar to *V. microptera* DC., which differs by few-capitulate capitulescences and unequal phyllaries. The numbers of ray florets per capitulum in *V. petzalensis* is given as 9 or more by both Olsen (1985) and Strother (1999), whereas the protologue gives as 8 the number or rays. The report by Parker (2008: 206) of *V. petzalensis* in Panama is based on a misdetermination of material referred here to *V. oerstediana*.


*Verbesina donnell-smithii* J.M. Coult.

Shrubs 1.5-3(-5) m; stems subterete-striate or sometimes somewhat angulate, exalate, brownish or sometimes purplish distally, hirsutulous to hirsute; herbage with trichomes mostly
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antrorse. Leaves alternate, unlobed, petiolate; blade 5-20 × 1.5-7 cm, lanceolate to narrowly ovate or oblong, chartaceous to stiffly so, venation pinnate, expanded portion of blade with 5-7 prominent secondary nerves per side, third order reticulations immersed but visible, surfaces concolorous or nearly so, adaxial surface scabrous to scabridulous, trichomes narrowly to obviously broad-based, abaxial surface hirsute to hispid, trichomes of larger nerves sometimes prominent, base gradually cuneate and ultimately narrowed into an acumen, margins serrulate to serrate, apex acute or acuminate; petiole 0.5-2(-3) cm, unwinged, neither dilated nor auriculate. Capitulescence 6-22 cm broad, corymbiform-paniculate, convex, somewhat closely 20-60+-capitate, not held well above mature leaves, branches bracteate; peduncles 0.4-2 cm, hirsutulous to substrigose, sometimes 1-2-bracteolate; bracteoles sometimes closely subtending capitula and somewhat squarrose-spreading. Capitula 6-10 mm, radiate; involucre 4-5 × 3.8-5 mm, noticeably shorter than disk florets, turbinate to narrow-campanulate; phyllaries 10-14, 0.9-1.3 mm diam., mostly ovate or oblong, moderately graduated, 2-3-seriate, appressed-ascending, flat, subherbaceous, indurate, usually not obviously squarrose, brownish, pilosulose-strigillose; outer phyllaries apex obtuse to rounded; inner phyllaries apex acute to obtuse, grading (except in length) into the typically much longer paleae; paleae 5.5-7 mm, strongly conduplicate, hirtellous to pilosulose, sometimes blackened, apex obtuse to acuminate. Ray florets 3-6, sterile and not styliferous, often developing non-synchronously, spreading laterally at about mid-paleae; corolla yellow, tube 1-1.4 mm, pilose, limb 3-5 × 2-2.5 mm, narrowly elliptic or ovate to oblong, 5-7-nerved. Disk florets 18-30+; corolla 3.8-4.5 mm, funnelform, yellow, tube 0.7-1 mm, hirsutulous, base of throat somewhat thickened, lobes 0.6-1 mm, triangular-lanceolate; anthers 1.7-2 mm; style branches c. 1 mm. Cypselae 3.5-6 mm, broadly winged when mature, glabrous or subglabrous, body black, wings to c. 0.8 mm diam., ciliate; pappus awns 2(-3), 2-3(-4) mm, sometimes fragile. 2n = 34. Flowering Nov-Feb(+ Apr-May). Montane forests, pine-oak forests, rocky road banks, thickets. Ch (Pruski et al. 4211, MO); G (Tuerckheim II, 1665, MO). 800-2400 m. (Endemic.)

Verbesina pleistocephala, described in Encelia because of its sterile rays, has nomenclatural priority over and is very similar by stiff obtuse phyllaries to white-flowered V. lanata and especially to yellow-flowered sterile-rayed V. apleura, which differs usually by larger subsquarrose capitula with more ray florets and sometimes denser leaf pubescence.

Coarse herbs to slender shrubs 2-5 m; stems exalate, thick and pithy, striae; densely villosulous to tomentulose, trichomes sordid; herbage with trichomes often patent-tortuous, occasionally heterotrichous with low farinose-moniliform trichomes present as well. Leaves simple and unlobed, alternate, petiolate; blade 12-50 × 4-13 cm, lanceolate to ovate, secondary veins c. 10 per side, adaxial surface scabrous to scabridulous, trichome subsidiary cells enlarged, abaxial surface densely hispidulous to hirsutulous, proximal portion rounded thence abruptly short-decurrent onto partly winged petiole, margins irregularly undulate-denticulate to coarsely dentate, apex acute to acuminate; petiole 2-10 cm, winged distally. Capitulescence 20-30 cm broad, thyrsoid-paniculate, rounded to sometimes somewhat flat-topped, many-numerous-capitulate, secondary and tertiary branchlets strongly spreading-divaricate; peduncles 0.5-1.2 cm, stiff, villosulous-hispidulous. Capitula 4.5-5.5 mm, radiate; involucre 2.8-3.5 × 3-3.5 mm, campanulate; phyllaries 2-3.5 × 0.7-1 mm, linear-lanceolate to oblanceolate, slightly unequal, slightly graduated, c. 2-seriate, apex acute to acuminate, mucronulate, pilosulose, the outer ones subherbaceous, the inner ones usually 1-nerved; paleae 3.2-3.8 mm, setulose. Ray florets 8-11; pistillate; corolla white, tube sparsely pilose, limb 3-4.5 × 1-2(-2.5) mm, ovate, c. 5-nerved. Disk florets 22-33; corolla 2-3 mm, greenish white, throat pilosulose, lobes triangular, 0.5-0.6 mm; style branches c. 1 mm. Cypselae blackish, 2.5-3 mm, hispidulous, trichomes becoming broad-based then somewhat tan-tuberculate, wings to 0.3-0.5 mm wide; pappus awns 2, 1.5-2 mm, scabridulous. Flowering Nov-Apr. Brushy slopes, cafetales, matorrales, mixed forests, moist barrack, oak forests, orilla de camino, pine forests, steep rocky dry slopes, wet thickets. G (Pruski y MacVean 4485, MO); H (Nelson Sutherland, 2008: 203). 1300-2600 m. (Endemic.)


Verbesina pringlei B.L. Rob., V. serrata var. pringlei (B.L. Rob.) B.L. Rob. et Greenm.

Shrubs 1-1.5(-3) m; stems exalate, pilose-hirsute. Leaves simple, opposite, petiolate; blade 5-10(-15) × 2-4.5(-6) cm, ovate-lanceolate to ovate, reticulations often prominent, surfaces concolorous, adaxial surfaces pilose-hirsute, trichomes broad-based, abaxial surfaces pilose-hirsute, trichomes narrow-based, base cuneate to obtuse or rounded thence with acumen decurrent onto petiole, margins serrate to coarsely so with 10-15 teeth per margin, apex acute to acuminate; petiole 1-3 cm. Capitulescence to c. 10 cm broad, corymbiform to corymbiform-paniculate, several-capitulate; peduncles 0.5-2(-4) cm, pilose-hirsute. Capitula 10-14 mm, radiate or sometimes discoid, (25-)26-37(-40)-flowered; involucre 5-10 mm wide, campanulate; phyllaries
8-10, unequal to subequal and nearly obgraduate, infrequently spreading, 2-3-seriate, herbaceous, at least the inner somewhat navicular, pilose-hirsute, obtuse; outer phyllaries 3-5(-6) × 1-2 mm, lanceolate to obovate; paleae 6-7 mm, setulose, acuminate. Ray florets (0-)1-2(-5), sterile or fertile and pistillate; corolla yellow, tube pilose, limb 4-6 mm, oblong. Disk florets 25-35; corolla 5.5-7.5 mm, yellow, tube pilose, lobes 1-1.3 mm, triangular to lanceolate, glabrous or sparsely setulose; style branches 2-2.5 mm. Cypselae 5.5-6.5 mm, body 2.2-3 mm wide, blackish, wings 1-1.5 mm wide, body sparsely pilose; pappus awns 2, 2-3.5 mm, subequal, scabrid, basally adnate with wings to tearing away and not so when awns spreading. Flowering time unknown. *Habitat unknown*. T (Cowan, 1983: 27). Elevation unknown. (Mexico.)

*Verbesina serrata* is a common Mexican species expected in Chiapas, but its occurrence in Tabasco was not verified. The citation by Breedlove (1986) of *V. serrata* in Chiapas is in reference to material I determine as *V. oligantha*.


Shrubs or small trees to 3 m; stems angulate, exalate, dense-tomentulose; distal internodes much shorter than clustered leaves. Leaves alternate, unlobed, petiolate; blade 6.5-16(-20) × 2.5-7(-11) cm, lanceolate-ovate, stiff-chartaceous, venation pinnate with 8-11 secondary veins per side, veins stramineous, prominulous abaxially, surfaces nearly concolorous but abaxial surface somewhat paler green, adaxial surface scabridulous, trichomes sometimes broad-based, abaxial surface moderately to densely pilosulose-hirsutulous, trichomes antrorse, base cuneate, then attenuate into an acumen 1-2 cm and slightly decurrent distally onto petiole, margins serrulate to serrate, apex acute to acuminate; petiole 1-4.5 cm, exalate, finely tomentellous. Capitulescence monocephalous to open-cymose, 1-5-capitulate; peduncles 1-5 cm, stout, 1-2-bracteolate, densely hirtellous to tomentulose; bracteoles 5-9 mm, oblongate. Capitula very large, 10-13 × 17-23 mm, globose, 230-350-flowered, radiate; involucre 5-10 mm, hemispherical to crateriform; phyllaries 2-2.5 mm diam., oblong, slightly graduate, 3-4-seriate, indurate; outer phyllaries 4-6 × 2-2.5 mm, herbaceous, hirtellous especially proximally, apex rounded; inner phyllaries 6-10 × 2-2.5 mm, stiff-chartaceous, sparsely puberulent, apex acute; paleae 5.5-7 × 0.5-0.8 mm, narrowly oblongate, slightly cymbiform, narrowly carinate, stramineous, apex broadly acute to acuminate. Ray florets 30-50, pistillate; corolla yellow, tube 2-3 mm, hirsutulous, limb c. 10 × 2.5-3 mm, oblongate, sparsely setulose abaxially. Disk florets 200-300; corolla 5-6 mm, cylindrical, yellow, tube 1-1.5 mm, densely hirsutulous, not obviously ampliate, lobes 0.6-0.7 mm, triangular; style branches 2-2.5 mm, apex distinctly acuminate. Cypselae 3-4.5 mm,
narrowly cuneate, brownish-black, glabrous, rays slightly trigonous with the 2 abaxial margins narrowly separated, disk compressed, abaxially exalate, adaxial margin very narrowly winged; pappus awns 0-1, 2-3 mm, present only adaxially, slender to base and never broadly decurrent onto wing. Flowering Oct. Pacific slope deciduous forests, wooded slopes, ?cloud forests). Ch (Stuessy y Gardner 4292, MO); ?G (Quedensley y Bragg, 2007: 67). 700-1000(-3000) m. (Endemic.)

This species is documented as occurring extremely near the border with Oaxaca where it should be expected, if indeed not already collected there. The report of this species disjunct to a high elevational cloud forest in Guatemala was not verified by me.


Shrubs 1-3 m; stems exalate, puberulent to glabrate. Leaves simple, opposite, petiolate; blade (4-)6-13 × (2-)3-10 cm, ovate to broadly so, weakly 3-nerved from above leaf acumination, reticulations often prominent, surfaces concolorous, adaxial surface hirsutulous, abaxial surface hirsute, base obtuse to truncate thence with acumen decurrent onto petiole, margins irregularly serrate, apex acute to acuminate; petiole 1-6 cm. Capitulescence to c. 10 cm broad, branches monocephalous to corymbiform and 3-7-capitulate, central capitulum sometimes closely subtended by distal-most leaf pair; peduncles 0.5-5(-8) cm, puberulent. Capitula 12-20 mm, radiate; involucre 8-14 mm wide, campanulate to hemispherical; phyllaries 21-27, subequal to somewhat gradient, 3-4-seriate, flat to slightly incurved, apex rounded; outer phyllaries 6-12(-15) × 7-10(-12) mm, broadly ovate to orbicular, often spreading, herbaceous, pubescent, shorter than to about as long as inner ones; inner phyllaries 10-12 × 4-6 mm, elliptic-lanceolate, appressed, scarious, glabrous; paleae 9-12 mm, short-setulose proximally, glabrous and sometimes blackening apically. Ray florets pistillate, 5-7; corolla light yellow, tube glabrous, limb 10-15 × 6-7 mm, oblong, 5-7-nerved, nerves abaxially sparsely setulose proximally. Disk florets 35-55; corolla 7-8.5 mm, light yellow, glabrous or nearly so, lobes c. 1 mm, long-triangular; style branches 1.5-2 mm. Cypselae 5-7(-8) mm, grayish, body and wings 2.5-4.5 mm wide, glabrous, wings usually narrow; pappus 2-cornudate, awns 0.3-0.7 mm. 2n = 34. Flowering Nov. Pine-oak forests. Ch (Breedlove 56000, MO). 2100 m. (Endemic.)

Slender shrubs to soft-wooded trees 5-15 m, leafy apically; stems simple or few-branched distally, suberete, exalate, brownish, moderately sordid-tomentulose distally, pith thick. Leaves alternate, unlobed, sessile with elongate petiole-like base winged to stem; blade of main stem leaves to lower capitulescence leaves 15-70(-122) × 5-25(-57) cm, obovate to sometimes spatulate, chartaceous, drying dull greenish-brown and more or less concolorous with stems, venation pinnate, secondary nerves of expanded portion of blade 9-15 per side, surfaces concolorous, adaxial surface hirsutulous-scabrous, abaxial surface pilosulose, leaf trichomes crisped-ascending, base long-attenuate and decurrent as wings onto petiole-like base to stem, subauriculate, petiole-like base about 1/4 leaf length, that of larger leaves 1.5-4 cm diam., margins subentire to denticulate, weakly revolute, apex acuminate. Capitulescence 25-35 cm diam., convex, corymbiform-paniculate from several distal branches 15-30 cm, 90+-capitulate, branches and branchlets moderately sordid-pilose-villous, internal bracteate leaves 5-15 cm, spatulate, the narrowly winged petiole-like base about half the length of these bracteate leaves; peduncles 1-3.8 cm, sordid-pilose-villous. Capitula 6-10 mm, (38-)43-54(-62)-flowered, radiate, drying brownish but stramineous-streaked from easily visible cypselae wings and pappus awns; involucre 4-5 × 4.5-8 mm, campanulate; phyllaries 2-3-seriate, moderately unequal with the outer few small but most phyllaries are longer and nearly subequal, flat or the inner ones somewhat navicular, stiff-subherbaceous, dark green, sordid-pilose-villous, apex broadly acute to obtuse; outer phyllaries 2-2.5 × 0.8-1 mm, lanceolate, slightly spreading; inner phyllaries 4-5 × 1-1.3 mm, lanceolate to oblanceolate, appressed; paleae 4-5 mm, reaching to only about middle of disk corollas, strongly navicular, scarious with subherbaceous apex, midrib ciliate, sparsely hirsutulous distally, apex acute. Ray florets 8-12, pistillate; corolla yellow, tube 1-1.3 mm, pilose, limb 2.5-3.2 × 1.6-2.3 mm, obovate, c. 5-nerved; styles more than half as long as corolla limb. Disk florets (30-)35-42(-50); corolla 3.8-5 mm, funnelform, yellow, tube 1-1.2 mm, sparsely pilose, throat much longer than either tube or lobes, moderately broader than tube, glabrous, lobes 0.5-0.6 mm, deltate; anthers c. 2 mm, connectives often stramineous, thecae black, appendage blackish. Cypselae 3.2-4 mm, body 1.2-1.5 mm diam., wings to c. 0.9 mm diam.; pappus awns 2, 2.2-3.3 mm, subequal or slightly unequal. Flowering Oct-Dec. Disturbed forests. CR (Hammel et al. 17691, MO). 1200-1800 m. (Endemic.)
**Verbesina tapantiana** is accepted as a satellite of the still variable *V. oerstediana*, from which it differs most notably by its leaves with petiole-like bases winged to stems and by its shorter obovate ray corolla limbs.


Shrubs?; stems angulate, exalate, sordid-hirsutulous, trichomes patent. Leaves alternate, subsessile, unlobed; blade 5-15 × 1.5-4 cm, elliptic to elliptic-oblong, thin-chartaceous, venation pinnate, finely reticulate, surfaces glabrous to sparsely strigillose-pilosulose, trichomes thin-based, basally cuneate to a short petiole-like base, not auriculate, margins callous-denticulate, teeth to c. 1 mm, apex acute to acuminate. Capitulescence closely corymbiform-paniculate, ultimate branchlet flowering clusters 2.5-10 cm diam., 5-10-capitulate; peduncles (0.1-)0.5-1.5 cm, sordid-hirsutulous. Capitula to c. 9 mm in fruit, c. 7-flowered, discoid; involucre 4-5 mm, campanulate; phyllaries ovate to oblong, navicular, subherbaceous, often black-streaked, 1-seriate, graduated, glabrous to sparsely hirsutulous, apex obtuse; paleae c.7 mm, sometimes hispidulous distally, apex acute to obtuse. Ray florets 0. Disk florets c. 7; corolla c. 5 mm, yellowish?, tube c. 1.5 mm, throat c. 1.5 mm, tube and throat densely hispidulous, lobes c. 2 mm, longer than throat, lanceolate, subglabrous. Cypsela c. 5 × 2.3 mm, flat and biconvex, faces carbonized to apex and without clear horizontal stramineous connecting line between pappus awns, longitudinally 1-nerved, margins callous-thickened but not broadly winged, hirsutulous; pappus awns 2, 2.5-3.2 mm, subequal. *Habitat unknown.* CR (*Kuntze s.n.*, US). Elev. unknown. (Endemic.)

The species is known from only its fragmentary type collection. The densely hispidulous disk corollas are somewhat reminiscent of those of *Garcilassa rivularis* Poepp., which has a much shorter corolla pubescence.

37. **Verbesina turbacensis** Kunth, *Nov. Gen. Sp.* (folio ed.) 4: 159 (1820 [1818]). Isotype: Colombia, *Humboldt y Bonpland s.n.* (B, photo in MO!). Illustr.: none. N.v.: Sakil baksuntez, tzelek' pat, Ch; toquillo, G; chimaliote negro, cube, ilamate, lemus, lengua de vaca, mano de león, muñeca, pascua de monte, rosca, tabaquillo, taco, toquillo muñeca, vara blanca, H; camaliote, capitanejo, chimaliote, chimaliote blanco, chimaliote negro, imaliote, ES; tora, CR.

*Verbesina exalata* Steyerl., *V. microcephala* Benth., *V. nicaraguensis* Benth., *V. sublobata* Benth.
Erect robust herbs to shrubs 0.5-3(?-6) m, unbranched below capitulescence; stems usually winged from decurrent petiole-like base or sometimes exalate, subterete-pluristriate to somewhat angulate, puberulent to tomentulose, trichomes patent to much less commonly appressed, wings 0.2-0.7 mm wide. Leaves usually pinnately 2-4-lobed per margin or occasionally sinuate-lobulate especially those of the distal nodes or rarely unlobed, alternate, with petiole-like base winged to stem; blade 12-35+ × 6-18+ cm, elliptic-lanceolate to obovate in outline, adaxial surface scabrous to hirsutulous, trichomes conical and subsidiary cells often enlarged, abaxial surface moderately to sparsely tomentulose, long-attenuate to base, often decurrent onto stem as wings especially visible in new growth or in low elevational plants but wings often not manifest or disintegrated in woodier plants or from higher elevations, margins lobed to deeply so, sinuses round, lobes to c. 13 × c. 5 cm, lanceolate or oblanceolate, subentire or denticulate to infrequently merely lobulate, apex acute to obtuse; winged petiole-like base to c. 15 cm. Capitulescence 15-30+ cm broad, corymbiform-paniculate, rounded to flat-topped, many-numerous-capitulate; peduncles 0.2-1.2 cm, hirsutulous, sometimes 1-2-bracteolate, bracteoles to c. 3 mm, linear-lanceolate. Capitula 4.3-7 mm, radiate; involucre 2.7-4 × 2.5-3.8 mm, narrow-campanulate; phyllaries 13-20, 1-3(-3.5) × 0.4-1.1 mm, usually noticeably shorter than disk florets, linear-lanceolate to inner ones oblong, unequal, graduated, c. 3-seriate, at least the inner ones somewhat navicular, apex thin-herbaceous, hirtellous to hirsutulous; paleae 3.5-4 mm, apiculate, hirsutulous. Ray florets 7-12, styliferous and fertile; corolla white, tube pilose to sparsely so, limb 2-4 × 1-2 mm, elliptic or ovate to obovate, c. 5-nerved. Disk florets 17-28; corolla 2-3 mm, white, pilose proximally, lobes 0.4-1 mm; style branches c. 1.1 mm. Cypselae 2-2.5 mm, body c. 0.8 mm wide, black, strigose, trichomes broad-based, sometimes imparting a tan-tuberculate appearance to surface, wings 0.2-0.7 mm wide, thin, base attenuate-stipitate; pappus awns 2, 1-1.6 mm, subequal. 2n = 34. Flowering year-round but with a peak from Oct-Feb. *Bosque enano, cafetales, cloud forest, disturbed areas, dry forest, edge of lava flows, fields, forest borders, open forest, orilla de camino, pastures, pine forests, pine-oak forests, potreros, rocky areas, sabinas, secondary vegetation, sitios abiertos, streamsides, thickets, volcano slopes.* T (Cowan 2779, MO, as "1779" in Cowan, 1983: 27); Ch (Breedlove y Thorne 21020, MO); ?B (Wiley 387, MO, late fruit and cannot be determined with certainty); G (Pruski y MacVean 4494, MO); H (Pruski et al. 4529, MO); ES (Linares y Martínez 2165, MO); N (Spooner y Dorado 2717, MO); CR (Williams y Molina R. 13831, MO); P (Busey 626, MO). 0-2600 m. (S. + E. México, Mesoamérica, Colombia, Venezuela.)

*Verbesina turbacensis* is probably the most common and widespread Flora Area Verbesina, and as circumscribed by Olsen (1985) has pubescent stems either winged or unwinged. *Verbesina*
tomentosa DC. is excluded from synonymy of *V. turbacensis*, although cited by Robinson y Greenman (1899) as a doubtful synonym of *V. sublobata*.

Within material of *V. turbacensis* in front of me there appears to be a general tendency toward winged stems in new growth, in lower elevational populations, or in plants of wet areas. On collection from Veracruz (*Pruski y Ortiz 4140*) consists of duplicates with either stems winged distally or wingless proximally.

Bibliography.

XII. J. Heliantheae subtribe Zinniinae Benth. et Hook. f.
Rudbeckiinae Dumort.

Por J.F. Pruski.

Annual or perennial herbs to shrubs. Leaves simple, alternate or opposite, sessile or petiolate; blade triplinerved or venation pinnate. Capitulescence monoecephalous to open-corymbiform, terminal or sometimes alternate, usually long-pedunculate to infrequently sessile. Capitula radiate or infrequently discoid; involucre turbinate to hemispherical or sometimes crateriform; phyllaries imbricate, subequal to gradate, 2-5-seriate, stifferly chartaceous to herbaceous, typically persistent; clinanthium convex to conical, paleate (Mesoamerica) or rarely epaleate; paleae usually as long as or longer than disk florets, conduplicate, usually persistent, apex infrequently spinescent. Ray florets typically 1-seriate, well-exserted, pistillate or infrequently sterile, without abscission zone at base of corolla (Mesoamerica); corolla marcescent (Mesoamerica) or rarely deciduous, tube lacking and limb arising directly from abaxial face of ovary (Mesoamerica except tube present in 1 sp.) or rarely tube developed. Disk florets typically bisexual or sometimes (e.g. Z. americana) functionally staminate; corolla actinomorphic or infrequently irregular, limb infrequently slightly asymmetric (one sinus deeper and adjacent lobes longer.
than the others), tube and throat sometimes thick-layered but veins of the throat without embedded fibers, lobes (3-)5; anthers sagittate, ecaudate, filaments glabrous, thecae dark to black, endothecial cell pattern polarized, appendage typically ovate, often glandular; style base glabrous, branches with stigmatic surfaces usually continuous, not 2-banded, apex acute to acuminate, usually with an appendage of small papillae. Cypselae usually compressed or the rays triquetrous and obcompressed, black, walls carbonized, sometimes striate, margins typically exalate or sometimes edges winged; pappose or weakly pappose, pappus when present represented by a low corona or 1-4 awns. $x = 19$. 7 gen., aprox. 65 spp.

Native to the Americas. 6 gen., 11 spp. in Mesoamerica, total including *Tehuana calzadae* which is expected in Mesoamerica.

Robinson (1981) treated Verbesininae and Zinniinae in synonymy of Ecliptinae, but Ecliptinae differs from both by having fibers embedded within the veins of the disk corolla throats. Karis, P.O. y Ryding (1994) recognized Zinniinae as including our genera as well as including *Podachaenium*, *Spilanthes*, and *Squamopappus*. The concept of Zinniinae use here is largely that of Panero (2007-HELIANTH), who excluded *Podachaenium* and *Squamopappus* to Verbesininae and placed *Spilanthes* into Spilanthinae, the subtribe sister to Zinniinae.

*Rudbeckia mollis* Elliott (*Sketch Bot. S. Carolina* 2: 453 1824[1823]) was listed as cultivated in Nicaragua by Ramírez (1911) but does not appear to escape from cultivation or even persist. *Echinacea* and *Rudbeckia* are usually placed within the same subtribe, and Karis, P.O. y Ryding (1994) treated both as Rudbeckiinae. More recently, Panero (2007-HELIANTH) retained Rudbeckiinae, but treated *Echinacea* within subtribe Zinniinae.


1. Leaves alternate; ray florets sterile
1. Leaves opposite; ray florets pistillate.

2. Ray cypselae 3-awned.
2. Ray cypselae 1-awned or epappose.

3. Shrubs; cypselae epappose.
3. Herbs; cypselae pappose or epappose.

4. Leaves glandular; phyllaries unequal, graduated, finely striate; ray cypselae obcompressed or slightly triquetrous, disk cypselae compressed; pappus absent or disk cypselae sometimes 1-awned.

6. *Zinnia*
4. Leaves eglandular; phyllaries usually subequal to obgraduate, often 2-costate; cypselae subterete to obconic-prismatic; disk cypselae epappose.

5. Paleae about as long as associated disk florets, apices acute to obtuse, ray corolla limbs 10-30 × 3-8 mm, lanceolate to oblong, abaxially glabrous; disk cypselae subterete or weakly prismatic, ecostate.

2. Heliopsis

5. Paleae c. 2+ mm longer than associated disk florets, apices subulate; ray corolla limbs 8-11 × 6-8 mm, obovate to orbicular, strigillose abaxially; disk cypselae quadrate, 4-costate.

5. Tehuana

1. Echinacea Moench

_Brauneria_ Neck. ex Porter et Britton, _Helichroa_ Raf.

Por J.F. Pruski.

Perennial herbs, usually tap-rooted; stems erect. Leaves basal and cauline, alternate, at least the proximal leaves petiolate; blade linear to ovate, chartaceous, 3-5-plinerved, eglandular. Capitulescence monocephalous; peduncles elongate, ebracteolate. Capitula radiate; involucre hemispheric to crateriform; phyllaries imbricate, unequal to subequal, linear-lanceolate to ovate, few-costate proximally becoming striate distally; clinanthium commonly conical, paleate; paleae spinescent, in fruit much longer than associated disk floret, carinate, subconduplicate proximally, persistent, apex stiffly attenuate-subulate. Ray florets 8-21+, sterile; corolla marcescent, tube basically absent, limb spreading or directed slightly downward (ours) to strongly drooping, pink to purple (ours), rarely white or yellow, setulose abaxially (ours) to glabrous; ovary sterile. Disk florets 200-300+, bisexual; corolla broadly tubular, greenish proximally to distally pinkish or purplish, rarely yellow, glabrous or throat sometimes sparsely setulose, tube shorter than throat, bulbous-based, lobes 5; anthers basally short-sagittate, usually dark; style slightly enlarged basally, branch stigmatic surface continuous, apex long-papillose. Disk cypselae (rays sterile) obconic-prismatic (ours) to less commonly subcompressed, tan to brown, smooth to slightly pustulate; pappus thick-corniform. _x_ = 11. 9 spp. Native to Canada, United States; elsewhere in cultivation and sometimes naturalized.

_Echinacea_ was monographed by Sharp (1935), McGregor (1968), and Binns et al. (2002), but this treatment is adapted basically from that of Urbatsch et al. (2006), who recognized 9 species of _Echinacea_. _Echinacea purpurea_ is a widespread ornamental and roots of several species are used in herbal medicine.


Fibrous-rooted herbs 0.5-1.5 m; stems simple to few-branched distally, hirsute to less commonly glabrous. Leaves long-petiolate or the distal ones short-petiolate; blade 5-25(-30) × (1-)2-7(-12) cm, 1.5-5× as long as broad, lanceolate to ovate, surfaces scabrous to hirsutulous, trichomes of adaxial surface often with prominent subsidiary cells, base usually obtuse or truncate(-cordate) to the distal leaves cuneate, margins serrulate to less commonly subentire, apex typically attenuate; petiole 1-20(-32) cm, those of basal leaves sometimes with distal 1-2 cm narrowly winged by decurrent blade. Capitulescence: peduncles 8-25 cm. Capitula 15-35(-45) mm; involucre 11-40 mm diam.; phyllaries 9-17 × (1-)2-4(-8) mm, usually c. 4-seriate, glabrous to hirsutulous, margins ciliate, usually reflexed, apex attenuate; clinanthium 20-30(-40) mm diam.; paleae 10-14 mm, lanceolate, c. 3-striate, reddish-orange (sometimes purple) distally, in fruit the narrowed apex 5-6 mm longer than associated disk floret. Ray florets 13-21+; corolla limb 35-50(-65) × 6-10(-15) mm, oblanceolate to oblong, 9-15-nerved, the 2 support veins prominent, apex acute to obtuse, entire or 2-dentate; ovary sometimes setulose. Disk florets: corolla 4.5-6 mm, lobes c. 0.7 mm, erect; anthers basically included at anthesis, fresh pollen yellow. Disk cypselae 3.5-5 × 2-3 mm, glabrous, broad apically. 2n = 22. Flowering Apr. Persisting from cultivation, naturalized. CR (Rodríguez 3340, INB). 900-1500 m. (Canada, United States; cultivated and persisting from cultivation, sometimes naturalized in Mexico, Mesoamerica, Venezuela, Brazil, Argentina, Chile; Europe, Africa, Asia, Australia, New Zealand, Pacific Islands.)

The original material of *Rudbeckia purpurea* matches the segregate taxon now called *Echinacea laevigata* (C.L. Boynton et Beadle) S.F. Blake, prompting the Binns et al. (2001) proposal made to maintain current usage of *E. purpurea*. The Binns et al. (2001) proposed
conserved type of *R. purpurea* is the lectotype of synonymous *Rudbeckia purpurea* var. *serotina* Nutt.


Por J.F. Pruski.

Annual or perennial herbs or less often subshrubs; stems erect or ascending to less commonly trailing, moderately branched sometimes from base, suberete, striate, glabrous to villose. Leaves opposite, subsessile or petiolate; blade filiform to orbicular, chartaceous, venation triplinerved from or near base, surfaces glabrous to variously pubescent, eglandular, base cuneate to nearly truncate, margins entire to coarsely serrate, apex acute to obtuse. Capitulescence monocephalous, terminal or axillary; peduncles typically elongate, ebracteolate. Capitula radiate or very rarely discoid; involucre turbinate to hemispherical, to 3.5 cm diam.; phyllaries imbricate, subequal or obgraduate, 2-3-seriate, lanceolate-ovate to ovate or spatulate, herbaceous to stiffly chartaceous, apex acuminate to obtuse, glabrous to pubescent, outer series sometimes herbaceous and longer than the disks; clinanthium convex to conical, paleate, sometimes fistulose; paleae about as long as associated disk floret, often persistent, conduplicate, stramineous to reddish or purple, apex obtuse to acute(-acuminate). Ray florets (0-)4-20, pistillate; corolla marcescent, without a tube and with the limb emerging directly from ovary apex, limb lanceolate to oblong, yellow to orange, rarely purple, abaxially glabrous to pubescent, adaxially sometimes noticeably papillose. Disk florets 30-150, bisexual; corolla narrowly funnelform, 5-lobed, often persistent, yellow to purplish, glabrous or lobes pubescent, tube shorter than throat, limb only slightly broadening, lobes erect or slightly reflexed, typically papillose within; anthers basally short-sagittate, thecae black, apical appendage usually black or sometimes stramineous, eglandular; style base broadened, branch stigmatic surface continuous, apex narrowed, papillose. Cypselae slightly heteromorphic, obconic-prismatic or suberete, ecostate (ours); epappose (ours) or pappus somewhat coroniform or squamulose. $x = 14$. Aprox. 13-16 spp. New World, 2 spp endemic to the United States, 9-12 spp. in Mexico (including 8-11 endemics), 2 spp. endemic to northern South America.


Annual or perennial herbs 0.4-8(-1.5) m; stems erect or less commonly proximally prostrate, simple or branched distally, glabrous to puberulent(-villous) in lines, internode typically much longer than leaves. Leaves petiolate; blade (2.5-)3.5-8.5(-10) × (1.5-)2.5-5 cm, lanceolate to deltate-ovate, both surfaces strigillose, base cuneate to broadly rounded, margins subentire or serrate to occasionally deeply serrate, apex acute to acuminate; petiole (1-)1.5-2.5(-3.5) cm. 

Capitulescence: peduncles (4-)8-15(-26) cm, slender, glabrous or distally puberulent in longitudinal lines, sometimes fistulose distally. Capitula 8-18 mm, radiate; involucre (4-)6-10 × (6-)8-12 mm, campanulate to hemispherical; phyllaries 14-20, c. 2-seriate, apically obtuse to rounded; outer phyllaries (4-)5-6(-9) × 1.5-3(-4.5) mm., oblanceolate to spatulate, herbaceous or at least distally, often 2-costate proximally, abaxially villous to villosulous, less so adaxially; inner phyllaries 3-5 mm, lanceolate to elliptic, c. 3-nerved; clinanthium 4-8 mm, conical; paleae 3.5-5(-7) mm, oblanceolate, persistent, firm, slightly keeled, stramineous with 1-3 brown nerves, sometimes reddish distally. Ray florets 9-19; corolla limb 10-30 × 3-8 mm, exserted from the involucre, somewhat stiff especially when dried, yellow adaxially, sometimes greenish abaxially, c. 10-nerved, abaxially glabrous, apex (2-)3-denticulate. Disk florets (30-)50-150; corolla 3.5-4.5 mm, persistent, yellowish brown, glabrous, tube 0.5-0.8 mm, lobes 0.5-0.7 mm, often reflexed, papillose within; anthers c. 1.2 mm, basically included at anthesis; style branches c. 1 mm, short-exserted. Cypselae 2.5-4 × c. 1.5 mm, brown (rays) to dark brown to black (disks), rugulose-tuberculate, glabrous or infrequently puberulent. 2n = 28, 56. Flowering Feb, May-Oct. *Bosque de pino-encino, clearings, cloud forest, low forest, meadows, mixed forest, moist thickets, Pine-oak forests, roadsides, selva baja caducifolia, trail sides*. Ch (King 3049, US); G (Proctor 25344, MO); H (Molina y Molina 14093, MO); CR (Fisher 1957: 185); P (Woodson y Schery 530, MO). 400-3000 m. (Mexico, Mesoamerica, Colombia, Venezuela, Ecuador, Peru, Bolivia.)

Pruski (2000) noted that the species was incorrectly called *Heliopsis oppositifolia* (Lam.) S. Diaz by Strother (1999), a later homonym blocked by *H. oppositifolia* (L.) Druce. Some small-leaved small-capitulate high-elevational Mesoamerican materials are referable to *H.*
buphthalmoides in technical features, but in gestalt somewhat resemble H. parviceps, which differs by capitula with 4-5 ray florets, purple corollas, and purple-tipped paleae. Some collections from Sierra San Filipe, Oaxaca (e.g., Pringle 4835) have paleae with acuminate apices, but never narrowed or elongated to the extent found in the similar Tehuana.

3. Philactis Schrad.


Por J.F. Pruski.

Shrubs; stems erect or ascending, moderately to much-branched, suberete, striate, glabrous to pubescent. Leaves opposite, petiolate; blade elliptic-lanceolate to deltate or ovate, chartaceous, venation triplinerved from base or nearly so to pinnately 3-veined from well above base, surfaces glabrous to pubescent, eglandular, margins serrulate to serrate; petiole of adjacent leaves typically slightly connate and distally sheathing stem. Capitulescence terminal and monocephalous or more commonly corymbiform; peduncles slender, ebracteolate, pith typically solid. Capitula radiate; involucre hemispherical; phyllaries imbricate, subequal or obgraduate, 2-4-seriate, few-costate basally, apex acuminate to obtuse; outer phyllaries herbaceous-tipped, all otherwise stramineous-chartaceous; clinanthium convex to short-conical, paleate; paleae about as long as or longer than the associated disks floret, persistent, conduplicate, stramineous, often uncinate, stiffly attenuate-tipped (ours) or merely acute. Ray florets pistillate, 11-22; corolla marcescent, without a tube and with the limb emerging directly from ovary apex, limb oblong, yellow to orange or with age turning maroon, somewhat stiff especially when dried, typically abaxially setulose at least on support veins. Disk florets 60-100+, bisexual; corolla broadly tubular, 5-lobed, persistent, yellow or golden-yellow, sometimes purplish distally, glabrous, tube not well differentiated from throat, often swollen and indurate in fruit, lobes erect, sometimes curved inward; anthers slightly exserted at anthesis, base short-sagittate, thecae black, appendage stramineous, slightly sculpted; style dilated basally, branches slightly exserted, recurved, stigmatic surface continuous, apex papillose. Cypsela dimorphic, smooth or costate (not tuberculate), dark brown, glabrous to puberulent, carpopodium flat; ray cypsela obconic-triquetrous with thickened angles, adaxial angle often slightly winged, 1-awned (ours) adaxially (inner face), awn broad-based, smooth, sometimes continuous with a narrow adaxial cypsela wing, slightly spreading; disk cypsela slightly compressed to obconic-prismatic, typically subquadrate, abaxial and adaxial angle generally more prominent; pappus 0-4-awned, awns setulose. x = 14. Aprox. 4 spp. Mexico, Mesoamerica.
The attenuate-tipped paleae and stramineous anther appendages of *Philactis*, serve to distinguish it from similar *Heliopsis*. Strother (1999) recognized *Philactis* as unispecific, reducing our two species to synonymy of *P. zinnioides*. Species circumscriptions basically follow Blake et al. (1926 sub *Grypocarpha*) and Torres (1969) by recognizing our two species as distinct from Oaxacan endemic *P. zinnioides* Schrad., which differs from our species by 4-awned disk cypsela and pilose herbage with patent trichomes.


1. Leaf blade veins abaxially hirsutulous with spreading or patent trichomes or sometimes merely strigillose; phyllaries hirsutulous or strigillose at least proximally; paleae at anthesis about as long as disk florets.

1. *P. liebmannii*

1. Leaf blade veins abaxially glabrous; phyllaries glabrous or margins ciliate; paleae at anthesis 1.5-2 mm longer than associated disk florets.

2. *P. nelsonii*


Perennial herbs to shrubs 0.2-3 m; stems typically sparsely strigillose. Leaves short-long-petiolate; blade 2-12 × 1.2-8 cm, elliptic-lanceolate to elliptic or less commonly ovate, generally pinnately 3-veined from above base to less commonly triplinerved from near base, surfaces strigillose or abaxial surface sometimes hirsutulous, veins abaxially hirsutulous with spreading or patent trichomes or sometimes merely strigillose, base nearly truncate to cuneately tapered, occasionally obliquely so, margins serrulate to serrate, apex acute to acuminate; petiole 0.6-5 cm, slightly hirsutulous. Capitulescence 1-3(-5)-capitulate, occasionally held above subtending leaves; peduncle 0.3-6.5 cm, hirsutulous or strigillose. Capitula 5-9(-12) mm; involucre 5-11 × 6-9 mm; phyllaries hirsutulous or strigillose at least proximally, sometimes distally glabrate; outer phyllaries 5-11 mm, distally to c. 1 mm diam., narrowly panduriform-lanceolate, slightly herbaceous and reflexed, c. 3-striate; inner phyllaries 4.5-5.5 × c. 1.5 mm, deltate, often slightly 1-3-striate, narrowly acute to acuminate apically; clinanthium c. 1.5 mm, convex-short-conical; paleae c. 5.5 mm, at anthesis about as long as disk floret, lanceolate, slightly keeled, sometimes
strigillose, apex c. 1.5 mm. Ray florets 11-16(-20); corolla limb 8-14 × c. 3 mm, 8-12-nerved, apex subentire to shallowly notched. Disk florets 25-43; corolla 2.7-3.8 mm, lobes c. 0.4 mm; style branches c. 1 mm, short-exserted. Ray cypselae 2-3.3 mm, glabrous or ventral angle ciliate, awn 1-2.5 mm; disk cypselae to c. 2.4 mm, puberulent, angles ciliate, pappus awns 0-3, 1-2.5 mm, unequal. Flowering Jul-Sep. *Matorral xerófilo, pine-oak forest, seasonal evergreen forest, secondary growth forests, selva mediana perennifolia, tropical deciduous forests.* Ch (Breedlove 39625, MO); G (Torres, 1969: 328). 500-1700 m. (Mexico [Oaxaca], Mesoamerica.)

*Melanthera fruticosa* Brandegee is usually (Blake et al, 1926; Torres, 1969) treated in synonymy of *Philactis liebmannii*, but Brandegee's protologue described the leaves and phyllaries of *M. fruticosa* as "glabris" (as in *P. nelsonii*), so it is here referred only provisionally to synonymy.


N.v.: none.

*Sanvitaliopsis nelsonii* (Greenm.) Greenm.

Low understory shrubs 0.6-1.5 m; stems glabrous. Leaves typically long-petiolate; blade 4-10 × 1.5-6 cm, elliptic-lanceolate to deltate-ovate, generally triplinerved from near base, glabrous or rarely strigillose abaxially near the petiole-midrib juncture, veins abaxially glabrous, base cuneate to nearly truncate, margins serrate, apex acute to acuminate; petiole 1.3-4 cm, slightly ciliate. Capitulescence 1-3-capitulate, not held much above subtending leaves; peduncle 0.7-6 cm, glabrous or slightly puberulent distally. Capitula 8-13 mm; involucre 5-9 × 6-10 mm; phyllaries glabrous or margins ciliate; outer phyllaries 5-9 mm, distally to 2 mm diam., ob lanceolate or panduriform, distal half herbaceous and reflexed, c. 3-striate, apically acute to acuminate; inner phyllaries 4-5 × 1-1.5 mm, deltate to lanceolate to elliptic, 1-3-striate, acuminate apically; clinanthium c. 3 mm, short-conical; paleae 5-7 mm, at anthesis 1.5-2 mm longer than associated disk floret, lanceolate, slightly keeled, the narrowed apex 2-3 mm. Ray florets 13-20(-22); corolla limb 9-11 × 2.5-4 mm, c. 13-nerved, apex shallowly 2-3-lobed. Disk florets 50-80; corolla 3-3.7 mm, lobes c. 0.7 mm; style branches c. 1 mm, short-exserted. Ray cypselae 3-4 mm, glabrous or nearly so, each face few-nerved, ventral angle slightly winged, awn 2-3 mm, the narrow adaxial wing continuous with awn; disk cypselae 2.5-3 mm, puberulent, pappus awns 2 (abaxial and
adaxial), 1.5-2(-3) mm, subequal, slender, 1 or 2 intermediate squamellae occasionally present, c. 0.2 mm. 2n = 56. Flowering July-Oct. Open rocky slopes in low mountains, tropical deciduous forests. Ch (Cronquist 9670, MO). 400-1300 m. (Mexico [Oaxaca], Mesoamerica.)

4. Sanvitalia Lam.

Lorentea Ortega

Por J.F. Pruski.

Tap-rooted annual herbs (ours) or sometimes perennial woody-based subshrubs; stems ascending to prostrate, dichotomously moderately-branched from base or throughout, subterete, finely striate, pubescent (indistinct moniliform trichomes also present); herbage with trichomes to 1+ mm. Leaves opposite, sessile or petiolate; blade linear to obovate, chartaceous, 3-nerved from base or nearly so, bases slightly connate at node, margins entire to lobed, surfaces eglandular, otherwise puberulent to pubescent. Capitulescence usually terminal and monocephalous, capitula commonly (ours) sessile or subsessile, typically immediately subtended by 1-3 pairs of leaves. Capitula radiate; involucre hemispherical to broadly campanulate; phyllaries imbricate (ours) or less commonly subimbricate, subequal to slightly unequal, 2-4-seriate, chartaceous (ours), nerves not prominent (ours); outer phyllaries 5-8, sometimes herbaceous or apically so; inner phyllaries sometimes apiculate, usually erect in fruit; clinanthium convex to short-conical, paleate; paleae typically about as long as or slightly longer than associated disk floret, typically dark-colored distally, apex often stiff-attenuate. Ray florets 5-20, pistillate, 1-2-seriate; corolla marcescent, without a distinct tube and with the limb emerging directly from ovary apex, limb exserted from involucre nearly at right angles, yellowish to yellow-orange (less commonly white), fading with age, apex 2-3-lobed. Disk florets (15-)30-60, bisexual; corolla broad-tubular to cylindrical-funnelform, 5-lobed, distally yellow-orange or sometimes apically purplish, usually glabrous, tube not well-differentiated from throat, lobes erect; anthers basically included, basally short-sagittate, thecae black, appendage navicular, light brown; style branches slightly exserted, recurved, stigmatic surfaces continuous, apex papillose. Cypsela heteromorphic, faces smooth to tuberculate, often pubescent at least apically with uncinate trichomes; ray cypsela obconic-subtriquetrous, 3-awned, awns broad-based, rigid, smooth, the 2 abaxial-lateral awns spreading to divergent; outer disk cypsela subquadrate, those of inner disks subquadrate or sometimes compressed (obovate in outline) and winged, wings entire to pectinate, pappus of 0-4 awns or corinula. x = 8. 6 spp. (SW United States, Mexico, Mesoamerica; 1 sp. in Argentina and Bolivia.)
Sanvitalia was revised by Torres (1964) and by it essentially tubeless ray corollas it is placed in subtribe Zinniinae. Because of awned-cypselae it is often confused with Calyptocarpus, which differs by ray corollas having an elongate tube. Anaitis DC. is listed as a synonym of Sanvitalia by Bentham y Hooker (1873). However, the phototype of Anaitis acapulcensis DC. (sub F. neg. #33768) shows an incomplete plant that is presumably not a Sanvitalia. Thus, Anaitis DC. is excluded from the synonymy of Sanvitalia.


1. Ray corollas shorter than ray pappus awns; disk cypselae never obviously winged.

1. S. ocymoides

1. Ray corollas at least as long as ray pappus awns; inner disk cypselae obviously winged.

2. S. procumbens


Calyptocarpus blepharolepis B.L. Rob., Sanvitalia tragiifolia DC.

Annual herbs 10-20 cm; stems much-branched from base, decumbent to erect, hirsute or strigose. Leaves petiolate; blade 1-3(-3.5) × 0.7-1.8(-2.2) cm, ovate to obovate, surfaces hirsute to substrigose, base cuneate, typically decurrent onto petiole, margins entire, apex obtuse; petiole 0.4-1 cm. Capitulescence sessile, subtending leaves sometimes grading into outer phyllaries. Capitula 6-8.5 mm; involucre 5-8 mm diam.; phyllaries 12-20, 3-4-5 mm, broadly ovate to obovate, subequal and +/- similar, distal margins sometimes herbaceous (infrequently outer few herbaceous in distal 1/3), hirsute-strigose, often ciliate, apex typically rounded-apiculate; paleae to c. 6.5 mm, at anthesis often c. 1 mm longer than associated disk floret, distally purple. Ray florets 8-11, 1-seriate; corolla limb c. 2 × 0.8-1.5 mm, shorter than ray pappus awns, about as broad as ovary and cypsela, triangular, 2-4-nerved, apex 2-denticulate. Disk florets 10-30, typically shorter than subtending paleae; corolla 1.5-2 mm, broad-tubular, lobes c. 0.3 mm.

Cypselae dimorphic; ray cypselae 3.5-4 mm, surface not tuberculate, cream-colored, pappus awns 2-3 mm, divergent, the 2 abaxial-lateral awns protruding at near right angles from involucre; disk cypselae 3-4 mm, isomorphic, all obconic-prismatic and subquadrate, faces tuberculate, typically cream-colored or black, angles sometimes thin-margined and to c. 0.2 mm wide but never obviously winged, basically epappose, shoulders sometimes corniculate, cornicula to c. 0.5 mm.
2n = 16. Flowering Sep. *Disturbed areas, thorn scrub.* Ch (expected); G (expected). 200-300 m. (SW United States, Mexico, expected in Mesoamerica.)

By imbricate phyllaries and ray corollas shorter than ray cypselae awns, *S. ocymoides* resembles *S. angustifolia* Engelm. ex A. Gray, which differs by lanceolate leaves and compressed winged inner disk cypselae.


Annual herbs 5-25 cm; stems several-branched from base, decumbent to prostrate, less commonly erect, spreading, often elongating to c. 30 cm, hirsute. Leaves petiolate; blade 0.9-3.5(-6) × 0.4-1.5(-3) cm, elliptic-lanceolate to ovate, surfaces scabrous to strigose, subsidiary cells sometimes prominent, base cuneate to rounded, then typically abruptly narrowed and slightly decurrent onto petiole, margins entire, apex acute, less commonly either acuminate or obtuse; petiole 0.4-1(-1.6) cm. Capitulescence subsessile, subtending leaves sometimes grading into outer phyllaries; peduncle (0-)5 mm. Capitula 6.5-9 mm; involucre 5-9 mm diam.; phyllaries 12-20, slightly unequal and slightly dimorphic, distally villose, often ciliate; outer 2-5 phyllaries 3-4 mm, usually about 2/3-3/4 as long as the inner, lanceolate or oblanceolate, distal 1/3 usually gradually narrowed, herbaceous, and sometimes reflexed; inner phyllaries 4-4.5 mm, broadly obovate, apex rounded-apiculate; paleae to c. 7.5 mm, distally purple. Ray florets 8-13, 1-seriate; corolla limb 3.5-6(-9) × 2-3.2 mm, at least as long as ray pappus awns, broader than ovary and cypselae, deltate-ovate, 5-7-nerved, 3-4 support veins more prominent, apex 2-3-denticulate. Disk florets 20-60, sometimes slightly shorter than subtending paleae; corolla 2.2-3.2 mm, cylindrical-funnelform, tube 0.3-0.6 mm, lobes 0.5-0.7 mm; style branches c. 0.5 mm. Cypselae heteromorphic; ray cypselae 2.5-3.5 mm, surface not tuberculate, cream-colored, pappus awns 1.5-3 mm; disk cypselae dimorphic; outer disk cypselae c. 2 mm, obconic-prismatic and subquadrate, faces tuberculate, cream-colored or black, epappose or 1-2-awned; inner disk cypselae 3.5-4 mm, obovate in outline, obviously compressed and winged, faces black, wings to 0.5+ mm diam., corky, cream-colored, entire to pectinate, wing extending above cypselae body, epappose or 1-2-awned, awns to c. 1 mm. 2n = 16. Flowering Jul-Jan, Mar. *Disturbed areas, dry forest, fields, roadsides, rocky slopes, secondary vegetation, selva baja caducifolia.* Ch (King
Sanvitalia procumbens is often used medicinally, as evidenced by its many common names. The plants are often found in dense populations. The sole Costa Rican voucher (Worthen s.n., MO) cited by Torres (1964) as S. procumbens has pedunculate capitula, ray corolla tubes, and is redetermined here as Calyptocarpus wendlandii. Sanvitalia is thus excluded from Costa Rica.

5. Tehuana Panero et Villaseñor

Por J.F. Pruski.

Annual herbs; stems erect, simple to few-branched, suberete, striate. Leaves opposite, petiolate; blade broad, chartaceous, triplinerved, surfaces hirsute to strigose, eglandular, trichomes on adaxial surface often with prominent subsidiary cells reflecting light and falsely appearing glandular. Capitulescence monocephalous to open corymbiform, terminal; peduncles elongate, ebracteolate. Capitula radiate; involucre hemispherical to crateriform; phyllaries imbricate, subequal, 2-seriate, herbaceous to stiffly chartaceous, often 2-costate; clinanthium conical, paleate; paleae c. 2+ mm longer than associated disk floret, subconduplicate proximally, apex attenuate-subulate. Ray florets pistillate; corolla marcescent, without a tube and with the limb emerging directly from ovary apex, limb ovate to orbicular, yellow-orange, exserted, strigillose abaxially. Disk florets 120+, bisexual; corolla broadly tubular, sometimes gibbous-based, 5-lobed, greenish proximally becoming yellow-orange distally, glabrous; anthers partly exserted at anthesis, basally short-sagittate, thecae black, apical appendage stramineous, eglandular; style branch stigmatic surface continuous, apex papillose. Cypselae dimorphic, dark brown, sparsely setulose; ray cypselae obconic-subtriquetrous, striate, epappose to adaxially 1-cornicate; disk cypselae obconic-prismatic, 4-costate, epappose. x = 14. 1 sp. Mexico, expected in Mesoamerica.

Tehuana differs from Mesoamerican taxa by its paleae much longer than disk florets and by sometimes orbicular ray corolla limbs.


Herbs 25-80 cm; stems sparsely strigose. Leaves: blade 3.5-8(-10) × 1.5-4(-6) cm, elliptic to ovate, base cuneate to sometimes rounded, margins subentire to serrulate, apex acute; petiole 0.7-3.2 cm. Capitulescence 1(-few)-capitulate; peduncles 8-15(-20) cm, slender, strigose. Capitula (12-)15-22 mm; involucre 12-15 mm diam.; phyllaries 9-14, lanceolate to elliptic-ovate; outer phyllaries 5-6 × 1.5-2 mm, strigose, spreading to loosely appressed; inner phyllaries 5.8-6.5 × 1-1.7 mm, strigose distally, aristate, loosely appressed to loosely so; clinanthium 4-12 × 2-3 mm; paleae 7-8 mm, oblong-elliptic, stramineous or pale green with apically c. 0.5 mm purplish, the narrowed apex 2-3.5 mm. Ray florets 7-9; corolla limb 8-11 × 6-8 mm, c. 9-nerved, apex obtuse, 2-denticulate. Disk florets: corolla c. 3 mm, glabrous, lobes c. 0.5 mm, ascending; anthers c. 1.3 mm; style branches c. 0.8 mm. Ray cypselae c. 3 × c. 1 mm, coriculum 0-1 mm; disk cypselae 2.7-3.4 × 1.1-1.2 mm, costae c. 0.2 mm diam., lighter brown than faces, faces minutely pustulate. 2n = 28. Flowering Aug-Sep. Disturbed areas, open forests. Ch (expected). 100-200 m. (Mexico [Oaxaca], expected in Mesoamerica.)

_Tehuana calzadae_ is known from low elevations along the Pacific coast in Oaxaca, about 150 km E of Tonala, Chiapas, where similar habitats occur and where the species might reasonably be expected to be found.

6. _Zinnia_ L., nom. cons.

_Anaitis_ DC., _Crassina_ Scepin, _Diplothrix_ DC., _Lepia_ Hill, _Mendezia_ DC., _Tragoceros_ Kunth, _Zinnia_ sect. _Tragoceros_ (Kunth) Olorode et Torres

Por J.F. Pruski.

Annual or perennial herbs to low shrubs; stems usually erect, few-much-branched, subterete to angled, striate to obscurely so, pubescent, fistulose or with solid pith. Leaves opposite, sessile or short-petiolate; blade linear-lanceolate to elliptic-ovate, chartaceous, venation palmately 3(or 5)-nerved from very base, less commonly pinnate to weakly 3-nerved, surfaces glandular (ours), pubescent, base narrowly cuneate to cordate, adjacent leaves typically subconnate, margins typically entire. Capitulescence monoecephalous to few-capitulate, terminal or from distal nodes; peduncles typically elongate, ebracteolate, sometimes distally fistulose. Capitula radiate; involucre turbinate or narrowly campanulate to hemispherical; phyllaries imbricate, graduated, 3-5-seriate, elliptic-ovate to obovate, thinly to thickly chartaceous, finely striate, apex typically rounded, often darker or differently textured, margins often ciliate; clinanthium convex to conical, paleate; paleae about as long as associated disk floret, persistent. Ray florets 2-21, pistillate, typically uniseriate, sometimes pluriseriate in cultivars; corolla marcescent, often
relatively thick and rigid (especially when dried), tube short ($Z. purpusii$) or more typically lacking with the limb emerging directly from ovary apex, limb white or yellowish to reddish-purple, 5-10-nerved, 2 support nerves especially prominent, nervation generally becoming much-reticulate, apex obtuse or less commonly acute, typically shallowly to deeply 2-3-lobed, nerves often greenish distally on abaxial surface, abaxially glandular or substrigillose or both, short-papillose adaxially; style trunk and abaxial branch surface rarely glandular. Disk florets 2-200, bisexual or sometimes (sect. *Tragoceros*) functionally staminate; corolla tubular to narrowly funnelform, 5-lobed, typically yellow becoming reddish-purple distally, tube or throat commonly dilated, tube much shorter than throat, limb sometimes slightly asymmetric (in Mesoamerica in some Zinnias with one sinus deeper and adjacent lobes longer than the others), generally setulose-papillose within or at least marginally; anthers included or short-exserted at anthesis, pale or less commonly slightly darkened, basally truncate to short-sagittate, apical appendage typically present, planar to weakly navicular; style branches apically tapering, each with a stigmatic surface continuous, apex papillose. Cypsela obcompressed to slightly triquetrous (rays) or slightly to strongly compressed (disks), orbicular to elliptic-ovovate in outline, glabrous to pubescent, faces sometimes tuberculate, often callous-margined or ciliate, apex truncate or sometimes bicornicate; ray cypselae epappose; disk cypselae epappose or pappus narrowly 1(-2)-awned or aristate laterally or adaxially from shoulders of cypsela. $x = 11, 12$. Aprox. 23 species, all neotropical, with occasional populations of representatives in the subtropics; 2 spp. naturalizing pantropically.

*Zinnia* was monographed by Torres (1963a), who recognized 17 species. *Tragoceros* was monographed by Torres (1963b), but subsequently its five species were treated as *Zinnia* sect. *Tragoceros* (Olorode y Torres, 1970). Among Mesoamerican genera of subtribe Zinniinae, our species of *Zinnia* may be recognized by their glandular leaves and strongly unequal, graduated, finely striate phyllaries.

Although Jeffrey (1993) attempted to typify *Zinnia*, the element designated as lectotype (pl. 64, in Miller, *Fig. Pl. Gard. Dict.*, 1756) is not an original element of *Chrysogonum peruvianum* L., the generitype (Pruski, 2007). The sole extant original element of *C. peruvianum* was determined by Pruski (2007) as *Sphagnicola trilobata* (L.) Pruski, and the conserved type (P-JU 9416) of *C. peruvianum* maintains current usage.

The sole species of *Zinnia* sect. *Tragoceros* known to occur in Mesoamerica is *Z. americana*, but Oaxacan *Z. flavicoma* (DC.) Olorode et Torres occurs within 100 kms of Chiapas and should be looked for in Mesoamerica. Nevertheless, it seems the Mesoamerican material cited as *Tragoceros microglossum* DC. and *T. zinnioides* Kunth by Hemsley (1881) may instead be *Z.
americana. Orange-flowered Mexican endemic Z. angustifolia Kunth was cited for Nicaragua by Bentham (1845, 1853) and Hemsley (1881), but surely the cited voucher is mislabeled and instead from Nayarit. Zinnia angustifolia is thus excluded from Mesoamerica.


1. Capitula 5-9 mm; ray florets 5-9, corolla limbs 2-3.5(-5) mm, shortly exserted from involucre.
   2. Ray corolla limbs short-lanceolate, abaxially eglandular; disk florets functionally staminate; ray cypselae truncate apically.
   1. Z. americana
   2. Ray corolla limbs ovate to orbicular, abaxially glandular; disk florets bisexual; cypselae bicorniculate apically.
   4. Z. purpusii

1. Capitula 10-20 mm; ray florets (5-)8-20+, corolla limbs ≥ 8 mm, typically well-exserted from involucre.
   3. Cypselae epappose; paleae reddish or purplish distally, apex pectinate-fimbriate.
   2. Z. elegans

3. Disk cypselae 1-awned; paleae typically stramineous throughout, apex entire to slightly erose.
   3. Z. peruviana


Annual herbs to 32 cm; stems erect, simple to more commonly several-branched, often basally so, subterete, striate distally, substrigose-pilose. Leaves sessile to very short-petiolate; blade (1-)1.5-3(-5) × 0.3-0.8(-1.5) cm, linear to lanceolate-(proximal ones elliptic), pinnate or weakly 3-nerved, base truncate to subauriculate, margins entire, apex acute to less commonly obtuse, both surfaces hirsute and glandular; petiole 0-0.1 cm. Capitulescence basically monochalous, pedunculate or subsessile, less commonly corymbiform with c. 3 pedunculate capitula; peduncles (0-)0.5-2.5(-5) cm, slender, strigose, solid. Capitula 5-7(-8) mm; involucre 2.5-4 mm diam., campanulate; phyllaries c. 10, c. 3-seriate, ovate to obovate, greenish to purplish distally, slightly c. 5-striate, rounded apically, glabrous; outer phyllaries 2-2.5 × 1-1.3 mm; inner phyllaries 5-7 × 2-2.5 mm; clinanthium small, convex to short-conical; paleae 3-4 mm, lanceolate, apex broadly acute to rounded, more or less entire or sometimes slightly fimbriate. Ray florets 5-6, uniseriate; corolla persistent, tube lacking, limb 2.5-3(-4.5) × c. 1 mm, short-lanceolate, shortly exserted from the involucre, rigid, adaxially white to greenish-yellow, abaxially eglandular, prominently 2-nerved marginally, these nerves hirsutulous, recurved distally, apex tapering and often bifid, apical dentations to c. 0.5 mm, abaxially eglandular. Disk florets 5-12(-18), functionally staminate; corolla 2.4-3 mm, tubular-funnelform, neither tube nor throat dilated, tube 1-1.3 mm, lobes c. 0.5 mm, slightly unequal, erect or slightly recurved, sometimes glandular, often papillose within; style entire to slightly bifid; ovary c. 0.5 mm, sterile. Ray cypselae (ovaries of disks florets sterile) 4-5 × c. 1.5 mm, tangentially compressed-triquetrous, elliptic to obovoid, apex truncate and merging into corolla, abaxial face black or nearly so, tuberculate, margins corky, recurved, adaxial face slightly bulging, with a medial nerve, otherwise typically smooth to distally substrigillose; pappus absent. 2n = 22. Flowering Jul-Dec. Open or brushy plains and hillsides, seasonal evergreen forest, dry hillsides, vegetation xerofítica, roadsides, rocky stream sides, grazed pasture. Ch (Breedlove y Thorne 20625, MO); G (Martínez et al. 23721, MO); H (Williams 16860, MO); N (Molina 23170, MO). 200-1200 m. (Mexico, Mesoamerica.)

The taxon treated here as *Zinnia americana* was called *Tragoceros schiedeanum* Less. by Torres (1963b) and Nash (1976d), but McVaugh (1972b) discussed the correct application of these names. The name *T. americana* was misapplied by Torres (1963b) to the taxon currently known as *Z. microglossa* (DC.) McVaugh (McVaugh, 1972b, 1984), which albeit very similar to *Z. americana*, differs by entire (not apically bifid) ray limbs and strictly sessile capitula. Strother (1999) recognized *Z. americana* as the sole *Tragoceros* in Chiapas, but I follow Olorode and Torres (1970) who placed *Tragoceros* in *Zinnia*. I am uncertain of the identity of *Tragoceros mocinianum* A. Gray, *Z. bicuspis* DC., and *Z. zinnioides* (Kunth) Olorode et Torres: each name is provisionally excluded from synonymy here.


Annual herbs to 1(-2) m; stems erect, simple or few-branched typically with 1 or 2 pairs of axillary branches, subterete, striate distally, grading from hispid-pilose proximally to substrigose distally. Leaves sessile or essentially so; blade 2.5-10(-15) × 0.5-4(-7) cm, lanceolate to elliptic-ovate or cordiform, palmately 3-5-veined, base truncate to cordate, margins entire, apex acute to acuminate, rarely obtuse, both surfaces hirsutulous-strigillose and glandular. Capitulescence monocephalous on main axis or axillary branches, capitula pedunculate to less commonly subsessile and immediately subtended by cauline leaves; peduncles 0.5-7 cm, those fistulose distally. Capitula (10-)15-20 mm; involucre (7-)10-15 × (7-)10-25 mm, hemispherical; phyllaries 20-25, ovate to obovate, 3-4-seriate, thickly chartaceous and stramineous proximally, herbaceous to scarious and greenish to purplish distally, rounded apically, glabrous or nearly so; outer phyllaries 2.5-5 × 2-4 mm; inner phyllaries (7-)10-15 × 4.5-6 mm; clinianthium convex to low-hemispheric; paleae 10-20 mm, lanceolate or outer ones rarely linear-filiform, keeled, stramineous becoming reddish or purplish distally, apex obtuse, pectinate-fimbriate. Ray florets 8-20+ (more in cultivars), typically uniseriate (to pluriseriate in cultivars); corolla limb (10-)15-25(-35) × c. 10 mm, spatulate to obovate, typically well-exserted from the involucre, stiff, often adaxially reddish (white to purplish in cultivars, rarely variegated), abaxially glandular, usually abaxially substrigillose at least on support nerves throughout their length, apex typically shallowly 3-lobed, medial lobe smaller than the laterals. Disk florets bisexual, (15-)60-150+; corolla 7-9 mm, tubular or throat slightly dilated basally, tube c. 1 mm, lobes 1-3 mm, often slightly unequal, reflexed or contorted, erect or slightly reflexed, typically densely setulose-papillose within, occasionally slightly setose adaxially; style branches 1.5-2 mm, short-exserted. Cypselae 6-10 mm, not tuberculate, margins not corky, slightly tangentially triquetrous and obovoid (rays) or compressed and oblancoolate to obovate (disks), typically smooth adaxially, glabrous to substrigillose; pappus absent. 2n = 24. Flowering Feb-Dec. *Cultivated ground, disturbed areas, bosque húmedo subtropical, bosque seco subtropical, forest edge, orilla de camino, pinares, pine-oak forests, riverine vegetation, roadsides, secondary vegetation.*


McVaugh (1972b) noted the name Zinnia violacea predates by two years Z. elegans. In much recent botanical (e.g., McVaugh, 1984; Strother, 1999; Barkley et al., 2006) and gardening (e.g., Staples y Herbst, 2005) works the earlier name Z. violacea was correctly widely adopted. However, the monographer Torres (1963a) and most pre-1972 literature used the name Z. elegans, and thus the conservation of the name Z. elegans over Z. violacea is perhaps worthy.


Annual herbs 8-60 (90) cm; stems erect, simple or few-branched, subterete, striate distally, strigose or glabrulate proximally. Leaves sessile or essentially so; blade (1.5- 2.5-6(-9) × to (0.5-)1-2.2(-3) cm, lanceolate to elliptic-ovate, palmately 3-5(-7)-veined from very base, both surfaces hirsutulous and glandular, base rounded to subamplexicaule, margins entire, apex acute to acuminate. Capitulescence monoecephalous on main axis or axillary branches; peduncles 0.5-7 cm, stout, that of central axis occasionally fistulose distally. Capitula 10-18 mm; involucre 10-15 × 7-15 mm, campanulate; phyllaries 15-30, 3-4-seriate, obovate to spatulate, thickly chartaceous, finely striate, rounded apically, stramineous proximally, sometimes reddish or purplish distally, glabrous or nearly so; outer phyllaries 3-5 × 2-3 mm; inner phyllaries 10-15 × 4-6 mm; clinanthium convex to low-hemispheric; paleae 13-15 mm, lanceolate, typically stramineous throughout, apex to acute to rounded, entire to slightly erose. Ray florets (5-)8-15, uniseriate; corolla limb 8-15(-25) × 2-6(-15) mm, typically spatulate, typically well-exserted from the involucre, stiff, often adaxially red (less commonly orange or yellow), abaxial surface glandular,
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hirsutulous only proximally, marginally short-ciliate, apex entire or shallowly 2-lobed. Disk florets bisexual, (12-)25-55(-80); corolla 5.1-6.7 mm, tubular or throat dilated basally, tube 0.5-0.7 mm, lobes 1-1.5 mm, greatly spreading, setulose-papillose within and marginally; style branches to c. 1 mm, short-exserted. Cypselae 7-10 × c. 2.5 mm, ellipsoidal, not tuberculate, margins not corky, obcompressed (rays) or compressed (disks), often 1-corniculate (disks), typically strigose (rays) or ciliate (disks); disk cypsela narrowly 1-awned adaxially (inner face), awn setulose. 2n = 24. Flowering Jun-Dec(Jan, Mar). Campo abierto, disturbed areas, meadows, pine-oak forest, pinares, roadsides, sabana, shrubby secondary growth slope, thickets, tropical deciduous forest, thorn woodland. Ch (Cronquist 9677, MO); G (Heyde y Lux 3808, NY); H (Molina 2671, MO); N (Oersted 11023, MO). 600-2200 m. (SW United States, Mexico, Mesoamerica, Colombia, Venezuela, Ecuador, Peru, Bolivia, Paraguay, Argentina, Cuba, Jamaica, Hispaniola, Puerto Rico, Lesser Antilles, Trinidad and Tobago; Africa, Australia, Islas del Pacifico.)

This species is the most common and widespread species of Zinnia (Robinson y Greenman, 1896; Pruski, 2007), occurring throughout much of the neotropics, but is rarely cultivated. It is similar and often confused with the commonly cultivated (and escaping) Z. elegans, but differs clearly by 1-awned (vs. epappose) disk cypselae.


Annual herbs to 30(-41) cm; stems erect, few-branched, subterete, striate strigose. Leaves sessile or short-petiolate; blade (1.5-)2.5-5.5 × (0.1-)0.3-0.6(-0.9) cm, linear-lanceolate, pinnate or weakly 3-nerved, base truncate to auriculate, margins entire, stiffly ciliate, apex acuminate, surfaces hirsute and glandular, adaxial surface strigillose, sparsely glandular, abaxial surface glandular, sparsely hirsutulous; petiole 0-0.1 cm, sometimes winged. Capitulescence basically monocephalous or less commonly corymbiform with c. 3 capitula; peduncles 0.5-1.5(-5) cm, slender. Capitula 6-9 mm; involucr 4-7 × 6-8 mm, hemispherical; phyllaries c. 15, c. 3-seriate, orbicular to ovate, slightly few-striate but striations basically obscured by colored apex, rounded apically, scarious and purplish distally, glabrous or outer ones hirsutulous distally; outer phyllaries 2-2.5 × 2-2.5 mm; inner phyllaries 4-7 × 2-3.2 mm; clinanthium 3-4 mm, conical; paleae 5-6 mm, lanceolate, stramineous becoming purplish distally, slightly glandular, apex acute to acuminate. Ray florets 5-9, uniseriate; corolla tube c. 0.7 mm, held between or connate with the elongated cypsela shoulders, limb 2-3.5(-5) × 1.2-2.5 mm, ovate to orbicular, typically shortly
exserted from the involucre, +/- stiff but not rigid, adaxially white to pale yellow, abaxially glandular, larger two nerves borne inward, nerves sparsely hirsutulous, apex entire rounded. Disk florets bisexual, 35-60; corolla 2-2.7 mm, tubular-funnelform, glabrous or nearly so, tube c. 0.3 mm, throat weakly flattened laterally, sometimes weakly dilated basally, lobes c. 0.5 mm, erect, smooth within; style branches c. 0.5 mm, weakly exserted. Cypselae 2.6-4 × c. 2.5 mm, black, bicorniculate apically, cornicula to c. 0.5 mm and pointing inward, bodies obcompressed-triquetrous and obovoid (rays) or compressed and obovate (disks), margins corky pectinate-winged, faces smooth or tuberculate; pappus absent. 2n = 24, 26. Flowering Sep. _Evergreen seasonal forest, pine-oak forests._ Ch (Breedlove 44354, MO). 900-1000 m. (Mexico [Jalisco, Colima, Guerrero], Mesoamerica.)

**XIII. Tribus Inuleae Cass.**

_Inulaceae_ Bercht. et J. Presl, _Inuleae_ Cass., _Inulinae_ Dumort., _Inuloideae_ Lindl.,
_Plucheae_ Anderb., _Plucheinae_ Dumort.

Por J.F. Pruski.

Annual herbs to trees; stems winged or exalate. Leaves basal (typically deliquescent at anthesis) and/or cauline, simple or occasionally pinnatifid, alternate or rarely subopposite; blade generally chartaceous, pinnately veined. Capitulescence terminal or less commonly axillary, generally corymbiform to thyrsoid-paniculate, rarely monocephalous or scapose. Capitula usually heterogamous and radiate or disciform, rarely homogamous, unisexual, discoid, generally many-numerous-flowered; involucre ecalyculate; phyllaries unequal or sometimes subequal, 2-6+-seriate, free, chartaceous to sometimes membranous or herbaceous, margins and apex sometimes scarious; receptacle mostly flat to convex, epalete (Mesoamerica) or rarely paleate, generally glabrous. Ray florets 0 or 1(-2)-seriate, typically pistillate; corolla usually yellow, limb often linear. Marginal florets (in disciform capitula) numerous, 1-10-seriate, pistillate; corolla often filiform, actinomorphic or nearly so, usually pink to purplish, glabrous or glandular, apex commonly minutely 3-denticulate; stigmatic surface 2-banded, fertile from base to apex. Disk florets 1-many, bisexual or functionally staminate, commonly slightly longer than the outer florets; corolla tubular or funnelform, (4-)5-lobed, pink to purplish (Mesoamerica) to yellow, lobes usually deltate; anthers tailed (generally calcarate with fertile spurs), spur tip acute to sometimes attenuate, apical appendage, linear to ovate; style trunk distally papillose (_Epaltes, Plucheia, Pseudoconyza, Tessaria_) but more typically trunk mostly glabrous throughout, undivided or bifid, exappendiculate, branches filiform to linear with apex acute, stigmatic surface
2-banded, fertile from base to apex, adaxially papillose, papillae obtuse, sometimes decurrent onto distal portion of trunk. Cypselae cylindrical, obconical or ellipsoidal, commonly somewhat plump, sometimes compressed or prismatic, erose-truncate, smooth or ribbed, never obviously rugulose-tuberculate abaxially, glabrous or setulose, often glandular, trichomes never myxogenic, carpocarpoid generally symmetrical and stramineous; pappus of 1(-2)-seriate bristles or squamellae, margins smooth to barbellate or infrequently plumose, rarely epappose (in Mesoamerica only in *Epaltes*). Aprox. 65 genera and 700 spp., mainly tropical and subtropical of both hemispheres, but sometimes (e.g., *Pluchea*) well represented in temperate areas.

Inuleae in the traditional sense may be recognized by its tailed anthers. The traditionally circumscribed Inuleae, i.e., that of Bentham y Hooker (1873), was restructured by Anderberg (1991a), who removed about 190 genera and 1200 species as Gnaphalieae, and Anderberg (1991b), who removed another 25 genera and 200 species as Plucheeae. More recently, Cariaga et al. (2008), recognized Inuleae as again containing Plucheeae, but they further split Inuleae by segregating Cuban Feddeeae. As circumscribed by Cariaga et al. (2008), Inuleae contains 65 genera and 700 species. Mesoamerican species are never radiate and belong to subtribe Plucheinae.

**Bibliografía.**

1. Cypselae epappose.
   1. Cypselae with a pappus of bristles.
      2. Capitulescence spicate; leaf surfaces bicolorous; style trunk glabous. **4. Pterocaulon**
      2. Capitulescence corymbiform to paniculate; leaf surfaces concolorous; style trunk distally papillose.
         3. Capitula with 1 disk floret; disk corolla lobe margins obviously thickened. **5. Tessaria**
         3. Capitula with ≥ 2 disk florets; disk corolla lobe margins not thickened.
            4. Leaves never lyrate-pinnatifid; pappus bristles scabrid-barbellate; disk florets functionally staminate. **2. Pluchea**
            4. Leaves, at least the proximal, lyrate-pinnatifid; pappus bristles smooth or nearly so; disk florets bisexual. **3. Pseudoconyza**
1. **Epaltes** Cass.


Por J.F. Pruski.

Annual or perennial herbs to subshrubs; stems long-winged to minutely so, subterete, erect to procumbent, simple to much-branched, wings continuous, commonly longer than the internodes. Leaves simple, alternate or subopposite, sessile, pinnately veined, surfaces concolorous, glabrate to pilose, margins basally decurrent onto stem as wings, slightly clasping. Capitulecence terminal or less commonly axillary, corymbiform or less commonly solitary, generally few-capitulate. Capitula bisexual and disciform (ours), rarely unisexual and discoid, commonly spherical; phyllaries subequal to graduate; receptacle flat pre-anthesis, in fruit becoming convex to strongly so, epleate. Marginal florets (0-)numerous in many series, generally pistillate; corolla filiform or tubular to inner series sometimes cupular, actinomorphic or nearly so, glabrous or glandular, apex rounded or minutely 2-3-denticulate, sometimes slightly asymmetrically so; style bifid, glabrous or with pilosulose base, branches linear, smooth. Disk florets several to many, functionally staminate or rarely bisexual, slightly longer than the outer florets; corolla tubular or funnelform, actinomorphic, 4-5-lobed, glabrous or glandular; anthers partly calcarate (with fertile spurs), spur base attenuate, endothecial tissue radial, appendage ovate, not greatly sculptured nor differentiated in texture from thecae, filament collar often weakly mamillose; style basal node glabrous or pilosulose, trunk distally papillose, undivided or sometimes shortly bifid. Cypselae obconical to ellipsoidal, costate, glabrous, puberulent, or glandular; pappus absent or an annular rim, rarely 2-6 squamose. \( x = 10 \). Aprox. 14 spp. 3 species in the neotropics. México, Mesoamerica, Brasil, Cuba; Africa, Asia, Australia.

Australian *Epaltes cunninghamii* (Hook.) Benth. is unique within the genus (Walsh y Entwisle, 1999) by its commonly monoecious plants with unisexual discoid capitula and by often pappose cypsela.


Erigerodes mexicanum (Less.) Kuntze, Pachythelia mexicana (Less.) Steetz.

Annual herbs to 1 m; stems erect to ascending, simple or branched, striate, pilosulose to glabrate, long-winged, wings several, to c. 2 mm diam. Leaves 3-7(-12.5) × 0.5-2 (-4.3) cm, elliptic-lanceolate to obovate, chartaceous, third order veins not prominent, surfaces punctate-glandular, otherwise pilosulose to glabrate, base attenuate-decurrent, margins serrate to serrulate, apex acute or sometimes obtuse, rarely rounded. Capitulescence corymbiform, each main branch usually 3-10-capitulate, distal stem leaves not closely associated with capitulescence; peduncles 1-10(-15) mm, arachnoid to strigulose. Capitula hemispherical pre-anthesis becoming spherical at anthesis, receptacle pre-anthesis c. 2× c. 3 mm, flat, at fruit 5-6× 5-6 mm, with margins deflexing; involucre reflexed in fruit with corollas and fruits not included; phyllaries c. 1. 5× c. 0.6 mm, elliptic-lanceolate, weakly 2-3-seriate, arachnoid-pubescent; receptacle to c. 3 mm diam., glabrous or glandular, corollas not included within involucre after receptacle becomes revolute. Marginal florets numerous; corolla 0.4-0.7 mm, stramineous, glandular, at least the base commonly persistent on cypsela; style branches weakly exserted, slightly spreading. Disk florets 25-50, functionally staminate; corolla 1.5-2 mm, funnelform, glandular, purplish, tube c. 0.5 mm, throat c. 0.6-1 mm, lobes 0.4-0.6 mm, short-lanceolate, subsessile and persistent on receptacle; anthers slightly exserted, c. 0.7 mm, tails c. 0.2 mm, filaments generally shorter than anthers; style branches slightly exserted, weakly bifid, c. 0.05 mm, ovary sterile, sterile short-annular. Ray cypselae (disk ovary sterile) c. 0.7 mm, obconical, costate, glandular, body brownish with ribs stramineous; epappose. 2n = 20. Flowering Jan, Apr, Jul-Aug. In or along water courses, selva media subperennifolia. T (Novelo y Ramos 1867, MO); Ch (Martinez 18409, MO); C (Chan 3785, MO); G (Lundell 1508, MO). 0-900 m. (México, Mesoamerica, Cuba?)

Liogier (1962 [1963]) listed Epaltes brasiliensis DC. as occurring in Cuba. I have not seen any Cuban material, but it seems more likely that the Cuban material would be E. mexicana, which has nomenclatural priority over E. brasiliensis, should these two names prove synonymous.

The fruiting capitula are inverted bicolored, with outer florets stramineous distally (the persistent corolla base) atop of the brownish cypselae, whereas the inner florets have annular ovary and corollas proximally stramineous and corollas darker distally.


Berthelotia DC. (Bertholletia Bonpl.), Conyza subgen. Leptogyne Elliott, Eremohylema A. Nels., Eyrea F. Muell. non Champ. ex Benth., Gymnostyles Raf., Gymnostylis Raf., Gynema Raf.,

Por J.F. Pruski.

Annual or perennial herbs to shrubs or sometimes trees, commonly aromatic; stems erect, commonly unwinged or sometimes long-winged, glabrous or pubescent. Leaves simple, never lyrate-pinnatifid, alternate, sessile or petiolate; blade pinnately veined, surfaces concolorous, both surfaces commonly glandular and with non glandular trichomes, basal margins sometimes decurrent onto stems as wings, margins entire or dentate. Capitulescence terminal, of many pedunculate capitula commonly densely corymbiform to paniculate; peduncles commonly pubescent. Capitula disciform, numerous-flowered; involucre campanulate to hemispherical; phyllaries lanceolate to ovate, graduate, 2-5-seriate, often reflexed after fruiting, usually chartaceous, generally pubescent, often partly pinkish; receptacle flat, epauleate. Marginal florets numerous, few- to several-seriate, pistillate; corolla filiform-tubular, shortly-lobed, cream-colored to more commonly purplish, glabrous or more commonly lobes weakly glandular; style bifid, branches linear to filiform. Disk florets few to several, functionally staminate; corolla narrowly funnelform, shortly 5-lobed, cream-colored to more commonly purplish, limb gradually ampliate, lobes often densely glandular, margins not thickened; anthers tailed, cream-colored, mostly exserted, filament collar sometimes weakly mamilllose; style papillose in distal half, undivided or weakly bifid, ovary sterile. Cypselae (of marginal florets, the disks have sterile ovaries) filiform-cylindrical, 3-6-costate, glabrous, glandular, or more generally pubescent; pappus of many scabrid-barbellate bristles, free or partly connate at base, about as long as the corolla. $x = 10$.

Aprox. 46 species in the warmer regions of both hemispheres: U.S.A., México, Central America, tropical and subtropical Suramérica, West Indies, África, SE Asia, Indo-Malay area, Australia, Oceania; c. 14 species in the Neotropics.

Applications of some of our most common Plucheas have changed greatly in the past 50 years, and published distributions, common names, and chromosome counts cannot be used blindly. Beginning with Linnaeus (1763), a complex of American species with clasping leaves passed under the name P. bifrons (L.) DC. The concept of P. bifrons was changed greatly by Godfrey (1952), who used the name P. foetida for the white-flowered plants formerly called P. bifrons. Godfrey segregated the red-flowered P. rosea from the plants that had been also passing as P. bifrons. Nesom segregated the solely glandular-pubescent P. yucatanensis from P. foetida and P. rosea. Pruski (2005) lectotypified P. bifrons and excluded it from the flora of the New World, and made the combination P. baccharis, treating Godfrey's P. rosea in synonymy.
The taxon to which the name *P. odorata* has changed in the last fifty years, first being used for our most common shrubby taxon (e.g., Swartz, 1797; Moore, 1936), but now correctly applied to our most common herbaceous species. For example, Nash (1976) followed Godfrey (1952) by misapplying the name *P. odorata* for our shrubby species now called *P. carolinensis* and by using the now synonymous *P. purpurascens* for the herb now passing under *P. odorata*. On the other hand, the application of these names by D'Arcy (1975) is correct. Gillis (1977) made the combination *P. symphytifolia* (Mill.) Gillis for our most common shrubby species, whereas Kahn and Jarvis (1989) used the name of our shrubby *P. carolinensis* for it, and reduced *P. symphytifolia* to synonymy of *Neurolaena lobata* (L.) Cass. (Heliantheae).

*Pluchea rosea* var. *mexicana* R. K. Godfrey is recognized here as *P. mexicana* (R. K. Godfrey) Nesom and is restricted to San Luis Potosí, México. Material from the Yucatán Peninsula cited by Godfrey (1952) as *P. rosea* var. *mexicana* is treated here as *P. yucatanensis* Nesom. The material cited by Villaseñor (1989) as *P. rosea* var. *mexicana*, but not seen by me, is presumably all referable to either *P. baccharis* or *P. yucatanensis*.

Mexican *Pluchea auriculata* Hemsl. was excluded from *Pluchea* by Godfrey (1952), but was neither recognized nor excluded by Nesom (1989). Largely South American, but also collected in Florida and Taiwan, *P. sagittalis* (Lam.) Cabrera should be looked for in the Flora Area, especially in the Yucatán Peninsula.

Within Mesoamérica three sections of the genus are recognized: *Pluchea* sect. *Pluchea*, *P. sect. Amplectifolium* G. L. Nesom, and *P. sect. Pterocaulis* G. L. Nesom. *Pluchea salicifolia* is the sole Mesoamerican species placed in *Pluchea* sect. *Pterocaulis*. The remaining Mesoamerican species are placed into either *P. sect. Pluchea* (*P. carolinensis* and *P. odorata*) or *P. sect. Amplectifolium* Nesom [*P. baccharis* (sub *P. rosea*) and *P. yucatanensis*]. Nesom recognized one additional section of America *Pluchea*, this for *Pluchea sericea* (Nutt.) Coville of México and SW. Estados Unidos. Nesom (1989) stated that *Pluchea sericea* is minimally deserving of section rank within *Pluchea* (Nesom 1989), but the earliest available sectional name (*Tessaria* sect. *Phalacrocline*) remains to be transferred to the sectional rank within *Pluchea*. Alternatively, Nesom (1989) stated that *Pluchea sericea* is perhaps deserving of generic rank, in which case he noted that *Eremohylema* A. Nels. is the earliest available name.


1. Stems winged. 4. P. salicifolia
1. Stems exalate.
2. Leaves sessile, bases subamplexicaul.
   3. Herbage pubescent with both glandular and patent non-glandular trichomes, corollas reddish. 1. P. baccharis
   3. Herbage sessile-glandular or shortly stipitate-glandular, otherwise glabrous; corollas white to reddish. 5. P. yucatanensis
2. Leaves petiolate, bases never subamplexicaul.
   4. Shrubs; stems subtomentellous to sometimes glabrate; leaf blades chartaceous to subcoriaceous, the margins entire or nearly so. 2. P. carolinensis
   4. Herbs; stems puberulent to nearly glabrous; leaf blades chartaceous to thinly so, the margins serrate or less commonly subentire 3. P. odorata


Perennial herbs, rarely becoming shrubby, 0.25-0.9 m, fibrous-rooted from short rhizome or caudex; stems one or more from caudex, simple to few-branched distally, subterete, exalate, commonly puberulent to villous and glandular distally, often also appressed-arachnoid pubescent, glabrous proximally; herbage pubescent with both glandular and patent non-glandular trichomes, often also appressed-arachnoid pubescent. Leaves 2.5-8 × 0.6-2.5 cm, elliptic-lanceolate to oblanceolate or obovate, sessile, chartaceous, weakly reticulate, surfaces glandular, weakly puberulent to less commonly sparsely villous, occasionally glabrate, base cuneate or more commonly truncate to subcordate, subamplexicaul, margins denticate to serrulate, apex obtuse to acute. Capitulescence terminal, corymbiform, open or sometimes tightly clustered, short, broad, each cluster c. 5-10-capitulate, these often subtended by involucrate leaves; peduncles 1-8 mm, puberulent to villous or arachnoid. Capitula 6-9 mm; involucre 4-7 mm diam., campanulate to turbinate; phyllaries subequal to weakly graduated, 3-4-seriate, reddish to purplish, apex acuminate, the outer phyllaries 3-4.5 × c. 1.5 mm, broadly lanceolate, glandular, distally
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arachnoid or villous, the inner phyllaries 5-6.5 × c. 0.7 mm, lanceolate, glabrate to apically
arachnoid-puberulent. Marginal florets few-seriate; corolla c. 3 mm, reddish, apex bifid or trifid.
Disk florets 15-30; corolla 4-4.5 mm, reddish, lobes 0.6-1 mm, lanceolate, glandular. Cypselae c.
1 mm, cylindrical-fusiform, sparsely pubescent; pappus c. 5 mm. 2n = 20. Flowering Mar-Jul.
Coastal dunes, savannas, marshes, secondary forests. C (Anon., BM); QR (Steere 2407, US); B
(Davidse y Brant 32986, MO); H (Nelson y Hernández 987, MO); N (Atwood 4530, MO). 0-100
m. (Estados Unidos, México, Mesoamérica, Cuba, Jamaica.)

Flora Area material of *Pluchea baccharis* often have leaves with truncate bases and obtuse
apices, whereas material from the Estados Unidos more commonly have leaves with subcordate
bases and acute apices.

*Pluchea baccharis* is closely related to *P. foetida* (L.) DC., which should be looked for in the
Flora Area. *Pluchea foetida* is characterized by larger lanceolate leaves with cuneate to truncate
bases, involucre never (vs. often) turbinate, obtuse (vs. acuminate) outer phyllaries, several-
seriate (vs. few-seriate) pistillate florets, and white (vs. reddish) corollas.

carolinensis* Jacq., *Icon. Pl. Ran.* fascicle 1 (bound in vol. 3): pl. 585 (1786-1793 [1788]).
3) (1786-1793 [1788]). The locality cited in *Collectanea* is "Crescit sponte in Carolina,"
seemingly in error as this taxon is known to occur in the continental Estados Unidos only in
southern Florida. The figure legend for the plate was published in *Icon. Pl. Ran.*, vol. 3. The
basionym was incorrectly cited in Sweet as Vol. 3 plate "185," *Ophrys crucigera* (Orchidaceae).
eihuapatli, kaxnan may te’, sitil choj, Y; alcanfor, chañl-ché, mil en rama, Y; chal-ch, chal-che, pito
sico, Santa Maria, B; chal che, musik witzir, santa maria, sesè-oh, siguapate, tabaco cimarrón,
tabaquillo, vitalino, G; salvia santa, siguapate, siguatepeque, suacumán, zoapate, H; ciguapate,
natuapate, siguapate, suquinay, suquinayo, ES; salvia, Santa Maria, N; curforal, tabbac cinarron,
P.

*Conyza cortesii* Kunth, *Pluchea cortesii* (Kunth) DC., *Pluchea odorata* var. *brevifolia*
Kuntze.

Common shrubs 1-4 (5) m, aromatic, with many lateral branches; stems irregularly angled,
exalate, subtomentellous to sometimes glabrate. Leaves: petiole 0.5-1.5(-2.5) cm, pubescent to
densely so; blade 4-15 × 1.5-6 cm, broadly elliptic to lanceolate, chartaceous to subcoriaceous,
the upper surface puberulent to nearly glabrous, abaxial surface subtomentellous to puberulent,
weakly glandular, base acuminate to acute, never subamplexicaul, the margins entire or nearly so, apex acute to obtuse. Capitulecence a broadly rounded terminal corymbiform panicle to 15×20 cm, with numerous capitula; peduncles 4-10 mm. Capitula 6-8 mm; involucre c. 4.5 × 8-10 mm, hemispheric to campanulate; phyllaries many, 3-4-seriate, pubescent, occasionally weakly glandular, becoming glabrous, especially toward tips of inner phyllaries; the outer phyllaries 2-2.5 × c. 2 mm, ovate, apically rounded; the inner phyllaries 3-4.5 × 1-1.5 mm, linear-lanceolate, apically attenuate to acuminate, very inner most late-deciduous; densely pubescent; receptacle 2-3 mm diam., glabrous. Marginal florets: corolla 3.5-4 mm, reddish-purplish, apex irregularly trifid. Disk florets 5-15+; corolla 4-5 mm, reddish, lightly glandular at tips, lobes c. 0.5 mm. Cypselae 0.5-1 mm, filiform, weakly puberulent, ribs obscure or 1 or 2 apparent; pappus c. 4 mm. 2n = 20. Flowering Year-round. Selva secundaria, sea cliffs behind beach, tintal (seasonally inundated low forest), clearings, on Mayan ruins, roadsides, manglar, selva baja caducifolia, dry savanna, bosque de pino-encino, disturbed areas, hillsides, riverbanks, campo abierto, rocky streams, en la parte baja de la laguna, pine-oak forests, bosque seco tropical. T (Villaseñor, 1989: 86 sub P. symphytifolia); Ch (Pruski y Ortiz 4180, MO); Y (Gaumer 399, NY); C (Lira et al. 262, MO); QR (King y Garvey 10658, MO); B (Schipp 762, NY); G (Greenman y Greenman 5879, MO); H (Williams y Molina 13656, MO); ES (Villacorta 762, MO); N (Seymour 5025, MO); CR (Rodríguez 1667, MO); P (Tyson 3467, MO). 0-2500 m. (Estados Unidos, México, Mesoamérica, Venezuela, Guyana, Surinam, Ecuador, Perú, Brazil, Cuba, Jamaica, Hispaniola, Puerto Rico, Virgin Islands, Lesser Antilles, Trinidad and Tobago; Asia, Islas del Pacífico.)

The type of Pluchea odorata var. brevifolia Kuntze from Venezuela is fragmentary, but nevertheless seems to belong in synonymy here.


Branched herbs 0.5-1.5 m; stems exalate, puberulent to nearly glabrous, also sessile-glandular, lateral branches often as long as central axis. Leaves petiolate to subsessile; petiole 0.3-2.5 cm, pubescent to puberulent, sometimes winged; blade 3.5-12 × 1-6 cm, lanceolate to ovate, chartaceous to thinly so, puberulent, generally weakly glandular on both surfaces, adaxially glabrous to weakly tomentose, abaxially glabrous to densely tomentose, base cuneate to obtuse, sometimes oblique, never subamplexicaul, the margins serrate or less commonly subentire, apex acute to rounded. Capitulescence a diffuse panicle of many flat-topped corymbiform clusters 3-4 × 2-3 cm broad, with 10 or more capitula, lateral flowering branches about as long as the terminal one; peduncles 1-6(-8) mm, pubescent. Capitula 5-7 mm; involucre c. 4× 4-6 mm, campanulate; phyllaries many, c. 4-seriate, puberulent, generally pinkish-purple apically; the outer phyllaries 1.5-2 × c. 1 mm, long-triangular, apically acute; the inner phyllaries 3.5-4 × 0.5-1 mm, lanceolate, apex attenuate; receptacle 1.5-2 mm diam., weakly puberulent. Marginal florets: corolla 3-3.5 mm, apex bifid or trifid, pink. Disk florets 5-9(-12); corolla 3.5-4 mm, pink, glabrous or very weakly puberulent at tips, lobes c. 0.5 mm, deltoid. Cypselae c. 1 mm, filiform, c. 5-costate, the ribs cream-colored, weakly puberulent and weakly glandular; pappus c. 3.5 mm. 2n = 20.

Flowering year-round. Beach strand vegetation, marshes, bog, wet areas, swamps, lake shores, orilla del canal en lugares protegidos, hidrófitas emergentes, roadside ditches, cultivated flood plain, secondary disturbed area in mangroves, disturbed grassy areas. T (Cowan 3104, MO); Ch (Matuda 16278, MO); Y (Gaumer 1002, NY); C (Cabrera 13995, MO); QR (Davidse et al. 20631, MO); B (Schipp 619, NY); G (Contreras 7449, MO); H (Yuncker et al. 8232, MO); N (Davidse y Pohl 2279, MO); P (Knapp 1937, MO). 0-200 m. (Canadá, Estados Unidos, México, Mesoamérica, Colombia, Venezuela, Guyana, Surinam, Cuba, Jamaica, Hispaniola, Puerto Rico, Virgin Islands, Lesser Antilles, Trinidad and Tobago; Africa.)

This herbaceous species is closely related to *Pluchea camphorata* (L.) DC. of the Estados Unidos, but differs by its puberulent (vs. sometimes glabrate), generally apically pinkish-purple (vs. generally cream-colored) phyllaries.

*Conyza purpurascens* was lectotypified by Howard (1989) upon the same Sloane plate (t.152, f.1.) designated by Britten (1898) as lectotype of *C. odorata*. Although King-Jones (2001) cited *C. purpurascens* Sw. as "nom. illeg.," this name, born legitimately, merely becomes nomenclaturally incorrect by these lectotypifications. *Conyza odorata* L. and *Conyza purpurascens* Sw. were not based on identical original materials and are thus not nomenclatural synonyms, despite being cited as such by King-Jones (2001).

Published distributions of *P. odorata* in southern South America are presumably in error for other herbaceous species. This name *Pluchea odorata* was cited for El Salvador by Berendsohn y
Araniva (1989), but this presumably represents misapplication of this name to plants of *P. carolinensis*. Nevertheless, *Pluchea odorata* should be looked for in El Salvador as well as in Costa Rica. Plants referred to *Pluchea odorata* var. *succulenta* (Fernald) Cronquist range from the mid-Atlantic coast northwards into Canadá and have large capitula, but seemingly intergrade with other populations, and *P. odorata* var. *succulenta* is not recognized here. Bolivian *P. odorata* var. *ferruginea* Rusby proves to be a synonym of *P. fastigiata* Griseb. I have not seen type material of *P. purpurascens* fo. *obovata* Fernald, but presume this name to belong in synonymy here.


Perennial herbs to shrubs 1-2 m; stems branched, erect to ascending, leafy in distal half, winged from decurrent leaf margins, puberulent or less commonly pilose, wings continuous, c. 2 mm diam., puberulent to pilose, also often sessile-glandular or shortly stipitate-glandular, those of distal leaves commonly longer than internodes. Leaves sessile; blade (2) 4-12 × (0.2) 0.5-2 cm, linear-lanceolate to lanceolate, chartaceous, the surfaces sessile-glandular or shortly stipitate-glandular, puberulent to less commonly pilose, basally clasping and margins decurrent onto stem as wings, margins subentire to irregularly serrulate-denticulate, apex acute to acuminate.

Capitulescence terminal, corymbiform, few-branched, many-capitulate, each cluster with c. 20 or more capitula; peduncles 1-9(-22) mm, ebracteolate or sometimes 1-2-bracteolate, branches and peduncles pilose to densely pilose. Capitula 4-6 × 2.5-4 mm; involucr ecampanulate; phyllaries graduated, 3-4-seriate, often pink apically, apex acuminate to long-attenuate; outer phyllaries to 2 × c. 0.8 mm, elliptic-lanceolate, glandular, often also pilose; inner phyllaries 4-5.5 × to c.1 mm, lanceolate, glabrate to apically puberulent-glandular; receptacle to c. 1.5 mm diam. Marginal florets: corolla 3.5-4.5 mm, pinkish to reddish distally, apex trifid. Disk florets 7-17; corolla 4-5 mm, reddish, lobes c.0.7 mm, lanceolate, glandular. Cypselae c. 0.8 mm, cylindrical-fusiform, sparsely pubescent; pappus 3.5-4.5 mm. 2n = 20. (México, Mesoamérica.)

*Pluchea salicifolia* is treated as containing solely the below two varieties, *P. salicifolia* var. *parviflora* (A. Gray) S.F. Blake from Baja California having been recognized by Godfrey (1952)
as a distinct species. Although degree of pubescence is often considered as a specific marker in *Pluchea*, it seems prudent to maintain recognition of the infraspecies here as varieties as treated by Godfrey (1952).

1. Leaves and peduncles puberulent.        4a. var. *salicifolia*
1. Leaves and peduncles canescent-tomentose. 4b. var. *canescens*

4a. *Pluchea salicifolia* var. *salicifolia*.


*Pluchea adnata* unranked *canescens* (A. Gray) S.F. Blake.


Perennial herbs 0.2-0.6 m, fibrous-rooted from short rhizome or caudex; stems one or two from caudex, simple to few-branched distally, erect, leafy in distal half, subterete, exalate; herbage sessile-glandular or shortly stipitate-glandular, otherwise glabrous. Leaves sessile; blade 2.5-6 × 0.4-2.4 cm, oblanceolate to obovate, stiffly chartaceous to slightly carnose, venation moderately reticulate, the surfaces glandular, base cuneate to subcordate, subamplexicaul, margins denticulate, apex obtuse, sometimes mucronulate. Capitulescence terminal, corymbiform, few-branched to sometimes several-branched and many-capitulate, each cluster c. 9-capitulate, peduncle or capitulum often subtended by a lanceolate bracteate leaf; peduncles 1.5-7 mm or rarely central capitulum subsessile, branches and peduncles slightly stipitate-glandular. Capitula 6-8 mm; involucre 4-5.5 mm diam.; turbinate; phyllaries weakly graduated or less commonly subequal, 3-4-seriate, indurate, pink to reddish apically, apex acuminate to attenuate, distally commonly punctate-glandular to sometimes also stipitate-glandular; the outer phyllaries 3.5-5 × 1-1.5 mm, elliptic-lanceolate; the inner phyllaries 5-6 × c. 8 mm, lanceolate, glabrate to
apically puberulent; receptacle to c. 1.5 mm diam. Marginal florets few-seriate; corolla 3.5-4.1 mm, white throughout to sometimes reddish distally, apex trifid. Disk florets 15-20; corolla 4.5-5 mm, usually reddish, lobes 0.6-0.8 mm, lanceolate, glandular. Cypselae c. 1 mm, cylindrical-fusiform, sparsely pubescent; pappus 4.5-5 mm. Flowering Jun-Aug. Mangrove swamp, sandy waste ground, savannas, intermittently wet area. C (Steere 1844, TEX); B (Croat 23817, MO). 0-20 m. (SE. Estados Unidos, Mesoamerica.)

3. Pseudoconyza Cuatrec.

Por J.F. Pruski.

Small malodorous herbs; stems erect, exalate or sometimes indistinctly winged, wings discontinuous. Leaves simple, alternate, at least the lower lyrate-pinnatifid, distal ones sometimes merely dentate, evenly spread along length of stem, greatly reduced distally in the capitulescence, and pinnately veined, surfaces concolorous. Capitulescence terminal, corymbiform-paniculate, several-many-capitulate, bracteate. Capitula disciform; involucre campanulate; phyllaries graduate; receptacle convex, epealeate. Marginal florets numerous, several-series, pistillate; corolla filiform, actinomorphic, apex rounded or minutely c. 3-denticulate; style glabrous, with filiform branches, stigmatic surface 2-banded, fertile to very apex of style branch. Disk florets 2-12, bisexual, slightly longer than the outer florets; corolla tubular, actinomorphic, shortly 5-lobed, eglandular, lobe margins not thickened; anthers included, shortly calcarate (with fertile spurs), sagittate but with sterile tip, appendage not greatly sculptured nor differentiated in texture from thecae; style trunk distally papillose, style branches short-linear, papillose, papillae obtuse. Cypselae cylindrical to ellipsoidal, reddish, body not costate or occasionally slightly costate, sometimes slightly compressed with the margins thickened; pappus of c. 10 subequal, white, free bristles, these smooth or nearly so, about as long as the corolla. 1 sp. Estados Unidos? (Florida?), México, Mesoamerica, Colombia, Venezuela, Ecuador, Perú, Bolivia? (see Foster, 1958), Cuba, Barbados? (see Howard, 1989), Bahamas, África, Asia.

The placement of the plant formerly called Conyza lyrata (e.g., Hemsley, 1881) was in flux for much of the 20th century, jostled about from Conyza (Astereae) to Pseudoconyza (sub Astereae) to Blumea (Inuleae), and finally to Pseudoconyza (sub Inuleae).

The correct generic affinities (sub Inuleae subtribe Plucheinae) of this plant were first recognized by Badillo (1946), and Badillo (1947) described in Spanish (not Latin) an invalid monotypic genus for this taxon. Cuatrecasas (1961), apparently unaware of Badillo work, described Pseudoconyza (sub Astereae), later sunk into Blumea by Badillo (1974). D'Arcy
(1975), Nesom (1983), Merxmüller y Roessler (1984), and Dillon y Sagastegui (1991), followed suite, recognizing this plant as *Blumea* (Inuleae), whereas Nash (1976) resurrected *Pseudoconyza* from synonymy under Old World *Blumea*. Cuatrecasas (1973) and D'Arcy (1973) each noted that Cuatrecasas (1961) erred in not correctly illustrating the tailed anthers in *Pseudoconyza*. It is these tailed anthers, in conjunction with the strongly papillose, exappendiculate styles, that support its tribal placement.

While *Pseudoconyza* is vegetatively similar to some species of *Blumea* (Inuleae s. str.), *Pseudoconyza* may be recognized by disk florets with a distally papillose (vs. glabrous) style trunk and obtuse (vs. acute) papillae (sweeping papillae) on the style branches and by reddish (vs. brownish) non-costate or slightly costate (vs. strongly costate) cypselae.


Annual or biennial herbs to 0.8 (-1.5) m; stems erect to ascending, subterete, striate, stipitate-glandular, commonly also pilose, sticky, the non-glandular trichomes much longer than the glandular trichomes. Leaves sessile or subsessile, dentate or lyrate-pinnatifid; blade 1-8(-12) × 0.4-4.5(-6) cm, elliptic to obovate or spatulate, chartaceous, reticulation not prominent, surfaces stipitate-glandular, weakly to densely pilose, base tapered, generally pseudopetioloate, pseudopetiolo often weakly lyrate-lobed especially in proximal leaves, weakly subamplexicaule, margins dentate to irregularly incised, apex obtuse to rounded or in smaller distal-most leaves acute. Capitulecence with each main branch c. 7-15-capitulate; peduncles 0.5-2 cm, stipitate-glandular, bracteoles few, elliptic-lanceolate, 5-10 × 2-3 mm wide. Capitula 5.5-6.5 mm; involucre 5-6 mm diam.; phyllaries lanceolate, c. 4-seriate, puberulent; the outer series 1.5-2.5 × c. 0.5 mm, herbaceous except at scarious base; the inner series c. 6 × 0.5-0.8 mm, scarious with an herbaceous midvein, apex and distal margins stiffly ciliate; receptacle 3-4.2 mm diam.

Marginal florets; corolla 3-4 mm, mostly cream-colored or slightly violet distally, style branches c. 0.8 mm. Disk florets: corolla c. 5 mm, cream-colored or violet distally, tube c. 2 mm, limb c. 3 mm, only slightly broadened, lobes c. 0.4 mm, triangular; anthers c. 2 mm, tails c. 0.2 mm; style branches c. 0.4 mm. Cypselae c. 0.8 mm, strigulose or rarely glabrate; pappus bristles c. 4.5 mm.

Flowering Jan-Jun [+ Aug, Nov-Dec]. Roadsides, beaches, borders of lakes, en manglar, en vegetación secundaria, foot of cliff by seaside, steep walled canyons, selva alta perennifolia, waste lands, dry subtropical forest, stone walls, dry thorn shrub areas, rivers margins, margin of brackish mudflat. Ch (Purpus 8987, NY); Y (Gaumer 23249, MO); C (Villaseñor, 1989: 90); G (Heyde y Lux 4237, NY); H (Mancías y Hernández 1037, MO); ES (Villacorta 2334, MO); N (Nichols 1387, MO); CR (Greenman y Greenman 5950, MO); P (Grisebach s.n., MO). 0-1900 m. (?Estados Unidos, México, Mesoamérica, Colombia, Venezuela, Ecuador, Perú, ?Bolivia, Cuba, ?Barbados, Bahamas; África, Asia.)

A sheet in BM was cited as "the type" by McVaugh (1984), but it is not clear to which of two sheets of perhaps different Houstoun gatherings this refers. McVaugh (1972) was the first to equate *Conyza lyrata* and *C. viscosa* Mill. (sub Astereae), these each typified by very early collections from the Americas. Merxmüller y Roessler (1984) were the first to synonymize *C. aurita* L.f. from India under *Blumea viscosa* (Mill.)V.M. Badillo (sub Inuleae). I have seen only one sheet from India, but nevertheless this material clearly has style trunks distally papillose and reddish cypselae typical of this taxon. On the other hand, *Erigeron chinensis* Jacq. was listed by Klatt (1873) as a synonym of the present taxon, but proves to be synonymous with *C. laevigata* (Rich.) Pruski. The Bojer holotipo of *B. glutinosa* is depauperate and thus not lending well to
accurate identification, but possibly represents the same gathering as the Bojer syntype of *B. bojeri* Baker.

The report of *Pseudoconyza viscosa* in the Estados Unidos (Nesom, 1983) is based on a single collection (*Rugel 301, MO*), but occasionally Rugel collections from Cuba are mislabeled as from "Florida", as I believe happened here. It is thus conceivable that *P. viscosa* has truly never been collected in the Estados Unidos. Similarly, the report of this genus occurring in Barbados and was not confirmed by Howard (1989) and its distribution in Bolivia was not verified by me. This plant is occasionally misdetermined as *C. laevigata* (Rich.) Pruski and it is possible that the reports of *P. viscosa* in Barbados and Bolivia, which remain to be falsified, result from perpetuating reports of earlier misdeterminations of *C. laevigata*, a species frequent in these areas.

### 4. *Pterocaulon* Elliott


Por J.F. Pruski.

Perennial herbs to subshrubs, glabrous to more commonly tomentose; stems long-winged by decurrent leaf margins. Leaves simple, alternate, sessile; blade linear to obovate, chartaceous to subcoriaceous, pinnately veined, surfaces bicolorous (ours), sometimes glandular, adaxially weakly arachnoid to glabrate, abaxially often white-tomentose, margins commonly weakly toothed. Capitulescence terminal, spicate (ours) to capitate. Capitula disciform, sessile, numerous-flowered; involucre campanulate; phyllaries linear-lanceolate, subimbricate, graduate, several-seriate, stiffly chartaceous, 1-veined, often tomentose at base, strongly attenuate; inner phyllaries often deciduous; receptacle small, flat, hirsute or glabrous, e paleate. Marginal florets many-numerous, several-seriate, pistillate; corolla filiform, white to yellow, glabrous, apically 3-4-denticulate; style bifid, branches linear to filiform, glabrous. Disk florets 1-several, bisexual; corolla narrowly funnelform, shortly 5-lobed, often papillose distally; style weakly bifid, branches elliptic-ovate, papillose distally, papillae not decurrent onto trunk. Cypselae ellipsoid, fusiform, or plump, brown, costate, pubescent, carpododium nearly symmetric, tan; pappus of many smooth-margined bristles about as long as the corolla. *x* = 10. Aprox. 17-18 spp., two spp. in the Estados Unidos, 10 in the neotropics; SE Asia, Indo-Malay area, Australia, New Zealand.

Species from Madagascar named as *Pterocaulon* are now excluded from the genus.

1. Leaf blades obovate or oblanceolate to narrowly elliptic; capitulescence spikes commonly uninterrupted.

1. **P. alopecuroides**

1. Leaf blades narrowly elliptic to linear-lanceolate; capitulescence spikes commonly interrupted.

2. **P. virgatum**


Erect xylopodial herbs 0.7-1.5 m, simple or few-branched from base or in capitulescence; stems 3-5-winged, white-tomentose, leaves greatly reduced in size distally, wings c. 2 mm diam. Leaves: blade 2.5-7.5 (11) × 1.2-4 cm, obovate or oblanceolate to narrowly elliptic, chartaceous, adaxially weakly arachnoid to nearly glabrate, abaxially white-tomentose, basally attenuate, the margins weakly dentate, apically obtuse to attenuate. Capitulescence spicate, spike to 10-(15) cm, spikes commonly uninterrupted, dense, round-capitate when young, simple or few branched. Capitula 9-12 mm; involucre c. 5 × 3-4 mm; phyllaries many, c. 4-seriate, spreading with age, 1-veined; outer phyllaries triangular-ovate, tomentose; inner phyllaries linear-lanceolate, often deciduous, tomentose proximally, apically glabrous, attenuate, apex often curved. Marginal florets: corolla c. 7 mm, cream-colored. Disk florets 1-3; corolla 4.5-5 mm, yellowish, lobes 1-1.5 mm, commonly glandular. Cypselae c. 1 mm, pilose and glandular; pappus c. 9 mm, white. Flowering Apr, Dec. *Grassy openings and hillsides*. P (Nee 11130, NY). 60-800 m. (Mesoamérica, Colombia, Venezuela, Guyana, Surinam, Ecuador, Perú, Bolivia, Brasil, Uruguay, Paraguay, Argentina, Cuba, Jamaica, Hispaniola, Puerto Rico, Virgin Islands, Lesser Antilles, Trinidad and Tobago.)

In the protologue Lamarck cites "Martinique" but no original material from there seems to have been found. Blake (1941) reported *Pterocaulon* as new to Central America and *P. alopecuroides* as new to Panamá, but D‘Arcy (1975) used the name *P. virgatum* for the material from Panamá. The Panamanian material cited by D‘Arcy (1975) as *P. virgatum* and the
Venezuela material cited by Cabrera and Ragonese (1978) as *P. rugosum* (Vahl) Malme was redetermined and cited by Pruski (1997a) as *P. alopecuroides*. I have not seen type material of *P. alopecuroides* var. *salicifolium* Chodat segregated from *P. interruptum* and am thus unable to place this name. It is possible that this name is a synonym of South American *P. balansae* as indirectly indicated by Cabrera and Ragonese (1978).


Erect, few-branched herbs 0.5-1(1.5) m; stems white-tomentose. Leaves: blade 3-9(-13) × 0.2-1(-2) cm, narrowly elliptic to linear-lanceolate, chartaceous, adaxially weakly arachnoid to nearly glabrate, abaxially white-tomentose, margins subentire or weakly toothed. Capitulescence, spiccate, spike to 30 cm, commonly interrupted with central axis visible between glomerules, simple or less commonly branched, capitula single or more commonly clustered in glomerules of 3-6. Capitula 6-8(-9) mm; involucre 4.5-7 × 3.5-7 mm; phyllaries many, 4-5-seriate, spreading with age, 1-veined; outer phyllaries triangular, tomentose; inner phyllaries linear-lanceolate, often deciduous, tomentose proximally, becoming glabrous at the attenuate apex. Marginal florets 25-50; corolla c. 6 mm, cream-colored. Disk florets 2-3(-5); corolla 4-5 mm, yellowish. Cypselae 0.5-1.5 mm; pappus 5-6 mm, white. 2n = 20. Flowering Oct, Jan-Feb. *Savannas, colinas, pinares cenagosos*. H (*Williams 16898*, MO). 800-900 m. (Estados Unidos, México, Mesoamérica, Bolivia, Brasil, Uruguay, Paraguay, Argentina, Cuba, Jamaica, Hispaniola, Puerto Rico, Virgin Islands.)

*Gnaphalium spicatum* Mill., not cited in Cabrera y Ragonese (1978), was placed in synonymy of *P. virgatum* by Pruski y Nesom (2004). Pruski y Nesom (2004) discussed the typification of *Gnaphalium spicatum* Mill., showing that it is heterotypic from, and not an earlier name for, *P. alopecuroides*.

5. **Tessaria** Ruiz et Pav.

Shrubs or trees, often adventitious from roots; stems exalate. Leaves simple, alternate, cauline; blade chartaceous to subcoriaceous, pinnately veined, mostly entire, surfaces concolorous, grayish, glandular. Capitulescence largely terminal, corymbiform-paniculate, many-numerous-capitulate. Capitula disciform, short-pedunculate; involucre turbinate-campanulate; phyllaries graduate, scarious; receptacle conical or convex, pubescent, alveolate, epaleate. Marginal florets many-numerous, several-seriate, pistillate; corolla filiform, actinomorphic, white to purplish; 2-3-denticulate, glabrous; style glabrous, branches linear, stigmatic surface 2-banded, fertile to very apex of style branch. Disk florets 1-several, functionally staminate, much longer than the outer pistillate florets; corolla funnelform, actinomorphic, white to purplish, throat elongate or reduced to an annular thickening, shortly to deeply 5-lobed, eglandular, lobe margins obviously thickened, weakly puberulent; anthers calcarate (with fertile spurs), sagittate, appendage not greatly sculptured nor differentiated in texture from thecae, filament collar often weakly mamilllose; style unbranched, thickened, papilllose; ovary sterile. Cypselae (of marginal florets) cylindrical, glabrous; pappus of many subequal, white, smooth-margined bristles about as long as the corolla, connate at base and deciduous as a unit. $x = 10.4$ spp. Central and South America.

Pluchea as delimited by Robinson and Cuatrecasas (1973) and Pruski (1997a) contains all but one of the species traditionally referred to *Tessaria*, whereas here I follow Pruski (2010) and treat *Tessaria* as containing four species and follow the generic concepts of Ariza-Espinar (1979). *Tessaria* differs from *Pluchea* by eglandular (vs. commonly glandular) corollas and by often one (vs. never one) central male floret with thickened acuminate (vs. non-thickened acute) corolla lobes, by glabrous (vs. generally pubescent) cypselae, and by basally connate (vs. free) pappus bristles.

South American *T. absinthioides* (Hook. et Arn.) DC., *T. ambigua* DC., and *T. dodoneifolia* (Hook. et Arn.) Cabrera are sometimes referred to *Pluchea*, but have involucral morphology and thickened corolla lobes typical of *Tessaria*. The species of *Tessaria*, with the exception of *T. integrifolia*, however, have several disk florets per capitulum, these with a typical (not short, thickened ring-like) corolla throats, thereby differing from *T. integrifolia*, the generitype. The strange disk corollas of *T. integrifolia* and capitula with a sole disk floret are highly derived states, and it seems that *T. integrifolia* is nested within *Tessaria* s. lat.


Shrubs to slender trees to 10(-15) m; stems erect, branched, suberete, greenish brown, smooth or sometimes pustulate when young, glabrescent with age. Leaves petiolate, evenly spread along the distal length of stem; blade 5-7 × 1-2.5 cm, progressively reduced distally, oblanceolate, lanceolate, or narrowly elliptic, reticulation obscure, the surfaces canescent to glabrescent, then with a waxy punctate patina of matted trichomes, base narrowly cuneate to attenuate, margins entire or serrulate, apex acute to obtuse, mucronate; petiole 2-8 mm.

Capitulescence 5-15 cm broad, branches cinereous, ultimate groups of capitula more or less tightly packed, usually rounded on top; peduncles 0-3 mm, cinereous. Capitula 4-6 mm (including corolla of exserted central floret, but not its anthers and style); involucre 2.5-3 mm diam.; phyllaries 3-5-seriate, glabrous or weakly arachnoid-tomentose marginally, acute or acuminate; the outer phyllaries to c. 1 mm, triangular; mid-series ones 2.5-3 × c. 1 mm, broadly lanceolate, outer and mid-series phyllaries chartaceous, brownish; the inner phyllaries 4-4.5 × c. 0.7 mm, apex whitish, flexuous or strongly reflexed at maturity; receptacle c. 0.5 mm diam. Marginal florets 40-80; corolla 3.5-4.5 mm, teeth c. 0.2 mm; style branches c. 1 mm. Disk florets 1, commonly greatly exserted from involucre; corolla 4-4.8 mm, deeply 5-lobed, pinkish, tube c.1 mm, throat represented solely by an annular thickening atop the tube, lobes c. 3-3.8 mm, erect; anthers c. 3 mm, exserted, tails of adjacent thecae connate; style exserted 2-3 mm from anther cylinder. Cypsela c. 0.6 mm; pappus 4-4.5 mm. 2n = 20. Flowering Feb-Apr, Jun, Sep-Dec. Secondary forests, sandy or gravely river banks, swamps. CR (*Mora y Rojas 1507*, MO); P (*Allen 5096*, MO). 0-600 m. (Mesoamérica, Colombia, Venezuela, Ecuador, Perú, Bolivia, Brasil, Paraguay, Chile, Argentina.)

The holotipo of *Tessaria integrifolia* is not on IDC microfiche BT-13 card 262 of the Ruiz and Pavon herbarium, where alphabetically an image of it would be expected to positioned. *Tessaria integrifolia*, when found, may be an exceeding common tree along water courses.

XIV. Tribus Liabeae Rydb.

Por H. Robinson.
Mostly perennial herbs or small shrubs, sometimes scandent, rarely annuals, usually highly tomentose at least on leaf abaxial surfaces and apices of phyllaries; herbage sometimes with milky latex. Leaves opposite or in rosette; blade filiform to deltoid, pinnately to palmately veined. Capitulescence simple or subcymose, sometimes forming pyramidal panicle or subumbellate, sometimes scapose or subscapose from short leafy stem. Capitula radiate or discoid, discrete; involucre: phyllaries graduated, few-many-seriate, not obviously scarious nor thinly papery; receptacle epaleate or rarely paleate, foveolate, often with crests, spines, or scales. Ray florets usually present, pistillate; corolla limb usually yellow. Disk florets regular, bisexual; corolla usually yellow, more rarely purple, lobes usually linear, inner surface smooth, outer surface often with broad-based small-tipped glands, sometimes with crests or spicules near apex; anthers spurred, calcarate, thecae pale or black, apical appendage distinct; nectary extending above base of style; style base glabrous, distal portion of trunk and abaxial face of branches papillose, stigmatic surfaces continuous. Cypselae (2-)8-10-ribbed, walls with raphids; pappus 1-many-seriate, usually 1 outer squamose series and 1 inner capillary series, rarely awned or plumose; pollen spherical, tricolporate, regularly or irregularly spinulose. Neotropical.


1. Leaf blades pinnately nerved; scandent plants with capitulescences partly in axils of mature leaves.  
   4. Oligactis

1. Leaf blades trinervately or palmately nerved; erect to subscandent plants with capitulescences showing only reduced leaves.
   2. Petiole bases without wings and nodes without stipuliform enlargements; leaves sometimes absent at anthesis; capitula radiate or discoid; cypselae with elongate raphids.  
   5. Sinclairia

2. Petiole bases usually broadened with wings or stipuliform enlargements or sheaths; leaves present at anthesis; capitula radiate; cypselae walls with quadrate raphids.
   3. Leaves without prominent teeth or angles; plants without latex; capitulescences subumbellate; anther thecae pale.  
   2. Liabum
3. Leaves with prominent teeth or angles; plants usually with latex; capitulescences corymbiform to cymose; anther thecae usually black.

4. Leaves usually palmately veined, herbage with stiff straight trichomes, without tomentum; receptacles without scales.

1. *Erato* DC.

4. Leaves trinervate, without stiff straight trichomes, abaxial surface usually densely tomentose; receptacles with or without scales.

3. *Munnozia*

1. *Erato* DC.

Por H. Robinson.

Coarse perennial herbs to subshrubs, erect to subscandent; herbage with stiff bulbous-based trichomes, without tomentum except sometimes on apex of phyllaries, with latex; stems slightly to densely pubescent, nodes with pairs of broad usually deeply emarginate enclosing stipuliform sheaths. Leaves simple, opposite, narrowly petiolate, present at anthesis; blade broadly ovate, chartaceous, palmately 5-9-nerved from base, both surfaces strigose, base attenuate to cordate, margins prominently serrate to doubly dentate, apex shortly and sharply acuminate; petiole unwinged. Capitulescence terminal, strongly cymose to densely corymbiform, showing only reduced leaves; peduncles elongate, pubescent. Capitula radiate; involucre broadly campanulate; phyllaries unequal, graduated, c. 4-seriate, ovate to narrowly oblong with obtuse herbaceous apex, margins densely ciliate with stiff trichomes; receptacle without scales, foveolate with scarcely lobed puberulent ridges. Ray florets numerous, many-seriate; corolla yellow, limb linear, glabrous. Disk florets numerous; corolla tubular-funnelform, yellow, tube and proximal portion of throat hisrute, throat abruptly expanded at base, lobes strongly setose apically; anther thecae black, not tailed at base; style branches short. Cypselae mostly 4-angled, glabrous or hispidulous, walls with quadrate raphids; pappus typically of numerous elongate, capillary, scabrid, persistent bristles, less commonly of c. 20 readily deciduous short scales. 5 spp. Mesoamerica, northern Andes to N. Peru.


Herbs to subshrubs 0.5-3 m; stems subterete, trichomes scattered, stiff; stipuliform sheaths to 1.8 cm, slightly pilose, connate proximally for 4 mm. Leaves typically long-petiolate; blade 10.5-22.5 × 4-20 cm, ovate to broadly ovate, both surfaces strigose with stiff trichomes, base typically truncate, margins mostly with large teeth and small remote serrations, apex short-acuminate; petiole 2-15 cm, reddish. Capitulescence sometimes lax; peduncles 1.5-8.2 cm, hirsute to strigose. Capitula 0.8-1.3 × 0.8-1.9 cm; phyllaries 50-70, 5-6-seriate, oblong to lanceolate, 5-nerved, usually without apical tufts of arachnoid tomentum. Ray florets 80-113; corolla tube 4-5.5 × 0.25 mm, sparsely puberulent distally, limb 9-10.5 × 0.3-0.5 mm, apex shortly 3-dentate, teeth to 0.3 mm. Disk florets 11-16; corolla tube 2.5-3.5 × 0.5, throat 4.5-5.5 × 2.5 mm, sparsely puberulent to hirtellous distally, lobes 2-3 mm. Cypselae c. 1.5 mm, mostly 4-sided, glabrous; pappus bristles c. 30, 4-6.5 mm, white to stramineous, persistent. *Wet forests, cut-over areas, moist wooded banks*. CR (*Standley 51800*, US); P (*Correa et al. 2004*: 268). 1100-1700 m. (Endémica.)

2. **Liabum** Adans.


Por H. Robinson.

Perennial herbs or subshrubs, erect to subscandent, thinly to densely tomentose on stems, abaxial surface of leaves, and peduncles, without latex; stems laxly branched, subterete to hexagonal, nodes sometimes pseudostipulate. Leaves simple, opposite, present at anthesis, bases connected by wing that is sometimes expanded into nodal disk; blade broadly ovate to narrowly elliptical, chartaceous, trinerved from near base, margins without prominent teeth or angles; petiole narrowly to broadly winged. Capitulescence terminal, cymose with umbellate proximal nodes, showing only reduced leaves; peduncles < 5 cm. Capitula radiate; involucre broadly campanulate; phyllaries graduated, c. 5-seriate, mostly linear to lanceolate, usually with lingering arachnoid-pubesence, apex acute to acuminate; receptacle with short spines or high ridges. Ray florets 40-300, usually 2-seriate; corolla yellow, limb linear. Disk florets: corolla narrowly funnelform, yellow, throat with short trichomes or glabrous, lobe
 apex smooth to densely spiculiferous; anther thecae pale, fringed at base, appendages oblong-ovate, smooth; style branches papillose. Cypselae 10-costate, setose with straight white trichomes, very rarely glandular, walls with quadrate raphids; pappus with outer series of short bristles, inner series of many capillary bristles, persistent, apex slightly thickened. Aprox. 37 spp. Mexico, Central America, Greater Antilles, South America S to Bolivia.


Rydberg (1927), followed by Standley (1938), reported the Andean *Liabum igniarium* (Kunth) Less. from Costa Rica. Standley cites reports by Klatt from the Térraba and Boruca areas, but stated that he had seen no specimens. No specimens have been seen in this study, and such an occurrence is highly unlikely.


Subshrubs mostly 1-2 m; stems simple or few-branched, hexagonal, densely appressed whitish tomentose. Leaf base broadly winged but without nodal disk; blade mostly 8-20 × 4-16 cm, usually broadly ovate, lateral veins from basal trinervation reaching to near apex, glabrous and smooth adaxially, densely whitish appressed-tomentose abaxially, base narrowly acuminate, margins remotely mucronate-toothed, apex short-acuminate; petiole to 5 cm, mostly elongate, winged, wings much narrowed distally. Capitulescence with peduncles typically < 1 cm. Capitula: involucre 8-9 mm; phyllaries narrowly lanceolate to linear, puberulent to slightly floccose. Ray florets 80-100, c. 3-seriate; corolla tube 3-4 mm, slightly puberulent distally, limb c. 3 × c. 0.5 mm. Disk florets c. 15; corolla tube c. 3.5 mm, puberulent distally, throat c. 1.5 mm, lobes c. 2 mm, apex scabrid. Cypselae c. 1 mm; inner pappus bristles c. 25, c. 5 mm. Roadsides, forested slopes, wet forest, ravines, by waterfalls, steam banks, on rocks beside rivers. Ch (Matuda 2746, US); ?B (Villaseñor, 1989: 70); G (Tuerckheim II 2123, US); H (Molina 11672, US); N (Sandino 567, F); CR (Skutch 4730, US); P (Allen 1587, US). 200-2000 m. (C. Mexico, Mesoamerica.)

The species is closely related to *Liabum asclepiadeum* Sch. Bip. of northern South America, but that differs by having only c. 40-50 ray florets in the capitula, generally
narrower leaf blades and shorter petioles, and more narrowly winged bases on the petioles. The present species approaches its South American relative most closely geographically on the Cerro Tacarcuna on the Panama / Colombia border (*Gentry y Mori 14098*, MO).

3. **Munnozia** Ruiz et Pav.

Por H. Robinson.

Perennial herbs or subshrubs, rarely annuals, low or creeping to scandent; usually tomentose on stems, abaxial surfaces of leaves, and peduncles, with latex. Leaves simple, opposite, petiolate, often auriculate or forming nodal disks, but not sheathing, present at anthesis; blade entire to deeply pinnatifid, chartaceous to subcoriaceous, trinerved (ours) to pinnately veined, abaxial surface usually densely tomentose, without stiff straight trichomes, rarely nearly glabrous, base rounded to hastate, margins prominently serrulate to deeply lobed or pinnatifid; petiole distinct, sometimes winged or toothed. Capitulescence terminal, corymbiform to laxly cymose, branching in distal portions sometimes becoming alternate, showing only reduced leaves; peduncles short to very long. Capitula radiate; involucre broadly campanulate; phyllaries 17-70, subequal to unequal, 2-4-seriate, outer phyllaries ovate to oblong, apex herbaceous, acute; receptacle with or without scales. Ray florets 6-70; corolla yellow, rarely lavender or whitish, tube often distally hirsute, limb linear. Disk florets 9-85; corolla yellow, rarely lavender or whitish, tube often distally densely pubescent, throat rather abruptly expanded at base, often basally densely pubescent, lobes sometimes bearing stout trichomes apically; anther thecae usually black, not tailed at base, appendage distinct, smooth; nectary short, style with slightly enlarged basal node, branches usually < 1/2 as long as hirtellous distal portion of trunk. Cypselae prismatic, 6-10-ribbed, setose, walls with quadrate raphids; pappus outer series of short bristles or distinct squamae, inner series of 5-55 bristles, bristles sordid or reddish, elongate, capillary, scabrid. 41 spp. Costa Rica and Andean South America to Bolivia.


1. Petioles unwinged for most its length; blades trinerved from base or nearly so; capitulescences with mostly opposite branching throughout; striations in phyllaries
reaching nearly to apex; disk corolla tubes distally pilose, throats 2-3 mm.

1. **M. senecionidis**

1. Petioles distinctly winged throughout; blades trinerved from above base; capitulescences commonly with much alternate or subopposite branching distally; striations in phyllaries ending before herbaceous distal 1/3; disk corolla tubes densely puberulent, throats c. 1 mm.

2. **M. wilburii**


Reclining herbs or subscandent to 7 m; stems slightly to strongly hexagonal. Leaf bases slightly broadened, rarely with lobes or large stipuliform wings; blade mostly 5-16 × 2-8 cm, triangular-oblong, strongly ascending trinerved from base or nearly so, the adaxial surface glabrous or puberulent, the abaxial surface whitish tomentose, base hastate or truncate with sharp angles, margins denticulate, apex usually narrowly acuminate; petiole 1-6 cm, unwinged for most its length, without evident teeth or lobes. Capitulescence terminal, mostly with opposite branching throughout, with little subopposite or alternate branching distally; peduncles mostly 3-10 cm. Capitula 10-15 mm; involucre 12-25 mm diam.; phyllaries 30-40, 2-10(-15) mm, subequal to very unequal, 3-4-seriate, ovate to oblong or narrowly lanceolate, 5-7-striate, striations reaching nearly to apex, apex obtuse or short-acuminate; receptacle with prominent laciniate crests. Ray florets 32-42; corolla tube 3-4 mm, pilose distally, limb 20-25 × < c. 2.5 mm, distal part of adaxial surface sparsely glandular, sparsely puberulent. Disk florets c. 40; corolla tube 3-7 mm, distally pilose, throat 2-3 mm, proximally pilose, lobes 2.5-3 mm long pilose below apex. Cypselae 1.3-1.7 mm, densely setose except at base, c. 8-ribbed; pappus bristles c. 40, mostly 6-8 mm, outer setae few, 1-4 mm.

_Roadsides, pastures, cleared areas, forest margins, second growth forest._ CR (*Allen 1458*, US); P (*Almeda 2100*, US). 1000-3200 m. (Mesoamerica, Colombia, Venezuela, Ecuador, Peru, Bolivia.)

Subshrubs to 2 m; stems hexagonal. Leaf bases connected across nodes by wing; blade mostly 9-16(-21) × 5-12(-18) cm, deltoid-oblong, spreading trinerved from above base, adaxial surface hirtellous, abaxial surface whitish tomentose, base hastate, margins dentate and mucronate-denticulate, apex short-acuminate; petiole to 8(-15) cm, distinctly winged throughout. Capitulescence terminal, with mostly opposite branching proximally, commonly with much alternate or subopposite branching distally; peduncles 4-10 cm. Capitula c. 10 mm; involucre 10-12 mm diam.; phyllaries 30-35, 4-7 mm, graduated, c. 3-seriate, ovate to broadly oblong, 5-10-striate, striations ending before herbaceous distal 1/3, apex obtuse to short-acute, receptacle with lacinate crests. Ray florets 40-45; corolla tube 4-6 mm, densely puberulent, limb 12-17 × < 2 mm, adaxially sparsely glandular, sparsely puberulent. Disk florets 40-50; corolla tube 4-5 mm, densely puberulent, throat c. 1 mm, lobes c. 2 mm, densely pilose apically. Cypselae c. 1.3 mm, long-setose c. 10-costate; pappus bristles 35-40, mostly c. 5 mm, outer setae 0.3-0.5 mm. **Steep roadside and riverside banks.** CR (Almeda 2378, US). 1200-1800 m. (Endemic.)


*Andromachia* sect. *Oligactis* Kunth

Por H. Robinson.

Vines, with tomentum on stems, abaxial surface of leaves, and peduncles, without latex; stem nodes with or without paired stipuliform disks. Leaves simple, opposite, rarely perfoliate; blade elliptical or ovate to narrowly linear, venation pinnate, adaxial surface flat or sometimes slightly bullate, margins never with large teeth or angles; petiole with or without wings. Capitulescence axillary or terminal, with subglomerate, spiciform or racemose arrangement of capitula; peduncles < 5 mm. Capitula radiate; involucre narrowly campanulate; phyllaries 16-35, unequal, 4-5-seriate, lanceolate to ovate, puberulent to hirsute, apex narrowly acute; receptacle with lacinate squamae or ridges. Ray florets 3-6, uniseriate; corolla yellow, limb short, elliptical, glabrous or nearly so. Disk florets 3-9; corolla narrowly funnelform, sometimes slightly swollen at base of throat, yellow, apex of lobes plain; anther thecae pale, digitate at base, appendages oblong-ovate, papillose; style base with distinct node, branches linear, shorter than hirtellous part of trunk, nectary short. Cypselae prismatic, 5-8(-10)-costate, glandular, also bearing contorted setulae, raphids quadrate; pappus biseriate,
outer series of short bristles or squamellae, inner series of elongate, persistent, capillary bristles, apex broadened. 12 spp. Costa Rica and NW South America to N. Peru.


Vines; stems slender, subterete, with appressed whitish tomentum, internodes elongate, nodes without nodal disks. Leaves petiolate; blade 6-13 × 1-6 cm, elliptic, adaxial surface with evanescent tomentum or glabrous, abaxial surface with dense whitish or pale brownish tomentum, base and apex short-acute to slightly acuminate, margins scarcely to distinctly mucronate-serrulate distally; petiole 0.5-1.8 cm, unwinged. Capitulescence mostly axillary, paniculate with cymose branches; peduncles 2-10 mm, slender. Capitula narrowly campanulate; involucre c. 5 × c. 3 mm; phyllaries c. 20, graduated, 3-4-seriate, ovate to lanceolate, glabrate, apex acute, innermost attenuate; receptacle c. 1.2 mm diam. Ray florets 3-6; corolla tube 2.5-4 mm, slightly puberulent, limb 3-4 mm, narrowly elliptical. Disk florets 7-9; corolla tube 2.5-3 mm, glabrous, throat c. 1 mm, lobes c. 2-2.3 mm, minutely setulose only apically; anther appendages papillose. Cypselae c. 2 mm, 8-10-costate; pappus bristles 35-40, 4.5-5 mm, narrow outer squamae 1-1.3 mm. *Wooded roadside, wet forest, cloud forest, vegetacion secundaria predominantemente de chusques.* CR (*Standley 42555*, US); P (*Blum y Dwyer 2618*, MO). 1300-3100 m. (Mesoamerica, Colombia, Venezuela.)

5. **Sinclairia** Hook. et Arn.


Por H. Robinson.
Erect to subscandent subshrubs or shrubs, or vines, sparingly branched, usually with underground tuber, with latex, usually tomentose on stems, abaxial surfaces of leaves, and peduncles. Leaves opposite or ternate, sometimes absent at anthesis; bases not winged (ours) or winged and perfoliate, not forming nodal disks; blade ovate to suborbicular or triangular, trinerved from near or above base, adaxial surface glabrous in most species, margins remotely mucronate-denticulate to coarsely dentate or deeply lobed; petiole distinct, narrow, unwinged (ours) or winged. Capitulescence terminal or from axils of reduced leaves, corymbose to thyrsoid with corymbose branches, showing only reduced leaves. Capitula radiate or discoid, narrowly to broadly campanulate, phyllaries graduated, 3-5-seriate, apex rounded to narrowly acuminate; receptacle glabrous or with minute spines or trichomes. Ray florets absent or 4-25, uniseriate; corolla yellow. Disk florets 5-30; corolla yellow with moderate expansion at base of throat; anther thecae pale, minutely crenulate at base; nectary with irregular crenulations or lobules, style base usually without node, branches 10-15x as long as wide. Cypselae prismatic, mostly 5-costate with various striations, glabrous to densely setulose, raphids elongate; pappus of persistent inner bristles and outer series of short usually squamiform setae. Pollen 33-52 μm diam., with spines rather irregularly distributed. 29 spp. Mexico and Central America to W. Colombia.


1. Capitula 15-30 mm; involucres 12-20 mm; phyllaries densely whitish tomentose; cypselae 5-7 mm, densely sericeous-setulose.
   2. Capitula radiate, containing 25-30 ray florets, 100-130 disk florets, and 100-130 phyllaries.
      1. *S. andrieuxii*
      2. Capitula discoid, c. 40 disk florets, and c. 40 phyllaries.

9. *S. tajumulcensis*

1. Capitula 7-15 mm; involucres 4-11 mm; phyllaries usually puberulent to glabrous; cypselae 1-4 mm, short-setulose to glabrous.
   3. Involucres 4-5 mm.
      4. Abaxial surfaces of leaves green, thinly tomentellous on veins; capitula radiate; peduncles 2-10 mm, flexuous.
      6. *S. hypochlora*
      4. Abaxial surfaces of leaves whitish to grayish tomentose; capitula discoid; peduncles 2-4 mm, not flexuous.
5. Disk florets c. 6; corollas with clustered short gland-tipped trichomes at apex of lobes; cypselae with pappus of c. 30 bristles.

2. **S. deamii**

5. Disk florets 9-12; corollas with few arachnoid trichomes on lobe apex; cypselae with pappus of 40-45 bristles.

3. **S. dimidia**

3. Involucres 6-11 mm.

6. Capitulescences thyrsoid paniculate, higher than wide; capitula discoid; phyllaries with apex erect, not coiled backward with age.

7. Phyllaries densely brownish hispidulous or glandular-dotted, inner phyllaries with pointed apex; capitula containing 30-40 florets; leaves strictly opposite, not totally absent at anthesis, blades broadest near middle.

8. **S. sericolepis**

7. Phyllaries without dense puberulence, inner phyllaries with rounded apex; capitula containing 8-15 florets; leaves opposite or more commonly ternate, often absent at anthesis, blades broadest below basal 1/3.

5. **S. glabra**

6. Capitulescences pyramidally paniculate, as wide as long; capitula radiate; phyllaries with apex weakly erect or usually strongly recurving or curling with age.

8. Leaf blades persistently pilose adaxially, adaxial surface with fine trichomes in addition to tomentum between veins.

10. **S. tonduzii**

8. Leaf blades essentially glabrous or sometimes thin-puberulent adaxially, adaxial surface without trichomes between veins.

9. Leaf blades broadest at or below basal 1/3; stems weak and fleshy; apices of inner phyllaries often distinctly pointed, weakly erect.

11. **S. vagans**

9. Leaf blades usually broadest distinctly above basal 1/3, often nearly elliptical; plants woody; apices of inner phyllaries rounded, becoming strongly recurved.

10. Cypselae densely setulose to base; stems usually hirsute with sparse coarse trichomes; blades trinerved from 1-2 cm above base.

7. **S. polyantha**
10. Cypselae glabrous or rarely with sparse short setulae mostly
distally on major ribs; stems glabrous or with thin whitish evanescent
arachnoid, without coarse trichomes; blades trinerved from base or < 1
cm above base.  4. S. discolor

Vernonia andrieuxii DC., Prodr. 5: 16 (1836). Holotype: Mexico, Andrieux 269 (G-

   Liabum andrieuxii (DC.) Benth. et Hook. f. ex Hemsl., Megaliabum andrieuxii
   (DC.) Rydb.

   Perennial herbs 1-2 m; stems shortly hirsute and thinly whitish tomentose. Leaves
opposite; blade to 18 × 20 cm, broadly deltoid, trinerved from distal part of
acumination, adaxial surface minutely puberulent, whitish tomentose, base spreading-
subtruncate from a narrow acumination, margins irregularly dentate, apex short-
acuminate; petiole 2-4 cm. Capitulescence with few opposite branches; peduncles 20-
50 mm. Capitula 25-30 × 25-30 mm, radiate; involucre 15-20 mm; phyllaries 100-130,
10-20 × 2-3 mm, c. 4-seriate, linear, densely whitish tomentose, apex narrow,
sometimes reflexed or flexuous. Ray florets 25-30, uniseriate; corolla yellow or
orange, tube c. 12 mm, pilosulous, limb c. 15 mm. Disk florets 100-130; corolla
yellow or orange, tube 8-10 mm, mostly glabrous, throat 4-5 mm, pilosulous
proximaly, lobes c. 4 mm. Cypselae 6-7 mm, 5 major costae with usually 5 weaker
costae between, densely sericeous-setulose; pappus of c. 70 bristles, bristles mostly 12-
15 mm, sordid to violet, outer series of setiform squamae c. 2 mm. Steep rocky slope,
wooded slopes, edge of deciduous forest. Ch (Breedlove 13827, US); G (Molina
21411, US). 600-1900 m. (Mexico, Mesoamerica.)

Liabum deamii B.L. Rob. et Bartlett, Proc. Amer. Acad. Arts 43: 60 (1907). Holotype:

   Liabum subglandulare S.F. Blake, Sinclairia subglandularis (S.F. Blake) Rydb.

   Clambering shrub to 3-10 m, with slender, rather woody stems bearing evanescent
arachnoid tomentum and sparse coarse trichomes. Leaves often absent at anthesis,
opposite; blade 6-17 × 4.5-15 cm, rhombic-ovate to subdeltoid, trinerved from at or
near base, adaxial surface thinly to densely puberulent, abaxial surface whitish to
grayish tomentose, more brownish on veins, short-acuminate at base and apex, margins with numerous remote mucronulate serrations; petiole mostly 2-4 cm. Capitulescence terminal, pyramidal paniculate, sometimes denser and thyrsoid; peduncles 2-4 mm, not flexuous, brownish puberulent with some whitish tomentum. Capitula 10-11 mm, discoid; involucre 4.5 × 4 mm; phyllaries 10-12, 2-3-seriate, distally puberulent, with short brownish trichomes and short whitish tomentum, apex rounded to obtusely pointed. Disk florets c. 6; corolla yellow, mostly glabrous with sparse trichomes on distal part of throat and clustered short gland-tipped trichomes on apex of lobes, tube 2.5-3 mm, throat c. 2 mm, lobes c. 2.5 mm. Cypselae c. 2.5 mm, c. 10-ribbed, densely shortly setulose throughout; pappus of c. 30 bristles 6-7 mm, bristles of outer series 1-2 mm. Wooded slope, hillside thicket, top of rocky river bank, on ruins. T (Turner 2007: 13); Ch (Laughlin 274, US); C (Lundell 1437, CAS); B (Bartlett 12910, US); G (Contreras 2063, US); H (Blake 7386, US); ES (Standley 19695, US). 100-1200 m. (Endémica.)


Scrambling shrubs to 7 m; with rather soft stems bearing evanescent arachnoid tomentum and sparse coarse trichomes. Leaves sometimes absent at anthesis, opposite; blade mostly 5-11 × 2.5-8 cm, elliptic-ovate, trinerved from near base, adaxial surface thinly to densely puberulent, abaxial surface whitish to grayish tomentose with veins more brownish, not or slightly acuminate at base and apex, margin with numerous minute mucronulate serrations; petiole mostly 1-2.5 cm. Capitulescence terminal, laxly pyramidal paniculate; peduncles 2-4 mm, not flexuous, with brownish puberulence and short whitish tomentum. Capitula 10-12 mm, discoid; involucre 4.5 × 4.5 mm; phyllaries c. 18, 3-4-seriate, ovate to oblong, weakly striated, bearing evanescent short arachnoid tomentum, inner phyllaries with rounded apex. Disk florets 9-12; corolla yellow, puberulent on throat, with only few arachnoid trichomes on lobe apex, tube c. 2.5 mm, throat c. 2 mm, lobes c. 2 mm. Cypselae c. 1.5 mm, c. 10-ribbed, densely shortly setulose throughout; pappus of 40-45 long bristles to 7 mm, outer indistinct bristles to 1 mm. Low forest. Ch (Breedlove 34987, CAS); G (Tún Ortíz 1083, US). 300-1200 m. (Endémica.)
This species was treated in synonymy of *Sinclairia polyantha* by Turner (1989). The report by Villaseñor (1989) of *S. dimidia* in Belize is based on misidentified material here referred to *S. polyantha*.


*Liabum discolor* (Hook. et Arn.) Benth. et Hook. f. ex Hemsl.

Scandent woody shrubs or small trees 2-5 m; stems glabrous or with thin whitish evanescent arachnoid tomentum, without coarse trichomes. Leaves opposite, sometimes absent at anthesis; blade mostly 8-14 × 4-12 cm, broadly ovate to rhomboid, usually broadest distinctly above basal 1/3, trinerved from base or < 1 cm above base, glabrous or with thin evanescent whitish arachnoid trichomes adaxially, with dense appressed white tomentum abaxially, broadly cuneate to rounded and short-acuminate at base, margin with minute mucronate denticulations often obscure, scarcely to sharply acuminate at apex; petiole mostly 2-7 cm. Capitulescence terminal, rather densely pyramidal paniculate, as broad as high; peduncles mostly 5-15 mm, glabrous to finely puberulent. Capitula 10-15 mm, radiate; involucre 7-11 × 4-8 mm when not recurved; phyllaries 16-20, 1-2.5 mm diam., c. 3-seriate, ovate to broadly linear, finely puberulent, especially nearer margins and apex, strongly recurved with age, inner phyllaries with often broadly rounded apex. Ray florets c. 6; corolla yellow, tube 3-4 mm, glabrous, limb 9-10 mm. Disk florets 12-15; corolla glabrous except for clustered arachnoid trichomes on lobe apex, yellow, tube 4-5 mm, throat c. 2 mm, lobes 2.5-3 mm. Cypselae 2-2.5 mm, with 5 major ribs and c. 15 striations, glabrous or rarely with sparse short setulæ mostly distally on major ribs; pappus of 35-45 bristles mostly 6-7 mm, outer series of narrow squamellæ c. 1 mm. *Bosque mixto y humedo, edge of forest, cloud forest area, in cleared pine forest, high ridge, serpentine derived laterite.* Ch (Ton 780, US); B (Gentle 6479, US); G (Türckheim II 2116, US); H (Williams y Molina 13728, US); ES (Molina et al. 16947, US); N (Molina 20555, US); CR (Standley 33202, US). 300-2700 m. (Endémica.).

For additional notes on distinctions from *Sinclairia polyantha* see the latter species. The citation by Turner (1989) and Correa et al. (2004) of *S. discolor* in Panama is based on Dwyer 7052, here referred to *S. polyantha*. 

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Shrubs or small trees 3-6 m; branches glabescent. Leaves opposite or more often ternate, often absent at anthesis; blade to 15 × 11 cm, ovate to narrowly ovate, broadest below basal 1/3, glabrous adaxially, with or without tomentum abaxially, acuminate at base and apex; petiole 2-5 cm. Capitulescence terminal, laxly to densely thyroid paniculate, higher than wide; often with large foliose primary phyllaries; peduncles 1-5 mm, with evanescent white arachnoid tomentum. Capitula c. 10 mm, discoid; involucre 6-8 × 5-6 mm; phyllaries c. 20, 3-4-seriate, ovate to linear, without dense puberulence, apex erect, not coiled backward with age, inner phyllaries with rounded apex. Disk florets 8-15; corolla yellow, glabrous, sometimes with minute stalked glands at apex of lobes, tube 3-5 mm, throat and lobes each c. 2 mm. Cypselae 1.5-1.8 mm, with 5 major ribs and 5 or more minor striations, glabrous proximally, with few to many setulae distally, rarely setulae extending below middle; pappus of c. 40 pale yellowish bristles 5-6 mm, outer series of squamae c. 1 mm. *Damp forested slopes, grassy slopes, in hedge, roadsides.* Ch (Matuda 16211, US); G (Pittier 1886, US); H (Nelson 1376, MO); ES (Standley 19530, US); N (Williams y Molina 20167, US). 70-2200 m. (SW Mexico, Mesoamerica.)

Three species are distinguished in most treatments. The name *Liabum glabrum* has been applied to specimens from Guatemala and Mexico west to Jalisco that have little or no whitish tomentum abaxially on the leaves, *L. sublobatum* applied to material from Guatemala and closely adjacent areas that have dense whitish abaxial tomentum, and *L. brachypus* was known from one Guatemalan specimen that differed only in having more setulae on the cypsela. Turner (1989) recognized both *Sinclairia glabra* and *S. sublobata* as distinct.


Scrambling shrubs 2-12 m on other shrubs and trees; stems slightly fleshy, bearing minute evanescent tomentellum and sparse pilosity. Leaves opposite, scarcely
broadened at base; blade mostly 10-14 × 4-7.5 cm, ovate, trinerved from well above base, abaxial surface green with minute glandular punctations, thinly tomentellous on veins, shortly acuminate at base and apex, margin minutely serrulate to subentire; petiole 2-5 cm. Capitulescence terminal, broadly pyramidal panicle; peduncles 2-10 mm, slender, flexuous, sparsely brownish puberulent. Capitula c. 9 mm, radiate; involucre c. 4 × 4-5 mm; phyllaries c. 15-18, 2-3-seriate, ovate to narrowly ovate, brownish puberulent, apex shortly acute. Ray florets 5-7; corolla yellow, tube c. 3 mm, glabrous, limb 3-4 mm, apical lobes to 1 mm. Disk florets 8-10; corolla yellow, glabrous except for short tomentum at apex of lobes, tube c. 4 mm, throat c. 2 mm, lobes c. 2 mm. Cypselae c. 1-2 mm, with 5 primary ribs, densely short-setulose; pappus of 30-35 bristles c. 6 mm, outer setae indistinct, c. 0.5 mm. Dense tangles over dead trees and stumps, second growth, roadside. Ch (Matuda 18461, US); G (King 7245, US). 500-1000 m. (Endemic.)


Sinclairia pittieri Rydb.

Woody vines 2-8 m; stems puberulent and usually sparsely to densely hirsute with sparse coarse trichomes, often also with arachnoid trichomes, becoming glabrous. Leaves opposite, often absent at anthesis; blade mostly 8-18 × 5-22 cm, broadly ovate to rhomboid or elliptical, usually broadest distinctly above basal 1/3, trinerved from 1-2 cm above base, glabrous or with thin arachnoid pubescence adaxially, pale-grayish tomentose abaxially, often mottled, more brownish on veins, rounded at base with minimal acumination, margin with minute mucronate-denticulations, often subentire, usually short acuminate at apex; petiole 1.5-10 cm, slightly broader at base. Capitulescence terminal, rather densely pyramidal panicle, as wide as long; peduncles 2-8(-13) mm, densely brownish puberulent or hirtellous, sometimes with pale tomentum. Capitula 9-10 mm, radiate; involucre 7-9 × c. 6 mm when not recurved; phyllaries 16-22, 1.5-6(-8) × 1-1.2(-2) mm, c. 3-seriate, ovate to linear, densely pale-puberulent except often near middle, strongly recurved with age, inner phyllaries with narrowly rounded to shortly obtuse apex. Ray florets 3-8; corolla yellow, tube 2-4 mm, glabrous, limb 3-6 mm. Disk florets 7-20; corolla yellow, glabrous except very short arachnoid trichomes at lobe apex, tube c. 3 mm, throat c. 2
mm, lobes c. 2 mm. Cypselae c. 2.5 mm, with often 5 major angles and 15 or more striations, densely shortly setulose to base; pappus of c. 38-42 bristles mostly c. 6 mm, outer setiform squamellae 0.5-1 mm. Base of hill, evergreen forest, on stumps, brushy slope, wet thicket, wet forest, thicket on summit of ridge. Ch (Turner 2007: 28); B (Gentle 5239, US); G (Lundell 15784, US); H (Nelson y Clewell 514, MO); N (Williams et al. 24796, F); CR (Skutch 5325, US); P (Hammel 1735, F). 0-1800 m. (S. Mexico, Mesoamerica, W. Colombia.)

The species tends to have shorter pedicles and narrower inner phyllaries than *Sinclairia discolor* through most of its range. The abaxial surfaces of the leaves have less dense tomentum than in *S. discolor* and usually have a less whitish more sordid coloration. Material of *S. polyantha* from central Panama is unusually robust and is more like *S. discolor* in its peduncles and phyllaries.


Lax shrubs to 2.5 m; stems sparsely appressed-whitish tomentose. Leaves strictly opposite, not totally absent at anthesis; blade 6.5-12 × 2.5-4 cm, elliptical, broadest near middle, trinerved from near base, adaxial surface glabrous, appressed grayish tomentose abaxially, base and apex shortly acuminate, margins minutely and remotely mucronate-denticulate; petiole 1.8-2.7 cm. Capitulescence thyrsoid paniculate, higher than wide; peduncles 9-15 mm, tenuously arachnoid tomentose. Capitula c. 12 mm, discoid; involucre c. 8 × c. 8 mm; phyllaries c. 35, c. 5-seriate, lanceolate, densely brownish hispidulous or glandular-dotted, apex narrowly acute, erect, not coiled backward with age, inner phyllaries with pointed apex. Disk florets c. 30-40, sometimes a few at edge pistillate; corolla yellow, glabrous, tube c. 5 mm, throat c. 2 mm, lobes c. 3.5 mm. Cypselae c. 4 mm, with 5 major ribs and 15 minor ribs, shortly hispid-setulose apically, glabrous proximally; pappus of c. 50 pale sordid bristles mostly c. 8 mm, outer setiform series 0.5-1 mm. *Heavily wooded slope.* ?T (Villaseñor, 1989: 96); Ch (Ton 3803, US). 100-800 m. (S Mexico, Mesoamerica.)

The Chiapas collection is one of three seen of the species. The Bourgeau type is cited from the Valley of Cordoba, Veracruz. and a 1974 specimen (*Vazquez 00437, BM*) is from southeastern Veracruz (17°13' N, 94°35' W).

Shrubs to 5 m; branches, thick, pale tomentose on branches, peduncles, and involucre. Leaves unknown, scars opposite at callus-margined nodes. Capitulescence terminal, densely thyrsoid; peduncles 5-10 mm. Capitula 15-18 mm, discoid, broad; involucre 12-14 × 15-18 mm; phyllaries c. 40, 4-5-seriate, lanceolate, densely whitish tomentose, narrowly acute. Disk florets c. 40; corolla yellow, pilosulous outside, with dense mixed trichomes and tomentum at lobe apex, tube c. 7 mm, throat c. 4 mm, lobes c. 3 mm. Cypselae c. 5 mm, with 5 prominent major ribs, densely sericeous-setulose throughout, pappus of c. 40 bristles, bristles mostly c. 12 mm, sordid. *Moist thickets bordering stream.* G (*Steyermark 36543*, F). 2300-2500 m. (Guatemala.)

The type collection was cited incorrectly by Nash (1976a) as *Steyermark "36453."*


Scandent shrubs 3-5 m; stems densely and shortly hirsute. Leaves opposite; blade mostly 8-15 × 4-10 cm, ovate, trinerved from near base, densely persistent pilose on both surfaces, adaxial surface with fine trichomes in addition to tomentum between veins, densely pale-grayish tomentose abaxially, brownish on veins, broadly rounded with minimal acumination at base, margin minutely remotely mucronate-denticulate, slightly short-acuminate at apex; petiole 2-6 cm, slightly broadened at base. Capitulescence terminal, broadly and densely pyramidally paniculate, as wide as long; peduncles 1-4 mm, densely brownish hirtellous. Capitula 7-8 mm, radiate; involucre c. 6 × c. 5 mm; phyllaries c. 17, c. 3-seriate, ovate to linear, mostly glabrous, strongly recurved with age, inner phyllaries obtusely pointed. Ray florets c. 5; corolla yellow, tube 1-2 mm, glabrous, limb c. 4.5 mm. Disk florets c. 8; corolla yellow, glabrous except for short arachnoid trichomes at lobe apex, tube c. 3 mm, throat c. 1.5 mm, lobes c. 2 mm. Cypselae c. 2.5 mm, with 5 major ribs and 10-15 striations, densely shortly setulose to base; pappus of c. 38 capillary bristles mostly 5-6 mm, outer narrow squamellae mostly 0.2-0.4 mm. *River margin, moist thicket.* CR (*Standley 42513*, US). 300-1100 m. (Endemic.)
This species was treated in synonymy of *S. polyantha* by Turner (1989).


Stragglng shrubs 3-4 m; stems weak and rather fleshy, bearing slight puberulence and evanescent pale arachnoid tomentum. Leaves opposite; blade mostly 10-15 × 8-13 cm, broadly suborbicular-ovate, broadest at or below basal 1/3, trinerved from or near basal acumination, essentially glabrous adaxially, without trichomes between veins, densely grayish-white tomentose abaxially, brownish on veins, shortly acuminate at base and apex, margins closely mucronulate-serrulate; petiole mostly 3-6 cm, broader and more fleshy toward base. Capitulescence terminal, broadly pyramidal panicle, as wide as long; peduncles 2-8 mm, slender, flexuous, brownish puberulent. Capitula c. 10 mm, radiate; involucre 6-8 × 6-7 mm; phyllaries c. 20, c. 3-seriate, ovate to narrowly oblong, brownish puberulent, erect or weakly recurved, apex obtusely pointed to short-acute, apex of inner phyllaries often distinctly pointed. Ray florets 5-7; corolla yellow, tube c. 5 mm, sparsely puberulent, limb c. 6 mm. Disk florets 6-8; corolla yellow, glabrous outside except for tomentum on apex of lobes, tube c. 5 mm, throat c. 2 mm, lobes c. 2.5 mm. Cypselae c. 2.5 mm, densely short-setulose almost throughout; pappus of c. 40 bristles c. 7 mm, with outer series c. 0.5 mm. *Forested mountain slope and ravines, rooted on mossy stumps.* Ch (*Breedlove 41721*, CAS); G (*Williams et al. 25855*, US). 900-2700 m. (Endemic.)

XV. Tribus Millerieae Lindl.


Por J.F. Pruski.

Annual herbs to trees; herbage often punctate-glandular or stipitate-glandular, without secretory cavities or latex. Leaves cauline (ours) or sometimes in basal rosettes, typically opposite (ours) to alternate, sessile to petiolate; blade linear to ovate or sometimes orbicular, sometimes lobed, typically chartaceous, venation trinervate or sometimes pinnate, margins entire to serrate. Capitulescence terminal or axillary, monocephalous to paniculate, open to congested. Capitula radiate or discoid to rarely disciform; involucre cylindrical to hemispherical; phyllaries graduated to subequal or obgraduate, 1-5+-seriate, flat to navicular-conduplicate, sometimes strongly dimorphic with an outer herbaceous series and inner
chartaceous-scarious series but then inner series not translucent, all not yellow-scarious, inner series often fertile by subtending and closely associated with individual ray florets, often persistent, sometimes variously surrounding the developing ovary and in fruit forming a perigynium-like structure or fused to them forming a conceptacle, the phyllaries of perigynium-like structures or conceptacles thus deciduous in a unit with cypselae; clinanthium usually convex to conical, paleate to less commonly epaleate; paleae flat to navicular or conduplicate, usually thin-chartaceous or scarious, sometimes trifid (Sabazia, Schistocarpha), infrequently filiform to very reduced or rudimentary (e.g., Alepidocline, Selloa, Unxia).

Ray florets typically 1(2-4)-seriate, pistillate; corolla tube often pubescent with simple trichomes or sessile glands, limb sometimes short, nerves typically equally thin, adaxial surface typically very finely-papilllose with nearly isodiametric epidermal cells (the rounded papillae encompassing much of the outer epidermal cell wall face), apex often (2-)3-dentate or (2-)3-lobed; style base glabrous, branches exappendiculate, with stigmatic surfaces 2-banded from base to apex. Disk florets bisexual and forming fruit or functionally staminate with suppressed gynoecia not forming fruits; corolla shortly (4-)5-lobed, gradually to abruptly ampiate, with single or paired resin ducts associated with each of the five veins in throat, resin ducts colorless (e.g., Melampodiinae, Milleriinae) or often golden or brownish, ducts infrequently reddish by polyacetylene compliments, typically pubescent with simple trichomes or sessile glands, lobes usually triangular, sometimes papilllose within; anthers ecaudate, filaments glabrous to very rarely pilose, thecae cream-colored to black, typically with polarized endothecium pattern, appendages lanceolate to ovate, typically navicular, glabrous or infrequently sessile-glandular; style exappendiculate, bases glabrous, trunk 2-veined, resin ducts usually 2, one each inside of or along a vein, infrequently with 4 ducts, a pair along side of each vein, branches somewhat flattened, with stigmatic surfaces 2-banded from base to apex, rarely continuous, when functionally staminate the style undivided. Cypselae usually obconical to obovoid or triquetrous to obpyramidal (3-4-angled), never obcompressed, sometimes incurved, usually free from phyllaries and not completely enclosed by them or sometimes merely connate basally to phyllary or palea, less commonly rays variously fused to or loosely but completely enclosed within a modified phyllary forming a perigynium-like structure or a conceptacle, carbonized, walls without raphids, usually finely striate (the striae being interruptions in the carbonized layer; striae absent in Espelitiinae), carbonized layer usually flat and in same plane as striations, carpopodium often broad or asymmetrical but usually non-sculptured; epappose or pappus of scales or bristles, scales or bristles rarely borne in a recessed ring, usually scabridulous to scabrid, rarely plumose or long-barbellate; seed coat typically with sinuous lateral walls and several cross-annulations. Aprox. 34 genera and 400 spp.

Cosmopolitan or pantropical but centered in the Neotropics.

Millierieae has usually been recognized within Heliantheae, and its members therein placed by Robinson (1981) variously in Melampodiinae, Milleriinae, Desmanthodiinae, or Galinsoginae, with only
Unxia not aligned with these groups. Some Mesoamerican genera treated by Robinson (1981) and others in these four former subtribes have been excluded to Heliantheae subtribe Ecliptinae (e.g., Rensonia and Delilia). Panero (2007a) placed Cuchumatanea in synonymy of Alepidocline, also commenting that in turn Alepidocline may prove best placed within Oteiza, but here these three genera are recognized as distinct as in Nash (1976d) and Robinson (1981). Turner (1980) treated our species of Selloa within Aphanactis Wedd., but here Aphanactis is treated as an Andean endemic as in Robinson (1981). Selloa is recognized here as circumscribed by Longpre (1970) and Robinson (1981).

Guardiola Cerv. ex Bonpl. extends from Arizona south to Oaxaca, and should be looked for in Mesoamerica. It is distinguished by its long-cylindrical capitula and pilose filaments. Similarly, Axiniphyllum Benth. occurs in tropical Mexico south to Oaxaca and should be looked for in Mesoamerica. It is a perennial herb with connate often lobed-leaves, usually dimorphic phyllaries, and bisexual disk florets.


1. Ray cypselae each within a conceptacle derived from fused inner phyllary.
   2. Conceptacles strongly uncinate spined; paleae and disk florets not caducous as a unit after anthesis.     
      1. Acanthospermum
   2. Conceptacles not uncinate spined; paleae and disk florets caducous as a unit after anthesis.

10. Melampodium

1. Ray cypselae not within a conceptacle derived from fused phyllary.
   3. Ray cypselae enclosed in a perigynium-like structure.
      4. Suffrutices to trees; capitulescence ultimate branches usually congested bracteate glomerules, capitula disciform.     
      5. Desmanthodium
    4. Herbs; capitulescences open corymbiform or if compact-corymbiform then plants acaulescent; capitula radiate.
    5. Herbage not stipitate-glandular; leaves sessile or subsessile; ray corollas glabrous; disk florets bisexual, corolla tubes pilosulose or villous.

9. Jaegeria
   5. Herbage stipitate-glandular; leaves winged-petiolate; ray corollas glandular; disk florets functionally staminate, corolla glandular.     
   11. Milleria

3. Ray cypselae free and not enclosed in a perigynium-like structure.
   6. Disk florets functionally staminate, corolla throats mostly with single resin duct along vein; epappose.
7. Capitula disciform; phyllaries more or less isomorphic.  8. Ichthyotheres
7. Capitula radiate, phyllaries dimorphic
8. Ray corolla limbs obviously cuneate or flabellate.  20. Trigonospermum
8. Ray corolla limbs ovate or elliptic to oblong.
   9. Herbs or sometimes shrubs, 1-4(-5) m; proximal leaves pinnately lobed to
      often pentagonal; capitulescences open-corymbiform; phyllaries strongly
      dimorphic, outer series (4-)5-6, spreading.  18. Smallanthus
9. Herbs 0.1-0.6 m; leaves not lobed, blades linear-lanceolate to lanceolate-ovate;
   capitulescences compact terminal cymes; phyllaries moderately dimorphic, outer
   series 2 or 4, appressed or ascending.
   21. Unxia
6. Disk florets bisexual, corolla throat with 1 or 2 resin ducts along vein; epappose or
   pappus of scabrid to scabridulous scales or bristles.
   10. Pappus of plumose-ciliate squamellae or of long-barbellate to plumose bristles.
   19. Tridax
   10. Epappose or pappus of scabrid to scabridulous scales or bristles.
   11. Phyllaries dimorphic.
   12. Perennial shrubby herbs to shrubs; disk corolla tubes nearly filiform.
   13. Rumfordia
   12. Annual or short-lived perennial herbs, disk corolla tubes cylindrical.
   13. Stems simple proximally and usually only few-branched distally in
      capitulescence, phyllaries reddish-striate, eglandular, outer series ovate to
      obovate, inner series only moderately conduplicate and not closely embracing
      associated ray ovaries or cypselae.  7. Guizotia
   13. Stems often much-branched; phyllaries indistinctly green-striatulate, outer
      series spatulate, usually stipitate-glandular, inner series navicular, closely
      subtending and infolding abaxial face of associated ray ovary or cypsela.
   17. Sigesbeckia
   11. Phyllaries more or less isomorphic.
   14. Capitula radiate, ray cypselae typically deciduous in a basally adnate unit
      together with and included between a phyllary and 2-3 appressed paleae.
   6. Galinsoga
   14. Capitula discoid or when radiate ray cypselae not deciduous in a basally
      adnate phyllary- paleae unit.
15. Minute annual herbs 1-2 cm; capitula discoid; phyllaries 2.

4. Cuchumatanea

15. Small annual herbs to trees or vines ≥ 5 cm; capitula various; phyllaries mostly 9-40.

16. Coarse perennial herbs to shrubs or vines 0.3-5(-7) m.

17. Pappus of quickly caducous short setose-bristles or awns borne in a recessed ring.

12. Oteiza

17. Pappus of persistent usually elongate bristles or scales not borne in a recessed ring.

18. Cypselae usually somewhat heteromorphic, ray cypselae (when present) usually epappose, disk cypselae usually pappose, pappus of broad-based scales; style trunks with 2 resin ducts.

3. Alloispermum

18. Cypselae isomorphic, both rays and disks bearing pappus bristles; style trunks with 4 resin ducts.

15. Schistocarpha

16. Small herbs 5-80(-90).

19. Annual herbs; ray corolla limbs oblong to obovate; pappus of 8-10 quickly caducous bristles.

2. Alepidocline

19. Perennial herbs; ray corolla limbs cuneate to cuneate-ovate; epappose or with pappus of several persistent scales.

20. Stems moderately to densely leafy; paleae lanceolate to elliptic-lanceolate.

14. Sabazia

20. Stems sparsely leafy; paleae linear.

16. Selloa

1. Acanthospermum Schrank, nom. cons.

Centrospermum Kunth

Annual herbs; stems dichotomously much-branched, prostrate to erect, subterete, pubescent, sometimes fistulose. Leaves simple, opposite; blade narrowly elliptic to rhombic-ovate, chartaceous, commonly 3-veined from near base or less commonly pinnate, pubescent on both surfaces, the abaxial also glandular, obtuse to attenuate at base, subentire to pinnatifid, acute to rounded at apex; petiole (when present) slender or slightly winged. Capitulescence axillary, of few sessile or shortly pedunculate capitula. Capitula small, radiate, 8-39-flowered; involucre
hemispherical; phyllaries 9-14, subequal, weakly imbricate, 2-seriate, the outer series 4-6, basally connate, oblong, herbaceous, pubescent, the inner series 5-8, each forming a conceptacle around the cypsela, greatly enlarged and ornamented in fruit; clinanthium small, convex, paleate. Ray florets 5-9, uniseriate, pistillate; corolla limb elliptic to ovate, shortly exserted from involucre, pale yellow, glabrous, apex emarginate to 2-3-dentate; style branches linear, stigmatic surfaces 2-banded with paired stigmatic lines. Disk florets 3-30, functionally staminate, paleae and disk florets not caducous as a unit after anthesis; corolla 5-lobed, yellow, shortly hispid-pilose or glandular, throat broad, with single resin duct along each vein, lobes long-triangular; anthers black, short-sagittate, partly exserted, appendage navicular, ovate, sometimes glandular; ovary sterile, epappose, style undivided. Ray cypselae irregularly striate, enclosed in a conceptacle derived from fused and indurate inner phyllary, conceptacles 5-9, oblong to obtriangular, sometimes strongly compressed, costate or not conspicuously so, strongly uncinate spined over entire surface or solely on angled, sometimes strongly spined at apex; epappose. x = 10, 11. 5 spp. Native to the neotropics, but Pruski (1997b) noted that both *A. australe* (Loefl.) Kuntze and *A. hispidum* DC. have become weeds in the Paleotropics.

Blake (1921), in his revision of *Acanthospermum*, recognized eight species. The number of recognized species was raised by Blake (1922), who described two new species from the Galapagos Islands, these treated by Cronquist (1970) in the related *Lecocarpus* Decne. Stuessy (1970) recognized *Acanthospermum* as containing six species. Pruski (1997b) conserved *Acanthospermum* over the earlier *Centroperum* Kunth, and recognized only five species.


1 Leaves 1.5-10(-12.5) cm, broadly elliptic to deltoid, venation triplinerved from near base, base acuminate to cuneate; capitula sessile or on peduncles to 1 cm; conceptacle bodies 4-6 mm, spines evenly distributed over surface.  

\[1. \textbf{A. hispidum}\]

1 Leaves 0.7-4.5 cm, lyrate-spatulate, venation arching-pinnate, base typically abruptly long-attenuate; capitula sessile or on peduncles to 3 mm; conceptacle bodies 2.5-4 mm, spines concentrated on margins and apices.  

\[2. \textbf{A. humile}\]

*Acanthospermum humile* var. *hispidum* (DC.) Kuntze.

Herbs 15-80 cm; stems erect, moderately subdichotomously branched, striate, elongate hispid-pilose. Leaves sessile, 1.5-10(-12.5) × 0.6-4(-8) cm, obovate or broadly elliptic to deltoid, venation triplinerved from near base, base acuminate to cuneate, margins serrulate to serrate, apex acute to obtuse, adaxial surface strigose-pilose, abaxial surface hispid-pilose, also glandular. Capitulescence solitary, sessile or short-pedunculate in the leaf axils or in forks of branches; peduncles, when present, to 1 cm. Capitula in anthesis 4-5 mm diam., in fruit 13-20 mm diam.; involucre campanulate to hemispherical; the outer phyllaries 5(6), 3.4-6 mm, 1.3-2.2 mm diam., ovate to oblong, pilose, apices acute; paleae c. 1.5 mm, oblanco, conuplicate, glandular, apex sometimes lacerate. Ray florets (5)6-8(9); corolla 1.3-1.7 mm, inconspicuous, puberulent, also slightly glandular, tube to c. 0.3 mm, limb 1-1.4 mm, elliptic; style branches c. 0.4 mm. Disk florets 5-9; corolla 1.7-2.5 mm, campanulate, pale yellow, glandular, tube 0.9-1.7 mm, throat c. 0.4 mm, lobes c. 0.4 mm. Ray conceptacles (5)6-8(9), obovoid-compressed, body 4-6 mm, inconspicuously costate, glandular or short stipitate-glandular, bearing many scattered stiff spines 1-1.8 mm, spines evenly distributed over surface, apex with 2 conspicuous apical spines up to 3-5 mm. 2n = 22. Flowering Jun-Jan, Apr. Fields, roadsides, riversides, pinares, scrub forests, lake shores, disturbed areas, bosque seco tropical, cultivated areas. ?G (Nash, 1976: 187); H (Thieme 5296, MO); ES (Renson 183, NY); N (Nee 28199, MO); ?CR (Nash, 1976: 187). 10-1400 m. (Estados Unidos, Mesoamérica, Colombia, Venezuela, Guayanas, Perú, Bolivia, Brasil, Paraguay, Argentina, Cuba, Hispaniola, Puerto Rico, Virgin Islands, Lesser Antilles, Trinidad and Tobago; introduced to Africa, Asia, Australia, Islas del Pacífico.)

Nash (1976) cited this species as occurring in Guatemala and Costa Rica, but I have not be able to verify these reports.


*Centrospermum humile* (Sw.) Less.

Herbs 17-41 cm; stems erect or decumbent, moderately subdichotomously branched, striate, hispidulous-pilose. Leaves sessile, 0.7-4.5 × 0.3-2.5 cm, lyrata-spateulate, venation arching-pinnate, base typically abruptly long-attenuate and somewhat resembling a winged petiole,
margins irregularly shallow-lobed to crenate, apex obtuse to rounded, less commonly acute,
adaxial surface hispidulous-pilose, abaxial surface hispidulous-pilose, also glandular.
Capitulescence solitary, sessile or sub sessile in the leaf axils or in forks of branches; peduncles,
when present, to 3 mm. Capitula at anthesis 3-4 mm diam., in fruit 12-15 mm diam.; involucre
campanulate to hemispherical; the outer phyllaries 5, 2.5-4 × 1-1.5 mm, oblong, hispid-pilose,
apices acute; paleae 1-1.5 mm, oblanceolate, conduplicate, glandular, sometimes apically
lacerate. Ray florets 5-7; corolla 1-1.4 mm, inconspicuous, puberulent, also slightly glandular,
tube to 0.2-0.3 mm, limb 0.8-1.1 mm, elliptic, entire to bifid apically, apical lobes, when present,
to 0.2 mm; style branches 0.3-0.4 mm. Disk florets 3-5; corolla 1.1-1.6 mm, campanulate, pale
yellow, glandular, tube 0.5-0.8 mm, throat 0.3-0.4 mm, lobes 0.3-0.4 mm. Ray conceptacles 5-7,
obovoid-compressed, body 2.5-4 mm, inconspicuously costate, glandular or short stipitate-
glandular, bearing several stiff spines to c. 1 mm, spines concentrated on angles, those on faces
few and smaller, apex with 2 conspicuous apical spines to 2-3.5 mm. Flowering Jan. Seaside
vegetation, disturbed areas. P (Fendler 171, MO). 0-100 m. (S.E. Estados Unidos, Mesoamerica,
Cuba, Jamaica, Hispaniola, Virgin Islands.)

Reports of this species being weedy elsewhere seem to be based on misidentifications of A.

hispidum.

2. Alepidocline S.F. Blake

Por J.F. Pruski.

Small annual herbs; stems erect to spreading, few-branched, subterete, striate, pubescent and
often stipitate-glandular, often glabrate proximally, internodes mostly longer than leaves. Leaves
opposite, petiolate; blade deltate-ovate to rhomboidal or ovate, chartaceous, thinly 3-nerved from
near base, trinervation reaching well past mid-blade, surfaces pubescent, not puncate-glandular.
Capitulescence terminal, open-cymose; peduncles typically much longer than capitula, pubescent
and often stipitate-glandular. Capitula radiate; involucre urceolate to hemispherical; phyllaries
18-30, elliptic to obovate, more or less isomorphic, imbricate, graduated, 3-5-seriate, scarious-
chartaceous, striate, glabrous of sometimes hirsutulous, margins thin, apex sometimes purplish;
clinanthonium convex to conical, indistinctly paleate; paleae filiform to elliptic-lanceolate, often
resembling pappus bristles, usually caducous. Ray florets 8-17, 1-seriate, pistillate; corolla white
to purplish, limb inconspicuous and shorter than tube to obvious and longer than tube, oblong to
oboavate, mostly 3-9-striate, adaxial surface finely papillose, abaxially eglandular, apex 3-lobed;
ovary obcompressed. Disk florets 10-100+, bisexual; corolla funnelform or narrowly
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campanulate, shortly 5-lobed, yellow, eglandular, tube longer than to much longer than limb, pubescent, throat usually with thin-paired resin ducts along each vein, lobes deltate, shorter than throat, lateral ducts often intramarginal, glabrous to puberulent; anther appendages ovate; style branches with stigmatic surfaces 2-banded with paired stigmatic lines, apex usually acute, rough-papilllose, ovary obcompressed. Cypselae prismatic-ovoid, black, finely striatulate, glabrous, carpodium asymmetric, ray cypsela not deciduous in a basally adnate phyllary-paleae unit; pappus of 8-10 bristles, bristles unequal, quickly caducous, 1-seriate, white, scabrid-barbellate. x = 8. Aprox. 5-6 spp. Mexico, Central America, northern South America.

Turner (1976) sunk _Alepidocline_ into _Sabazia_, but Turner (1990) resurrected _Alepidocline_. Turner (2011) recognized six species in _Alepidocline_ and provided maps and a key to species.


1. Involucres 5-8 mm diam.; capitula short-radiate with ray corolla limbs 1.5-2 mm.

   1. _A. annua_

1. Involucres 7-10 mm diam.; capitula obviously radiate with ray corolla limbs 7-15 mm.

   2. _A. breedlovei_


   _Sabazia annua_ (S.F. Blake) B.L. Turner, _Sabazia brevilingulata_ B.L. Turner.

   Herbs 10-40 cm; stems ascending to erect, purplish, hirsutulous to pilose, also with some shorter stipitate glands especially distally, glabrate proximally. Leaves: blade 1.5-5(-7.5) × 1.2-2(-4.5) cm, deltate-ovate to rhomboidal or ovate, adaxial surface hirsutulous to pilose or substrirose, abaxial surfaces pilose, base cuneate to rounded, margins serrulate to serrate, apex acute to acuminate; petiole 0.5-3 cm. Capitulecence diffuse, 30+-capitulate; peduncles 1.5-6 cm, pilose and also short stipitate-glandular. Capitula short-radiate; involucre 5-6.5 × 5-8 mm, broadly campanulate; phyllaries 2-6.5 mm, elliptic to oblong, 4-5-seriate, apex rounded grading to inner phyllaries acute; paleae filiform. Ray florets 8-13(-17); corolla short-exserted from involucre, white to pinkish, tube 3-4 mm, slender, puberulent, limb 1.5-2 mm, triangular-lanceolate to oblong, 5-7-nerved. Disk florets 10-80; corolla 2.5-3.5 mm, lobes 0.3-0.4 mm. Cypsela 1.5-1.8 mm; pappus bristles 1-1.8 mm, shorter than disk corollas. 2n = 16. Flowering Nov-Jan. _Cornfields, disturbed areas, openings in montane forests, roadsides, thickets, volcano_
slopes. Ch (*Breedlove y Smith* 22718, MO); G (*Standley 83516*, MO). 1800-3500 m. (Mexico, Mesoamerica.)

Venezuelan *Galinsoga macrocephala* H. Rob. was reduced to *Alepidocline annua* by Turner (1990), but recognized as *A. macrocephala* (H. Rob.) B.L. Turner by Turner (2011).


Herbs 20-80 cm; stems erect to ascending, sometimes violet-tinged, mostly sparsely pilose becoming moderately so near capitulescence, sometimes stipitate-glandular distally. Leaves: blade 2.5-9 × 0.8-6.6 cm, elliptic-lanceolate to ovate, surfaces sparsely to moderately pilose, base cuneate to sometimes obtuse, margins serrulate to serrate, apex acuminate to attenuate; petiole 0.4-4 cm. Capitulescence open, 3-10-capitulate; peduncles 1-6 cm, densely pilose, also sometimes stipitate-glandular. Capitula obviously radiate; involucre 5-7 × 7-10 mm, broadly campanulate to hemispherical; phyllaries 2-7 mm, lanceolate to ovate, c. 4-seriate, apex rounded grading to inner phyllaries acute; paleae dimorphic, outer ones elliptic lanceolate grading to linear. Ray florets 8-13; corolla well-exserted from involucre, white, tube 3-5 mm, slender, puberulent, limb 7-15 mm, oblong to spatulate, 7-9-nerved. Disk florets c.100; corolla 3.5-4 mm, lobes c. 0.5 mm. Cypselae c. 1.5 mm; pappus bristles 1-1.5 mm, shorter than disk corollas. 2n = 16. Flowering Oct-Nov. *Openings in montane forests*. Ch (*Breedlove y Strother 46197*, NY). 1900-2100 m. (Endemic.)

Four of the five collections I have seen are from the SW side of Cerro Mozotal (about 8 km NW of Motozintla), and three of these have stipitate-glandular peduncles. The eglandular type was collected about 4 km SW of Motozintla.

3. **Alloispermum** Willd.


Por J.F. Pruski.

Coarse perennial herbs to subshrubs to 5(-7) m; stems erect to scandent, simple to few-branched, subterete, striate, internodes often elongate; herbage rarely stipitate-glandular. Leaves opposite, sessile to petiolate; blade chartaceous, 3-5-nerved from near base, trinervation reaching to near apex, surfaces typically not punctate-glandular, glabrous to pubescent. Capitulescence terminal or axillary, open to compact, cymose to corymbiform-paniculate; peduncles pubescent. Capitula
radiate or infrequently discoid; involucre campanulate to hemispherical; phyllaries mostly 12-20 (ours), more or less isomorphic, imbricate, strongly graduated, 2-4(-5)-seriate, scarious to coriaceous, margins thin; clinanthium convex to low-conical, paleate; paleae usually lanceolate, navicular, scarious-stramineous, striate, usually trifid. Ray florets (0-)3-25, 1-seriate, pistillate, usually epappose; corolla white often suffused with purple abaxially, tube pubescent, limb usually longer than tube, oblong to obovate, equally 3-5-nerved, sometimes with a few intermediate fine striatulae, adaxial surface finely papillose, abaxially eglandular, apex (2-)3(-4)-lobed. Disk florets 8-70+, bisexual, usually pappose; corolla funnelform to narrowly campanulate, shortly 5-lobed, yellow, eglandular, tube usually shorter than limb, sometimes subequal to limb, pubescent, dilated at base, throat usually with paired resin ducts along each vein, lobes deltate to triangular, shorter than throat, lateral ducts often intramarginal, rarely with medial nerve, puberulent; anther appendages ovate; style branches with stigmatic surfaces 2-banded with paired stigmatic lines, apex usually obtuse to rounded. Cypselae usually somewhat heteromorphic, prismatic-ovoid, mostly black, finely striatulate; ray cypselae (when present) epappose (ours) or rarely pappose, glabrous, not deciduous in a basally adnate phyllary- paleae unit; disk cypselae pappose or sometimes epappose, pubescent or glabrous, carpodium asymmetric; pappus of (0-)7-20 broad-based commonly elongate (infrequently short) scales not borne in a recessed ring, subequal, linear-lanceolate to sometimes spatulate, 1-seriate, white, erose. x = 8. Aprox. 15 spp. Mexico, Central America, Andean South America.

Our species of *Alloispermum* were treated in *Calea* by Robinson y Greenman (1896) and Nash (1976). *Alloispermum* was resurrected by Robinson (1978), and revised by Fernandez (1980). Fernandez (1980) the generic base chromosome number as x = 8, our two species thus being tetraploids.


1. Sprawling herbs to weak-stemmed subshrubs 1-4(-7) m; stems few-branched, leaves petiolate; capitulescences on leafy axis and not held much above distal leaves; capitula radiate; phyllaries apices acute to sometimes obtuse; disk cypselae pappose, hirsute; pappus scales more than 1/2 as long as disk corollas, apices narrow.

1. **A. integrifolium**

1. Erect herbs 0.3-1.2 m; stems simple proximally; leaves sessile or subsessile; capitulescences held well (15-30 cm) above distal leaves on naked axis; capitula discoid; phyllaries apices mostly
obtuse-rounded; disk cypselae pappose or epappose, glabrous or sometimes hirsutulous; pappus scales usually less than 1/2 as long as disk corollas.

2. A. scabrum


Calea integrifolia (DC.) Hemsl., Calea integrifolia var. dentata J.M. Coult.

Sprawling herbs to weak-stemmed subshrubs 1-4(-7) m; stems usually few-branched, hirsute or pilose to glabrate. Leaves petiolate; blade (2-)5-10(-16) × 1-4.5(-6) cm, lanceolate to ovate, adaxial surface scabrous to infrequently glabrate, rugulose, abaxial surfaces sparsely to densely pilose to glabrate, veins raised, base obtuse to rounded, margins subentire to few-serrate, apex acuminate to attenuate; petiole (0.1-)0.5-1 cm. Capitulescence on leafy axis and not held much above distal leaves, somewhat closely corymbiform-paniculate; peduncles 1-5(-10) mm, pilose. Capitula inconspicuously or conspicuously radiate; involucre (2.5-)3-4.5 × 3-4.5 mm, campanulate; phyllaries 15-20, 1.5-4.5 mm, mostly ovate, chartaceous with scarios margins, 3-7-striate, glabrous to sparsely pilosulose distally, ciliolate, apex acute to sometimes obtuse; paleae 3-5 mm, lanceolate. Ray florets (4-)5-8(-12); corolla included to moderately exserted from involucre, white, tube (1-)1.5-2.2 mm, pilose, limb (1-)2.5-5 mm, usually pilose proximally on nerves. Disk florets (10-)12-30; corolla (2.5-)3-5 mm, yellow, tube pilose, limb sparsely pilosulose, lobes 0.4-0.8 mm. Cypselae 1-1.5 mm; ray cypselae epappose, glabrous; disk cypselae pappose, hirsute; disk pappus scales c. 20, 2-3.5 mm, more than 1/2 as long as disk corollas, linear-lanceolate, apex narrow. 2n = 32. Flowering mostly Dec-May. Brushy hillsides, cafetales, disturbed areas, montane forests, pine-oak forests, roadside banks, thickets. Ch (Pruski et al. 4210, MO); G (Heyde y Lux 4506, US); H (Williams y Molina 11995, MO); ES (Clewell 3677, LD); N (Williams et al. 23914, S). 600-2500(?-2700) m. (Mexico, Mesoamerica.)

Short-rayed small-capitulate Mesoamerican material determined by Fernandez (1980) as Alloispermum colimense is referred here provisionally to A. integrifolium, as in Nash (1976) and Strother (1999). However, while Strother (1999) reduced A. colimense to synonymy, here it maintained as distinct and extra-Mesoamerican.


Erect herbs 0.3-1.2 m; stems simple proximally, usually few-branched only in capitulescence, hirsute or pilose to glabrate. Leaves sessile or subsessile; blade (2-)3.5-10(-15) × 1-3(-5) cm, lanceolate to ovate, adaxial surface pilose to substrigose to infrequently glabrate, abaxial surfaces pilose to infrequently glabrate, veins not greatly raised, base obtuse to rounded, subclasping, margins few-serrate, apex acute to long-attenuate; petiole 0-0.3 cm. Capitulescence held well (15-30 cm) above distal leaves on naked axis, closely corymbiform-paniculate at very apex, ultimate few capitula subglomerate; peduncles 0-6(-10) mm, densely pilose, rarely stipitate-glandular. Capitula discoid; involucre 4-7 × 3-5 mm, turbinate to campanulate; phyllaries usually 12-16, 2.5-7 mm, oblong to ovate, chartaceous with narrow scarious margins, 5-7-striate, glabrous to rarely puberulent distally, apex mostly obtuse-rounded; pales 4-5 mm, spatulate. Ray florets 0. Disk florets 8-15(-23); corolla 3.5-5 mm, yellow, tube pilose, limb sparsely pilosulous, lobes 0.5-0.9 mm. Disk cypselae 1.5-2.5 mm, pappose or epappose, glabrous or sometimes hirsutulous; pappus scales 0 or 7-12, 0.5-1.5(-2) mm, usually less than 1/2 as long as disk corollas, lanceolate to oblong, apex sometimes obtuse. 2n = 32, 34. Flowering May-Nov, Feb. *Montane forests, oak forests, pine forests, rocky slopes.* Ch (Purpus 9103, F); G (Molina y Molina 26331, MO); H (Nelson, 2008: 149). 1100-2500 m. (Mexico, Mesoamerica.)

4. *Cuchumatanea* Seid. et Beaman

Por J.F. Pruski.

Minute subglabrous or sparsely puberulent annual herbs; stems spreading to ascending, basal node not branched, usually branched at distal few nodes. Leaves opposite, sometimes anisophyllous, subsessile to short-petiolate; blade spatulate, chartaceous, thinly 3-nerved from
stem, margins entire. Capitulescence terminal, monocephalous, sessile or subsessile, closely subtended by stem leaves. Capitula discoid; involucre narrow-campanulate; phyllaries 2, oblong-ovate, more or less isomorphic, eximbricate, subequal, somewhat navicular but ecarinate, scarious-chartaceous with apex subherbaceous, glabrous, often purplish distally; clinanthium more or less conical, paleate; paleae oblong grading to linear-lanceolate, flat to weakly navicular, often purplish distally. Ray florets 0. Disk florets 5-10, bisexual; corolla campanulate, shortly 3-4-lobed, yellow throughout or often purplish distally, eglanudal, tube subequal to limb, sparsely pubescent, not obviously dilated basally, throat often with paired resin ducts along each vein, lobes glabrous, often with only a single lateral vein; anthers pale, appendage ovate to suborbicular; style branches with stigmatic surfaces 2-banded with paired stigmatic lines, apex broadly acute. Cypselae obconical, black, finely striatulate, glabrous, carpopodium slightly asymmetric; epappose. \( x = 8 \). 1 sp. Mesoamerica.

*Cuchumatanea* was treated in synonymy of *Aphanactis* by Panero (2007a). Here, *Cuchumatanea* is resurrected from synonymy of *Aphanactis*, which differs by disciform or radiate capitula, consistently linear paleae, and 5-lobed disk corollas.


Minute annuals 1-2 cm, sometimes growing in clumps; stems few-branched, sparsely hirtellous to glabrate. Leaves decussate; blade 0.3-0.7 × 0.05-0.3 cm, adaxial surface glabrous, abaxial surface glabrous to sparsely puberulent, base narrowed and petiolar, apex obtuse to rounded. Capitula 2.1-3 mm; involucr 2.2-2.9 × 1.1-1.3 mm diam.; phyllaries 2.1-2.9 × c. 1 mm, subglabrous, apex obtuse; paleae c. 2 mm, distally finely lacerate. Disk florets: corolla 1.1-1.2 mm, lobes 0.1-0.2 mm. Cypselae 1.1-1.2 mm. 2\( n = 16 \). Flowering Aug-Oct. *Open areas of rocky alpine pine forest*. G (*Smith 831, F*). 3600-3800 m. (Endemic.)

5. **Desmanthodium** Benth.

Por J.F. Pruski.

Suffrutices to trees (ours) or coarse perennial herbs; stem erect or less commonly scandent, branching opposite; herbage glabrous or pubescent. Leaves simple, opposite, sessile or petiolate, sometimes perfoliate; blade lanceolate to ovate, usually chartaceous, usually triplinerved, surfaces
eglandular. Capitulescence corymbiform to paniculate, branches usually strongly ascending, ultimate branches usually congested bracteate glomerules with capitula sessile, each glomerule often of 3 glomerulettes, each glomerullette often 1-3-capitulate; bracts elliptic to ovate, ascending to appressed, +/- chartaceous, green, several-striate. Capitula disciform, 3-13-flowered; involucre 3-10 mm, cylindrical to hemispherical, often compressed or triquetrous in cross-section; phyllaries 1-5+, +/- subimbricate, subequal, few-striate; clinanthium small, epaleate. Marginal florets 1-3, pistillate, ovary and proximal part of corolla +/- loosely enclosed within an associated phyllary; corolla filiform-tubular and inconspicuous, usually white, glabrous or infrequently pilose proximally, apex denticulate, limb absent; style branches with paired stigmatic surfaces inconspicuously 2-banded. Disk florets 2-10, functionally staminate, at anthesis sometimes with corolla completely exerted from involucre; corolla small, campanulate, 5-lobed, usually white or pale bluish, early deciduous, tube, throat, and lobes more or less subequal, limb often setulose, throat with paired resin ducts along each vein; anthers thecae pale, obtuse basally, filaments glabrous, appendage small, ovate; style undivided, papillose distally, ovary 2+ mm (ours), sterile, epappose, long-stipitate and ultimately becoming about as long as marginal florets, often mistaken as base of an elongate corolla tube. Ray cypsela slightly triquetrous or obcompressed, oblongoid-pyriform, black, finely striate, glabrous, completely enclosed in a scarious-menbranous perigynium-like structure, corolla base often persistent; epappose. $x = 18$. 7 spp. Mexico, Mesoamerica, Venezuela.

The synopsis of Desmanthodium by Turner (1996:80-257) recognized seven species and included maps of all species. The species are basically circumscribed on vegetative features only, and I follow Turner (1996:80-257) in treating D. hondurense in synonymy.


1. Stems tomentulose, trichomes present throughout, not restricted to lines, trichomes usually 0.5+ mm; leaf blades broadest at base or in proximal 1/3, adaxial surfaces strigillose-pilosulose, abaxial surfaces strigose-pilose.  

3. D. tomentosum

1. Stems subglabrous to crisped-pubescent, pubescent in lines, trichomes usually ≤ 0.3 mm; leaf blades usually broadest near middle, adaxial surfaces usually glabrous, abaxial surfaces glabrous to crisped-puberulent.

2. Leaves subsessile to petiolate, never perfoliate.  

1. D. guatemalense

2. At least some of the main stem leaves sessile and narrowly to broadly perfoliate.  

2. D. perfoliatum

*Desmanthodium hondurense* Ant. Molina.

Much like *D. perfoliatum*, suffrutices to shrubs, 1.5-3 m; stems sometimes scandent, sometimes maculate, subglabrous to crisped-pubescent, trichomes usually in lines, trichomes usually ≤ 0.3 mm, pith sometimes fistulous, nodal ridge (sometimes present) c. 1 mm diam. Leaves subsessile to petiolate, never perfoliate; blade 6-19 × 1.7-10 cm, elliptic or lanceolate to ovate, usually broadest near middle, chartaceous to stiffly chartaceous, venation trinerved to 5-plinerved from 1-2(-4) cm above base, basal margins sometimes ciliate, surfaces glabrous to less commonly crisped-puberulent, base obtuse to acuminate, with or without distinct basal acumination, margins serrate to sometimes serrulate, apex acute to attenuate; petiole 0.2-1.5 cm, slightly dilated basally, ciliate. Capitulescence corymbiform-paniculate, broadly rounded on top, branches 5-15 cm, branches spreading at c. 45° to strongly ascending, puberulent to pilose-hirsute in lines, ultimate glomerules 10-20 mm diam.; bracts 5-7 × 3-4 mm, glabrous or ciliate basally. Capitula 4.5-6.5 mm; involucre 3-4 mm diam., turbinate; phyllaries 3-5, 4-6 mm, ob lanceolate to elliptic, glabrous. Pistillate florets: corolla c. 1 mm; style branches c. 1 mm. Disk florets: corolla 3.3-4 mm, glabrous. Cypselae 2+ mm. Flowering Year-round. *Disturbed areas, disturbed forests, moist forests, pine forests, pine-oak forests, roadsides, steep slopes, streamsides, thickets, wet seepage areas.* G (*King y Renner 7113, MO*); H (*Williams y Molina 18701, F*); ES (*Smeets y Quiñonez 302, MO*). 900-3000(?-3600) m. (Endémica.)


Shrubs or trees, 1-4(-6) m; stems subglabrous to crisped-pubescent, trichomes usually in lines, trichomes usually ≤ 0.3 mm, pith solid or fistulose. At least some of the main stem leaves sessile and narrowly to broadly perfoliate, capitulescence leaves mostly subsessile; blade (5)-8-25 × (1-2)12 cm, basal 1/4 of blade (0.2-)1-2 cm diam. and as broad as nodal disk, lanceolate to elliptic-lanceolate, usually broadest near middle, venation trinerved from well above (to 7 cm) base, adaxial surface glabrous, abaxial surface crisped-pubescent on veins, otherwise glabrous to less commonly sparsely crisped-puberulent, margins subentire to serrulate or less commonly serrate, apex acuminate to caudate. Capitulescence corymbiform-paniculate, convex, main branches 10-
30 cm, densely crisped-pubescent in 1 or 2 broad lines, ultimate glomerules 10-15(-25) mm
diam.; bracts 3-7 mm. Capitula 4-6 mm; involucre c. 3 mm diam., campanulate; phyllaries 3-5, 4-
5 mm, ovate, glabrous or sometimes sparsely pilosulose. Pistillate florets 1-3; corolla 0.8-1.5 mm,
sometimes pilose proximally; style 1.5-2× as long as corolla. Disk florets 2-7; corolla 2.5-3.5
mm, glabrous to sometimes distally setulose. Cypselae 2-3 mm. 2n = 36. Flowering Aug-Oct.

\textit{Deciduous forests, pine-oak forests, rocky slopes}. Ch (Breedlove 26862, MO). 800-1700(-2200)
m. (Mexico [Guerrero, Oaxaca], Mesoamerica.)

Mexico, Chiapas, Purpus 6683 (MO!). Illustr.: Arriagada y Stuessy, \textit{Brittonia} 42: 284, t. 1 sub

\textit{Desmanthodium congestum} Arriagadaet Stuessy.

Shrubs, 2-3 m; stems tomentulose, trichomes present throughout, not restricted to lines,
trichomes usually 0.5+ mm. Leaves petiolate, never perfoliate; blade 6-20 × 3-14 cm, ovate to
broadly triangular-ovate, broadest at base or in proximal 1/3, venation trinerved from 2-3 cm
above base in basal acumination, adaxial surface strigillose-pilosulose, abaxial surface strigose-
pilosose, base acute to truncate, thence with distinct basal acumination attenuate onto petiole,
margins subentire to serrate, apex acuminate to infrequently caudate; petiole 2-6 cm.

Capitulescence 10-15 × 10-25 cm, corymbiform-paniculate, rounded on top, main branches
tomentulose to tomentose, tomentum throughout, not restricted to lines, ultimate glomerules 5-17
mm diam.; bracts 4-5 × 3-4 mm, midrib pilosulose and basal margins ciliolate. Capitula 4-5.5
mm; involucre c. 3 mm diam., turbinate; phyllaries c. 3, 4-5 mm, lanceolate to spatulate, glabrous
or midrib pilosulose. Pistillate florets (1-)2-3; corolla 0.6-1.1 mm; style trunk distal c. 0.5 mm
exserted, branches 0.5-0.7 mm. Disk florets 2-4; corolla 3-3.5 mm, limb sparsely pilose. Cypselae
2.5-4 mm. Flowering Aug-Nov. \textit{Montane forest on volcanoes, pine-oak forests}. Ch (Breedlove
29482, MO); G (Dwyer 15316, MO). 500-2200 m. (Endémica.)

Turner (1996:80-257) cited \textit{Dwyer 15316} (MO) as \textit{Desmanthodium tomentosum}, but cited
\textit{Dwyer 15316} (US) as \textit{D. guatemalense}.


\textit{Adventina} Raf., \textit{Stemmataela} Wedd. ex Benth. et Hook. f., \textit{Vargasia} DC., non Bertero ex Spreng.,

\textit{Vasargia} Steud., \textit{Vigolina} Poir., \textit{Wiborgia} Roth, non Thunb.

Por J.F. Pruski.
Annual herbs; stems erect to decumbent, leafy or infrequently leaves basal, usually pilose. Leaves opposite, sessile or petiolate; blade lanceolate to ovate, thin-chartaceous, 3(-5)-plinerved from near base, surfaces glabrous to hirsute or densely pilose, not punctate-glandular, margins entire to serrate. Capitulescence mostly terminal, leafy, loose(-congested) cymose-paniculate. Capitula usually 3-8 mm tall and wide (excluding rays), radiate(rarely disciform or discoid); involucre hemispherical to campanulate; phyllaries usually 5-10(-15), elliptic to ovate or oblong, more or less isomorphic, usually 2-seriate, subimbricate, subequal to graduated, usually chartaceous or with hyaline scarious margins, striate, glabrous to pilosulose or stipitate-glandular, all or most deciduous, outer few usually sterile by not subtending a ray floret, sometimes slightly herbaceous, inner phyllaries usually fertile by immediately subtending a ray floret; clinanthium typically (ours) conical, paleate or infrequently epaneate; paleae reaching to about middle of disk corolla, lanceolate to obovate, somewhat conduplicate. Ray florets (0-)3-5(-15), pistillate, opposite an inner phyllary; corolla white to reddish, tube hirsute or pilose, limb (0-)0.5-6(-12) mm, oblong to cuneate, usually c. 7-nerved, nerves equally-thin, lacking larger support veins, adaxially obviously and strongly micropapillose, apex entire to deeply 3-lobed; style short-exserted. Disk florets 5-60(-150), bisexual; corolla 1-3 mm, abruptly narrow-funnelform-campanulate (rarely broad-campanulate), 5-lobed, yellow to greenish or purplish, tube shorter than limb, tube hirsute or pilose, throat usually with paired resin ducts along each vein, lobes deltate to triangular, lateral ducts often intramarginal, papillose adaxially, setulose-papillose abaxially; anther thecae pale; style base enlarged, branch apex penicillate, blunt-papillose. Cypselae pappose or epappose, rays obcompressed and obpyramidal in outline, disks obconical to obpyramidal, black, faces often finely 10+-striatulate, glabrous to patent-setose or strigillose, carpododium asymmetric; ray cypselae typically deciduous in a basally adnate unit together with and included between a phyllary and 2-3 appressed paleae; ray cypselae pappose or sometimes epappose; disk cypselae usually pappose or sometimes epappose but when epappose the ray cypselae similarly epappose; pappus of (0-)5-20 persistent scales, 1-2-seriate. $x = 8$. Aprox. 14 spp. Native to the New World, 2 spp. adventive in the Old World.

*Galinsoga* is circumscribed here as in Blake (1922), Canne (1977), Robinson (1894), Schulz (1981), St. John y White (1920), and Turner (1966), except for exclusion of *Stenocarpha* S.F. Blake (1915). *Galinsoga* is traditionally diagnosed by its ray cypselae shead in a unit between a basally adnate phyllary and 2-3 paleae, although McVaugh (1972) noted that occasionally *Tridax* displays this condition. Perennial *Alloispermum* and *Sabazia*, which when pappose have a pappuse composed of scales, are maintained here as distinct from the otherwise very similar *Galinsoga*. 
Diploid *Galinsoga parviflora* is narrowly circumscribed and diagnosed by deeply trifid persistent paleae in conjunction with ray and disk cypselae having a heteromorphic pappus rays epappose but disks pappose) as in Canne (1977). However, infrequently some material with a heteromorphic pappus (e.g., Canne 28, 29, 36, 37, 40, and 50 from Guatemala; and Haber 10217 and Weston 3799 from Costa Rica) have deciduous, entire to merely moderately trifid paleae and with doubt are referred to tetraploid and variable *G. quadriradiata*, following Canne (1977). All fully epappose plants (described as *Wiborgia urticifolia*) seen by me are referred to *G. quadriradiata*. It seems possible that literature reports of *G. parviflora* in Mesoamerica may refer instead to the infrequent variants of *G. quadriradiata* that have a heteromorphic pappus. If these two species prove synonymous, as suggested by Strother (1999), the name of *G. parviflora* has priority.


1. Inner paleae usually deeply trifid and persistent after fruit fall; ray and disk cypselae with obviously heteromorphic pappus; outer sterile phyllaries 2-4; phyllaries nearly always glabrous, a few usually persistent after fruit fall. 1. *G. parviflora*

1. Inner paleae subentire to moderately trifid, usually deciduous after fruit fall; ray and disk cypselae typically with a more or less isomorphic pappus or similarly epappose; outer sterile phyllaries 1-2(-3); phyllaries often stipitate-glandular, usually all deciduous after fruit fall. 2. *G. quadriradiata*


Herbs to 1 m; stems sparsely pilose proximally, strigose or moderately pilose-hirsute distally, infrequently also stipitate-glandular distally. Leaves cauleine; blade 2-7(-11) × 0.5-4(-7) cm, ovate or lanceolate, surfaces sparsely to densely pilose, base cuneate to rounded, margins crenate to subentire, apex acuminate to acute; petiole 1-2(-3) cm. Capitulescence paucicapitulate; peduncles
1-40 mm, usually strigose with nearly appressed non-glandular trichomes, sometimes also stipitate-glandular. Capitula 3.5-7 mm; phyllaries nearly always glabrous, very rarely sparsely stipitate-glandular, some with margins and apex moderately scarious, a few persistent after fruit fall, outer sterile phyllaries 2-4; clinanthium paleate, not naked after fruit fall; paleae 2-3.2 mm, inner ones usually deeply trifid for about half of their length with lobes to 0.5+ mm, some persistent after fruit fall. Ray florets 5; corolla limb (0-)0.5-1.5(-2) × 0.9-1.5 mm, often shorter than tube, obovate to orbicular, white to pink, usually shallowly lobed. Disk florets 8-35(-50); corolla 1-1.8 mm, throat setulose. Cypsela 1.2-2.3 mm, ray and disk cypsela with obviously heteromorphic pappus, setose or glabrous; ray cypsela epappose or nearly so (infrequently short-setose apically, setae to 0.8 mm, terete or rarely weakly flattened in cross-section); disk cypsela pappose with 15-20 tawny or white mostly obtuse-fimbriate-tipped scales 1.5-2 mm, scales usually about as long as or longer than disk corollas and about as long as disk cypsela. 2n = 16(32). Flowering year-round. Cultivated areas, disturbed areas, fields, gardens. Ch (Rzedowski y Calderón de Rzedowski 2008: 260); ES (Standley y Calderón, 1941: 281); CR (Standley, 1938: 1477). 500-1500 m. (Canada, Estados Unidos, Mexico, Mesoamerica, Colombia, Ecuador, Peru, Bolivia, Brazil, Uruguay, Paraguay, Chile, Argentina, Jamaica, Hispaniola, Puerto Rico, Lesser Antilles; Europa, Africa, Asia, Australia, New Zealand, Pacific Islands.)

The lectotype is on the right-hand side of a MA-CAV sheet that is mixed with Galinsoga quadriradiata. Three labels are positioned on the left-hand side of the sheet, and it appears that the left-center label and perhaps the upper-left label belong to the lectotype. Although the protologue states that some original material was seen cultivated in both Paris and Madrid, the lectotype may have been field-collected in Peru.


Herbs mostly 0.15-0.6 m; stems sparsely pilose proximally, distal portions strigose, moderately to densely pilose-hirsute, and commonly also stipitate-glandular. Leaves cauline; blade mostly 2.5-7(-9) × 1.4(-8) cm, ovate or sometimes lanceolate, surfaces sparsely to densely pilose, base cuneate to rounded, margins serrate or sometimes serrulate, apex acuminate to acute; petiole 0.3-3 cm. Capitulescence paucicapitulate; peduncles 2-30(-50) mm, pilose-hirsute, with patent non-glandular trichomes and commonly also stipitate-glandular. Capitula 3-6 mm; phyllaries glabrous or often stipitate-glandular, margins and apex narrowly scarious, usually all deciduous after fruit fall, outer sterile phyllaries 1-2(-3); clinanthium paleate or in epappose plants often epaleate, typically naked after fruit fall; paleae 2-3 mm, inner ones subentire to moderately trifid, usually deciduous after fruit fall. Ray florets 4-5; corolla limb (0-)1-2.5 × 1-2 mm, usually longer than tube, obovate to cuneate. white to purple, apex moderately to deeply 3-lobed. Disk florets (8-)15-60; corolla 1.2-2 mm, throat glabrous to sometimes setulose. Cypsela 1.3-2 mm, ray and disk cypselae nearly always with a more or less isomorphic pappus (very rarely heteromorphic with epappose rays and pappose disks) or similarly epappose, all setose or rays sometimes glabrous; ray cypselae epappose or usually pappose at least adaxially with 8-15 fimbriate often aristate scales 0.3-1.2 mm; disk cypselae epappose or more commonly (except at high elevations from Costa Rican to Andean Ecuador) pappose with (1-5)15-20 usually white fimbriate often aristate scales 0.2-1.7 mm, scales usually shorter than both disk corollas and disk cypselae. 2n = 32(48, 64). Flowering year-round. Clearings, cultivated areas, disturbed areas, fields, gardens, mountain slopes, open banks, pine-oak forests, roadsides. Ch (Nelson 3356, GH); G (Pruski y MacVean 4493, MO); H (Molina 27451, MO); ES (Calderón 1277, MO); N (Moore 2113, NY); CR (Pruski et al. 3803, MO); P (Allen 1406, MO). 200-3800 m. (Canada, Estados Unidos, Mexico, Mesoamerica, Colombia, Venezuela, Peru, Bolivia, Brazil, Argentina, Jamaica, Hispaniola, Puerto Rico, Lesser Antilles; Europa, Africa, Asia, Australia, Pacific Islands.)

Ramtilla DC., Veslingia Vis, non Heist. ex Fabr.
Annuals herbs to shrubs to 2 m; stems simple proximally and usually only few-branched distally in capitulescence, branched; herbage not stipitate-glandular. Leaves opposite or distal ones alternate, cauline, sessile or petiolate; blade lanceolate to rhombic or oblanceolate, usually chartaceous, pinnately veined, surfaces glabrous or pubescent, sessile-glandular at least abaxially, margins entire to serrate. Capitulescence open-cymose from distal-most axils. Capitula radiate; involucre double, cymaneate to hemispherical; phyllaries dimorphic, 2-seriate, reddish-striate, eglandular, persistent; outer series 5-8, ovate to obovate, subequal, ascending to erect, herbaceous, inner series 6-18, fertile by immediately subtending but only moderately conduplicate and not closely embracing associated ray ovary or cypsela, erect; clinanthium hemispherical to low-conical, paleate; paleae oblong to lanceolate, scarious to thinly so, more or less similar in texture to inner phyllaries, moderately navicular and partly conduplicate, 3-5-nerved, sometimes glandular or puberulent, inner paleae often carinate and ciliate distally. Ray florets 6-18, 1-seriate, pistillate; corolla yellow, tube pubescent, limb more or less elliptic-ovulate, evenly striate, abaxially eglandular, apex rounded to truncate, 3-dentate. Disk florets many, bisexual; corolla campanulate, 5-lobed, yellow, pubescent especially basally in dense ringed tuft of spreading eglandular trichomes, tube broad-cylindrical, much shorter than limb, throat with single resin duct along each vein; anther appendage sometimes sessile-glandular; style branches 2-banded, papillose at base of short-lanceolate appendage. Cypsela 3–4-angled, somewhat compressed, black or brown, glabrous; epappose. \( x = 15 \). 6 spp. Native to Africa; 1 sp. cultivated for oil extracted from fruits and sometimes as an ornamental, escaped from cultivation, and naturalized in Americas, Europe, Asia, Australia, and New Zealand.


*Guizotia oleifera* (DC.) DC., *Heliopsis platyglossa* Cass., *Jaegeria abyssinica* (L. f.) Spreng., *Ramtilla oleifera* DC.

Annual tap-rooted herbs to 1(-2) m; stems erect, sometimes purplish, villosulous to glabrate; internodes about as long as leaves. Leaves subsessile: blade 4-18 × 1-5 cm, lanceolate or oblanceolate, adaxial surface glabrous, abaxial surface glandular, otherwise glabrous or veins
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sparsely hirsutulous, base rounded to cordate and subamplexicaul to sometimes abruptly
narrowed into shortly winged petiolar base, margins subentire to serrate, apex acuminate.
Capitulescence usually 3-15-capitulate, branching sometimes alternate; peduncle 1-6(-12) cm,
villosulous. Capitula 9-13 mm; involucre 10-17 mm diam.; phyllaries slightly obgraduate; outer
phyllaries 5, 7-10 × 4-6 mm, c. 9-nerved, erect; inner phyllaries 5-7 × 2-3.5 mm, oblong to
obovate, apex obtuse; palea 5-8 mm, stramineous, 5-nerved, nerves drying brownish. Ray florets
(7-)8(-10); corolla tube 1.2-2.3 mm, limb 8-15 × 4-8 mm, c. 9-nerved. Disk florets: corolla 4-5.5
mm, basal ringed tuft of trichomes to c. 0.5 mm; anthers 2-2.5 mm, pale brown, appendage 0.2-
0.3 mm; style branches c. 1 mm, appendage to c. 0.4 mm. Cypselae 3.5-5 mm, ray cypselae
triquetrous, disk cypselae long-obpyramidal. 2n = 30. Flowering Dec-Jan. Escaping from
cultivation. CR (Tonduz s.n., MO). 1100-1500 m. (Native to Africa; naturalized in United States,
Mesoamerica, Europe, Asia, Australia, New Zealand.)

8. Ichthyotherex Mart.

Latreillea DC.

Por J.F. Pruski.

Perennial herbs to shrubs often from a xylopodium; stems erect or rarely vining, simple to
moderately branched, glabrous to shortly pilose. Leaves simple, opposite, sessile or petiolate;
blade chartaceous to subcoriaceous, glabrous to scabrous or pilose on both surfaces, abaxial
surface glandular, margins entire to serrate. Capitulescence generally of tightly compacted
subsessile capitula, but occasionally open and corymbiform. Capitula disciform; involucre
turbinate to hemispherical; phyllaries few, loosely imbricate, 2-3-seriate, more or less isomorphic
or at least not strongly dimorphic, not strongly scarious or outer ones with herbaceous apices,
striate; inner phyllaries subtending and slightly adhering to ray cypselae; clinanthium convex to
short-conical, paleate; paleae spatulate or obovate. Marginal florets pistillate, few; corolla small,
tubular or filiform, white or yellow, often pilose; style branches often thick, stigmatic surfaces 2-
banded with paired stigmatic lines. Disk florets functionally staminate; corolla shortly 5-lobed,
white or yellow, throat with single resin duct along each vein; anthers brownish to black,
mostly included, basally short-sagittate; style typically undivided; ovary sterile, epappose. Ray
cypselae broad-obovoid, slightly obcompressed, glabrous, conceptacle sometimes weakly
baccate; epappose. x = 16. Aprox. 20 spp. Nicaragua to Paraguay.

Most members of the largely South American genus are xylopodial subshrubs, but our rare
species (the sole extra South American species) is known to become a vining shrub.

Herbs to slender vining shrubs, 0.4-3(-5) m; stems striate, sordid-villosulous, trichomes patent to appressed. Leaves: petiole 0.5-4(-7) cm, winged distally; blade 5-18(-24) × 1.7-10.5(-14) cm, elliptic-lanceolate to ovate, thin-chartaceous, venation 3-5-plinerved from well above base, main lateral veins strongly arching to near apex, surfaces strigose to glabrate, base cuneate to decurrent onto petiole, margins subentire to serrulate, apex falcate-acuminate. Capitulescence a loosely corymbiform-paniculate, few-15-capitulate; peduncles (0-)1-7(-25) mm, villosulous or strigillose, generally 1-bracteolate; bracteole c. 1.5 mm, basal. Capitula 4-5.5 mm; involucre 3-5.5 mm diam., campanulate; phyllaries unequal; outer phyllaries typically 5, 1-1.5 mm, broadly lanceolate, villosulous, free or connate basally, spreading; inner phyllaries 2(-3), 4-5 mm, ovate-galeate, sparsely villosulous to glabrate; paleae 2.5-4 mm, rounded apically; outer 2 paleae obovate, flat, resembling inner phyllaries; inner paleae oblong-ovate, conduplicate. Marginal florets 2(-3); corolla 0.8-1.1 mm, tubular, minutely 2-4-lobed, cream-colored, villosulous within near apex; style c. 2.4 mm; style branches 0.7-0.9 mm, recurved. Disk florets 8-10; corolla 1.8-2.5 mm, funnelform, cream-colored, glandular, lobes 0.4-0.5 mm, papillose within. Ray cypselae 4-5.5 × 2.5-3.3 mm, c. 10-striate. Flowering year-round except Jul. *Disturbed areas, forest opening, borde de bosque, moist forest, roadsides.* N (*Stevens 4790*, MO); CR (*Skutch 2239*, MO); P (*Hartman 12276*, MO). 200-1700 m. (Mesoamérica, Colombia, Venezuela, Ecuador, Perú.)

9. **Jaegeria** Kunth

*Aganippea* Sessé et Moc. ex DC., *Heliogenes* Benth., *Macella* C. Koch

Por J.F. Pruski.

Annual or perennial herbs of moist places, infrequently aquatics; stems decumbent or less commonly erect, subterete, striate, glabrous to pubescent, sometimes fistulous, often rooting at the proximal nodes; herbage not stipitate-glandular. Leaves simple, opposite, sessile or subsessile (ours) to short-petiolate; blade linear-lanceolate to ovate, chartaceous or succulent, typically 3(-5)-nerved from near base, bases sometimes connate. Capitulescence terminal or axillary, openly corymbiform to monocephalous, or if not then plants acaulescent and compact-corymbiform, capitula pedunculate or when plants acaulescent then short-pedunculate, usually loosely corymbiform open, peduncles short to long, typically slender. Capitula radiate; involucre
typically campanulate; phyllaries eximbricate to weakly subimbricate, subequal, 1(-2)-seriate, thinly herbaceous, typically each subtending a ray floret, the basal portion expanded laterally into membranous wings tightly wrapping cypsela and deciduous together as a perigynium-like structure; clinanthium conical, paleate, paleae reaching to near apex of disk corolla, navicular, the inner ones often persistent. Ray florets pistillate, fertile or rarely sterile, uniseriate, typically the same in number as phyllaries and opposite an associated subtending phyllary; corolla glabrous, sometimes persistent on cypsela, tube usually reduced, limb cream-colored or yellowish, often suffused with violet or pink, few-nerved, nerves equally-thin; style moderately exserted and usually more than twice as long as tube. Disk florets bisexual; corolla narrowly campanulate, (4-)5-lobed, yellowish or greenish, distally glabrous, tube pilosulose or villous, throat usually with thin-paired resin ducts along each vein, lobe nerves often intramarginal; anthers cream-colored, basally short-sagittate, appendatge ovate; style weakly exserted, recurved, branches with 2-banded stigmatic surfaces with paired stigmatic lines, apex acute or obtuse, papillose abaxially. Cypsela obovoid or slightly compressed, black, finely striatulate, glabrous, epappose, carpopodium small; ray cypsela enclosed by a phyllary and paleae in a perigynium-like structure. \( x = 9 \). Aprox 10 spp. Neotropical with 1 sp. extending into subtropical México and \( J. hirta \) extending into subtropical South America. (México, Mesoamerica, Colombia, Venezuela, Ecuador, Perú, Bolivia, Brasil, Uruguay, Paraguay, Argentina).

\textit{Jaegeria} was monographed by Torres (1968), who diagnosed the genus by its pistillate ray florets, recognized 8 species in the genus, and noted its close relationship with \textit{Sabazia} and \textit{Aphanactis}. Subsequently, \textit{Jaegeria} was expanded by McVaugh (1972) to include \textit{J. sterilis} McVaugh, characterized by its sterile ray florets. Turner (1984) expanded to 10 the number of species in the genus.


1. Caulescent herbs, leafy-stemmed.
1. Acaulescent rosulate herbs.

1. J. hirta
2. J. standleyi


Frequent weedy annual caulescent herbs, remarkably variable in size and habit, (1-)5-40(-85) cm; stems strict or more commonly basally decumbent, much-branched to rarely simple stemmed dwarf plants, leafy, branches commonly opposite in pairs, hirsute, brownish-red, internodes typically longer than leaves. Leaves sessile or subsessile; blade 0.7-4(-9) × 0.3-2(-3) cm, lanceolate to elliptic-ovate, chartaceous, 3-nerved from near base, both surfaces long-hirsute to long-pilose to less commonly sparsely so, base broadly acute to rounded, connate, margins entire to less commonly serrulate, apex acute to obtuse. Capitulescence loosely corymbiform, open, few-many-capitulate; peduncles (4-)9-30(-50) mm, strigose. Capitula 3-5 mm, 45-71-flowered; involucre 3.5-5 mm diam.; phyllaries 2.2-3.4 mm, lanceolate, 1-seriate, hirsute to pilose or only basally so, hyaline, to c. 2 mm long with erose apex; clinanthium narrowly conical, to c. 1.7(-2.5) mm; paleae 1.5-2 mm, 1-3-nerved, outer ones somewhat herbaceous, inner ones scarious, typically acuminate, outer ones somewhat herbaceous, inner ones scarious. Ray florets 5-11; corolla tube c. 0.3 mm, limb 1.5-2 mm, elliptic-ovate, slightly exserted from associated phyllary, cream-colored to yellow, 2(-4)-nerved, shortly bilobed apically. Disk florets to c. 40(-60); corolla c. 1.3 mm, (4-)5-lobed, yellow-orange, pilose basally, lobes c. 0.2 mm; style branches c. 0.3 mm. Cypselae c. 1 mm, those of the rays somewhat compressed, topped by a minute white annulus. $2n = 36$. Páramos, near ponds, riverbanks, sandy alluvium in river beds, bosques de Pinos, forested slopes, evergreen cloud forests, manchones, cloud forest remnants, disturbed primary forests, along trails, roadsides, light gaps in premontane forest, lawns, disturbed areas, wooded slopes, pastures, set dry slopes, montane rain forests, open grassy slopes, cornfields, rocky outcrops. Ch (González 73, MO); G (Pruski y MacVean 4484, MO); H (Portillo 100, MO); ES (Standley 22419, NY); N (Rueda et al. 16415, MO); CR (Pruski et al. 3874, MO); P (Allen 1377, MO), (200-)700-3500 m. (México, Mesoamerica, Colombia, Venezuela, Ecuador, Perú, Bolivia, Brasil, Uruguay, Paraguay, Argentina.)


Acaulescent rosulate fibrous-rooted annual herbs to 1 cm, spreading to prostrate, rosettes (or leaf pairs) 2-3.6 cm diam. Leaves sessile, decussate; blade 0.7-1.8 × 0.5-1.3 cm, ovate to suborbicular, adaxial surface hirsute-pilose, abaxial surface pale green, subglabrous to sparsely hirsute, margins entire, apex obtuse to rounded. Capitulescence compact-corymbiform, of 2-7 very short-pedunculate capitula very nearly held within leaves of acaulescent plant; peduncles 0.5-1.5 mm. Capitula 3.5-4 mm; involucre 2.5-3 mm diam.; phyllaries 3-5, 3-4 × 0.8-1.5 mm, subequal, lanceolate to lanceolate-ovate, hirtellous, trichomes longer than phyllary diameter, apex acute; paleae 1.5-2.5 mm. Ray florets 3-5; corolla tube 0.3-0.4 mm, limb 0.5-1 mm, elliptic-ovate, pale yellow, 2-nerved. Disk florets 6-10+; corolla 1-1.4 mm, lobes 0.2-0.3 mm. Cypselae 1-1.4 mm. Flowering Sep-Dec. Alpine meadows, volcano slopes. Ch (Strother, 1990: 62); G (Molina 21244, NY). 2500-3600 m. (Endemic.)

*Jaegeria standleyi* is known only from the Sierra de Cuchumatanes, volcano slopes in SW Guatemala, and Volcán Tacaná on the Guatemalan border with Mexico.

10. Melampodium L.


Por J.F. Pruski.

Annual or perennial herbs to soft-stemmed subshrubs, 5-50(-150+) cm; stems erect to procumbent, dichotomously branched proximal to and overtopping the terminal capitula, occasionally trichotomous with lateral branches shorter than main axis, subterete to somewhat angled, glabrous to pubescent, solid or sometimes fistulose. Leaves cauline, simple or infrequently pinnatifid; opposite, petiolate (petiole usually winged) or sessile, rarely perfoliate; blade linear to ovate or obovate, typically chartaceous, palmately 3-veined from near to well above base or venation pinnate, surfaces usually pubescent, sometimes stipitate-glandular or puncate-glandular to only abaxially so, base attenuate to obtuse, less commonly subauriculate to rarely cordate or perfoliate, margins entire to dentate, apex acuminate to obtuse. Capitulescence of solitary capitula or few-capitulate and corymbiform in the axil of the distal leaves but typically exserted from subtending leaves, sometimes reduced and bracteolate; peduncles elongate or less commonly short, glabrous to pubescent, sometimes stipitate-glandular. Capitula radiate; involucre
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(3-)5-15(-30+) mm diam., mostly hemispheric or cupulate; phyllaries strongly dimorphic, subequal, biseriate, non-articulated basally, the outer series (2-3-)5, subimbricate or imbricate to less commonly eximbricate, typically herbaceous throughout or less commonly with margins scarious, erect or ascending to rarely spreading in fruit, free to sometimes connate proximally, persistent, nervation parallel to reticulate, glabrous to pubescent or puncate-glandular, the inner series same in number as the ray florets, each subtending an individual ray floret and typically fully enveloping its ovary, with maturation of the included cypsela forming a perigynium; clinanthium often short-conical, paleate; paleae linear to obovate, conduplicate, stramineous to yellow, sometimes with a darkened midrib, rarely purplish-tipped, scarious, apex sometimes dilated and erose. Ray florets 2-14, pistillate; corolla attached to adaxial side of ovary, yellow or golden yellow to less commonly white, sometimes purplish or greenish abaxially, tube typically very short or sometimes included within apex of perigynium, limb well-exserted from involucre or less commonly included, ob lanceolate to ovate or rarely orbicular, nerves usually concolorous with limb to infrequently distally greenish abaxially, apex shortly 2-3-dentate or sometimes entire to infrequently deeply bifid or trifid; style branches with stigmatic surfaces 2-banded with paired stigmatic lines, obtuse apically. Disk florets (3-)10-80(-110+)+, functionally staminate, paleae and disk florets caducous as a unit after anthesis; corolla funnelform to campanulate, (3-)5-lobed, yellow to golden-yellow, tube to c. 0.5(-1) mm, throat with single resin duct along each vein, lobes deltate, often reflexed or squarrose; anthers partly exserted, tan to brown; style unbranched, ovary sterile, minute to less commonly linear-stipiform, epappose. Ray cypsela obovoid, compressed, often incurved, epappose, carbonized areas convex with striations recessed, each enclosed in a conceptacle derived from fused and modified inner phyllary; conceptacles variously shaped, typically brown to black, not uncinate spined, sometimes with tan ridges or tubercules, scarious to indurate, surface smooth to tuberculate or wrinkled, typically glabrous, apex more or less truncate to sometimes cartilaginously cucullate or rarely corniculate directly from body of perigynium, cucullus (when present) sometimes abaxially 1-2(-3)-corniculate, conceptacles foot rarely hardened and elongated, often positioned mid-face ventrally, with body of conceptacle prolonged ventral-proximally. x = 9-12. 32-36 spp. 12 in Mesoamérica; mostly México, also SW. Estados Unidos, South America and West Indies; introduced into Paleotropics.

Melampodium was revised by Robinson (1901) and Stuessy (1972), both of whom noted the taxonomic importance at generic and specific rank of the phyllaries enveloping the ray ovaries. McVaugh noted that the apex of the perigynia is not always closed, and also that M. serecium possesses 4-lobed disk corollas. Stuessy recognized 37 species, 32 of which are recognized here and two of which are noted as possibly synonyms. Two additional species were described after
1972. Stuessy (1972) listed Zarabellia as invalid, but Zarabellia is valid, merely listing Berkheya Ehrh. sensu Necker as a usage [not taxonomic] synonym.

Tetraploid M. costaricense is recognized by Stuessy (1972) as distinct from the sympatric M. divaricatum, the two basically differing otherwise mainly in ray corolla features. On the other hand, Stuessy (1972) treats as M. paniculatum the tetraploid populations from Brasil and allopatric diploid populations from Central America, although the Brazilian populations consistently differ by larger capitula with more ray florets. The utility of ploidy level dictating taxonomic rank is seemingly lessened by these variously treated taxa.

All species in Mesoamerica have yellow ray corollas, and the white-flowered condition is presumably related to pollination mechanisms.


1. Outer phyllaries 2.
2. M. bibracteatum
1. Outer phyllaries 3-5.
2. Peduncles short-stipitate glandular; outer phyllaries 3(-5); ray corolla limbs typically moderately to deeply bifid or trifid, nerves distally greenish abaxially; \( x = 9 \).
3. Ray corolla limbs \( \leq 2 \) mm, often wider than long, held within the involucres.

10. M. paniculatum
3. Ray corolla limbs \( \geq 2 \) mm, longer than wide or less commonly wider than long, slightly to well exserted from involucres.
4. At least some proximal leaves semiamplexicaule.
5. M. gracile
4. Leaves attenuate to less commonly obtuse basally, not dilated near stems.

8. M. microcephalum
2. Peduncles not stipitate-glandular; outer phyllaries 5; ray corolla limb apices shortly 2-3-dentate to subentire, nerves usually concolorous with limb (sometimes distally greenish abaxially only in M. divaricatum and M. montanum); \( x = 10, 11, 12 \).
5. Leaves glabrous to hirsute-pilose abaxially, simple; disk ovaries ovoid, minute, c. 0.4 mm; perigynia apex ecuculate and ecorniculate.
6. Leaves, at least of proximal leaves, perfoliate, abaxially punctate-glandular; involucres spreading laterally in fruit, (12-)18-34 mm wide.

11. M. perfoliatum
6. Leaves not perfoliate, abaxially eglandular (rarely minutely glandular in *M. montanum*); involucres erect to ascending, 5-11 mm wide.

7. Perennial rhizomatous fibrous-rooted herbs; stems decumbent to ascending.

**9. M. montanum**

7. Annual generally tap-rooted herbs, stems typically erect.

8. Ray florets 5-8, corolla limb not exserted, 5(-7)-nerved, 1-1.6 × 0.5-1.1(-1.6) mm; peduncles apically glabrous to hirsutulous, phyllary margins glabrous to basally pilose; disk florets 15-25.

**3. M. costaricense**

8. Ray florets 8-13, corolla limb typically well-exserted, 9-nerved, (1.6-)3.5-7(-8.5) × 1.5-3.5 mm; peduncles apically and phyllaries basally typically tomentellose near juncture, phyllary margins typically stiffly short-ciliate; disk florets 40-70.

**4. M. divaricatum**

5. Leaves white-sericeous or long-pilose abaxially, simple to pinnatifid; disk ovaries linear-stipiform, 1.2-2.5 mm; perigynia apex typically cucullate or corniculate directly from body of perigynium.

9. Perigynia apices corniculate, ecucullate, cornicula arising directly from body of perigynium; leaves long-pilose abaxially; ray corolla tubes 0.5-1 mm.

**7. M. longipilum**

9. Perigynia apices cucullate, cornicula (when present) coming from apex of coriculum; leaves white-sericeous abaxially; ray corolla tubes c. 0.3 mm.

10. Margins of outer phyllaries (of at least two of the five per capitulum) conspicuously broad-scarious; leaves (if non-pinnatifid) or lobes (if pinnatifid) 1-3 mm wide.

**6. M. linearilobum**

10. Outer phyllaries herbaceous throughout; leaves or lobes (if pinnatifid) 2-30(-40) mm wide.

11. Capitula long-pedunculate, well-exserted from subtending leaves, > 47-flowered; paleae yellowish; ray florets 8-14, corolla limbs 4-6(-7) × 1.5-3 mm; disk corollas 5-lobed.

**1. M. americanum**

11. Capitula not well-exserted from subtending leaves, < 20-flowered; paleae yellowish or sometimes purple-tipped; ray florets 5-7, corolla limbs 0.8-1.2(-2) × 0.6-1.2 mm; disk corollas 3-4-lobed.

**12. M. sericeum**


Herbs often flowering in the first year to subshrubs, 10-60 cm; stems ascending to erect, simple to few-several branched, substrigose to hirsute-pilose. Leaves simple or pinnately trifid to less commonly pinnatifid with 2(-4) linear to lanceolate lobes to 1.5(-2) cm per margin, sessile; blade 2-9 × 0.2-1.8 cm wide when simple or when pinnatifid to 3 cm wide in outline, lanceolate when simple or ovate to obovate in outline when pinnatifid, venation not prominent, adaxially strigose-pilose, abaxial surface white-sericeous, also minutely punctate-glandular, base attenuate to obtuse, leaf or lobe margins entire, lobes (when leaf pinnatifid) somewhat directed apically, apex acute to obtuse. Capitulescence with 1-3 long-pedunculate capitula per branch, capitula exserted from subtending leaves; peduncles 2.5-7.5 cm, hirsute-pilose, not stipitate-glandular. Capitula 7-8 mm; involucre 7-10 mm diam., hemispherical to cupulate; outer phyllaries 5, 5-7 × 3-4 mm, ovate to obovate or rhombic, subimbricate to imbricate, herbaceous throughout, weakly connate basally, surface pilose, also sometimes minutely punctate-glandular, apex typically sharply acuminate; paleae 4-4.5 mm, oblanceolate, yellowish, midrib darkened distally, puberulent. Ray florets 8-14; corolla tube c. 0.3 mm, limb 4-6(-7) × 1.5-3 mm, oblong-elliptic, golden yellow, to c. 10-nerved, abaxially pilose, also glandular, apex shortly 3-dentate. Disk florets 40-80(-100); corolla 2-2.7 mm, 5-lobed, yellow, tube 0.6-0.7 mm, throat 0.8-1 mm, lobes 0.6-1 mm, papilllose-setose; ovary linear-stipiform, 1+ mm. Perigynia body 2-3 mm, surfaces striate to few-tuberculate, apex cucullate, stramineous, concolorous with striations of body, moderately smooth, to c. 1.5(3) mm, corniculum apex subentire to infrequently (in Mesoamerican material) corniculate. 2n = 20. *Thorn scrub, deciduous or evergreen forests, disturbed areas, pine-oak forests, savannas.* Ch (Seler y Seler 1954, MO); G (King y Renner 7089, MO). 600-900(-1400) m. (C. y S. México, Mesoamérica; introduced into the Philippines.)

In México, the perigynia of *M. americanum* are typically cucullate and the corniculum often has a terminal corniculum to 3 mm. However, in material from Mesoamérica I find the corniculum to be infrequently corniculate. The citation of *M. americanum* in El Salvador (Berendsohn y Araniva de González, 1989) could not be verified, and is possibly based on a
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misdetermination. A synonymy for *M. americanum* modified from that of McVaugh (1984), Robinson (1901), and Stuessy (1972) is used here. For example, *M. longipes* was recognized by each Robinson (1901) and Stuessy (1972) and McVaugh (1984) placed *Melampodium nayaritense* Stuessy in synonymy of *M. americanum*. Here I treat *M. longipes* as a synonym of *M. americanum* and recognize *M. nayaritense* as distinct, as it seems to differ from *M. americanum* by having a much smaller number of florets per capitulum, by paleae somewhat dilated apically, by typically corniculate perigynia, and by 5-lobed disk corollas. *Melampodium diffusum* and *Melampodium pilosum*, each characterized as annuals and recognized by Stuessy (1972), are also treated here in synonymy of *M. americanum*.


Holotype: México, México, *Pringle 3230* (imagen en Internet ex GH!). Illustr.: no se encontró.  
N.v.: none.

Annual fibrous-rooted subaquatic herbs, 5-32 cm; stems ascending to decumbent, simple to few-branched, puberulent to glabrate, few-leaved, internodes typically much longer than leaves. Leaves simple, sessile or subsessile; blade 1-4 × 0.4-1.8 cm, oblanceolate, trinerved from well above base, midrib 1-2 cm broad basally then abruptly narrowed distally, adaxially glabrous, abaxially subglabrous, base obtuse to subauriculate, margins subentire to serrulate, apex acute to obtuse. Capitulescence of few, axillary, often bracteate, subsessile or short-pedunculate capitula not exserted from the distal 1-4 nodes; peduncles 1-6 mm, glabrous. Capitula 3-4.5 mm; involucre 3.5-5.5 mm diam., hemispherical; outer phyllaries 2, 3-5 × 2-4 mm, ovate, opposite, eximbricate, erect to slightly spreading, glabrous, apex acute; paleae 1.5-2 mm, narrowly oblanceolate, glabrous. Ray florets 3(-4-6); corolla limb 1-1.2 × 0.4-0.7 mm, elliptic to ovate, very short and not exserted from involucre, pale yellow, indistinctly few-nerved, glabrous or abaxially weakly setulose, apex obtuse, entire or emarginate. Disk florets 4 or 5; corolla 1.5-2 mm, campanulate, 3-4-lobed, pale yellow, glabrous, tube 0.6-1 mm, throat 0.5-0.6 mm, lobes c. 0.4 mm; ovary ovoid, minute. Perigynia 2.5-3 mm, surfaces smooth to verrucose, apex ecuculate and ecorniculate. *Wet meadows, stream sides.* G (*Beaman 3977*, GH). 3400-3500 m. (C. México, Mesoamérica.)

*Melampodium bibracteatum*, by its few-flowered capitula with disk corollas 3-4-lobed, is closely related to the possibly synonymous *M. repens* Sessé et Moc., which differs primarily by the vegetative characters of obovate leaves and prostrate stems.

Annual generally tap-rooted herbs 15-35 cm; stems few-several-branched often from near base, erect to less commonly lateral stems decumbent, sometimes purplish, glabrous to tomentellose in lines, most internodes longer than leaves to distal 2 or 3 nodes congested. Leaves simple, petiolate, not perfoliate; blade (1.5-)2.5-7 × (0.7-)1.5-5.5 cm, ovate or rhombic to less commonly lanceolate, trinerved from near base, surfaces eglandular, adaxial surface pilose-strigose, adaxial surface substribose to glabrous, base attenuate to obtuse, margins serrate to less commonly subentire or undulate, apex acuminate or obtuse; petiole 0.3-3 cm, sometimes very narrowly winged, bases often connected by a wing that is expanded into a narrow nodal disk. Capitulescence few-capitulate and corymbiform due to closely spaced distal nodes, subsessile or short-pedunculate and not held well above subtending leaves; peduncles 0.5-3(-6) cm, glabrous to hirsutulous, not stipitate-glandular. Capitula 4-5 mm; involucre 5-8 mm diam., cupulate, erect to ascending; outer phyllaries 5, 3-5 × 2-4 mm, orbicular, subimbricate to imbricate, connate basally for up to 1/2 of their lengths, surface eglandular, glabrous or margins pilose to sparsely so, apex broadly obtuse to rounded; paleae c. 2 mm, oblong, midrib indistinct or slightly darkened apically, margins slightly erose distally, apex yellow. Ray florets 5-8; corolla limb 1-1.6 × 0.5-1.1(-1.6) mm, not exserted from involucre, but merely extending laterally across truncate ovary apex, pale yellow to golden yellow, 5(-7)-nerved, glabrous, apex acute and emarginate. Disk florets 15-25; corolla c. 2.5 mm, yellow, glabrous or lobes setose apically within, tube c. 1 mm, throat c. 1 mm, lobes c. 0.5 mm; ovary ovoid, minute, c. 0.4 mm. Perigynia tan or with blackish faces, more or less triagonal, c. 3 mm, ribs few, extremely thickened, longitudinal but with one per face diagonal, apex ecucullate and ecorniculate. 2n = 48 +/- 2. *Cafetales, disturbed areas, fields, forest borders, pastures, river banks, roadsides*. N (*Oersted 9010*, K); CR (*Skutch 3968*, MO); P (*Woodson et al.* 724, MO). 0-1800 m. (Mesoamérica, Colombia.)

Material from Belize formerly determined as *M. costaricense*, including paratypes, all typically occur on limestone and have broader than average capitula with each ray floret corolla limb c. 2 mm × 1.5 cm, orbicular, 9-nerved. Although these materials have short ray corolla limbs, all material from Belize has 9-nerved ray corolla limbs and is thus here redetermined as *M. divaricatum*. *Melampodium costaricense* is thus excluded from the flora of Belize. A single sheet of a collection made by Oersted in the 1800s is the sole paratype of *M. costaricense* from Nicaragua (Stuessy, 1972, cited a photo in US of a K sheet), but a photograph (F negative #22573) of an Oersted sheet in C has now been seen and is here considered to be of the same gathering.


Common annual generally tap-rooted herbs, (10-)50-100 cm; stems sometimes purplish, dichotomous or uncommonly trichotomous few-several-branched, erect or rarely with lateral stems decumbent, pilose-hirsute to glabrescent, becoming fistulose when large, internodes often much longer than leaves. Leaves simple, petiolate, not perfoliate; blade 3-10(-16) × 1.5-5(-10) cm, lanceolate or more commonly ovate to rhombic, trinerved from above base to well above base, surfaces eglandular, hirsute to hirsutulous or substrigillose, base attenuate to less commonly obtuse or rarely cordate, margins subentire to undulate or serrate, apex acuminate or obtuse; petiole narrowly winged, 0.2-2(-5) cm. Capitulescence monocephalous to few-capitulate and corymbiform, long-pedunculate; peduncles 2-10(-13) cm, hirsutulous or hirsute-pilose to tomentellose distally, not stipitate-glandular. Capitula 5-10 mm; involucre 6-10 mm diam., cupulate, erect to ascending.; outer phyllaries 5, 3.5-6(-8) × 3-5 mm, ovate to obovate or orbicular, subimbricate to imbricate, glabrous to nerves sparsely strigillose or margins typically tomentellose basally near peduncle, connate basally for up to 1/5 of their lengths, margins typically stiffly short-ciliate, apex obtuse to rounded; paleae 2.5-3 mm, obovate, midrib indistinct, margins and apex fimbriate to erose distally, apex slightly dilated, yellow. Ray florets 8-13; corolla limb (1.6-)3.5-7(-8.5) × 1.5-3.5 mm, oblong to rarely orbicular, typically well-exserted from involucre, occasionally (in Belice) included, golden yellow, c. 9-nerved, nerves sometimes greenish abaxially when limb immature, glabrous or very rarely glandular, apex obtuse, shortly 3-dentate. Disk florets 40-70; corolla 2-3 mm, yellow or golden yellow, glabrous or sometimes sparsely glandular distally, tube 0.5-1.5 mm, throat c. 1 mm, lobes c. 0.5 mm; ovary c. 0.4 mm, minute, ovoid. Perigynia 2.5-4 mm, more or less triangular, bicolored, wall of the inner faces brownish and sometimes disintegrating revealing the black cypsela within, ribs few, thickened, longitudinal but with one per face diagonal, stramineous, apex ecucullate and ecorniculate, very
rarely with a thickened ventral-tangential rim. 2n = 24. *Cafetales*, cultivated areas, deciduous forests, disturbed areas, fields, forest borders, gravel bars, lake borders, limestone outcrops, pine-oak forests, ravines, river banks, roadsides, rocky hillsides, secondary growth, selva baja subcaducifolia, selva mediana subcaducifolia, selva baja subperennifolia, selva mediana subperennifolia, slopes, trail sides, wet thickets. T (Stuessy 547, TEX); Ch (Pruski et al. 4229, MO); Y (Gaumer 563, F); C (Martínez S. et al. 31634, MO); QR (Gaumer 2345, MO); B (Arvigo et al. 142, NY); G (Lehmann 1434, US); H (Nelson y Cruz 9456, MO); ES (Harriman 14537, MO); N (Moreno 2579, MO); CR (Pruski y Sancho 3810, MO); P (Woodson et al. 1370, MO). 0-1800 m. (C. + S. México, Mesoamérica, Colombia; cultivated and introduced into Brasil, Bolivia?, Cuba, Hispaniola, Puerto Rico, Virgin Islands; Asia, Islas del Pacífico.)

*Melampodium divaricatum* is the most common melampodium, is the sole species found in each of the 12 main political units within the Flora Area, often forms weedy roadside stands, and is also often cultivated in both tropical and temperate gardens. Some collections may have distal leaves resembling those of *M. perfoliatum*, but *M. divaricatum* may be recognized by its capitula with subglabrous phyllaries and 8-13 ray florets with corolla limbs c. 9-nerved and typically exserted and by its strongly angled-costate bicolored perigynia sometimes with the wall of the perigynia disintegrating.

Although Stuessy (1972) cited one collection of *M. costaricense* from Belice, all material (although with short ray corolla limbs) formerly determined as *M. costaricense* from Belice have 9-nerved ray corolla limbs, and are redetermined here as *Melampodium divaricatum*. The collections from Belice also match *M. divaricatum* in pubescence of the peduncle and phyllaries. I presume the short-rayed material from Belice formerly determined as *M. costaricense* is simply an extreme ecotipo of *M. divaricatum* growing on limestone and adapted for dry habits.

The type of *Dysodium divaricatum* is presumably a Bertero collection (albeit in the Richard herbarium), s Bertero collected at Gaira near Santa Martha, Colombia, the locality cited in the protologue, but Richard is not known to have visited Santa Martha. It is thus possible that *Melampodium berteroanum* and *Dysodium divaricatum* are typified by elements of a single collection by Bertero, albeit from different sheets. It should be noted, that material of *M. divaricatum* from the dry Caribbean coast of Colombia (including the Bertero material) has shorter than average ray corolla limbs, thus further the supposition that ray corolla limb length may be environmentally influenced.

N.v.: none.


Annual tap-rooted herbs, 15-50 cm; stems erect, several-branched, often sparsely stipitate-glandular, also hirsute-pilose, the non-glandular trichomes c. twice as long as the glandular ones, internodes about as long as leaves to proximal internodes much longer than leaves. Leaves simple, typically subsessile and at least proximal ones semiamplexicaule; blade (2-3.5-9(-12) × 2-4 cm, hastate-lanceolate or panduriform to triangular-ovate or ovate, trinerved from well above base, surfaces sometimes stipitate-glandular, strigillose or sparsely hirsute to subglabrous, base dilated near stem, attenuate-acuminate to rounded or subauriculate, margins obscurely crenulate to deeply crenate, apex acute to acuminate; petiole 0.1-0.3 cm. Capitulescence corymbiform, few-capitulate, long-pedunculate; peduncles 2-9 cm, weakly short-stipitate glandular, also sparsely hirsute-pilose. Capitula 6-7 mm; involucre 5-10 mm diam., cupulate to spreading laterally; outer phyllaries 3(-5), eximbricate to subimbricate, ovate to lanceolate, (2-)3.5-5 × (0.8-)1.5-3.5 mm, sparsely hirsute, also short-stipitate glandular, apex acute to acuminate; paleae 2-2.5 mm, oblong to ovate, midrib weakly darkened distally, apex yellowish. Ray florets 5-8; corolla limb 2.5 × 3-4 mm, suborbicular, slightly longer than wide, slightly exerted from involucre, golden yellow, the 5-7 nerves distally greenish abaxially, apex moderately bifid or trifid to less commonly emarginate, apical notch 0.5-2 mm deep, setose abaxially; style branches elongate, erect to slightly spreading, shorter than corolla limb, reaching nearly to base of corolla teeth. Disk florets 25-45; corolla 2-2.6 mm, yellow to golden yellow, tube 0.9-1.3 mm, throat 0.7-0.8 mm, lobes 0.4-0.5 mm, papillose-setose, sometimes reflexed; ovary ovoid, minute. Perigynia 2.2-2.5 mm, surfaces somewhat reticulate-verrucose, apex ecuclulate and ecorniculate. $2n = 18$. Along streams, disturbed areas, roadsides, rocky areas, selva baja caducifolia, slopes with Quercus, thorn-scrub forests, wet thickets. Ch (Breedlove 26221, MO); Y (Gaumer 789, MO); C (Arreola V. 3, MO); B (Lundell 6759, NY); G (Aguilar H. 25, MO). 15-1700(-2000) m. (C. + S. México, Mesoamérica.)

The reports of *M. oblongifolium* (a synonym of *M. gracile* as defined here) in Costa Rica by Standley (1938) and in El Salvador (as cited by Berendsohn y Araniva de González, 1989) are most likely based on misdeterminations of the related and widespread *M. paniculatum*.

Melampodium canescens Brandegee.

Annual herbs, 6-50 cm; stems erect, sometimes decumbent, few-much-branched, strigulose-strigose. Leaves simple to commonly finely few-pinnatifid, sessile; blade 1.5-4(-5) cm, if linear and non-pinnatifid then 1-3 mm diam., linear to obovate in outline, venation not prominent, adaxially strigose-pilose, abaxial surface white-sericeous, also minutely-glandular, base attenuate to obtuse, leaf or lobe margins entire, apex acute to obtuse, lobes linear, 1-3 mm wide. Capitulecence with 1-3 capitula per branch, several-many-capitulate when plant much branched; peduncles 3.5-6 cm, strigose-pilose, not stipitate-glandular. Capitula 5-7 mm; involucre 6-10 mm diam., hemispherical to cupulate; outer phyllaries 5, 3.5-5.5 × 2.5-3 mm, ovate or obovate to oblanceolate, subimbricate to imbricate, mid-region herbaceous, weakly connate basally, margins and apex (of at least two of the five phyllaries per capitulum) conspicuously broad-scarious and yellow, apex acute, herbaceous surface pilose to strigose, sometimes punctate-glandular, margins glabrous; clinanthium conical, to 2 mm; paleae c. 4 mm, oblanceolate, midrib darkened distally, mostly glabrous, apex yellow, dilated. Ray florets (6-)8; corolla tube c. 0.3 mm, limb 2-4 × 2-5 mm, ovate-orbiculate to broadly cuneate, yellow, to c. 10-nerved, typically abaxially glandular, also setulose on veins, apex emarginate or shortly 3-dentate. Disk florets (10-)45-75; corolla 2-2.4 mm, yellow, tube c. 0.6 mm, throat c. 0.8 mm, lobes 0.6-1 mm, papillose-setose, fully reflexed at maturity; ovary linear-stipiform, c. 2.5 mm. Perigyny body 2-3 mm, surfaces striate to tuberculate, striations and tubercules stramineous, apex cucullate, stramineous, concolorous with striations of body, moderately smooth, to c. 2.5 mm, cucullus subentire to occasionally 1-2-corniculate, cornicula (when present) outwardly coiled, coiled diam. to c. 0.7 mm. 2n = 20. Thorn scrub, brushy slopes, deciduous or evergreen forests, pinares, river margins, disturbed areas, savannas. Ch (Purpus 9113, MO); G (Pruski et al. 4549, MO); H (Molina y Molina 22740, MO); ES (Tucker 455, MO); N (Stuessy 619, MO); CR (Rowlee y Rowlee 179, NY). 0-1600 m. (México, Mesoamérica.)

Much herbarium material of M. linearilobum was annotated in the 1960s as M. hispidum Kunth.


Melampodium villicaule Greenm.

Annual herbs, 7-30 cm; stems few-branched, erect, long-pilose, internodes about as long as to longer than leaves. Leaves simple, subsessile to petiolate, bases sometimes connected by a wing that is expanded into a narrow nodal disk; blade 1.5-5(-7.5) × 0.5-3.5 cm, elliptical to ovate,
trinerved from well above base, surfaces long-pilose, also minutely punctate-glandular, base attenuate to broadly obtuse or sometimes subauriculate, margins entire, apex acute to less commonly obtuse; petiole 0.2-1.5 cm, broad-based, narrowly winged. Capitulescence monocephalous to sometimes few-capitulate and corymbiform, pedunculate and held above subtending leaves; peduncles 1-7(-11) cm, long-pilose, not stipitate-glandular. Capitula 5-7.5 mm; involucre 6.5-9.5 mm diam., hemispherical to cupulate; outer phyllaries 5, (2.5-)3.5-5(-6) × 2-3.5 mm, ovate to orbicular, subimbricate to imbricate, slightly connate basally, long-pilose, also minutely punctate-glandular, apex acute or obtuse, often cuspidate; paleae 2.5-3 mm, oblanceolate, glabrous, midrib slightly darkened apically, margins and apex erose, apex yellow, more or less truncate. Ray florets (4-)8; corolla tube 0.5-1 mm, extended, limb 3.5-5.5 × 1.8-4 mm, ovate to oblong, exserted from involucre, golden, yellow, 6-8-nerved, abaxially glandular, the two thicker nerves also setose, apex obtuse to truncate, subentire to often emarginate. Disk florets 30-60; corolla 1.2-1.6 mm, yellow or yellow-green, minutely glandular proximally, tube 0.4-0.6 mm, throat 0.5-0.6 mm, lobes 0.3-0.4 mm, apically papillose within; ovary c. 2.5 mm, linear-stipiform. Perigynia 2-2.5 mm, dorsal surface smooth, lateral surfaces large-tuberculate and rugulose, apex ecucullate but with late-forming flattened broad-based setose cirrose-coiled corniculum arising directly from body of perigynium, corniculum base c. 1.5 mm diam., coiled diam. of corniculum 2.5-4 mm, corniculum appressed against ray limb. 2n = 20. Deciduous forests, pine forests, rocky areas. Ch (Reyes G. 1303, MO); G (Vélez 14266, MO). 200-1600 m. (C. + S. México, Mesoamérica.)

The flattened broad-based corniculum arising directly from perigynia rather than from a calculus and the long ray corolla tube distinguish this species.


Melampodium lanceolatum Sessé et Moc.

Annual tap-rooted herbs, 15-60(-80) cm; stems erect to decumbent and rooting at nodes, few-branched, short-stipitate glandular and hirsute or hirsutulous to rarely glabrescent, the non-glandular trichomes c. twice as long as the glandular ones, internodes generally longer than leaves. Leaves simple, subsessile or short-petiolate; blade 2-6(-9) × 1-2.5(-3.5) cm, lanceolate to less commonly ovate, trinerved from near base to occasionally pinnately veined, adaxially hirsutulous or strigose, abaxially strigose, sometimes stipitate-glandular, base attenuate to less commonly obtuse, not dilated near stem, margins entire to obscurely crenulate-undulate, apex
acute or acuminate to rarely obtuse; petiole 0.1-0.4 cm. Capitulescence corymbiform, monocephalous to few-capitulate, long-pedunculate; peduncles 1-3(-6) cm, short-stipitate glandular and hirsute. Capitula 3-4 mm; involucre 5-8(-10) mm diam., cupulate to rarely spreading: outer phyllaries 3(-5), 3.5 × 1.5-3 mm, lanceolate to obovate, eximbricate to subimbricate, base occasionally slightly connate, hirsute to sparsely so, also short-stipitate glandular, apex acuminate or acute; paleae c. 2 mm, oblong to ovate, apex yellowish. Ray florets 5-8; corolla limb 2.5-4 × 2-3 mm, elliptic, longer than wide, slightly exserted from involucre, yellow, the 5 or 6 nerves distally greenish abaxially, setose abaxially, apex moderately bifid to trifid, apical notch to c. 1.2 mm deep; style branches ascending to recurved, much shorter than corolla limb. Disk florets 25-45; corolla c. 2.1 mm, yellow to golden yellow, tube c. 1 mm, throat c. 0.8 mm, lobes c. 0.3 mm, papillose-setose, sometimes reflexed; ovary ovoid, minute. Perigynia 1.6-2.4 mm, surfaces reticulate or tuberculate, apex ecuculate and ecorniculate. 2n = 18. Wet areas, disturbed areas, fields, open forests. Ch (Breedlove y Thorne 20795, MO); G (King 3425, NY). 3-1500(-2000) m. (México, Mesoamérica.)

The report of Melampodium microcephalum in Honduras by Clewell (1975) is presumably based on a misdetermination of either the similar M. gracile or M. paniculatum, both of which appear to be much more common in the Flora Area. It is possible that the concept M. microcephalum used by Clewell (1975), who listed M. oblongifolium as a synonym, refers to the same taxon as do the concepts of M. gracile (sub M. oblongifolium) of Standley (1938) for Costa Rica and of Berendsohn y Araniva de González (1989) for El Salvador. However, this supposition is not confirmed here as the respective vouchers have not been seen. It should be noted, however, that misdeterminations among M. gracile, M. microcephalum, and M. paniculatum, are common, and thus country records, especially those representing extreme range extensions, based on literature citations are generally not accepted by me.

9. Melampodium montanum Benth., Pl. Hartw. 64 (1840). Holotype: México, Oaxaca, Hartweg 475 (K, photo en MO!). Illustr.: no se encontró. N.v.: K'an nich wamal, k'anal nich, tzajal akan, Ch.

Melampodium liebmannii Sch. Bip. ex Klatt, Melampodium montanum var. viridulum Stuessy.

Perennial rhizomatous fibrous-rooted herbs, (10-)20-40 cm; stems few-branched often from near base, decumbent to ascending, sometimes purplish, pilose-hirsute or rarely glabrescent, internodes often longer to much longer than leaves. Leaves simple, subsessile, bases sometimes connected by a wing that is expanded into a narrow nodal disk, not perfoliate; blade (1-)1.5-4.5 × (0.3-)0.7-2.2 cm, elliptical-lanceolate to ovate, trinerved from near to from well above base,
surfaces typically eglandular, hirsute-substrigose to occasionally glabrous especially abaxially, base obtuse or broadly cuneate, margins entire to subentire, apex broadly acute to obtuse; petiole 0.1-0.3 cm. Capitulescence monoecephalous to sometimes few-capitulate and corymbiform, pedunculate and held above subtending leaves; peduncles (1-)3-9.5 cm, pilose-hirsute, not stipitate-glandular. Capitula 4.5-6 mm; involucre 8-11 mm diam., hemispherical, erect to ascending: outer phyllaries 5, 4-5.5 × 3-5 mm, ovate to orbicular, subimbricate to imbricate, connate basally, glabrous to much more commonly pilose basally, glabrous distally, margins narrowly scarious, margins and apex sometimes purplish, apex acute or obtuse; paleae c. 2 mm, oblanceolate, midrib slightly darkened apically, margins entire, apex yellow. Ray florets (7-)13; corolla limb (4-)6-12 × 1.5-3 mm, elliptic-lanceolate or oblong, well-exserted from involucre, yellow or frequently greenish abaxially especially when immature, 5-7-nerved, glabrous, apex obtuse or truncate to shortly 2-3-dentate or emarginate, style and corolla inserted on extreme adaxial apex of ovary. Disk florets 70-110; corolla 2.5-2.7 mm, yellow or yellow-green, glabrous, tube 1.1-1.3 mm, throat c. 0.7 mm, lobes c. 0.7 mm; ovary c. 0.4 mm, minute, ovoid, Perigynia sublunate, 1.6-2.1 mm, dorsal-distal portion much expanded, surfaces smooth or sometimes ridged, apex ecuculate and ecorniculate. 2n = 22. Pine-oak forests, meadows, roadsides, rocky slopes. Ch (Ghiesbreght 546, MO); G (Skutch 1036, F). (1600-)2000-3400 m. (México, Mesoamérica.)

Stuessy (1972) recognized within this normally yellow-flowered species var. viridulum based on abaxially greenish ray corolla limbs, but this feature occurs occasionally in immature material of typically yellow-flowered *M. divaricatum* and in corollas and fruits of many other Compositae and thus is not used here as diagnostic. Hexaploid *M. aureum* is very closely related to *M. montanum*, and I agree with Stuessy (1972) that ultimately *M. aureum* Brandegee may prove synonymous and merely to be a hexaploid race of *M. montanum*.


*Melampodium brachyglossum* Donn. Sm.

Annual tap-rooted herbs, 10-100 cm; stems ascending to erect, several-branched, stipitate-glandular, also sparsely hirsute-pilose, the non-glandular trichomes c. twice as long as the glandular ones, internodes typically longer than leaves. Leaves simple, often abruptly reduced in size in the capitulescence, sessile or stem leaves short-petiolate: blade 2.5(-9) × 1.2(-5) cm, ovate or rhombic, to lanceolate, trinerved from near to well above base, surfaces sometimes stipitate-glandular, strigillose to subglabrous, base attenuate and slightly dilated to obtuse, sometimes
subauriculate, margins subentire to serrate, apex acuminate to acute; petiole (when present) 0.1-1.5 cm, proximal ones sometimes winged. Capitulescence corymbiform to corymbiform-paniculate, several-capitulate, often bracteolate, short-long-pedunculate; peduncles 1-5 cm, short-stipitate glandular, also sparsely hirsute-pilose. Capitula 2.2-4.5 mm; involucre 3-6.5 mm diam., hemispherical to cupulate; outer phyllaries 3(4), 1.8-4 × 1.5-2.8 mm, lanceolate to ovate, eximbricate to subimbricate, sparsely hirsute-pilose, also sometimes short-stipitate glandular, apex acute to acuminate; paleae c. 1.3 mm, elliptic-lanceolate, midrib weakly darkened distally, glabrous, apex yellowish. Ray florets 3-8; corolla limb 1.2 × 1-2 mm, often wider than long, very short and held within the involucre, very broadly cuneate, pale yellow to yellowish-orange, the c. 5 nerves distally greenish abaxially, glabrous or setulose abaxially, apex obtuse, deeply bifid to trifid, apical notch 0.5-1.5 mm deep and often nearly to base of the limb; style branches recurved.

Disk florets 8-15(-29); corolla 1.6-2 mm, pale yellow, tube 0.7-0.8 mm, throat 0.7-0.8 mm, lobes 0.2-0.4 mm, papillose-setose, sometimes reflexed; ovary ovoid, minute. Perigynia 2-3 mm, surfaces striate and verrucose, apex sometimes setose, ecucullate and ecorniculate. 2n = 36, 54.

Brushy slopes, bosques mesofilo, disturbed areas, pinares, Oak forests, cornfields, edges of lakes, riversides, roadsides, fence rows, meadows, clearings, pastures, river edges. Ch (Pruski et al. 4189, MO); G (Tuerckheim II 1289, MO); H (Croat 42774, MO); ES (Rosales 1117, MO); N (Kral 69027, MO); CR (Solis R. 62, MO); P (White y White 111, MO). 300-2000 m. (Mexico [Oaxaca], Mesoamérica, Colombia, Venezuela, Brasil.)

Stuessy (1975) gave the number of ray florets per capitulum of M. paniculatum as "3-6". However, Baker (1884) gave the number as "5-8" and Smith (1888), in the protologue of the synonymous M. brachyglossum, gave as the number of ray florets "6-7". Morphologically, material of M. paniculatum examined from Mesoamérica is characterized by capitula with 3-5(-7) ray florets and up to 15 disk florets, whereas Brazilian material is characterized capitula with 5-8 ray florets and up to 29 disk florets. Stuessy (1972) noted a cytological distinction between these populations, with those from Mesoamérica being tetraploids, whereas Brazilian ones are hexaploids.


Polymnia perfoliata (Cav.) Poir., Wedelia perfoliata (Cav.) Willd.
Frequent tap-rooted annual herbs, 0.2-1.5(-2) m; stems erect, simple or more commonly few-branched, minutely puberulent to proximally glabrate, internodes often much longer than leaves. Leaves simple, sessile, semiamplexicaule, at least proximal leaves ones perfoliate; blade 3-15(-20) × 1.5-12(-15) cm, deltate to rhombic-deltate, trinerved from well above base, surfaces punctate-glandular especially abaxially, otherwise puberulent to hirsutulous, base attenuate and clasping to subclasping, nodal flange ≤ 1.5 cm wide, margins subentire to serrate, apex acute or obtuse. Capitulescence corymbiform, few-capitulate, long-pedunculate; peduncles (1-)2-10 cm, striate, hirsutulous, not stipitate-glandular. Capitula 5-7 mm; involucre (12-)18-34 mm diam., spreading laterally in fruit; outer phyllaries 5, (6-)9-17 × 4-11 mm, oblong to elliptic or ovate, leafy, subimbricate, punctate-glandular especially marginally, also sometimes substrigose, connate basally, margins often stiffly short-ciliate, apex obtuse or sometimes acute; paleae c. 2.1 mm, oblong, yellowish, midrib typically darkened distally, apex slightly dilated and erose, glabrous. Ray florets 8-13; corolla limb 2.5-4.5 × 1.6-3 mm, oblong-elliptic, typically not surpassing phyllaries, golden yellow, 5-10-nerved, obtuse and emarginate apically, punctate-glandular abaxially. Disk florets 30-45; corolla 2.1-2.7 mm, yellow, sparsely glandular distally, tube 0.9-1.2 mm, throat 0.8-1 mm, lobes 0.4-0.5 mm; ovary c. 0.4 mm, minute, ovoid. Perigynia 4-7 mm, brown throughout, directed outward and forming a long-persistent ring of 8-13 lobed subtended by the 5 leafy outer phyllaries, surfaces smooth to indistinctly few-striate, not strongly ridged, apex rounded, shortly 5-pointed, ecucullate and ecorniculate; perigynipodium hardened. 

$2n = 22, 24$. Along streams, disturbed areas, roadsides, pine-oak forests, wet thickets, cultivated areas, fallow field. Ch (Alush Méndez Ton 4566, MO); G (Castillo M. 1571, MO); ES (Renderos et al. MR-00318, MO); CR (Stuessy y Gardner 4485, MO). 500-1900(-2200) m. (México, Mesoamérica; cultivated and sometimes escaping in California [Estados Unidos], Cuba, Europa.)

*Melampodium perfoliatum* is a common weedy species easily recognized by the perfoliate leaves and the long-persistent perigynia that are directed outward and subtended by the 5 leafy spreading outer phyllaries.


Annual tap-rooted herbs, 7-40 cm, sometimes as broad as; stems ascending to erect, simple to several-branched, hirsute-pilose. Leaves simple to sometimes pinnatifid with 1-4 lobes per margin, sessile to petiolariform; blade 2-6.5(-8) × 0.2-2(-4) cm, oblanceolate to elliptic or
lanceolate in outline, indistinctly pinnate to trinerved from near base, adaxially strigose-pilose, abaxial surface white-sericeous, also minutely-glandular, base attenuate to obtuse, leaf of lobe margins entire, lobes $\leq 2.3 \times 0.2$-0.9 cm wide, lanceolate, apex acute to sometimes obtuse. Capitulescence with 1-5 capitula per branch, not well exerted from subtending leaves; peduncles 0.3-2 cm, hirsute-pilose, not stipitate-glandular. Capitula 4-5 mm; involucre 4-8 mm diam., hemispherical to cupulate; outer phyllaries 5, 3-7 $\times$ 2-4 mm, ovate to obovate or rhombic, subimbricate, herbaceous throughout, weakly connate basally, pilose, apex acute; paleae c. 3.5 mm, oblanceolate, yellowish or sometimes purple-tipped, midrib darkened distally, glabrous. Ray florets 5-7; corolla tube c. 0.3 mm, limb 0.8-1.2(-2) $\times$ 0.6-1.2 mm, elliptic, short and not exerted from involucre, yellow or sometimes purple abaxially, c. 5-nerved, abaxially setulose, also glandular, apex emarginate or shortly 3-dentate. Disk florets (5-)8-12; corolla 1-1.3 mm, 3-4-lobed, yellow, tube 0.4-0.5 mm, throat 0.4-0.5 mm, lobes 0.2-0.3 mm, papillose-setose, often reflexed; ovary linear-stipiform, c. 1.2 mm. Perigynia apices typically cucullate, sometimes tardily so, body 2.5-3.3 mm, surfaces striate to few-tuberculate, cucullus stramineous, concolorous with striations of body, moderately smooth, to c. 1 $\times$ 1 mm, cucullus often 1-3-corniculate, cornicula (when present) outwardly coiled at apex, to c. 1.4 mm. 2n = 60. Along streams, disturbed areas, fields, roadsides, slopes with Quercus. Ch (D'Arcy 12107, MO); G (King y Renner 7139, MO); ES (Calderon 1019, US). 900-1600(-2000) m. (México, Mesoamérica; sometimes cultivated in temperate zones, but not known there as an escape.)

No material of *M. sericeum* from Nicaragua has been seen, and the report by Hemsley (1881) of this species in Nicaragua is presumably in reference to materials of *M. linearilobum*. The material with paleae apically purple and ray corolla limbs abaxially purple resemble, in terms of coloration, the poorly known *M. pringlei*., which is provisionally recognized as distinct. By opposite sometimes pinnatifid leaves *Tridax coronopifolia* is similar *M. sericeum*.

11. *Milleria* L.

Por J.F. Pruski.

Tall annual tap-rooted herbs, herbage commonly viscous, stipitate-glandular and sometimes pilose, rarely punctate-glandular; stems erect, branched, subterete, fistulous, nodes sometimes pseudostipulate. Leaves simple, opposite, petiolate to rarely perfoliate, spread evenly along length of stem, progressively reduced distally; blade elliptic to broadly ovate or deltate-cordiform, chartaceous, 3-5-nerved from near base of blade; petiole winged. Capitulescence terminal and axillary, open, corymbiform, several-capitulate, dichotomously branched 2 or 3 times, the central
capitulum short-pedunculate, quickly over-topped by elongate lateral branchlets, the ultimate branchlets racemose with often nutant capitula more or less subequal to short peduncles; peduncles short, ebracteolate. Capitula small, few-flowered, obscurely radiate, ray florets asymmetrically disposed; involucre in fruit accrescent; phyllaries few, c. 2-seriate, the outer 2 chartaceous becoming indurate in fruit and closely florets forming a perigynium-like structure; clinanthium flat, paleate, paleae and inner phyllaries weakly differentiated. Ray florets 1(-2), pistillate; corolla weakly exserted from the involucre, glandular, limb 3-lobed; style branches with stigmatic surfaces 2-banded with paired stigmatic lines. Disk florets few, functionally stamine; corolla 5-lobed, exserted from involucre, glandular, throat with single resin duct along each vein, lobes short, erect; anthers black or rarely yellow anther appendage sometimes sessile-glandular. Ray cypsela obpyroidal, slightly obcompressed, enclosed by the irregularly thickened involucre in a perigynium-like structure; epappose. x = 15. 1 sp. Neotropical.

*Milleria* is similar to *Trigonospermum* but differs by fruits in perigynium-like structures.

*Milleria* is long-known, having been collected by both W. Houstoun (Veracruz) and R. Miller (Campechy) in the early 1700s. The second name (*Milleria biflora* L.) validated by Linnaeus in *Species Plantarum* 1753 was designated by Cassini (1824) as the type of *Elvira* Cass. (1824), a taxonomic synonym of *Delilia* Spreng. (1823), whereas *M. quinqueflora* was designated by Cassini (1824) as the type of *Milleria*.


Herbs 0.3-1.5(-2.5) m; stems striate, often pilose proximally, stipitate-glandular distally, pseudostipules reflexed, deltoid, ≤ 1 × ≤ 1.5 cm broad. Leaves petiolate, distal most greatly reduced; blade 2-14(-20) × 0.6-12(-18) cm, elliptic to broadly ovate, adaxially scabrous, abaxially pilosulose, weakly glandular-stipitate, basally rounded, truncate, or subcordate, then attenuately tapered onto the petiole, margins subentire to serrate-dentate, apex acute to acuminate, less commonly obtuse; petiole 0.4-7(-10) cm, winged. Capitulescence to 25 cm tall and broad. Capitula 2-5 × 2-5 mm, ovoid; involucre campanulate; outer phyllaries ovate, glandular-stipitate,
inner phyllaries 1 or 2, closely subtending ray floret(s), hyaline; peduncles slender, sometimes recurved, 2-6 mm. Ray floret 1(2); corolla pale yellow or white, limb to c. 4 mm, obovate, lobes spreading, to c. 1.5 mm, tube c. 1 mm; style exerted from tube, branches c. 2 mm, sometimes reaching to near the apex of the limb. Disk florets 3-5(-8); corolla funnelform, greenish-white, lobes c. 0.5 mm; anthers partly exerted; style undivided, generally included, rarely exerted to c. 2 mm from corolla. Cypselae black, completely enclosed by accrescent phyllaries forming a coriaceous, glabrous or nearly so, irregularly tuberculate, brownish-green nut-like structure, this c. 5 × c. 3 mm. 2n = 30. Disturbed areas, roadsides, weedy thickets, secondary forests, scrubby slopes, seasonal evergreen forests, oak-pine forests, stream sides. Ch (Breedlove 28330, MO); Y (Gaumer 949, MO); C (Houstoun s.n., BM n.v., photograph sub BH neg. #5241: NY!); QR (Darwin 2385, MO); B (Gentle 844, MO); G (Heyde y Lux 4110, NY); H (Standley 27485, MO); ES (Calderón 1136, MO); N (Kral 69380, MO); CR (Tonduz 13801, NY); P (Dwyer 2542, MO). 0-1400 m. (México, Mesoamérica, Colombia, Venezuela, Ecuador, Perú, Bolivia, Cuba, Trinidad.)

Milleria is generally considered unispecific, Turner y Triplett (1996) called attention to the great variation of Milleria by noting that Milleria maculata Mill., Milleria quinqueflora, and Milleria triflora Mill. were all described from plants cultivated from a single Mexican seed source. Moreover, Turner y Triplett (1996) reduced Milleria peruviana H. Rob. to synonymy of Milleria quinqueflora. Simultaneously, however, Milleria perfoliata B.L. Turner was described in Turner y Triplett (1996), raising to two the number of recognized species in Milleria.

Milleria perfoliata, known only from the holotipo from Jalisco, México, was thought to be distinct based on its punctate glandular (vs. stipitate-glandular) herbage, perfoliate (vs. winged-petiolate) leaves, 6-8 (vs. 3-5) disk florets with yellow (vs. green) corollas, and by its 10-20 (vs. c. 5) mm long ultimate peduncles. I have seen further specimens of two perfoliate individuals (Villaseñor y Spooner 771, MO, from D.F., México and LeSueur 1021, MO, from Chihuahua, México) both with abaxially punctate-glandular leaves, thus differing from the bulk of material generally determined as Milleria quinqueflora. Villaseñor y Spooner 771 (MO) and LeSueur 1021 (MO), however, each have green disk corollas and black anthers, and Villaseñor y Spooner 771 (MO) has ultimate peduncles to only c. 5 mm, diminishing the supposed distinctiveness of Milleria perfoliata. Occasional Mesoamérica specimens (e.g., Stevens 3426, MO, and Dwyer 2542, MO) have abaxially punctate-glandular leaves as in Milleria perfoliata, but these collection are not perfoliate, and lack the yellow disk corollas and yellow anthers described in the protologue of Milleria perfoliata. Unless I am amply fooled, the variation noted in the above
cited specimens shows that Ayala 345 (the type of Milleria perfoliata) also fits within the variable (Turner y Triplett, 1996) Milleria quinqueflora, with which is it herein synonymized.

Stuessy in D'Arcy (1975) listed LINN 1031.1 as "type," of Milleria quinqueflora but Turner y Triplett (1996: 350) noted that this was a later addition to LINN, thus is not type material.

12. Oteiza La Llave


Por J.F. Pruski.

Coarse perennial herbs to shrubs or vines 1-8 m; stems erect to climbing, not stipitate-glandular. Leaves opposite, petiolate to nearly subsessile; blade lanceolate to ovate, chartaceous, thinly 3-nerved from near base, trinervation reaching at least to near distal 2/3 of blade, surfaces pubescent, not punctate-glandular, margins more or less serrulate. Capitulescence terminal, cymose to corymbiform-paniculate. Capitula radiate; involucre narrow-campanulate to hemispherical; phyllaries 9-24, more or less isomorphic, imbricate, graduated, 3-5-seriate, chartaceous, striate, glabrous with ciliate or erose thin-scarious margins; clinanthium more or less conical, paleate; paleae lanceolate or oblanceolate, sometimes subnavicular but not carinate, sometimes trifid from mid-palea. Ray florets 5-8, 1-seriate, pistillate; corolla white or greenish-yellow, limb longer than tube exserted from involucre, evenly thin-nerved, abaxially eglandular, apex 3-lobed. Disk florets 20-75, bisexual; corolla funnelform, shortly 5-lobed, yellow, eglandular, tube shorter than limb, usually pubescent, throat usually with paired resin ducts along each vein, lobes triangular, shorter than throat, lateral ducts often intramarginal, glabrous to puberulent; anthers yellowish to pale brown, appendage ovate; style base slightly dilated where inserted into circular nectary, trunk with 4 resin ducts, branches to apex with stigmatic surfaces 2-banded with paired stigmatic lines, apex acute to sometimes obtuse, finely papillose. Cypselae obconical, sometimes indistinctly 3-5-costate or angled, black, finely striatulate, glabrous, carpopodium asymmetric, apical portion bearing pappus bristles borne in a recessed ring, ray cypselae not deciduous in a basally adnate phyllary- paleae unit; pappus of many short setose-bristles or awns, bristles or awns unequal, quickly caducous, barbellate, 1-seriate, white, usually reaching only to about tube-throat juncture. x = ?8, 17. 4 spp. Mexico, Mesoamerica.


*Calea insignis* S.F. Blake, *Schistocarpha steyermarkiana* H. Rob.

Vining shrubs 2-5 m; stems sparsely pilose. Leaves petiolate; blade (4-)7-13 × (1.5-)3-9 cm, ovate, base cuneate to nearly truncate, with short acumen, adaxial surface strigillose-scabrid, abaxial surface substrigillose or hirsutulous to subglabrous, apex acuminate; petiole 1-4 cm. Capitulescence 10-22-capitate; peduncles 4-20 mm, sparsely hirsutulous to subglabrous. Capitula c. 10 mm; involucrre 6.5-8 × 5-8 mm, canpanulate; phyllaries c. 25, 3-8 × 1.5-3 mm, oblong, distally erose; apex obtuse, brownish; paleae 6-7 mm. Ray florets 8; corolla well-exserted, tube c. 1.5 mm, limb 8-14 × 3-4 mm. Disk florets 20-30; corolla 5-6.5 mm, tube hispidulous, lobes 0.6-0.8 mm, glabrous. Cypselae 2-2.7 mm; pappus bristles 15-20, 2-3 mm. Flowering Jan-Feb. *Montane forest, volcano slopes*. G *(Holway 817, MO)*. 2300-3200 m. (Mexico, Mesoamerica.)

13. **Rumfordia** DC.

Por J.F. Pruski.

Coarse perennial shrubby herbs to shrubs to 3(-6) m; stems erect, few-branched, subterete or subhexangular, striatulate, sometimes fistulose; herbage sometimes stipitate-glandular. Leaves opposite, sessile or petiolate, sometimes perfoliate; blade mostly lanceolate to ovate-deltate or ovate-rhomboidal, chartaceous, pinnately veined or triplinerved from well above base, surfaces eglandular or glandular dotted, glabrous to pubescent. margins serrate or dentate. Capitulescence terminal or sometimes also on axillary branchlets from distal few nodes, open and sometimes leafy, corymbiform-paniculate, branching mostly opposite; peduncles pubescent. Capitula radiate; involucre double, hemispherical; phyllaries dimorphic, obgraduate, 2-seriate, loosely imbricate but eximbricate within individual series; outer series of phyllaries usually 5, broadly ovate to elliptic, thinly herbaceous, spreading to reflexed; inner series of phyllaries 6-20, much shorter than outer ones, fertile by immediately subtending a ray floret, erect, scarious, navicular and loosely surrounding but not fused to ray ovary and reaching to proximal part of corolla tube, apex cucullate; receptacle convex to hemispherical, paleate; paleae usually navicular and conduplicate around disk ovary, scarious, more or less similar in texture to inner phyllaries. Ray florets 6-20, 1-seriate, pistillate; corolla yellow often fading to white, tube narrow, noticeably longer than ovary, hirsute-pilose, usually also stipitate-glandular, limb usually oblong to obovate, evenly
striate, abaxially eglandular, apex 2-3-denticulate. Disk florets 18-100+, bisexual; corolla tubular-funnelform or slender-campanulate, shortly 5-lobed, yellow, glabrous to more commonly pubescent or glandular, tube nearly filiform, about as long as limb, dilated proximally, limb elongate, abruptly but narrowly ampliate, usually less pubescent than tube, throat with single resin duct along each vein, lobes deltate; anthers yellow to brownish, appendage ovate; style branches with stigmatic surfaces 2-banded to near apex with paired stigmatic lines, apex deltate, papillose. Cypselae obliquely obconical or obovoid, somewhat compressed, black, striate, glabrous; epappose. x = 12, 13. Aprox. 8 spp. Mexico, Central America.

*Rumfordia* was revised by Robinson (1909) and Sanders (1977), who each recognized six species, albeit with four species recognized by Robinson (1909) treated subsequently by Sanders (1977) in synonymy of *R. guatemalensis*. Greenman (1903) and Turner (1989: 491-492) noted the close overall similarity between *Rumfordia* and *Smallanthus*, but that the genera differ in disk floret sexuality, the basis upon which Robinson (1981) positioned them in different subtribes. *Rumfordia* may be distinguished from *Smallanthus* by its bisexual disk florets with a slender corolla tube, and by all florets forming fruits.


1. Proximal leaves with blades mostly subhastate-rhomboidal or at least deeply-toothed proximally, grading to distal capitulescence leaves with blades leaves lanceolate to ovate, abaxial surfaces usually finely glandular, triplinerved from well above base; outer phyllaries 8-20(-25) mm.

#### 1. *R. guatemalensis*

1. Leaf blades lanceolate to elliptic, eglandular, pinnately veined; outer phyllaries 3-6 mm.

#### 2. *R. penninervis*


Shrubby perennial herbs 1-3(-5) m; stems puberulent or villous to glabrate, sometimes also short stipitate-glandular, sometimes fistulose. Leaves winged-petiolariform, sometimes perfoliate; blade (5-)10-23(-30) × (1.7-)4-13(-19) cm, the proximal leaves with blade mostly subhastate-rhomboidal or at least deeply-toothed proximally, grading to distal capitulescence leaves with blade lanceolate to ovate, triplinerved from well above base near distal portion of basal acumination, veins spreading from midrib at < 45°, adaxial surface thinly villosulous to glabrate, abaxial surface usually finely glandular, also substriose or puberulent to pilose-hirsute or villosulous, sometimes also stipitate-glandular, base cuneate to cordate or hastate then abruptly narrowed and long-decurrent onto petiolar base, margins usually evenly denticulate with teeth c. 0.5 mm or sometimes with 1(-2) pairs of larger teeth 2-5 mm, apex acute to acuminate; winged petiolar bases (1-)3-11(-15) cm, usually shorter than blade, infrequently auriculate.

Capitulescence 10-30+-capitulate, slightly leafy with abruptly smaller leaves subtending branchlets; peduncles 1-4.5 cm, very slender, sparsely villosulous to densely villose, sometimes heterotrichous with both eglandular trichomes and stipitate glands. Capitula usually 10-15 mm; involucre 10-15 mm diam.; outer phyllaries 8-20(-25) × 3-9(-13) mm, broadly lanceolate to ovate, 3-5-nerved, sparsely villose to glabrate, often also stipitate-glandular, broad-based, apex usually acute to acuminate; inner phyllaries 5-7 mm, pyriform-lanceolate, stoutly stipitate-glandular and also often sparsely pilose, acuminate; paleae strigose; receptacle c. 10 mm diam.

Ray florets 8-15; corolla tube 2-5 mm, limb 8-20 × (1-)3-5 mm, 7-9-nerved. Disk florets 20-100+; corolla 5-8 mm, tube 2.5-4 mm, typically pilose and stipitate-glandular, limb 2.5-4 mm; anthers 2-3 mm, well-exserted; style branches 0.5-1.2 mm. Cypselae 2-2.5 mm. 2n = 24, 26.

Flowering Oct-Apr. Montane forests, pine-oak forests, streamsides, volcano slopes, wet thickets. Ch (Matuda 710, US); G (Tuerckheim II 1732, MO); CR (Pittier 13246, US); P (Allen 1413, MO). 1000-2500 m. (Mexico to Mesoamerica.)

Robinson (1909) diagnosed the taxon now called *R. guatemalensis* as having main stem leaves subhastate-rhomboidal, whereas Sanders (1977) diagnosed the species by its leaves abaxially glandular leaves sometimes with blades merely deeply-toothed proximally.


Shrub 1-3 m; stems glabrous or capitulescence branchlets villosulous. Leaves subsessile or short-petiolate; blade 7-35 × 2-15 cm, lanceolate to elliptic, pinnately-veneined with about 6-10 secondary veins per side, veins spreading from midrib at 45-60°, 1-2 proximal pairs more strongly developed and arching past mid-blade, midrib broadly thickened at base, surfaces
eglandular, adaxial surface glabrous, abaxial surface glabrous to veins sparsely pilosulous, base more or less gradually attenuate, margins evenly and finely serrulate in distal 3/4, apex acuminate; petioles 0-1 cm, narrowly winged to base. Capitulescence 20-50+–capitulate, nearly flat-topped, slightly leafy with gradually smaller leaves subtending proximal branchlets; peduncles 1-3.5 cm, very slender, sparsely villosulous with papillate trichomes. Capitula usually 5-8 mm; involucre 5-7 mm diam.; outer phyllaries 3-6 × 1.5-3.8 mm, obovate, 5-11-nerved, glabrous or ciliate distally, apex obtuse to rounded; inner phyllaries 2-4 mm, lanceolate, scarious but subindurate in fruit, stipitate-glandular, attenuate. Ray florets 8-10; corolla tube 2-3 mm, limb 9-13 × 3-5 mm, 5-9-nerved. Disk florets 35-60; corolla 4-4.5 mm, tube 1.5-2 mm, sparsely pilose and stipitate-glandular, limb c. 2.5 mm; anthers 1-1.5 mm, slightly exserted; style branches to c. 1 mm. Cypselae 1.8-2.4 mm. Flowering Oct-Jan. Brushy hillside, montane forests, volcano slopes, wet thickets. Ch (Breedlove 42725, MO); G (Steyermark 35843, F). 1800-3300 m. (Endemic.)


Baziasa Steud., Tricarpha Longpre

Por J.F. Pruski.

Small perennial (ours) or infrequently annual herbs, rarely subshrubs; stems erect to decumbent, branched, moderately to densely leafy, glabrous to pilose, infrequently stipitate-glandular; herbage with eglandular trichomes or rarely with stipitate-glandular trichomes. Leaves opposite, sessile to petioloate; blade lanceolate to ovate, thin-chartaceous, 3-5-plinerved, margins entire to serrulate. Capitulescence mostly terminal, monocephalous to open cymose, often long-pedunculate. Capitula radiate; involucre hemispherical to campanulate; phyllaries usually 12-16, broad, more or less isomorphic, 2-3(-4)-seriate, more or less imbricate, subequal to slightly(-moderately) graduated with the outer about 1/2 or more as long as inner, chartaceous throughout of outer phyllaries sometimes thinly herbaceous and purplish distally, striate, glabrous to moderately pubescent, at least some persistent; clinanthium convex to conical, paleate; paleae lanceolate to elliptic-lanceolate, sometimes trifid, often reaching to about middle of disk corolla, mostly persistent. Ray florets (4-)5-17, pistillate, not in 1-1 relation with nor consistently opposite an inner phyllary; corolla white to pinkish abaxially or throughout when young, tube hirsute or pilose, limb often cuneate, moderately to well-exserted from involucre, nerves equally-thin, lacking larger support veins, adaxially slightly micropapillose, never obviously and strongly micropapillose, adaxially smooth and never obviously strong-papillose, apex shallowly to often deeply 3-lobed; style short-exserted. Disk florets bisexual; corolla narrowly funnelform, 5-lobed,
yellow, tube shorter than limb, tube hirsute or pilose, throat usually with paired resin ducts along each vein, lobes deltate to triangular, much shorter than throat, lateral ducts often intramarginal; anther thecae pale, thecae ecaudate, base short-sagittate-obtuse, shorter than collar, appendage ovate-navicular, filaments strongly flattened; style branches short, flattened, recurved, apex acute or obtuse. Cypselae pappose or epappose, ray cypselae not deciduous in a basally adnate phyllary-paleae unit, disk cypselae obconical to obovate, weakly 3-5-angled or rays slightly obcompressed, black, finely striatulate, glabrous to setulose; pappus (when present) of several persistent lanceolate scales. x = 8. Aprox. 15 spp. Mexico to Colombia.


1. Stems often rooting at the proximal nodes; leaves obviously petiolate, blades coarsely serrate; disk cypselae usually epappose.

3. S. sarmentosa

1. Stems not obviously or infrequently rooting at the proximal nodes; leaves subsessile to short-petiolate, blades entire to few-serrulate; disk cypselae usually pappose.

2. Stems densely leafy; leaves subsessile; peduncles 1-3(-7) cm, held slightly above stem leaves.

1. S. densa

2. Stems moderately leafy; leaves short-petiolate; peduncles 5-17 cm, held well above stem leaves.

2. S. pinetorum


Holotype: Costa Rica, Beaman 5040 (MSC, photo in MO!). Ilustr.: None. N.v.: None.

Decumbent perennial rhizomatous herbs 5-16 cm; stems from slender rhizome, not obviously or infrequently rooting at the proximal nodes, simple, moderately branched throughout, densely leafy, somewhat roughened by persistent petiolate bases, sparsely to densely strigose-pilose, internodes much shorter than leaves. Leaves subsessile; blade 0.7-1.5(-3) × 0.2-0.6(-1.4) cm, elliptic to lanceolate, triplinerved from base, surfaces sparsely hirsute-pilose, margins entire to 1-serrulate, apex acute to obtuse; petiole 0.1-0.2(-0.4) cm. Capitulescence monocephalous; peduncles 1-3(-7) cm, held slightly above stem leaves, strigose-pilose, infrequently also stipitate-glandular. Capitula 5-7 mm; involucre 5-6 × 6-10 mm, hemispherical-campanulate; phyllaries 3.5-6 mm, outer elliptic-ovate or all ovate, slightly graduated, 2-3-seriate, mostly glabrous, base thinly herbaceous, apex acute to broadly obtuse, purplish; paleae 2.5-5 × 0.5-1.2 mm, lanceolate, entire. Ray florets 8(-13); corolla tube 1.6-2.3 mm, limb 6-10 mm, ovate-cuneate to oblong, 9-11-nerved, lobes to 2 mm. Disk florets 40-50; corolla 3-3.6 mm, lobes c. 0.5 mm. Ray cypselae 2-2.2
mm, epappose to infrequently pappose, glabrous; disk cypselae 1.8-2 mm, pappose, rarely epappose, setulose; pappus of 4-10 lanceolate scales, scales 2.5-3.5 mm, nearly as long as disk corollas. Flowering (Jun-)Jul-Jan(+Apr). Páramo, on rocks. CR (Pruski et al. 3934, MO). 3000-3600 m. (Endemic.)


Sabazia pinetorum var. dispar S.F. Blake.

Decumbent to ascending perennial usually rhizomatous herbs 10-55 cm; stems several from slender rhizomes or in young plants from basically bulbous caudices, not obviously or infrequently rooting at the proximal nodes, simple to sometimes few-branched, moderately leafy in proximal 2/3, pilose, trichomes usually antrorse; internodes usually shorter than leaves. Leaves short-petiolate; blade (0.8-)1.2-2(-3) × 0.3-0.7(-1.3) cm, lanceolate to elliptic-lanceolate, triplinerved essentially from base, surfaces sparsely to moderately hirsute-pilose, margins entire to few-serrulate, apex acute to acuminate; petiole 0.15-0.4(-0.6) cm. Capitulescence monocephalous; peduncles 5-17 cm, held well above stem leaves, antrorse-pilose, infrequently also stipitate-glandular. Capitula 5-7 mm; involucre 4-6 × 6-10 mm, hemispherical-campanulate; phyllaries 3.5-6 mm, ovate, slightly graduated, 2-3-seriate, mostly glabrous, apex acute to obtuse; paleae 2.5-5 × 0.5-1.5 mm, linear-lanceolate to elliptic-lanceolate, sometimes trifid. Ray florets 7-8; corolla tube 1.5-2.2 mm, limb 5.5-10 mm, ovate-cuneate to oblong, 9-11-nerved, apical teeth usually 1-2 mm. Disk florets 40-60+; corolla 2.9-3.3 mm, lobes 0.4-0.6 mm. Ray cypselae 1.5-1.8 mm, epappose, glabrous; disk cypselae 1.5-1.8 mm, pappose, rarely epappose, setose or sometimes glabrous; pappus of (0-)14-20 lanceolate scales, scales 1.7-2.5 mm. 2n = 16. Flowering Jul-Dec, Mar. Alpine grasslands with scattered pines, moist areas. G (Pruski y Ortiz 4278, MO). 3100-3500 m. (Endemic.)

All collections of Sabazia pinetorum (including the type of var. dispar) known to me have pappose disk cypselae, except for the type collection of the typical variety, which has epappose disk cypselae. By narrow leaves, S. densa and S. pinetorum are very similar to Mexican S. mullerae S.F. Blake, which differs by even mature plants usually having bulbous caudices and not being obviously rhizomatous.


Sprawling procumbent to ascending perennial herbs to 60(-90) cm; stems often rooting at the proximal nodes, strigose-pilose distally, proximal parts glabrous to sparsely pilose, internodes mostly about as long to much longer than leaves. Leaves obviously petiolate; blade mostly 2-6(-9) × 1.2-3(-4.5) cm, lanceolate-ovate to ovate, surfaces usually sparsely strigose-pilose, trichomes of adaxial surface often with enlarged basal subsidiary cells, base cuneate to rounded, margins coarsely serrate, apex acuminate to acute; petiole 1-3 cm. Capitulescence of many monocephalal simple branchlets with aspect of open cymes, 1-8-capitulate; peduncles 3-20.5 cm, strigose-pilose and often stipitate-glandular. Capitula 5-10 mm; involucre 4-6 × 5-9 mm, hemispherical-campanulate; phyllaries 10-15, 3-8 mm, lanceolate-ovate to ovate, slightly to moderately graduated, 2-3-seriate, glabrous, outer ones herbaceous and inner ones chartaceous, apex acute to obtuse; paleae 2.5-5 × c. 1 mm, lanceolate, often trifid. Ray florets 5-8(-11); corolla tube 1-2 mm, limb 5.5-11 mm, cuneate to oblong, 9-11-nerved, lobes 1-2.5 mm. Disk florets (20-)40-100; corolla 2.4-3.1 mm, lobes 0.4-0.6 mm. Ray cypselae 1.5-2 mm, epappose, glabrous or sometimes setose; disk cypselae 1.5-2.2 mm, epappose, rarely pappose, setose or sometimes glabrous; pappus (when present) of 12-18 lanceolate scales, scales 1.5-2 mm. 2n = 48. Flowering year-round. Disturbed areas, moist areas, montane forests, páramo, pine-oak forests, roadsides, volcano slopes. Ch (Breedlove y Strother 46225, NY); G (Longpre 257, MO); H (House 1188, MO); CR (Pruski et al. 440, TEX); P (Woodson et al. 1055, MO). 600-3100(-3600) m. (México a Mesoamérica.)

Throughout its range *Sabazia sarmentosa* is usually fully epappose, as keyed here. In Chiapas, and to a lesser extent in on Volcan de Chiriqui in Panama, however, this characterization begins to breaks down and material may have disk (and rarely also ray) cypselae pappose. Judith Canne (en schedula MO) annotated atypical materials (e.g., Ton 982, 1263, 1277) from Chiapas have been by as "perhaps a hybrid" between *Galinsoga quadridariata* and *Sabazia sarmentosa*. Notwithstanding these anomalies, it should be noted that *S. sarmentosa* is very similar to both *S. humilis* Kunth, which differs by being an annual, and to *S. liebmannii* Klatt, which differs by its capitulescence usually of open cymes and not commonly being monocephalous.

15. **Schistocarpha** Less.

*Neilreichia* Fenzl, *Zycona* Kuntze
Coarse perennial herbs to shrubs to 5 m; stems ascending to scandent, few-branched, subterete, striate, leafy, large-leafed, internodes often elongate; herbage infrequently stipitate-glandular. Leaves opposite or distal ones rarely alternate, subsessile to more commonly petiolate; blade broad, chartaceous, 3-nerved from near base, surfaces typically not punctate-glandular, adaxial surface scabrid or sometimes glabrous, abaxial surface glabrous to velutinous or pilosulate, base usually with acumen decurrent onto petiole, infrequently amplexicaul, margins serrulate to coarse-serrate; petiole typically somewhat winged from decurrent blade. Capitulescence terminal or axillary from the distal nodes, pluricapitulate, corymbiform-paniculate (less commonly flat-topped corymbiform or open-paniculate); peduncles slender, typically pubescent, sometimes stipitate-glandular. Capitula heterogamous, radiate (then usually heterochromous) or indistinctly subradiate, sometimes disciform; involucre cylindrical-campanulate to hemispherical, infrequently turbinate; phyllaries mostly 18-40, more or less isomorphic, imbricate, graduated, 2-5-seriate, appressed but sometimes spreading post-anthesis or fully reflexed post-fruit, often persistent, scarious-chartaceous, usually (3-)7-11-striate, striations drying dark, distal margins often ciliate; clinanthium convex to conical, paleate; paleae shorter than disk florets, lanceolate to elliptic-lanceolate, weakly navicular, scarious-stramineous, striate, usually lacerate or trifid. Ray florets (0-)8-25(-60), pistillate, 1(-3)-seriate; corolla white to yellow, tube about as long as pappus, limb ovate to oblong, short- to well-exserted, nerves equally-thin, lacking larger support veins, apex usually 3-denticulate. Marginal florets (when capitula indistinctly subradiate or disciform), (5-)40-70, (1-)2-4-seriate, pistillate; corolla tubular-filiform and typically indistinctly radiate with no or a minute flattened limb. Disk florets 5-75, fewer to more than pistillate florets, bisexual; corolla funnelform, shortly 5-lobed, yellowish, tube slender, generally about as long as limb, usually pubescent, often glabrous, throat usually with paired resin ducts along each vein, lobes triangular, erect, shorter than throat, lateral ducts often intramarginal, often with medial nerve, usually pubescent; anthers cream-colored or greenish becoming post anthesis brownish to blackish, thecae ecaudate, bases short-sagittate, apical appendage sculptured, eglandular; style base dilated, trunk with 4 resin ducts, branches short, partly exserted, apically short-acute, papillose. Cypselae isomorphic, prismatic-obovoid to terete, apical portion of both rays and disks bearing pappus bristles flat and not sunken, ray cypselae or marginal cypseae when disciform) not deciduous in a basally adnate phyllary- paleae unit; pappus of 25-35 persistent (but somewhat fragile) elongate capillary bristles, bristles subequal, not borne in a recessed ring, white, in a
single series, usually reaching to about throat-lobes juncture. \( x = 8 \). Aprox. 12 spp. Mexico, Central America, Andean South America, Hispaniola.

*Schistocarpha*, by its yellow disk corollas with an elongate tube and capillary pappus bristles, were once treated as Senecioneae, but were treated within the Heliantheae alliance by Rydberg (1927), Robinson y Brettell (1973), Panero (2007b), and Pruski (2012-104). The genus is basically continental, but is known in the West Indies from a single recent collection of *S. eupatorioides* (Pruski, 2012-104). Material from Chiapas called *S. bicolor* Less. in Strother (1999) is referred here mostly to *S. longiligula* or *S. platyphylla*.

Two species groups treated here appear clinal, with their respective long-rayed extremes (*S. longiligula* and *S. paniculata*) recognized here as including the bulk of the geographic and morphological intermediates, which conveniently include the types of later described names. In each species group, the short-rayed variants (*S. matudae* and *S. croatii*, respectivey) are provinsnally recognized, but with the caviat that field studies are desired to determine worth of characters used taxonomically.


1. Ray florets or marginal pistillate florets 2-4-seriate.
   2. Capitula indistinctly subradiate to disciform.                    **2. S. eupatorioides**
   2. Capitula radiate.
      3. Stems sparsely pilosulose; ray corolla limbs usually 2-3.5 mm. **1. S. croatii**
      3. Stems usually coarsely pilose; ray corolla limbs usually 4-10 mm.
        **6. S. paniculata**

1. Ray florets or marginal pistillate florets 1-seriate.
   4. Disk corolla throats evenly hirsutulous throughout, as densely hirsutulous as lobes. **3. S. hondurensis**
   4. Disk corolla throats glabrous to infrequently sparsely hirsutulous distally but never as densely and evenly hirsutulous as lobes.
   5. Capitula with 8-11 disk florets. **8. S. pseudoseleri**
   5. Capitula usually with 14-40 disk florets.
      6. Phyllaries usually acute to acuminate; involucre sometimes turbinate; capitula often disciform. **7. S. platyphylla**
6. Phyllaries usually obtuse to rounded; involucre typically campanulate; capitula always radiate, never disciform.

7. Ray corolla limbs usually 4–7 mm; phyllaries glabrous or subglabrous.

4. **S. longiligula**

7. Ray corolla limbs 1.5–2 mm; phyllaries often sparsely pilose.

5. **S. matudae**


N.v.: None.

Shrubs 1–2.1 m; stems sparsely pilosulose. Leaves: blade 6–12 × 2.5–10 cm, ovate, surfaces sparsely pilosulose, base cuneate, apex acuminate; petiole 1–9 cm. Capitulescence a series of lax panicles; peduncles 5–40(-60) mm, sparsely puberulent, non-glandular. Capitula 7–9 mm, short-radiate; involucre 5–6 × 7–10 mm, shorter than to often nearly as long as disk florets; phyllaries 20–30, 2–6 × 1–2.3 mm, oblong, c. 3-seriate, sparsely pilosulose, apex obtuse to rounded; paleae 4–5 mm. Ray florets 40–60, 2–3-seriate; corolla tube 3–5 mm, dense-hispidulous, limb usually 2–3.5 mm, subequal to much shorter than tube, slightly exserted from involucre, linear-oblanceolate to oblong, 2–5-nerved, apical teeth sometimes to 1 mm. Disk florets 30–40; corolla c. 4.5 mm, throat glabrous or infrequently hirsutulous, lobes c. 0.5 mm, without medial resin duct, hispidulous with 3–5(-6)-celled stout trichomes. Cypselae c. 1.1 mm; pappus bristles 3.5–4.5 mm.

Flowering Feb–May. *Disturbed forests, open areas, volcano slopes.* P (*Croat 34995*, MO). 1800–3200 m. (Endemic.)


**Schistocarpha hoffmannii** Kuntze, *Schistocarpha margaritensis* Cuatrec., *Schistocarpha oppositifolia* (Kuntze) Rydb., *Zycona oppositifolia* Kuntze.

Perennial herbs to subshrub 0.5–3 m; stems pubescent to less commonly glabrate. Leaves: blade 4–20 × (0.5–)2.5–13(-17) cm, ovate or distal ones lanceolate, surface strigillose to sometimes glabrous, abaxial surface pilosulose to strigose, much less commonly glabrous, base obtuse to subcordate or truncate, then abruptly attenuate onto petiole, basal acumen to 3 cm, apex acuminate to attenuate; petiole 0.8–7 cm. Capitulescence usually 2–15 × 2–15 cm, each branchlet
20-50+ capitulate with 1-3 clusters, clusters usually moderately dense-spherical and cymose, infrequently (i.e., in the \textit{S. margaritensis} phase) entire capitulescence having a nearly flat-topped and corymbiform aspect; peduncles 2-10(-30) mm, pubescent to pilose-substrigose, occasionally also stipitate-glandular, often 1-bracteolate, bracteole 2-4 mm, linear-lanceolate, typically basal. Capitula 7-10 mm, indistinctly subradiate to disciform; involucre 7-8 × 4-7(-10) mm, about as long as disk florets; phyllaries 25-30, 1.5-8 mm, elliptic-lanceolate grading to lanceolate, 3-4-seriate, glabrous or sometimes sparsely ciliate distally, apex commonly obtuse to rounded, at least the inner series pale and scarious-chartaceous; paleae 5-6 mm, linear-lanceolate, usually persistent, stramineous, apically lacerate, central part sometimes long-attenuate. Marginal florets 30-70, 3-4-seriate; corolla indistinctly subradiate or tubular-filiform (often within a single capitulum), white to yellowish, tube 4-5 mm, laxly pilosulose, limb 0-1 mm, when present c. 5× shorter than tube, basically included within involucre, sometimes faintly 3-nerved; style sometimes much longer than corolla. Disk florets 5-18; corolla 4.5-5.5 mm, yellowish, tube 2-3 mm, glabrous (often in Central American populations) or laxly sparsely setose (often in South American populations), throat c. 2 mm, glabrous, lobes c. 0.5 mm, without medial resin duct, commonly setulose with slender 3-5-celled trichomes with elongate cells; style branches to c. 0.5 mm. Cypselae 1-1.5 mm; pappus bristles 4-4.5 mm, 2n = 16. Flowering year-round. 

Brushy slopes, disturbed areas, fields, forest edges, moist slopes, open places, pastures, pine forests, roadsides, sandy areas, secondary growth thickets, selva alta subperennifolia, selva baja caducifolia, streamsides, wet thickets, mostly Gulf watershed or tierra caliente. T (Ventura 20576, MO); Ch (Pruski y Ortiz 4218, MO); C (Bacab 158, MO); QR (Téllez y Cabrera. 3439, MO); B (Schipp 933, NY); G (Molina y Molina 25192, MO); H (Yuncker et al. 8539, MO); N (Baker 2339, MO); CR (Skutch 2739, MO); P (Woodson et al. 1822, NY). 100-1600 m. (Mexico, Mesoamerica, Colombia, Venezuela, Ecuador, Peru, Bolivia, Argentina, Hispaniola).


Shrubs 1.5-3.5 m; stems hirsute to villous. Leaves: blade (4-)6-24 × (1.5-)3-17 cm, ovate to deltate-ovate, surfaces sparsely hirsutulous to sparsely pilose or only so on veins, rarely villous, base obtuse to subcordate, sometimes cuneate, contracted and decurrent onto petiole for about 1/4 of length but never winged to base, apex acuminate to attenuate; petiole 1-10 cm. Capitulescence broadly corymbiform-paniculate; peduncles 2-15 mm, usually densely pilosulose, non-glandular. Capitula 6.5-8 mm, radulate; involucre 4-5 mm, somewhat shorter than disk florets, phyllaries 16-20, 1.5-5 mm, oblong, c. 3-seriate, glabrous to sparsely puberulent, apex rounded to broadly
acute, often ciliolate; paleae c. 4 mm, usually lacerate. Ray florets c. 8, 1-seriate; corolla tube 2-4 mm, dense-hispidulous, limb 2-5 mm. Disk florets 20-25; corolla 4.5-5 mm, throat evenly hirsutulous throughout, as densely hirsutulous as lobes, lobes c. 0.5 mm, usually with medial resin duct, hispidulous with c. 2-celled stout trichomes. Cypselae 1-1.7 mm; pappus bristles c. 4 mm. Flowering Jan-Jun. Field margins, humid forests, bosques enano, mixed forests, pine forests, roadsides, secondary vegetation. G (expected); H (Blackmore y Chorley 3714, MO); ES (Villacorta y Hellebuyck 2066, MO); N (Rueda 13522, MO). 600-2200(-2500) m. (Endemic.)

Clewell (1975) referred material of *S. hondurensis* to *S. paniculata*, Robinson (1979) recognized *S. hondurensis*, whereas Turner (1986) treated *S. hondurensis* in synonymy of *S. longiligula*.


Perennial herbs to shrubs(-trees) 1-3(-5) m; stems hirtellous to dense-pilose. Leaves: blade 5-20 × 2-18.5 cm, ovate to deltate-ovate, surfaces (sparsely) hirtellous to villous-pilose, base cuneate to sometimes obtuse or infrequently nearly truncate, contracted and decurrent onto petiole for about 1/4 to 1/2 of length but never winged to base, apex acuminate; petiole 1-10 cm. Capitulescence broadly corymbiform-paniculate; peduncles 4-20 mm, hirtellous to densely pilose, non-glandular. Capitula 6-8 mm, long-radiate, never disciform; involucre 4-5 × (3-)6-8 mm, much shorter than to sometimes nearly as long as disk florets, typically campanulate; phyllaries 16-25, 1.5-6 × 1-1.5 mm, oblong, 2-3-seriate, glabrous or subglabrous, apex usually obtuse to rounded and often ciliolate, at high elevations infrequently inner series acute; paleae 3-4 mm, much shorter than disk florets, usually lacerate and without a long slender central portion. Ray florets 8-15, 1-seriate; corolla tube 2-4 mm, dense-hispidulous, limb usually 4-7 mm, subequal to more commonly longer than tube, usually obviously exserted from involucre, oblong, 5-7-nerved. Disk florets 25-40; corolla 4-5 mm, throat glabrous or infrequently sparsely hirsutulous especially on veins distally but never as densely and evenly hirsutulous as lobes, lobes c. 0.5 mm, with or without medial resin duct, hispidulous with 1-3-celled stout trichomes. Cypselae 1.3-1.6 mm; pappus bristles 3.5-5 mm. 2n = 16. Flowering Nov-Apr. Brushy slopes, forest edges, mixed forests, moist slopes, roadsides, secondary vegetation, principally in the Gulf watershed. Ch (*Pruski y Ortiz 4217*, MO); G (*Türckheim II 2131*, MO). 100-1300 m. (Endemic.)
Strother (1999) treated *S. longiligula* and its synonyms in synonymy of *S. bicolor* Less. (which differs by petioles often winged to base and by paleae usually with a long slender central portion) and Turner (2002) treated them in synonymy of *S. platyphylla* (which differs by capitula disciform to short-radiate and phyllaries mostly acute to acuminate). Here, *S. longiligula* Rydb. is resurrected and nearly circumscribed as in Turner (1986), who established the priority of *S. longiligula* over *S. seleri*. In general, the lowland Chiapas populations (e.g., the type of *S. seleri*) have short involucres and phyllaries rounded apically, the populations in the central depression and the Sierra Madre that are provisionally referred here (e.g., the type of *S. chiapensis*) have a long involucere and inner phyllaries acute apically, but these two extremes are nearly bridged by the typical material from Verapaz, which has an intermediate involucre size and phyllaries obtuse apically. Material from Honduras and Nicaragua called *S. seleri* by Nash (1976) is referred here to *S. hondurensis* and that from Costa Rica is referred to *S. paniculata*. Most materials from above 1300 m elevation that Nash (1976) referred *S. longiligula* and *S. seleri* have acute to acuminate phyllaries and are mostly determined here as *S. platyphylla*.


Shrubs; stems hirsute. Leaves: blade 6-15 × 3.9-5 cm, ovate, base obtuse to nearly truncate, contracted and short-decurrent onto distal 1/4 of petiole but never winged to base, apex acute; petiole 1-5 cm. Capitulescence corymbiform-paniculate; peduncles 2-10 mm, densely hirtellous, non-glandular. Capitula 6-7 mm, always radiate, never disciform; involucre 4.5 × 5-8 mm, nearly as long as disk florets, typically campanulate; phyllaries 20-23, 2-5 mm, oblong to lanceolate, 2-3-seriate, often sparsely pilose, apex mostly obtuse, often densely ciliolate; paleae 2-2.5 mm, lacerate. Ray florets 12-15, 1-seriate; corolla tube 2.5-3 mm, dense-hispidulous, limb 1.5-2 mm. Disk florets 30-40; corolla 4-4.5 mm, throat subglabrous, lobes c. 0.5 mm, usually with medial resin duct, hispidulous with 1-3-celled stout trichomes. Cypselae c. 1.5 mm; pappus bristles 3-4 mm. Flowering Dec. *Opening in Pacific watershed low forest*. G (*Matuda 709*, MEXU).

Elevation unknown. (Endemic.)

*Schistocarpha matudae* is known to me from only the type from Mt. Ovando. Turner (1986) listed four other collections and said this is a weakly differentiated (extreme clinal form) segregate of *S. longiligula*. 

Lectotype (designated by Robinson, 1979): Costa Rica, Pittier 866 (GH, photo in MO!). Illutr.: None. N.v.: None.

*Schistocarpha wilburii* H. Rob.

Robust herbs to shrubs 1.5-3 m; stems usually coarsely pilose, sometimes also stipitate-glandular. Leaves: blade (4-)6-17 × 3-14 cm, ovate to subdeltate, surfaces hirtellous to pilose, base obtuse to subcordate, apex acuminate; petiole 1-8 cm. Capitulescence broadly corymbiform-paniculate a series of lax panicles; peduncles 5-40 mm, densely pilose sparingly puberulent, sometimes also stipitate-glandular. Capitula 10-13 mm, radiate; involucre c. 8 × 8-14 mm, about as long as disk florets; phyllaries 35-40, 2.5-8 × 1.5-2.5 mm, lanceolate to mostly oblong, c. 4-seriate, glabrous to pilose, apex obtuse to acute but at least some constricted and darkened, sometimes recurved; paleae 5-6 mm, trifid. Ray florets 20-25, 2-seriate; corolla tube 4-6 mm, hispidulous, limb usually 4-10 mm, subequal to longer than tube, moderately to well-exserted from involucre, oblong, 3(-5)-nerved. Disk florets 40-100; corolla 5-7 mm, lobes c. 0.5 mm, with or without medial resin duct or southern populations sometimes with medial resin duct, hispidulous with 3-6-celled stout trichomes. Cypsela 1.6-1.9 mm; pappus bristles 4-5 mm. 2n = 16. Flowering Jan-Jul, Sep, Nov. *Oak forests, open forests, roadside banks, secondary forests, volcano slopes*. CR (Skutch 3399, MO).1500-3300 m. (Endemic.)

The ray length and phyllary shape of material determined formerly as *S. wilburii* very nearly grades into *S. croatii*, which is nevertheless provisionally maintained as a smaller-capitulate shorter-rayed regional segregate of *S. paniculata*. Material from Honduras (cited by Molina, 1975) and Bolivia (cited by Foster, 1958) was referred in error to *Schistocarpha paniculata*.


*Schistocarpha kellermanii* Rydb.

Perennial herbs to shrubs 1-3.5 m; stems sparsely hirtellous or pilose to glabrate. Leaves: blade 6-25 × 3-22 cm, ovate to rounded-ovate, trinervation moderately prominent, surfaces villose-pilose or only sparsely so, base cuneate to subcordate, decurrent onto petiole but not broadly winged to base, apex acuminate; petiole 2-11 cm. Capitulescence broadly corymbiform-paniculate; peduncles 2-17 mm, usually sparsely hirtellous to thinly pilose, non-glandular. Capitula 6-8+ mm, short-radiate or disciform (but consistent within an individual plant); involucre 5-7 × 4-8 mm, nearly as long as disk florets, campanulate to often appearing turbinate
post anthesis; phyllaries 16-20, 2-6 × 1-1.5 mm, broadly lanceolate, c. 3-seriate, inner ones sometimes pale and somewhat scarious, sometimes sparsely puberulent or pilosulous distally, apex mostly acute to acuminate, often ciliolate; paleae 2.5-3 mm, 3-5-lacerate. Ray florets or marginal florets 8-10(-13), 1-seriate; corolla tubular-filiform to obviously radiate, tube (2-)2.5-3.5 mm, dense-hispidulous, limb usually 0-2(-3.5) mm, usually indistinct and shorter than tube, occasionally about as long as tube and moderately exserted from involucre, sometimes deeply 2(-3)-lobed, occasionally to base with lobes to c. 2 mm; style sometimes much longer than corolla. Disk florets usually 14-25; corolla 4.5-5.5 mm, throat glabrous or very sparsely setulose, but never densely and evenly hirsutulous, lobes c. 0.5 mm, subglabrous or sparsely setulose with 2-3-celled stout trichomes. Cypselae 1-1.5 mm; pappus bristles 4-5 mm. 2n = 16. Flowering Dec-Mar.

Bosque húmedo, cafetales, mixed forest, montane forests, oak forests, pine-oak forests, secondary vegetation, thickets, volcano slopes. G (Pruski y Ortiz 4261, MO); ES (Rodríguez et al. 739, MO). (600-)1200-3100(-3400) m. (S. Mexico, Mesoamerica.)

The protologue described the phyllaries as obtusish, as keyed by Nash (1976). The material from Chiapas cited by Nash (1976) and Robinson (1979) and Turner (1986) is referred here to S. pseudoseleri.


Herbs to shrubs 1.5-4 m; stems sparsely pilosulose. Leaves: blade 6-12 × 3-7 cm, surfaces sparsely pilosulose, base cuneate, contracted and decurrent onto petiole as narrow wings for about 3/4 of length, apex acuminate; petiole 1-3 cm. Capitulescence narrowly corymbiform-paniculate; peduncles 1-9 mm, densely pilosulose, non-glandular. Capitula 5.5-6.5 mm, short-radiate or disciform; involucre 4.5-5 × 3-3.5 mm, somewhat shorter than disk florets, campanulate; phyllaries 15-18, 1.5-5 × 1-1.4 mm, ovate, c. 3-seriate, glabrous, apex obtuse to acute, the inner ones ciliolate distally; paleae 2-3 mm, much shorter than disk florets, irregularly lacerate and sometimes with a slender central portion. Ray florets or marginal florets 5-9, 1-seriate; corolla tube 1.5-3.5 mm, moderately hispidulous, limb (0-)2-3.5 mm, when present subequal to tube and slightly from involucre, ovate, 2-3-nerved; style well-exserted 4-5 mm. Disk florets 8-11; corolla 4-5 mm, lobes c. 0.5 mm, lateral veins slightly intramarginal, typically without medial resin duct or in bud with indistinct duct, hispidulous with c. -celled stout trichomes. Cypselae 1-1.5 mm; pappus bristles 3-4 mm. Flowering Nov-Feb. Montane forests, volcano slopes. Ch (Breedlove y Smith 31647, MO); G (Williams et al. 26256, NY). 1400-2400 m. (Endemic.)
Schistocarpa pseudoseleri was treated within S. longiligula Rydb. by Turner (1986), within S. bicolor by Strother (1999), within S. platyphylla by Turner (2002), and its future type was treated as S. seleri by Nash (1976). Only the type of S. pseudoseleri is radiate; the other collections known to me are disciform and were distributed as S. platyphylla. However, the disciform plants of S. pseudoseleri differ from S. platyphylla by their pistillate florets having a limb-less indistinct tubular corolla only c. 1.5 mm that is much less than 1/2 as long as the style. The species occurs in the Sierra Madre in a narrow NW-SE oriented 70 km-long band, 35 km on each side of Volcán Tacaná, from near Motozintla to San Marcos, Guatemala.

   Feaea Spreng.

Por J.F. Pruski.

Small perennial herbs to c. 50 cm; stems erect to decumbent, simple and subscapose to few-branched, sparsely leafy or leaves all basal, usually somewhat pilose; herbage with eglandular or stipitate-glandular trichomes. Leaves opposite, sessile or subsessile; blade lanceolate to ovate, thin-chartaceous, 3-5-plinerved from stem, surfaces glabrous to moderately hirsute-pilose, margins entire to few-serrulate. Capitulecence mostly terminal, monocephalous to long-stalked umbellate-subglomerate; peduncle elongated pre-anthesis. Capitula radiate; involucre hemispherical to campanulate; phyllaries usually 6-12, broad, more or less isomorphic, 2-3-seriate, more or less imbricate, subequal to slightly graduated, thinly herbaceous throughout to sometimes purplish distally or marginally, striate, glabrous to moderately pubescent, at least some persistent; clinanthium conical, paleate; paleae linear, shorter to much shorter than disk corolla. Ray florets 6-21, pistillate, not in 1-1 relation with nor consistently opposite an inner phyllary; corolla white to pinkish abaxially or throughout when young, tube hirsute or pilose, limb cuneate-ovate, very slightly to well-exserted from involucre, nerves equally-thin, embedded, lacking larger support veins, adaxially slightly micropapillose, never obviously and strongly micropapillose, apex shallowly to deeply 3-lobed; style short-exserted. Disk florets bisexual; corolla funnelform to salverform, 5-lobed, yellow to greenish, tube somewhat shorter than limb, tube hirsute or pilose, throat usually with paired resin ducts along each vein, lobes delate to triangular, lateral ducts often intramarginal; anther thecae pale, longer than or subequal to filaments, thecae ecaudate, base short-sagittate-obtuse, shorter than collar, appendage ovate-navicular, filaments strongly flattened; style base very slightly dilated, free from nectary, branches short, flattened, recurved. Cypselae turbinate to obovoid, black, finely striatulate,
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glabrous, epappose (ours) or pappose, ray cypselae or marginal cypseae (when disciform) not
deciduous in a basally adnate phyllary-paleae unit; pappus (when present) of 5-10 setiform
caducous bristles. \( x = 8 \). 3 spp. Mexico, Mesoamerica.

By linear paleae and strictly epappose cypselae \textit{Selloa} is similar to Andean \textit{Aphanactis}, which
differs by peduncles elongating only during and after anthesis (Robinson, 1997). Our two species
were treated in \textit{Selloa} by Longpre (1970), who recognized three species in his generic
monograph. These two species were transferred to an expanded \textit{Aphanactis} by Turner (1980), but
by the peduncle feature they were returned by Robinson (1997) to \textit{Selloa}, but excluded yet again
by Panero (2006) who recognized elloa as monotypic. Nevertheless, \textit{Selloa} is recognized as


1. Capitulescence of 1-3 long-stalked 3-5-capitulate umbellate-subglomerules; ray corolla limbs
1.5-2 mm, slightly shorter than tubes, very slightly exserted from involucres.

1. S. breviligulata

1. Capitulescence monocephalous to loosely cymose and 3-capitulate; ray corolla limbs 3-5 mm,
obviously longer than tubes, well-exserted from involucres. 2. S. obtusata

Holotype: Costa Rica, \textit{Evans y Lellinger 149} (MSC, photo in MO!). Illustr.: None. N.v.: None.
\textit{Aphanactis breviligulata} (Longpre) B.L. Turner.

Decumbent to ascending stoloniferous herbs 20-40 cm; stems simple (branched only in
capitulescence), very sparsely leafy with only 3-4 pairs of leaves in proximal 3/4, sparsely to
moderately pilose and stipitate-glandular; internodes much longer than leaves. Leaves sessile;
blade 1-4.3 \( \times \) 0.3-1.2 cm, oblong or oblanceolate, 3-5-plinerved, surfaces sparsely hirsute-pilose,
margins entire or 1-2-serrulate, ciliolate, apex obtuse to rounded. Capitulescence sometimes
branched at distal-most leaf pair, with 1-3 long-stalked 3-5-capitulate umbellate-subglomerules,
stalks of glomerules 1-10 cm; peduncles c. 0.2 cm, sericeous-pilose. Capitula 5-8 mm; involucre
5-7 \( \times \) 6-9 mm, hemispherical-campanulate; phyllaries 4-7 mm, subequal to slightly graduated
with the outer much more than half as long as inner, lanceolate-ovate to broadly ovate, 2(-3)-
seriate, outer ones strigose-pilose proximally or on midvein, margins stiff-ciliate, inner ones
glabrous, apex broadly acute to nearly rounded; paleae 1.5-2.5 \( \times \) 0.1-0.2 mm, about as long as
mature cypselae. Ray florets 6-11; corolla tube 1.8-2.2 mm, limb 1.5-2 mm, slightly shorter than
tube, cuneate-ovate, very slightly exserted from involucre, pinkish, faintly 2-4-nerved, apical teeth 0.2-0.4 mm. Disk florets 7-24; corolla 1.8-2.2 mm, campanulate to salverform, tube nearly as long as limb, lobes c. 0.5 mm, nearly as long as throat; anthers longer than filaments; style branches 0.2-0.3 mm. Ray and disk cypselae 1.6-2 mm, epappose, glabrous. Flowering Aug-Sep. Páramo. CR (Pruski et al. 3913, MO). 3400-3500 m. (Endemic.)


* Aphanactis obtusata* (S.F. Blake) B.L. Turner.

Ascending stoloniferous herbs 10-23 cm; stems simple to few-branched, sparsely leafy with 3-6 pairs of leaves in proximal 2/3, sparsely long-pilose and stipitate-glandular; internodes often longer than leaves. Leaves sessile; blade (0.5-)1-3 × 0.3-1.1 cm, spatulate or ob lanceolate to distal-most sometimes lanceolate, triplinerved, surfaces sparsely to moderately stipitate-glandular, margins entire or 1(-2)-serulate distally, apex obtuse. Capitulescence monocephalous to loosely cymose and 3-capitulate; peduncles 3-10 cm, held well above stem leaves, long-pilose and stipitate-glandular. Capitula 5-10 mm; involucre 4-5.6 × 7-10 mm, hemispherical-campanulate; phyllaries 4-5.6 mm, subequal, ovate, 2(-3)-seriate, sparsely stipitate-glandular, apex obtuse; paleae 1.5-3 × c. 0.2 mm. Ray florets 11-21; corolla tube 1.2-2 mm, limb 3-5 mm, obviously longer than tube, cuneate, well-exserted from involucre, 5-7-nerved, apical teeth 0.2-1.1 mm. Disk florets 30-35; corolla 2-3 mm, campanulate to salverform, tube shorter than limb, lobes 0.7-0.8 mm, nearly as long as throat; anthers longer than filaments. Ray and disk cypselae 1.2-2 mm, epappose, glabrous. 2n = 16. Flowering Aug-Sep. Alpine grasslands with scattered pines. G (Longpre 228, MO). 3200-3800 m. (Endemic.)

17. **Sigesbeckia** L.

Por J.F. Pruski.

Annual or short-lived perennial herbs, leafy-stemmed or sometimes rosulate, fibrous-rooted; stems usually erect or ascending to infrequently repent, often much-branched, subterete; herbage often obviously stipitate-glandular. Leaves opposite, sessile to -petiolate; blade broad, chartaceous, 3-nerved well above base, surfaces pubescent, margins entire to usually regularly serrate; petioles when present commonly winged. Capitulescence cymose to commonly corymbiform-paniculate; peduncles typically densely stipitate-glandular, often heterotrichous and
also with eglandular usually patent trichomes. Capitula radiate; involucre campanulate or hemispheric, double; phyllaries dimorphic, in two series, indistinctly green-striatulate; outer series of phyllaries often 5(-6), usually as long as or often longer than inner series, mostly narrowly to broadly spatulate, spreading laterally to reflexed, herbaceous, usually moderately to densely stipitate-glandular or vary rarely nearly eglandular; inner series of phyllaries usually 5-15, at maturity usually only slightly longer than cypselae, navicular, eximbricate, each closely subtending and infolding abaxial face of associated ray ovary or cypsela, appressed, chartaceous to partly herbaceous, glabrous to stipitate-glandular, apex often subacute; clinanthium convex to conical, paleate; paleae similar to inner phyllaries but narrower. Ray florets 1-seriate, pistillate; corolla usually yellow to sometimes whitish or abaxial surface purplish, eglandular or very infrequently sessile-glandular, tube hispidulous, limb usually longer than tube, oblong to cuneate, nerves usually equal in thickness, abaxial surface mamillose or papillose, apex 3-lobed. Disk florets 3-35, usually bisexual (ours), rarely functionally staminate; corolla funnelform-campanulate, shortly (3-)5-lobed, usually yellow, often hispidulous proximally, eglandular or very infrequently sessile-glandular, tube short-long-cylindrical, limb usually abruptly ampliate, throat with single resin duct along each vein; anthers yellow or green, appendage ovate; style base dilated, branches c. 0.5 mm, with stigmatic surfaces 2-banded to apex with paired stigmatic lines, apex usually acute, finely papillose, papillae blunt. Cypselae broadly obconical and tapering to an incurved narrow base, black, finely striatulate, glabrous, carpododium minute, apex rounded; epappose. x = 10, 12, 15, 16, 30. 9-12 spp. Pantropical.

Treatments of some American species of *Sigesbeckia* were provided by Humbles (1972), McVaugh y Anderson (1972), and Schulz (1988). *Sigesbeckia* is similar to *Trigonospermum*, which differs by outer phyllaries usually appressed or ascending, andand to *Zandera* D.L. Schulz, which is provisionally retained in *Trigonospermum*.

*Sigesbeckia orientalis* L., which is similar by green anthers *S. jorullensis* but differs by glandular leaves and irregularly coarse-serrate leaves, should be looked for in Mesoamerica.


1. Subscapose rosulate herbs; ray corollas conspicuous, only slightly shorter than outer phyllaries, limbs 5-10 mm.  

3. **S. nudicaulis**  

1. Leafy-stemmed herbs; ray corollas moderately inconspicuous, usually shorter to much shorter than outer phyllaries, limbs 1.5-3(-3.5) mm.
2. Leaves sessile-glandular abaxially; outer phyllaries usually only slightly longer than ray florets, spatulate; anthers yellow.  

1. *S. agrestis*

2. Leaves eglandular abaxially; outer phyllaries much longer than ray florets, narrowly linear-spatulate, usually homotrichous with only stipitate-glandular trichomes; anthers green.

2 *S. jorullensis*


Erect leafy-stemmed annual herbs 30-80(-150+) cm; stems dichotomous-branched distally or sometimes nearly throughout, hirsute and short-stipitate-glandular (the glandular trichomes 0.2-0.3 mm) especially distally. Leaves sessile or subsessile; blade (1.5-4-12 × (0.6-)1.5-6.5(-8) cm, lanceolate to ovate or obovate, surfaces pilose or villous, abaxial surface also sessile-glandular, base cuneate to obtuse, semiamplexicaule to perfoliate, margins subentire to serrulate or sinuosity-serrate, apex acute. Capitulescence leafy, compound-corymbiform-paniculate with lateral branches over-topping central axis, pluricapitulate; peduncles 1-2(-5.5) cm, very slender, capitula erect, stipitate-glandular. Capitula 3-4(-5) mm, short-radiate; involucral disk 4-5 mm diam.; outer phyllaries 5, (2.5-)3-7(-10) × 0.7-1(-2) mm, usually only slightly longer (subequal) than ray florets, spatulate, spreading to fully reflexed, heterotrichous, glandular trichomes c. 0.2 mm, also long-pilose with patent eglandular trichomes much more than twice as long, apex acute to obtuse; inner phyllaries 5-13, 2.3-3 × c. 1 mm, elliptical, navicular and surrounding abaxial half of associated cypsela, stipitate-glandular, apex acute to obtuse; paleae 2.3-3 mm, obovate, margins sometimes distally ciliate, otherwise glabrous or sometimes sparsely stipitate-glandular apically. Ray florets 5-13; corolla (subequal-)shorter than outer phyllaries, yellow to orange-yellow, tube 0.2-0.7 mm, limb 2-3 mm, moderately inconspicuous. Disk florets 8-18(-32); corolla 1.5-2 mm, lobes c. 0.5 mm; anthers yellow. Cypsela 1.5-2.3 mm. 2n = 30, 32. Flowering (June +)Aug-Jan. Cafetales, conifer forests, fields, foist edges, oak forests, roadsides, shaded banks, streamsides. Ch (Breedlove y Smith 22644, MO); G (Türckheim II 1291, NY); H (Nelson, 2008: 194); ES (Carlson 405, F); N (Grijalva y Araquistain 612, MO); CR (Smith A619, MO). 600-2300 m. (Mexico, Mesoamerica, Colombia, Ecuador, Peru, Hispaniola.)

*Sigesbeckia agrestis* is moderately variable in leaf and capitula sizes. Nevertheless, the only segregate of it is the very different Mexican *S. andersoniae* B.L. Turner, which differs by having outer phyllaries very sparsely stipitate-glandular (and a slightly shorter ray corolla tube), but
which was included in the concept of glandular-leaved yellow-anthered *S. agrestis* by Humbles (1972) and McVaugh y Anderson (1972).


Erect leafy-stemmed annual or short-lived perennial herbs 30-150+ cm; stems 1, sometimes branched from base, distal nodes often with fertile axillary branches, often sparsely pilose-villous proximally and sparsely stipitate-glandular distally. Leaves winged petiolate and sometimes obviously perfoliate or distal ones sessile; blade 3-11(-16) × 2-6(-11) cm, usually delorate or trullate to ovate or distal ones lanceolate, surfaces pilose or villous with simple trichomes and often also sparsely short-stipitate-glandular, abaxial surface not glandular-dotted, base often truncate or subcordate thence usually abruptly attenuate into winged petiole, margins subentire or serrulate to coarse-serrate, apex acuminate or acute; winged petiole (1-)2-8 cm. Capitulescence leafy, compound-corymbiform with lateral branches often nearly as long as central axis, several-capitulate; peduncles 1-3.5(-5) cm, capitula sometimes somewhat nutant, densely stipitate-glandular. Capitula 3-5(-6) mm, short-radiate; involucral disk 4-7 mm diam.; outer phyllaries 5-6, 5-18 × 0.5-1 mm, much longer than ray florets, narrowly linear-spatulate, spreading to reflexed, usually homotrichous with only stipitate-glandular trichomes 0.2-0.6 mm, rarely also with shorter eglandular trichomes or basally with appressed eglandular trichomes, apex obtuse; inner phyllaries usually 5-8(-12), 2-3.5 × 1-1.5 mm, elliptical to obovate, navicular and surrounding abaxial half of associated cypsela, stipitate-glandular, apex acuminate; paleae 2.5-3.5 mm, stipitate-glandular distally. Ray florets 5-8(-12); corolla much shorter than outer phyllaries, yellow or sometimes purplish abaxially or purple-nerved, infrequently sessile-glandular, tube 0.8-1.5 mm, limb 1.5-2.5(-3.5) mm, moderately inconspicuous, usually 3-7-nerved. Disk florets 8-20; corolla 1.5-2 mm, infrequently sessile-glandular, lobes c. 0.5 mm; anthers green. Cypselae 2-3.5 mm. 2n = 30, 32. Flowering Sep-Mar(-May). Alpine areas, cloud forests, conifer forests, fields, meadows, moist slopes, montane forests, oak forests, open places, roadsides, volcano slopes. Ch (Breedlove y Thorne 31059, MO); G (Guerrero 122, MO); CR (Pruski et al. 3853, MO); P (Davidson 150, US). (?1400-2100-3800 m. (Mexico, Mesoamerica, Colombia, Venezuela, Ecuador, Peru, Bolivia, Chile, Argentina, Hispaniola.)
McVaugh y Anderson (1972) accepted some glandular-leaved yellow-anthered South American plants within the fabric of *Sigesbeckia jorullensis*, but in Mesoamerica such variants are rarely seen. In and around Michoacan, Mexico such intermediates with basically homotrichous phyllaries are frequent. By their typically smaller phyllaries these intermediate seem closer to *S. agrestis* than to *jorullensis* and may be hybrids.


Subscapose rosulate perennial herbs 15-40 cm; stems 1, erect, simple proximally, 1-3-branched in capitulescence, basal rosettes usually 6-8-leaved, otherwise nearly leafless with usually 2 pairs of opposite leafy bracts at proximal nodes of capitulescence, densely short-stipitate-glandular, usually also sparsely pilose with longer eglandular trichomes. Basal leaves winged-petiolate; blade 5-8 × 2-4 cm, ovate to obovate, adaxial surface densely villous, abaxial surface eglandular, glabrous to subglabrous, base cuneate or obtuse with abrupt or gradual acumen, margins undulate-serrulate to subentire, apex obtuse; cauline leafy bracts 1.5-3 cm, lanceolate to oblanceolate, sessile. Capitulescence open-cymose, (1-)2-4-capitulate; peduncles 5-16 cm, short-stipitate-glandular, glandular trichomes 0.2-0.3 mm. Capitula 6-8 mm, radiate; involucral disk to c. 10 mm diam.; outer phyllaries 5-8, 7-12 × 1.5-2 mm, only slightly longer than ray florets, oblong, spreading to post-anthesis reflexed, apex obtuse to rounded; inner phyllaries 3-5 mm, obovate-oblanceolate. Ray florets 10-15; corolla only slightly shorter than outer phyllaries, yellow, limb 5-10 mm, conspicuous. Disk florets several to many; corolla c. 2 mm. Cypselae c. 2 mm. Flowering Aug. Alpine areas. G (Steyermark 50114, US). 2800-3400 m. (Endemic.)

*Sigesbeckia nudicaulis* is similar to Oaxacan *S. repens* B.L. Rob. et Greenm., which differs by its weak or repent leafy stems and abaxially glandular leaves.

**18. Smallanthus** Mack.

*Polymniastrum* Small (non Lam.)

Por J.F. Pruski.

Coarse suffrutices or shrubs to trees, occasionally annual herbs, 1-5(-12) m, fibrous-rooted or roots sometimes oblongoid-tuberous; stems usually erect to ascending, branched, subterete or sulcate to hexagonal, often striate, glabrous to densely pubescent, often viscid or short-stipitate glandular, solid or when herbaceous sometimes fistulose; herbage when stipitate-glandular with
glandular trichomes much shorter than non-glandular trichomes. Leaves simple, opposite or the distal ones sometimes alternate, petiolate to sessile, typically subsessile with a broadly winged petiolariform base, often dilated basally or clasping; blade usually large, lanceolate to broadly ovate or deltate, often shallowly palmately lobed or infrequently deeply pinnately lobed, thinly chartaceous, palmately 3(-5)-veined from above base or infrequently venation pinnate, adaxial surface glabrous to pilose, infrequently punctate-glandular, adaxial surface glabrous or pilose to sometimes slightly tomentose, often minutely punctate-glandular or rarely distal-most leaves short-stipitate glandular, base acute to rounded or subcordate, then usually abruptly long-attenuate into a petiolariform base, margins entire to dentate or lobed, apex acute to acuminate. Capitulescence terminal on leafy branches, open-corymbiform, usually few-several-capitulate and flowering branches with few pairs of leaves; peduncles moderately slender, pubescent or less commonly subglabrous, sometimes stipitate-glandular. Capitula radiate, many-flowered; involucre mostly hemispherical; phyllaries strongly dimorphic, unequal, biseriate, non-articulated basally, the outer series (4-)5-6, more or less subimbricate, leafy or at least herbaceous, spreading, connate basally, large, lanceolate to orbicular, few-parallel nerved, glabrous to pubescent or short-stipitate glandular; the inner series 8-20+, same in number as and each subtending (an individual) ray floret(s), eximbricate, thinly herbaceous, lanceolate to spatulate, navicular, proximally surrounding and longer than ray ovary-cypsela and then narrowed distally, apex erect or sometimes incurved and subcalyculate, usually shorter than outer phyllaries; clinanthium broad, convex, paleate; paleae lanceolate, somewhat conduplicate, yellowish, scarious, several-nerved. Ray florets 8-20+, pistillate, 1(-2)-seriate; corolla typically well-exserted, usually yellow, infrequently orange throughout or reddish distally, tube short, especially compared to mature fruit, typically densely long-pilose, limb oblong to elliptic, apex shortly (2-)3-dentate, papillose adaxially, often punctate-glandular abaxially; style branches divaricating, with stigmatic surfaces 2-banded with paired stigmatic lines meeting at the obtuse apex. Disk florets 15-100+, functionally staminate; corolla funnelform to more commonly campanulate, 5-lobed, yellow throughout or rarely purplish distally, tube not slender, much shorter than throat, glabrous to setose, throat with single resin duct along each vein, limb glabrous or sparingly setose, infrequently scattered punctate-glandular, tube and throat 5(-10)-nerved, lobes deltate to triangular, sometimes densely setose; anthers black, appendage ovate to deltate, eglandular; style appearing unbranched without branches separating or recurved, papillose distally, very shortly to less commonly long-exserted, ovary sterile, short-cylindrical, c. 0.5 mm, epappose. Ray cypselae large, black or dark brown, obovoid to spherical, often slightly compressed, 30-40-striate, carbonized areas convex with striations recessed, mostly glabrous, epappose, each somewhat
enclosed by a subtending inner phyllary; carpopodium small, not well-developed. \( x = 16, 17, 18 \).

Aprox. 17 spp. 1 sp. in the Estados Unidos, the others in México, Central America, and South America; introduced into Bermuda.

*Smallanthus* was treated as a synonym of *Polymnia* by Wells (1965) and Nash (1976), but was reinstated by Robinson (1978). Wells (1965) recognized 19 species of *Polymnia*, and all but two of these have been transferred to *Smallanthus*. Robinson stressed that *Smallanthus* may be distinguished from *Polymnia* by cypselae that are several-striate (vs. smooth), non-angled (vs. prominently 2-3-angled), and often slightly compressed, (vs. obcompressed). Additionally, *Polymnia* has pinnately veined and pinnately lobed leaves and glandular anther appendages, whereas most species of *Smallanthus* have trinerved pentagonal leaves and eglandular anther appendages.

The presence and density of stipitate-glands is sometimes environmental variable and gland characters cannot always be used diagnostically. For example, Wells (1965) noted that a single introduction of a plant of *S. uvedalia* onto the island of Bermuda has resulted in populations in different habitats that now show morphologies that could be assigned three traditionally recognized varieties.

The species described by Robinson (1978) and Turner (1988) are all treated here as synonyms of *Smallanthus maculatus*. *Smallanthus sonchifolius* (Poepp.) H. Rob. a native of the Andes, is often cultivated in both the Old World and the New World for its sweet edible tubers, which may be eaten raw.


1. Proximal leaves pinnately veined and pinnately lobed; ray corollas orangish drying magenta or purplish; disk floret style long-exserted.  
2. *S. oaxacanus*  
1. Proximal leaves trinerved and often pentagonal; ray corollas yellow or occasionally reddish abaxially, disk florets style very shortly exserted.
   2. Subglabrous herbs; leaves simple, petiolate, eglandular abaxially; outer phyllaries 4 per capitula; ray corolla limbs 9-15-nerved, eglandular abaxially.  
3. *S. quichensis*  
2. Pubescent herbs or shrubs; at least proximal leaves divided, glandular abaxially; outer phyllaries 5 per capitula; ray corolla limbs 5-10-nerved, glandular abaxially.
3. Inner phyllaries often heterotrichous, often stipitate-glandular and hirsutulous-substrigose, apices acute to sometimes acuminate, to 3.5 mm; paleae hirsutulous-substrigose distally.


Annual or perennial herbs, 1-3(-5) m; stems erect, sulcate-subhexangular, glabrous to pilose, also often stipitate-glandular, often purple-maculate, central axis fistulose, proximal internodes often much longer than leaves. Leaves variable, sessile to petiolate, at least proximal leaves dilated basally and semiamplexicaule or subclasping; blade (8-)12-30(-45) × 5-25(-40) cm, usually pentagonal or irregularly angulate and broadly ovate in outline, shallowly to rarely deeply pinnately incised or lobed, sometimes distal-most leaves elliptic-ovate and subentire, trinerved (even when pinnately lobed), from well above base with largest pair of proximal veins much more prominent than distal nerves and rarely at right angles to midrib, base truncate to obtuse, then usually gradually (in distal leaves) or abruptly (in proximal leaves) contracted and long-decurrent into a smooth margined or less commonly irregularly few-lobed petiolariform base usually 2-20 × 1-2(-4) cm, blade margins often coarsely lobed-dentate, lobes (when present) shallow or rarely to near midrib, usually triangular and ≤ 3 cm, lobe apex acute to obtuse, serrate or serrulate between lobes-dentations, blade apex acute to acuminate, adaxial surface subglabrous to sparsely hispidulous or scabrellous, abaxial surface pilose-villous to sometimes subcanescent or infrequently subglabrous, also punctate-glandular or in distal-most leaves short-stipitate glandular. Capitulescence of 3-9+ capitula in open and sometimes irregular clusters, held above leaves or sometimes closely subtended by leafy bracts, capitula often noding when in fruit; peduncles 1.5-8(-10) cm, hirsute-pilose or short-stipitate glandular, often heterotrichous, less commonly subglabrous. Capitula 10-14 mm; involucre (8-)10-20 mm diam., (or wider when outer
phyllaries fully spread); outer phyllaries 5(-6), (5-)9-15 × (3-)6-9(-12) mm, ovate-orbicular to less commonly elliptic-lanceolate, dark green, both surfaces stipitate-glandular or hirsutulous-substrigose, less commonly subglabrous or villosulous, margins typically ciliate to infrequently stipitate-glandular, apex obtuse to less commonly acute; inner phyllaries (8-)11-21+, pale-green, lanceolate to broadly so, 4-5 × c. 2 mm, often obviously heterotrichous, stipitate-glandular and hirsutulous-substrigose, apex acute to sometimes (at high elevations) acuminate to 3.5 mm; paleae 4.5-6 × 1-2.5 mm, hirsutulous-substrigose distally. Ray florets (8-)11-21+; corolla yellow or very rarely purplish, tube 1.5-3 mm, sometimes also papillose, limb (7-)10-25 × 3-6(-10) mm, elliptic-oblanceolate, 7-10-nerved, nerves sometimes reddish abaxially, typically setose and punctate-glandular abaxially. Disk florets often c. 100+; corolla 5-6.4 mm, funnelform, tube 1.3-1.8 mm, limb typically setose to sometimes densely so, throat 3.1-3.6 mm, lobes 0.6-1 mm; style very shortly exserted (≤ 1.5 mm) from anthers. Cypselae 3.5-5.5 × 3-5 mm. 2n = 32. Beach strand vegetation, borde de bosque, bosques seco tropical, cloud forests, cultivated areas, disturbed areas, montane wet forest, muddy soil, pine-oak forests, premontane wet forest, quebradas, railroad tracks, ravines, roadsides, secondary vegetation, soils not derived from limestone, streamsides, wet thickets. T (as cited by Villaseñor, 1989; Cowan 2099, MEXU, cited by Cowan, 1983); Ch (Breedlove 29299, MO); B (Balick et al. 2216, NY); G (Pruski y MacVean 4483, MO); H (Nelson et al. 3547, MO); ES (Davidse et al. 37402, MO); N (Neill 2206, MO); CR (Zamora et al. 2139, MO); P (Croat 13672, MO). 0-2100(-3100) m. (México, Mesoamérica.)

Typical materials of the common and vegetatively variable S. maculatus are from low elevations, have hirsute-pilose peduncles, and ovate-orbicular, subglabrous (but ciliate-margined) phyllaries. Such plants are the dominant form in México and Guatemala, match the protologue, but were redescribed by Robinson (1978) as S. lundellii, here reduced to synonymy.

A frequently encountered variant, occurring at high elevations from México and more common southwards into Costa Rica and Panamá, has short-stipitate glandular peduncles and often narrow heterotrichous phyllaries. This variant was recognized as "var. adenotricha" by Wells (1965), but only with reservation as such by Nash (1976). Although prescence of stipitate-glands is a frequently used taxonomic character of high-elevational taxa (e.g., species Oxylobus and Ageratina, of tribe Eupatorieae), study of individuals of S. maculatus from near sea level to 2000(-3100) meters elevation shows that indument features seem to vary clinally.

Some populations of S. maculatus occurring in high-elevational Chiriquí, Panamá differ slightly by villosulous peduncles, broad villosulous eglandular outer phyllaries, and an irregularly lobed petiolariform leaf base. Some individuals with short-radiate capitula are encountered occasionally from 1400-2400 meters elevations in Costa Rica and Panamá. A further high-
elevational ecotipo from Chiapas and Guatemala (described as *S. obscurus*) has an irregularly lobed petiolariform leaf base as in the plants from Chiriquí, but also has deeply palmately 5-lobed to pinnately 7-lobed proximal leaves. The deeply lobed leaves of these high-elevational plants from Chiapas and Guatemala are always trinerved, however, thus distinguished from *S. oaxacanus*.

Each of these aforementioned ecotypes match the species in the essential characters of palmately veined and lobed abaxially glandular leaves and fruits less than 6 mm. The occurrence of such variation in *S. maculatus* negate the utility of using the varietal concepts of Wells (1965), but may represent incipient taxa of either geologically young or environmentally harsh areas of Mesoamérica.

Turner (1988) treated tropical *S. maculatus* (L.) H. Rob. as a synonym of the very similar and temperate *S. uvedalia* (L.) Mack., and biosystematic studies may ultimately show them to be synonymous. However, in this flora I provisionally recognize *S. maculatus* and *S. uvedalia* (L.) as distinct, as did Wells (1965), Nash (1976), Robinson (1978), and Strother (1999). The concepts used here are basically traditional and +/- intermediate to those of Wells (1965) and Turner (1988), and +/- parallel those of Robinson (1978) and Strother (1999). Here I follow the species concepts of Wells (who noted that *S. maculatus* has cypselae consistently smaller than those of *S. uvedalia*), but recognize no varieties within *S. maculatus*.


Perennial? herbs, 1-3 m; stems erect to ascending, few-branched, suberete, hispid-pilose to sparsely so, also moderately to densely stipitate-glandular throughout, often purple- striate, often fistulose, internodes about as long as to longer than leaves. Leaves sessile to subsessile, with a long winged petiolariform base, at least proximal leaves dilated basally and subauriculate or sometimes perfoliate; blade (7-)9-15(-30) × (2.5-)5-15(-20) cm, shallowly to more commonly deeply (to near midrib) few-pinnately lobed, dellite or ovate in outline, to distal-most sometimes less divided or merely lanceolate and subentire, venation pinnate with secondary veins at c. right angles to midrib, adaxial surface hirsutulous to hisrute, abaxial surface punctate-glandular, otherwise subglabrous to hisrute-pilose, base truncate to obtuse, then abruptly contracted and long-decurrent into a few-denticulate petiolariform base usually 1.5-12 × 0.5-2 cm, blade margins subentire to denticulate or less commonly dentate, lobes (when present) lanceolate, 2-6(-13) ×
1.5-2.5(-3.5) cm, lobe margins rarely secondarily lobed, lobe apex acuminate to obtuse, blade apex acute to acuminate or infrequently obtuse. Capitulescence 3-7-capitulate, rarely monocephalous, held well above leaves; peduncles 3-12 cm, hirsute-pilose and stipitate-glandular, also usually finely villosulous distally beneath other indumentum. Capitula 8-12 mm; involucere 8-10 mm diam.; outer phyllaries 5, ovate or elliptic-lanceolate, 5-11 × 3-6 mm, hirsutulous-substrigose, often also stipitate glandular, basally sometimes finely villosulous beneath other indumentum, apex acuminate to obtuse; inner phyllaries c. 13, lanceolate to broadly so, 5-6 × 2-3.7 mm, typically stipitate-glandular and hirsute, apex narrowly acute; paleae 4.5-6 × c. 1.6 mm, reaching to distal part of throat, outer series reddish distally. Ray florets c. 13; corolla orange or sometimes golden-orange, drying magenta or purplish, tube 0.5-0.8 mm, limb 8-12(-14) × 3-7 mm, elliptic-ovate, 8-10-nerved, often bilobed, typically long-setose and punctate-glandular abaxially. Disk florets: corolla 5-6.5 mm, funnelform, golden-yellow, tube 0.7-1 mm, sometimes very short, limb typically setose to sometimes densely so, throat 3.3-4.3 mm, lobes 1-1.2 mm, long-triangular, sometimes slightly unequal; filaments sometimes very long; style long-exserted (to 2.5 mm) from anthers. Cypselae c. 3 × c. 2.7 mm. 2n = 32, c. 40. Bosque húmedo subtropical, bosque seco subtropical, montane rain forests, pine-oak forests, streamsides, grassy hillsides. Ch (Nelson 3221a, US); G (Tuerckheim II 1494, MO); H (Yuncker et al. 6000, MO). 700-1800 m. (W. y S. México, Mesoamérica.)

Smallanthus oaxacanus is atypical in orange ray corollas and well-exserted disk styles (as noted by Wells, 1965) that perhaps relate to pollination syndrome differences between it and other species of the genus. Vegetatively it is closely related to yellow-flowered S. putlanus B.L. Turner from Oaxaca.


Polymnia latisquama S.F. Blake, Smallanthus latisquamus (S.F. Blake) H. Rob.

Subglabrous herbs, 1-3 m; stems erect or reclining, slender, glabrous or nearly so, midstems narrowly fistulose, internodes about as long as or shorter than leaves. Leaves petiolate, narrowly connate basally; blade 9-17(-30) × 3-10(-15) cm, lanceolate to elliptic-ovate, trinerved from above base, surfaces eglandular, adaxial surface glabrous to sparsely scabrellous, abaxial surface glabrous to veins or vein axils sparsely villosulous, base narrowly cuneate or the proximal ones broadly obtuse, margins irregularly dentate or denticulate to less commonly subentire, apex narrowly acute to acuminate; petiole 0.5-4.5 cm, sometimes sparsely ciliate, cuneately winged
apically. Capitulescence monocephalous or less frequently 3-5-capitulate in regular and open clusters, held slightly above subtending leaves; peduncles typically elongate and slender, 2-10 cm, glabrous or sometimes puberulent apically, eglandular. Capitula 10-15 mm; involucre (10-)15-25+ mm diam.; outer phyllaries 4, decussate, suborbicular to broadly lanceolate, 15-25 × 8-17 mm, margins indistinctly ciliolate, apex acute, surfaces subglabrous; inner phyllaries 7-15, broadly ovate, 10-13 × 6-9 mm, subglabrous or sometimes papillose, apex narrowly acute; paleae c. 9 × c. 3 mm, sparse-pilosulose distally. Ray florets 7-15; corolla tube c. 1.5 mm, limb 15-24 × 6-9 mm, oblanceolate, 9-15-nerved, typically sparsely setose abaxially, eglandular. Disk florets c. 100+; corolla 6.5-9.5 mm, funnelform, tube 1.5-2 mm, limb glabrous or nearly so, throat 4-5.5 mm, lobes 1-2 mm; style very shortly exserted from anthers. Cypselae 5-7 × 4-6 mm. \textit{Borde de potrero, disturbed primary forest, slope of volcano, thickets.} G (Croat 40990, MO); CR (Standley 35340, US). 2000-2700(-3000) m. (Endemic.)


Perennial somewhat succulent herbs or sometimes shrubs, 2-4 m; stems erect, glabrous or sparsely hirsute to rarely densely pilose, sometimes also stipitate-glandular, sometimes fistulose, distal internodes much shorter than leaves. Leaves sessile or with winged petioliform base, dilated basally; blade 10-30(-50) × 5-30 cm, pentagonal or deltate to broadly ovate or sometimes distal-most elliptic-lanceolate and without winged petioliform base, trinerved from well above base in the expanded (when lobed) portion of blade, surfaces eglandular, adaxial surface subglabrous to sparsely hispidulous, abaxial surface glabrous or pilosulose especially on veins to rarely moderately pilose, base subcordate to obtuse, then usually abruptly contracted and long-decurrent into a typically smooth-margined petioliform base usually 3-12 × 0.7-3.5 cm, blade margins angulate to denticulate, lobe apex acute, blade apex narrowly acute to acuminate. Capitulescence 3-15-capitulate, held above leaves; peduncles 1.5-6(-8) cm, sparsely hirsute-pilose or less frequently stipitate-glandular, when heterotrichous typically with non-glandular trichomes as the prevalent indument, sometimes (in South America) moderately hirsute-pilose. Capitula 7-10 mm; involucre usually c. 1 cm diam.; outer phyllaries (4-)5, usually broadly ovate to less commonly elliptic-ovate, 7-12 × 5-10 mm, surfaces glabrous or rarely minutely puberulent, margins typically glabrous to sometimes ciliolate, apex obtuse to less commonly acute; inner phyllaries 8-14, elliptic-lanceolate, 8-13 mm, about as long as or longer than outer phyllaries, apex abruptly narrowed into a tardily elongating densely stipitate-glandular long-attenuate often
involute appendage 5-10 mm, appendage homotrichous or nearly so; paleae 4-5 mm, subglabrous.
Ray florets 8-14; corolla tube 1.5-2 mm, limb 10-15 × 5-6 mm, broadly oblong, 5-7-nerved,
typically punctate-glandular abaxially but glands destroyed when pressed in EtOH, rarely (in
South America) also setose. Disk florets 30-60; corolla 5-6 mm, funnelform, yellow throughout
or (in Flora Area) purplish distally, tube 1.5-2 mm, limb especially lobes often sparsely broad-
based setose or glandular, throat 3-3.2 mm, lobes 0.5-0.8 mm; style very shortly exerted (≤ 1.5
mm) from anthers. Cypselae 3-4 × c. 3 mm. 2n = c. 30. Damp thickets, volcano slopes, evergreen
forests. Ch (Fryxell y Lott 3363, MO); G (Nash, 1976: 293). 1200-2400 m. (México,
Mesoamérica, Colombia, Venezuela, Ecuador, Perú?.)

Smallanthus riparius and South American S. siegesbeckius (DC.) H. Rob. are the only species
of Smallanthus with long-attenuate inner phyllaries apices, and thus are similar in this regard.
Wells (1965) noted the intermidiacy of some Andean collections, and if the two are ultimately
shown to be synonymous S. riparia would have priority. Wells (1965) took Bolivian material as
intermediate with S. siegesbeckius (DC.) H. Rob. However, all Bolivian materials seen by me
with long-attenuate inner phyllaries apices also have short ray corolla limbs, densely glandular-
stipitate peduncles, ciliate outer phyllaries, and are here referred to S. siegesbeckius. I thus
exclude S. riparius from the flora of Bolivia, and note that in the Peruvian Andes more potential
intermediates seem to be prevalent than in Bolivia. Within Mesoamérica, especially at higher
elevations, some plants of S. maculatus have narrowed acuminate inner phyllary apices somewhat
resembling those of S. riparius, but differ being heterotrichous, by their ciliate outer phyllaries,
and abaxially glandular leaves.

19. Tridax L.

Balbisia Willd., Bartonlia Adans., Carphostephiun Cass., Galinsogea Kunth,
Ptilostephiun Kunth, Mandonia Wedd., Sogalgina Cass.

Por J.F. Pruski.

Annual or perennial, subscapose to leafy-stemmed herbs to less commonly subsuffrutices; stems
erect to procumbent, occasionally rooting at the nodes, weakly to densely pubescent. Leaves
simple to trilobate or pinnatifid, opposite, petiolate or sessile; blade linear-lanceolate to broadly
ovate, chartaceous to rarely subcarnose, surfaces eglandular, nearly glabrous to densely pilose,
margins entire to deeply lobed. Capitulescence terminal, open, monocephalous to corymbiform,
1-several short-long-pedunculate capitula; peduncles usually ebracteate, often pilose or stipitate-
glandular. Capitula radiate, discoid, or discoid-pseudobilabiate; involucre hemispheric to
cylindrical-campanulate; phyllaries imbricate, subequal to unequal and graduated, 2-5-seriate, often longitudinally striate; outer phyllaries often pilose-hirsute but eglandular, herbaceous throughout or apically so, never enclosing entire capitulum, apex and margins sometimes purplish; inner phyllaries not enclosing ray cypselae, usually scarious, puberulent to glabrous, margins and apex often purplish; clinanthium convex to sometimes dome-shaped, paleate; paleae conduplicate, persistent, thin-scarious. Ray florets (when present) few, pistillate; corolla often lightly pilose, limb inconspicuous to conspicuous, white, yellow, red, or purplish, glabrous or setulose abaxially, often apically 2-4-lobed, sometimes deeply so. Disk florets many, bisexual or sometimes when discoid-pseudobilabiate pistillate; corolla actinomorphic or occasionally pseudobilabiate and zygomorphic, usually funnelform or narrowly campanulate, commonly yellow, usually shortly 5-lobed, pubescent to less frequently glabrous, throat usually with ducts in thin pairs, lateral ducts often intramarginal; anthers brown or black, endothecial cells walls mostly with polar irregular thickenings, base obscurely to markedly sagittate, apical appendage often deltoid; style base swollen and globular (stylopodium free) above cylindrical nectary, trunk usually with 4 resin ducts, branches with stigmatic surfaces 2-banded with paired stigmatic lines, usually recurved, apex sterile, tapered. Cypselae of ray and disk florets +/- similar but rays slightly obcompressed, narrowly obconical to turbinate, usually dark brown, +/- suberete and costate, finely striatulate between costae, strigose-sericeous or rarely glabrous or nearly so; pappus commonly of (0-)12-35 plumose or long-barbellate stramineous bristles or scales, disk pappus about as long as corolla, ray pappus often shorter than disk pappus and often about as long as corolla tube, sometimes only c. half as long as corolla tube. x = 9, 10. Approx. 29 spp. Native to the Neotropics, concentrated in Mexico, 5 spp. Andean, 4 spp. in Mesoamerica and one to be expected; 1 sp. introduced and weedy in the tropics and subtropics of the Old World.

The genus Tridax was revised by Robinson y Greenman (1896), who recognized 22 species, and more recently by Powell (1965), who recognized 26 species. Cymophora B.L. Rob. is closely related to Tridax, but differs by disk corollas always white. The reduction by Keil et al. (1987) of Cymophora to Tridax is not followed here. Species of Tridax may at once be recognized by their generally plumose pappus (as noted by Cassini, 1828). Slight variation in bristle lateral cilia length exist, however, as evidence by Linnaeus (1737) describing Tridax as having "pappo setaceo" and Cassini (1826, sub Ptilostephium) as having pappus of "squamellules ... barbées." The clinanthia are convex to dome-shaped, not "conical" as stated in Powell (1965). Although the occasional species of Tridax may have stipitate-glandular peduncles, the phyllaries are never stipitate-glandular as in Milleriinae (which includes the Mesoamerican genera Milleria, Rumfordia, Sigesbeckia, Smallanthus, Trigonospermum, and Unxia).
1. Peduncles elongate-stipitate-glandular; phyllaries strongly graduate; 4-6-seriate, the outer phyllaries several times shorter than the inner phyllaries; ray corollas pinkish purple, limbs 11-14 mm; pappus shorter than cypselae.  

4. T. purpurea

1. Peduncles eglandular; phyllaries 2-3-seriate, slightly unequal to nearly subequal, the outer slightly shorter than to about as long as the inner; ray florets (when present) with corollas pale yellow to white, limbs ≤ 7 mm; pappus often longer than cypselae.

2. Leaves often pinnatifid or trilobed, 0.2-0.7(-1) cm wide, trichomes subsidiary cells not prominent; capitula discoid-pseudobilabiate.  

1. T. coronopifolia

2. Leaves simple to infrequently hastate-trilobed, 0.5-4.5(-10) cm wide, trichomes subsidiary cells prominent or somewhat prominent; capitula radiate.

3. Involucres cylindrical-campanulate to drum-shaped; outer phyllaries usually as long as the inner phyllaries; ray corolla limbs glabrous or sometimes 2 main nerves setulose abaxially; erect to ascending annual herbs.  

2. T. platyphylla

3. Involucres campanulate; outer phyllaries about as long as to slightly shorter than the inner phyllaries; ray corolla limb 2 main nerves setulose abaxially; procumbent to ascending perennial herbs, sometimes flowering in first year.

4. Ray corollas white to pale yellow; cypselae with ray pappus 2-3.5 mm, about as long as or only slightly shorter than ray corolla tubes; outer phyllaries slightly shorter than the inner phyllaries.  

3. T. procumbens

4. Ray corollas bright yellow; cypselae with ray pappus 1-2 mm, c. half as long as ray corolla tubes; outer phyllaries about as long as the inner phyllaries.  

5. T. purpusii

Carphostephium trifidum (Kunth) Cass., Ptilostephium trifidum Kunth, Tridax coronopifolia var. alboradiata (A. Gray) B.L. Rob. et Greenm., Tridax lanceolata Klatt, Tridax macropoda Gand., Tridax trifida (Kunth) A. Gray, Tridax trifida var. alboradiata A. Gray.

Low perennials herbs, 10-40 cm, often flowering first year, simple-stemmed to more commonly few-several-branched proximally, leafy only proximally or often to mid-stem, sometimes rhizomatous; stems procumbent to erect, striate, sparsely hirsute, internodes often somewhat clustered and shorter than associated leaves. Leaves variable, simple to pinnatifid or trifid (palmatifid), petiolate, leaf (including petiole) 1.5-7 × 0.2-6 cm, simple and lanceolate or oblanceolate to lobed and ovate or obovate in outline, blade when simple or lobes when pinnatifid 0.2-0.7(-1) cm wide, chartaceous, base narrowly attenuate to subclasping, margins few-dentate to deeply lobed, lobes (when pinnatifid or trifid) usually 1-5 × 0.2-0.3 cm, linear to linear-lanceolate, 1-3 per margin with the proximal the largest, blade and lobe apices acuminate, both surfaces pilose-hirsute, trichomes subsidiary cells not prominent. Capitulences of 1-several solitary long-pedunculate capitula terminating main axis and branchlet apices; peduncles 3-15(-25) cm, slender, sparsely hirsute to sometimes apically strigillose, eglandular. Capitula 6-10 mm, discoid-pseudobilabiate; involucre 5-8 mm, broadly campanulate to hemispheric; phyllaries 11-15, imbricate, usually slightly unequal to subequal, 2-3-seriate, margins scarious, the outer phyllaries 4-6.5 × 1.5-2 mm, slightly shorter than to about as long as the inner; elliptic-lanceolate, purplish or only marginally and apically so, apex acute to acuminate, sometimes strigillose, sometimes distally ciliate, grading progressively to the inner phyllaries, these 5-7 × 2-3.5 mm, oblong, apex obtuse to rounded; clinanthium 3-4 × 3-6 mm; paleae 5-7 mm, oblanceolate. Ray florets 0. Marginal florets c. 8, pistillate or appearing bisexual; corolla 4-8 mm, pseudobilabiate, zygomorphic, white to yellow, outer three lobes 1-5 mm, sometimes setulose, typically greatly enlarged and exserted, resembling a deeply trilobed ray corolla limb, inner two lobes much shorter; anthers sometimes seemingly staminodial. Disk florets proper 30-60+; corolla 3.5-5.5 mm, cylindrical-funnelform, usually yellow, tube 0.5-1 mm, shorter than throat, pubescent, throat usually with paired resin ducts along each vein, lobes 0.5-1.3 mm, finely puberulent; style branches 1.2-1.5 mm. Cypselae 2-3 mm, strigose-sericeous; pappus 1.5-4.5 mm, shorter than to usually longer than cypselae, of 16-20 linear-lanceolate plumose-ciliate squamellae or plumose bristles. 2n = 18, 36, 54. Flowering May. Sandstone bluffs in seasonal evergreen forests. Ch (Breedlove 25260, DS). 900 m. (Mexico, Mesoamerica.)

Tridax coronopifolia, known to us from a single collection in the Central Depression of W. Chiapas, may be recognized by its narrow leaves or narrow leaf lobes and zygomorphic corollas of the marginal florets, but is variable with marginal florets either pistillate or apparently
bisexual, has pappus of varying lengths, and includes populations of differing ploidy (diploids, tetraploids, and hexaploids) levels (Powell, 1965). However, the extremes are bridged by intermediates and the species seems best treated in the broad sense as done by Robinson y Greenman (1896) and Powell (1965). Robinson y Greenman (1896) appear to be the first to synonymize the two species, effecting the priority of *Ptilostephium coronopifolium* over *Ptilostephium trifidum*. Both Powell (1965) and Index Kewensis (Jackson, 1895) misattributed the combination *T. coronopifolia* to Hemsley. The type of this species, as is typical of many species illustrated in Kunth (1820), is not represented in the microfiche of P-HBK herbarium, but is nevertheless presumably in P.

In spite of the ultimate recognition of the two Kunth names as representing but a single species, the variable pappus of *Tridax coronopifolia* influenced Cassini (1826) to recognize the two Kunth names above as different genera. Cassini (1826), in discussing the pappus of *Tridax* (sub *Carphostephium* and *Ptilostephium*), stated "dans l'ordre des Synanthérées il existe un grand nombre de genres uniquement fondés sur les caratères de l'aigrette." For explanation of Cassini's terminology see Pruski y Robinson (1997). Gray (1879) considered the two Kunth names above as distinct species. Gray's (1879) discussion of the variable pappus, refers to *Ptilostephium coronopifolium* "of DeCandolle's Prodromus, not P. coronopifolium, HBK," inferring that Kunth or Candolle had, in part, misinterpreted the pappus of what Powell (1965) considers a single species.


*Tridax scabrida* Brandegee.

Erect or ascending annual herbs; stems 30-75 cm, several-branched, leafy throughout, hispid-pilose, suberete to subhexagonal, striate-sulcate, hirsute to hispid, internodes about as long as or shorter than associated leaves. Leaves simple to infrequently hastate-trilobed, subsessile to winged-petiolate; blade 3-10(-11.5) × 1.5-4.5(-10) cm, elliptic-ovate to broadly ovate, chartaceous, trinerved from basal acumination, adaxial surface scabrous, trichomes antrorse, abaxial surface hirsute throughout to only on larger veins and otherwise subglabrous, trichomes subsidiary cells prominent, base rounded or obtuse (rarely hastate) to more commonly acuminate to attenuate above the basal acumination, thence narrowly decurrent onto petiole, margins subentire to irregularly coarsely serrate, apex acute or acuminate to infrequently obtuse; petiole 0.1-3 cm, hirsute, narrowly winged. Capitulescence corymbiform, moderately lax, several-many-capitulate; peduncles 2-8(-11) cm, sparsely hispid-pilose, eglandular. Capitula 9-11(-14)
mm, radiate; involucre 5-9(-14) × 7-11 mm, cylindrical-campanulate to drum-shaped; phyllaries 11-13, imbricate, subequal or nearly so with outer phyllaries usually as long as the inner phyllaries, indistinctly 2-seriate, the outer phyllaries 3.5-7(-14) × 2-6.5 mm, ovate to obovate, alternating broader and longer, margins sometimes scarios-purplish, apex acuminate to attenuate, harshly hirsute-strigose, grading progressively to the inner phyllaries, these 3.5-7.5 × 2-3 mm, elliptic-lanceolate to oblong, apex acute to acuminate, often purplish especially apically and marginally, scarios and glabrous throughout or sometimes apex herbaceous and hirsute-strigose; clinanthium 1.5-2 × 2.5-4 mm; paleae 5-9.5 mm, 1-3-nerved, acuminate to cuspitate, glabrous. Ray florets (2-)5-8; corolla white or pale yellow, tube 3-4.5 mm, setose, limb 4-7 × 4-7 mm, obovate to cuneate, 10-12-nerved, glabrous or sometimes 2 main nerves setulose abaxially, apex 3-lobed. Disk florets 20-30; corolla 6-8 mm, cylindrical-funnelform, pale yellow, tube 1.2-2 mm, setose, tube and throat glabrous, lobes 1.2-1.8 mm, papillose; style branches c. 2 mm. Cypselae 2-2.7 mm, strigose-sericeous; pappus of c. 20 plumose bristles; ray pappus 1-3 mm, about as long as to much shorter than cypselae and ray corolla tube; disk pappus 3-6.8 mm, usually much longer than cypselae. 2n = 18. Flowering Jul-Dec. *Bosques seco tropical, coastal vegetation, disturbed sandy bluffs, disturbed thorn scrub, grassy hills, pastures, roadsides, tropical deciduous forest.* Ch (Purpus 6441, NY); G (?possible); ES (Montalvo JF-00123, MO); N (Neill 1151, MO). 0-800 m. (S. Mexico, Mesoamerica.)

*Tridax platyphylla* occurs mainly on the Pacific watershed. Powell (1965) reported the species disjunct from Chiapas to Nicaragua, but the fact that collections of the species now known from geographically intermediate El Salvador increase the likelihood that the species may be found as well in Guatemala. The trichomes are "tuberculate at base," i.e., have prominent subsidiary cells, as mentioned by Powell (1965), and although pronounced here are not diagnostic and occur in several species of the genus.


Common diffuse perennial herbs, (4-)20-60 cm, sometimes flowering in first year; stems procumbent, elongating horizontally to 1 m, brittle to infrequently subsucculent, often rooting at the nodes, striate, pilose-hirsute and also often minute-puberulent with ascending to appressed moniliform trichomes, internodes about as long as or longer than associated leaves; herbage with trichomes often 1-2 mm. Leaves simple, petiolate; blade (1-)2-6.5 × (0.4-)1-3.5(-5) cm, lanceolate to ovate or sometimes trilobed, chartaceous, trinerved from very near the base, adaxial surface sometimes scabrous, both surfaces pilose-hirsute to rarely strigose, trichomes subsidiary cells prominent base cuneate to obtuse or infrequently subhastate above the basal acumination, margins coarsely few-serrate to 2-4-incised (incisions 0.5-1.5 cm) especially proximally, apex acute or acuminate; petiole (0.2-)0.4-2(-3) cm, base subclasping. Capitulescence of 1-few(-several) solitary capitula terminating main axis and branchlet apices; peduncles (5-)10-25 cm, pilose-hirsute, eglandular, sometimes slightly fistulose apically. Capitula (7-)10-13 mm, radiate; involucre 5-8 × (4-)7-11 mm, campanulate; phyllaries 12-16, 5-8 × 2-3.5 mm, loosely imbricate, slightly unequal, 2(-3)-seriate, narrowly ovate to lanceolate, 3-10-striate, the outer phyllaries slightly shorter than the inner, green to purplish, pilose, apex acute or acuminate, the inner phyllaries scarious, sometimes purplish distally, apex acute to less frequently obtuse, puberulent; paleae 6-8 mm, stramineous-hyaline with narrowly brown midvein, entire or sometimes subtrifid or sublacerate, apex sometimes purplish. Ray florets (3-)5(-8); corolla 6-8 mm, white to pale yellow, tube 2.5-4 mm, setose, limb 2.5-5 × 2-3.5(-5) mm, obovate or suborbicular to cuneate, c. 10-nerved, 2 main nerves setulose abaxially, apex (2-)3-lobed, sometimes deeply so. Disk florets (15-)25-50+; corolla 5-6.5 mm, funnelform, yellow to sometimes rose-purplish-tipped, setose, tube much shorter than throat, lobes 0.7-1 mm; style branches 1-1.5 mm. Cypselae 2-2.5 mm, strigose-sericeous; pappus of 18-20 unequal broad-based plumose bristles alternating longer and shorter, lateral cilia 20-30+ per bristle, cilia to 1+ mm; ray pappus 2-3.5 mm, about as long as or only slightly shorter than ray corolla tube; disk pappus 5-6 mm. 2n = 36. Flowering Year-round.

Beaches, cafetales, campo abierto, disturbed areas, gravel bars, open subtropical forest, roadsides, rock crevasses, sand dunes, savannas, streamsides. T (Pruski et al. 4237, MO); Ch (Croat 40705, MO); Y (Valdez 89, NY); C (Martinez S. 30015, MO); QR (Tellez y Cabrera 2784, MO); B (Lundell 4826, NY); G (Pruski et al. 4511, MO); H (Yuncker 4884, F); ES (Calderón 428, MO); N (Baker 2130, US); CR (Pruski y Sancho 3807, MO); P (Greenman y Greenman 5008, MO). 0-1500(-2500) m. (S. Estados Unidos, Mexico, Mesoamerica, Colombia, Venezuela, Guyanas, Ecuador, Peru, Bolivia, Brazil, Argentina, Cuba, Jamaica, Hispaniola, Puerto Rico, Virgin Islands, Lesser Antilles, Trinidad and Tobago; introduced into Africa, Asia, Australia, New Zealand, Islas del Pacifico.)
Tridax procumbens is found in all 12 Mesoamerican political units, widely distributed elsewhere, and in parts of its range has been variously used medicinally. It is the most common species of Tridax in Mesoamerica.


Perennials subscapose herbs, 30-90 cm, few-branched at base, sparsely leafy to mid-stem, from thick xylopodium; stems usually simple or sometimes branched in capitulescence, erect or extreme base slightly procumbent, striate, hirsute proximally, elongate-stipitate-glandular distally, internodes about as long as or shorter than associated leaves. Leaves simple, subssesile or short-petiolate, distal-most pair bracteate; blade 3-6.5 × 0.7-2.3 cm, lanceolate, chartaceous to stiffly so, secondary veins not prominent, both surfaces hirsute, subsidiary cells somewhat prominent, base narrowly cuneate, margins subentire to serrate with 2-8 pairs of teeth, apex acute or acuminate; petiole 0.2-1 cm, narrowly winged distally, hirsute. Capitulescence monocephalous to open-corymbiform, 1-3-capitulate, capitula held to c. 60 cm above distal-most leaves, lateral capitula (when present) late-forming and long-pedunculate, nearly overtopping capitulum of central axis; peduncles 1-33 cm, naked when open-corymbiform or when monocephalous with a pair of bracteate leaves at c. mid-peduncle, elongate-stipitate-glandular especially distally. Capitula c. 15 mm, radiate; involucre 9-12 × 8-10 mm, narrowly campanulate; phyllaries 12-17, imbricate, strongly rounded, 4-6-seriate, the outer several times shorter than the inner, margins scarious, apices rounded, the outer phyllaries 1.5-3 × (1-)2-3 mm, ovate, apex green to purplish, distally ciliolate, grading progressively to the inner phyllaries, these 10-12 × 2-4 mm, elliptic-lanceolate, apex purplish; paleae 5-6 mm, oblong, apex obtuse to acute, sometimes trifid. Ray florets (2-)3; corolla pinkish purple, tube 5-7 mm, setose, limb 11-14(-15) × 9-10 mm, cuneate, c. 14-nerved, glabrous abaxially, apex subtruncated, shortly 3-lobed. Disk florets 16-40; corolla 7.5-8.5 mm, funnelform, yellow, tube setose, shorter than throat, lobes 1-1.5 mm, margins papillose; style branches 1.5-1.7 mm. Cypselae 3-3.5 mm, strigose-sericeous; pappus 0.8-2 mm, shorter than cypselae, of 10-14 plumose-ciliate squamellae. Flowering Nov. Pine-oak forests. Ch (Breedlove 65645, DS n.v., cited by Strother, 1999); G (Skutch 1632, F). 1500-2200 m. (Mexico [Oaxaca], Mesoamerica.)

Tridax purpurea is apparently rare, and is known to me in Chiapas from only a single collection in the eastern Sierra Madre near Volcán Takaná. The type collection of Tridax oaxacana B.L. Turner is the fourth collection of T. purpurea known to me, two collection
localities occurring in each Mexico and Guatemala. Budding material distributed as *Tridax purpurea* does not have stipitate-glandular peduncles and is excluded.


Perennials herbs, 15-40 cm, sparsely leafy; stems few-branched, procumbent to ascending, striate, hirsute, internodes about as long as or shorter than associated leaves. Leaves simple, subsessile to short-petiolate, distal-most pair sometimes narrow and bracteate; blade 2-6.5 × 0.5-2 cm, lanceolate to ovate, chartaceous, trinerved from near base, both surfaces hirsute, subsidiary cells somewhat prominent, base attenuate, margins coarsely to deeply serrate, apex acute or attenuate; petiole 0-0.3 cm, hirsute. Capitulecence of open corymbiform, few-capitulate, capitula long-pedunculate; peduncles 8-20 cm, slender, pilose-hirsute, eglandular. Capitula 8-11 mm, radiate; involucre 6.7-7.5 × 9-13 mm, campanulate; phyllaries 10-12, imbricate, nearly subequal, 2-3-seriulate, the outer phyllaries 3.5-6-(7) × 2-6.5 mm, about as long as the inner ones, ovate to obovate, alternating broader and longer, hirsute-strigose, trichomes thin, apex acuminate to attenuate, grading progressively to the inner phyllaries, these 3-7.5 × 2-3 mm, elliptic-lanceolate to oblong, 3-5-striate proximally, scarious and glabrous throughout or sometimes apex herbaceous and harshly hirsute-strigose; clinanthium 1.5-2.5 × 4-6 mm; paleae 6-9 mm, apex broadly acute, setulose apically. Ray florets 6-8; corolla bright yellow, tube 4-5 mm, setose, limb 4-7 × 3-7 mm, obovate to cuneate, c. 10-nerved, 2 main nerves setulose abaxially, apex 3-lobed. Disk florets 20-30; corolla 6-9 mm, narrowly funnelform, yellow, tube 1-1.5 mm, setulose, throat long and slender, lobes 1-1.5 mm, spreading-reflexed, setulose; style branches 1.5-2 mm.

Cypselae 2-2.5 mm, strigose-sericeous; pappus 4-7.5 mm, shorter than cypselae, of c. 20 plumose bristles; ray pappus 1-2 mm, c. half as long as ray corolla tube and about as long as or shorter than cypselae; disk pappus 4-7.5 mm, longer than cypselae. 2n = 18. Flowering Aug-Mar. *Dunas costeras, roadsides*. 0-50 m. (Mexico [Guerrero y Veracruz], expected in Mesoamerica.)

*Tridax purpusii* is very similar to *T. platyphylla*, differing slightly by bright yellow (vs. white or pale yellow) ray corollas and apically acuminate (vs. broadly acute) paleae. The furthest east *T. purpusii* is known to me is documented by *Smith 579* (MO), a collection from Coatzacoalcos, Veracruz, only 40 km west of the Tabasco border. *Tridax purpusii* might thus be reasonably expected in low coastal regions of Tabasco and perhaps elsewhere in Mexican Mesoamerica. Powell (1965) gave the flowering time as March-August.

Annual or short-lived perennial herbs; stems erect, pubescent, usually stipitate-glandular at least in capitulescence. Leaves opposite, petiolate or distal ones with petiole winged to base or sometimes subsessile; blade rhombic-ovate to elliptic, chartaceous, triplinerved from above base near basal acumination, trinervation continuing to near apex, both surfaces pubescent, trichomes of adaxial surface with bulbous subsidiary cells, abaxial surface also usually finely punctate-glandular, base cuneate to rounded then abruptly narrowed and decurrent onto petiole, margins denticulate, apex acute or acuminate, petiole winged distally. Capitulescence terminal, corymbiform-paniculate, branching opposite; peduncles usually stipitate-glandular and pubescent, capitula sometimes subnutant in bud. Capitula radiate, phyllaries, paleae, and sterile disks ovaries often greatly acrescent in fruit; involucre broadly turbinate to hemispherical; phyllaries to 5 mm, shorter than disk florets, dimorphic, usually somewhat graduate, 2-seriate, loosely imbricate but eximbricate within individual series, the series more or less alternate with each other, thinly herbaceous, green; outer 5 phyllaries linear to elliptic, usually appressed or ascending, very rarely reflexed, hispidulous and sometimes subsessile-glandular; inner 3-10 phyllaries cuneate or obovate to orbicular, navicular, fertile by immediately subtending a ray floret, closely surrounding abaxial part of ray ovary and typically deciduous with it, erect, sparsely hispidulous; clinanthium convex, paleate; paleae dimorphic, scarious, stramineous or sometimes pale green, subglabrous or broad outer paleae hispidulous distally on adaxial surface, outer paleae obovate to orbicular, reverse-appressed to ray cypselae but not deciduous with it, striate, inner paleae linear-lanceolate, 1-nerved. Ray florets 3-10, 1-seriate, pistillate; corolla lemon-yellow or white, tube very short, sometimes stipitate-glandular, limb obviously cuneate or flabellate, evenly thin-nerved, abaxially setose, apex deeply 3-lobed; styles well exserted, branches about twice as long as corolla tube, branches with stigmatic surfaces 2-banded with paired stigmatic lines. Disk florets 8-30(-55), functionally staminate, epappose; corolla funnelform, shortly 4-5-lobed, yellow or orange-yellow, tube shorter than limb, throat with single resin duct along each vein; anthers yellowish to pale brown, appendage ovate, apex acuminate; style undivided or minutely bifid. Ray cypselae black, shining, triquetrous (adaxial face planar), obpyramidal or sometimes ellipsoidal, longitudinally striate, apex truncate or sometimes rounded; epappose. $x = 15$. Aprox 5 spp. Mexico, Mesoamerica.

*Trigonospermum* was revised by McVaugh y Laskowski (1972), who recognized four species. The cypselae of *Trigonospermum* are closely surrounded an adnate-subtending inner phyllary and
an appressed but not adnate outer palea, but only falsely resemble the ray cypselae unit of *Galinsoga*. The paleae are noteworthy in their hispidulous adaxial surfaces. Within individual capitula, disk floret numbers may vary greatly, disk corollas are often either 4-lobed and 5-lobed, and ray corolla limb sizes vary greatly, thus these characters are not useful in species circumscriptions.


1. Outer paleae hispidulous distally on adaxial surface, apices fimbriate-erose.

3. **T. melampodioides**

1. Outer paleae glabrous except for erose apices.

2. Ray cypselae obpyramidal, broadest at truncate apices. **1. T. adenostemmoides**

2. Ray cypselae obovoid, broadest below the obtuse-rounded apices. **2. T. annuum**


Herbs, presumably annuals, to 0.8 m; stems simple into capitulescence. Leaves: blade 6-12 × 4-8 cm, broadly ovate or rhombic-ovate grading to distal ones elliptic-ovate, surfaces hirsutulous, eglandular or sparsely punctate-glandular, margins regularly crenulate or crenate, apex acute; petiole 0.5-1.5(2) cm, winged in distal half. Capitulescence pluricapitulate, mostly from distal 1-2 nodes; peduncles usually 5-20 mm, hispidulous and stipitate-glandular. Capitula c. 3 mm, short-radiate; involucre 2-3 mm diam., campanulate; phyllaries 6-8, 1-3.5 mm, sparsely hispidulous or hirsutulous; outer phyllaries appressed or ascending; inner phyllary apex acuminate; outer paleae 1.8-2.5 mm, glabrous except for erose apex; inner paleae to c. 1 mm. Ray florets 3; corolla c. 2 mm, only slightly exserted. Disk florets c. 10; corolla 1.5-2.5 mm, 4-5-lobed. Ray cypselae 1.8-2.5 mm, obpyramidal, broadest at truncate apex. Flowering Sep-Nov. *Tropical deciduous forests, volcano slopes*. Ch (Strother, 1999: 130). 700-1700 m. (Mexico [Veracruz, Chiapas].)

I have seen only a photograph of the holotype of *Trigonospermum adenostemmoides*, the only taxon cited by Strother for Chiapas. McVaugh y Laskowski (1972) give *T. adenostemmoides* as endemic to the Orizaba region, and it seems possible that some of five collections (i.e., *Soule y Prather 3093* and the three Breedlove collections, each from near Motozintla and Niquivil along the southwestern border with Guatemala), cited by Strother (1999) may instead be *T. annuum.*

*Trigonospermum stevensii* S.D. Sundb. et Stuessy.

Annual herbs 0.2-1.4 m; stems unbranched in proximal half, distally hirsutulous and stipitate-glandular. Leaves: blade 4-14 × 1.5-9 cm, elliptic to ovate, adaxial surface scabrous-hispidulous to strigose, trichomes antrorse to subappressed, abaxial surface punctate-glandular, otherwise substrigillose to strigose, trichomes mostly appressed, base cuneate or obtuse, then narrowing into attenuate acumen, margins finely serrulate or sometimes subentire, apex acuminate; petiole 0.8-2.5 cm, winged in distal 1/2-2/3. Capitulescence pluricapitulate, mostly from distal 2-5 nodes; peduncles usually 5-20 mm, hirsutulous and stipitate-glandular, the glandular and non-glandular trichomes usually 0.5-1 mm, more or less subequal in number and length. Capitula 2.5-5(-6) mm; involucre 3-4(-6) mm diam., turbinate to hemispherical; phyllaries (7-)8(-9), mostly 2.5-4.5(-5.5) mm, puberulent and punctate-glandular to stipitate-glandular; outer phyllaries (4-)5, 0.5-1 mm diam., lanceolate; inner phyllaries 3(-4), 3-4 mm diam., ovate, apex apiculate especially in fruit; outer paleae 2.4-5 mm, obovate, 5-9-nerved, stramineous, in post-fruiting capitula falsely resembling rays corolla limbs, glabrous except for erose apex; inner paleae 1.3-2.3 mm. Ray florets 3-4; corolla 2.5-3.5(-5) mm, usually slightly exserted, tube c. 0.4 mm, limb 1.5-4.5-5.5 × 3-6 mm diam., broadly flabellate and often broader than long, faintly c. 5-nerved, sparsely glandular abaxially, deeply lobed about 1/2 to base. Disk florets (1-)6-25; corolla 2-2.4 mm, usually sparsely glandular and very sparsely setose, tube shorter than to about as long as sterile ovary, at anthesis limb more or less fully exserted, lobes 5, c. 0.3 mm; ovary 0.6-1.5 mm (usually acrescent), much shorter than inner paleae. Ray cypselae 3-4 mm, obovoid, broadest below the obtuse-rounded apex. Flowering Oct-Nov. *Cultivated areas, dry hillsides, fields, thickets.* G (Pruski y MacVean 4492, MO); N (Stevens y Grijalva 16156, MO). 800-2100 m. (Mexico, Mesoamerica.)


Herbs 0.4-2.5(-4) m; stems distally hirtellous to hirsutulous and stipitate-glandular. Leaves: blade (3.5-)8-18 × (1.5-)5-14 cm, ovate or rhombic-ovate grading to distal ones elliptic-ovate,
adaxial surface scabrous-hispidulous to sometimes glabrate, trichomes usually patent to antorse, abaxial surface punctate-glandular, otherwise subtrigillose or villosulous to sparsely so or sometimes glabrate, trichomes mostly appressed, base obtuse to truncate, with broad acumen, margins finely serrulate to serrate, sometimes irregularly so, apex acute to acuminate; petiole 0.5-5 cm, winged in distal half. Capitulescence pluricapitulate, mostly from distal 1-2 nodes; peduncles usually 5-20 mm, hispidulous and stipitate-glandular. Capitula 3.5-6 mm, obviously radiate; involucre 2.5-5 mm diam., campanulate to hemispherical; phyllaries c. 10, mostly (1.5-)2.5-3.5(-4) mm; outer phyllaries appressed or ascending, glabrous to hirtellous, ciliate; inner phyllaries hirtellous, apex acuminate especially in fruit; outer paleae 1.8-3 mm, hispidulous distally on adaxial surface, apex fimbriate-erose; inner paleae c. 1.5 mm. Ray florets 3-5(-8); corolla mostly 5-11 mm, well-exserted, tube c. 0.5 mm, limb 5-10.5 mm diam., 8-11-nerved, glandular abaxially, teeth 2-3.8 mm. Disk florets (10-)20-40(-55); corolla 1.5-3 mm, tube c. 0.5 mm, lobes c. 0.5 mm. Ray cypselae 2-3 mm, obpyramidal, broadest at truncate to concave apex. Flowering Dec-Jan. Pacific slope montane forests, pine-oak forests, volcano slopes. Ch (Gómez 104, MO). G (McVaugh y Laskowski, 1972: 505). 1400-2100 m. (Mexico, Mesoamerica.)

*Trigonospermum melampodioides* was excluded from Guatemala by Nash (1976), but here I follow McVaugh y Laskowski (1972), who reported the species in Guatemala based on *Standley 59378* (MICH).

21. **Unxia** L. f.


Por J.F. Pruski.

Annual herbs or subshrubs to 2.5 m; stems branched, spreading, subterete, pilose to subglabrous, not stipitate-glandular, trichomes often as long as or longer than stem diam. Leaves opposite, sessile to short-petiolate; blade linear-lanceolate to ovate, not lobed, chartaceous, 3-5-veined from near base, adaxial surface subglabrous to pilose, abaxial surface subglabrous to densely pilose, sparsely glandular, nearly smooth to abaxial surface conspicuously reticulate. Capitulescence a leafy compact terminal cyme with 1-5 subsessile to short-pedunculate capitula. Capitula radiate or sometimes indistinctly so, 8-30-flowered; involucre campanulate to hemispherical; phyllaries 6-18, moderately dimorphic, imbricate, subequal to somewhat graduate with the outer typically more than half as long as the inner, 2-3-seriate, greatly spreading only post-fruit, elliptic to obovate, at least the inner pluristratiate; outer series 2 or 4, opposite or opposite-decussate, subherbaceous to thinly so, appressed or ascending, flat, pubescent to pilose; innermost phyllaries
navicular-plicate, scarious-chartaceous, often yellowish; receptacle convex to short-conical, pateate to often irregularly so in the outer disk florets, sometimes all disk florets appearing epileate; paleae linear-lanceolate to lanceolate-pyriform or sometimes rudimentary and squamulose, not conuplicate, scarious, brittle, deciduous individually or sometimes persistent but greatly spreading or reflexed. Ray florets 3-7(-9), 1-seriate, pistillate; corolla attached to center of ovary apex, yellow, tube glandular or pilose to infrequently glabrous, tube and limb subequal or limb somewhat longer than tube, limb ovate (ours) to oblong, evenly thin-nerved, abaxially glandular, apex rounded to shallowly 3-lobed; style branches with stigmatic surfaces 2-banded with paired stigmatic lines. Disk florets 5-20, functionally staminate, epappose; corolla small, funnelform, 5-lobed, yellow to yellow-orange, glandular (glands readily collapse in EtOH) or sometimes seemingly glabrous, rarely pilose, throat usually with resin ducts single along veins, lobes triangular-lanceolate, shorter than the throat, erect; anthers yellow to black; ovary sterile, style undivided. Ray cypselae obovoid, moderately compressed, black, striatulate, sometimes sublenticellate, glabrous, annulus sometimes raised; epappose. x = 16. 2 spp. Panama, northern South America.


Annual herbs 0.1-0.6 m; stems single from base, thin, strongly divaricate-branched throughout, branching opposite proximally, branching distally appearing dichotomous with lateral branches quickly overtopping terminal remnant capitulescence of central branch, brownish to reddish-brown, paucicostate-sulcate, long white-pilose to sometimes sparsely so, internodes (0.5-)4-16 cm, at mid-stem usually much longer than decussate leaves, distal 2-3 nodes sometimes closely spaced, trichomes to 3.5 mm. Leaves subsessile to short-petiolate; blade 1.5-5(-8) × 0.3-1.7(-2.7) cm, linear-lanceolate to lanceolate-ovate, laterally spreading, arching basal pair of
lateral veins reaching to near apex, long-pilose to sparsely so with trichomes to c. 1 mm, adaxial surface with veins slightly impressed, abaxial surface also sparsely punctate-glandular, base rounded or obtuse to sometimes cuneate, margins subentire to serrulate, apex acute to acuminate; petiole 0.1-0.5(-0.8) cm. Capitulescence subsessile, 1-3-capitulate, about half as long as the subtending laterally spreading leaves; peduncles 1-6(-10) mm, pilose to densely so. Capitula 3.5-6 mm, globose, short-radiate, 8-15-flowered; involucre 3-7 mm diam.; phyllaries 6-10; outer phyllaries 2-6 × 1-2.5 mm, lanceolate to elliptic, sometime slightly spreading, thinly subherbaceous, indistinctly 5-9-striate, hirtellous to pilose, ciliate; inner phyllaries 3.5-5 × 1.5-3 mm, oblong to obovate, obviously c. 11+-striate, hirsute to glabrous, apex rounded; receptacle to c. 0.6 × 0.6 mm diam., indistinctly and irregularly paleate to basically epeate; paleae of outer disk florets few, (0.2-)1-2 mm, linear-lanceolate or sometimes merely squamulose, the inner disk florets typically appearing epeate. Ray florets 3-5, shortly exserted and ascending to slightly spreading; corolla tube 0.4-1 mm, usually sparsely glandular, limb (1-)1.3-2.2 mm, ovate, 3(-5)-nerved, lobes (when present) < 0.1 mm. Disk florets 5-10; corolla 2.2-3.2 mm, glandular, infrequently glabrous or very rarely weakly pilose, tube 0.7-1.2 mm, lobes 0.5-0.9 mm; ovary to c. 1 mm. Ray cypsela 2-2.8 × c. 2 mm, a gradually raised annulus sometimes present, to c. 0.2 mm. 2n = 32. Flowering Aug, Nov-Jan. Brushy slopes, rocky hillsides, sandy areas, savannas. P (Dodge et al. 16878, MO). 0-300 m. (Mesoamerica, Colombia, Venezuela, Guyanas, Bolivia, Brazil.)

Bibliography for Millerieae


**XVI. Tribus Mutisieae** Cass.


Por J.F. Pruski.

Acaulescent rosulate perennial herbs (Mesoamerica), shrubs, vines, or trees, generally monoecious or very rarely dioecious (*Chaetanthera*). Leaves simple or lyrate to infrequently pinnatisect with a tendril-like tip, alternate or rosulate, venation usually pinnate or plinerved, surfaces glabrous or pubescent, base sometimes sheathing, margins commonly subentire to weakly toothed, never spiny. Capitulescence monocephalous, corymbose, or thyrsoid-paniculate, never glomerate. Capitula commonly large and showy, homogamous or heterogamous, typically variously bilabiate (e.g., bilabiate+subactinomorphic, bilabiate+tubular-bilabiate, etc.) or radiate, sometimes discoid, infrequently disciform, chasmogamous or rarely
cleistogamous (autumnal phase of *Leibnitzia*); involucre 1-pluriseriate; phyllaries imbricate; receptacle epeate, glabrous to fimbriate or pilose. Florets isomorphic or dimorphic to sometimes trimorphic, generally bisexual or sometimes unisexual, rarely sterile; corolla 4-5-lobed, subactinomorphic (discoid), bilabiate, or sometimes marginal florets with corollas radiate or long-bilabiate in 1+ series, inner lip (when present) entire to bifid; anthers typically long-caudate (with sterile tails), tails of adjacent thecae free or connate, smooth or papillose, apical appendage elongate, usually stout, typically flat and not ornamented, rarely basally constricted or demarcated from the thecae, filaments usually glabrous, pollen prolate or subprolate, usually subpsilate to microechinate; style trunk glabrous, branches typically shortly bilobed (ovate) to sometimes bifid, usually abaxially with poorly developed collecting papillae, papillae rounded apically, stigmatic surface continuous, apex usually obtuse to rounded, never narrowly acute nor with a well-developed tuft of collecting papillae. Cypselae generally cylindrical, fusiform, or obovoid, infrequently compressed, glabrous or pubescent, apically truncate to rostrate, carpododium annular, infrequently bulbous, never sculptured; pappus generally of many 1-pluriseriate elongate subequal bristles, scabrid to infrequently barbellate, very rarely plumose (*Pachylaena*), commonly persistent, rarely fragile or deciduous, rarely epappose (e.g., *Adenocaulon*). 26 genera and aprox. 260 spp. Centered in the Americas, but the *Gerbera* group especially well-developed in Africa and Asia, largely absent from Australia and Pacifica. 6 genera and 14 spp. occur in Mesoamerica.

Mutisieae were initially circumscribed (albeit with slightly differing complements of genera) by La Gasca (1811) and Candolle (1812) and defined by their capitula which contain bilabiate corollas. The invalid descriptive names Chaenanthophorae and Labiatiflorae were used, respectively, by La Gasca (1811) and Candolle (1812). Cassini (1819b) simultaneously validated Mutisieae and Nassauvieae, separating genera that were treated in a combined sense by both La Gasca (1811) and Candolle (1812). Nassauvieae was treated within Mutisieae by Bentham y Hooker (1873), but Pruski (2004a, 2004b) resurrected Nassauvieae. Bentham y Hooker (1873) recognized 43 genera and five subtribes of Mutisieae (albeit using the later name Onoseridinae Benth. & Hook. f. for the Mutisiinae Less.), but the most widely used system in the 1900s was that summarized by Cabrera (1977), who recognized four subtribes in Mutisieae. The Mutisieae, whether treated as containing or excluding Nassauvieae, are, as noted by Don (1830), largely a South American group. Although Mutisieae are basically defined by having bilabiate corollas (as well as long-caudate anthers and styles with short, often ovate, abaxially weakly papillose branches with a continuous stigmatic surface), bilabiate corollas do not occur in all genera (Cabrera, 1977).
Where they occur, bilabiate corollas may occur in only the marginal florets of capitula in some genera, only in the central florets in other genera, and may be mixed with other floret types (see La Gasca, 1811; Candolle, 1812; Cassini, 1819b; Don, 1830; and Bentham y Hooker, 1873; Cabrera, 1977). This variation is manifest in the many types of capitula that may occur among various genera, including several homogamous types (e.g., bilabiate, long-bilabiate, tubular-bilabiate, and sometimes discoid), heterogamous ones (radiate, long-bilabiate+tubular-bilabiate, long-bilabiate+subactinomorphic, radiate+filiform-subactinomorphic+bilabiate, etc.). That such capitular variation occurs together with variations in bilabiate corolla floral formulae (4+1, 3+1, 1+4, and the common 3+2) serves to illustrate that our tribal taxonomy is not built principally upon differences in corolla or capitular morphologies, but rather on the anthers and style branch features stressed by Cassini (1819b). Indeed, Pruski (2004a, 2004b) resurrected tribe Nassauvieae from synonymy of Mutisieae stressing the diagnostic characters of the slender, apically tufted-papillose, typically truncate-tipped style branches of Nassauvieae as differing from Mutisieae s. str.

Cabrera’s (1977) work summarized the suprageneric systems proposed over the previous century. Because Cabrera was long-acknowledged world specialist who over five decades of active work revised several of the largest genera of the tribe (e.g., Chaetanthera, Gochnatia, Mutisia, etc.) and gave a clear concise morphological character overview, the Cabrera (1977) classification scheme has been largely accepted de facto and used as the framework (as done here) for future investigations, many of which ultimately tweaked the Cabrera groupings and/or ranks.

The most significant recent discovery in Asteraceae, for example, was that of Jansen y Palmer (1987), who described subfamily Barnadesioideae based on their finding that (the then) subtribe Barnadesiinae Benth. et Hook. f. lacks a 22 kb chloroplast DNA inversion found in all other Asteraceae, to which it is thus sister. The three remaining subtribes of the early-divergent Mutisieae (sensu Cabrera, 1977), in turn, have each been elevated to the tribal level, but only Pruski’s (2004a, 2004b) resurrection of tribe Nassauvieae involves Mesoamerican genera and their tribal dispositions. Of the two non-Mesoamerican subtribes of Mutisieae (sensu Cabrera, 1977), Barnadesiinae is recognized as Barnadesieae D. Don and Gochnatiinae Benth. et Hook. f. is recognized as Gochnatiaeae Rydb. No species of Gochnatia Kunth (Gochnatieae) are known in Mesoamérica, but G. obtusata S.F. Blake and G. smithii B.L. Rob. & Greenm. occur in Oaxaca and should be looked for in Mesoamerica.

Although among Mesoamerican groups, the Gerbera group is sometimes recognized at the tribal level, they were treated as Mutisieae by Cabrera (1977). The Gerbera group is treated here
in Mutisieae (i.e., basically the Mutisiinae sensu Cabrera, 1977), as done by Hind (2007) and Katinas et al. (2008), whereas Onoseris as well as Lycoseris are recognized as tribe Onoserideae, as in Panero y Freire (2013). Nassauvieae, Onoserideae, and Mutisieae belong to subfamily Mutisioideae, which was first formally resurrected from synonymy of Carduoideae by Pruski y Sancho (2004). Mutisioideae was unnamed in Bremer (1994), albeit implicit in his tribal cladogram. Because phylogenetically Onoserideae Solbrig (Mutisioideae) appears sister to Mutisieae+Nassauvieae it is recognized at tribal level, even though some studies it appears nested within Mutisieae. Other important works used here as building blocks upon which this treatment draws significantly are those of Hansen (1990, 1991), Bremer (1994), and Hind (2007), and Katinas et al. (2008).

As described by Bentham y Hooker (1873), Mutisieae included some members with opposite leaves and stems with axillary spine. However, the genera possessing those characters have been excluded from Mutisieae, and the description above modified accordingly. Cabrera (1977) recognized 89 genera and about 950 species of Mutisieae. Bremer (1994) recognized Barnadesieae as distinct, and recognized 76 genera and about 970 species as Mutisieae. Hind (2007) recognized Barnadesieae as distinct, and recognized 82 genera and 950+ species of Mutisieae. Katinas et al. (2008) recognized both Barnadesieae and Nassauvieae (as well as Stifftieae and the Dicoma group) as distinct and recognized 43 genera and about 500 species as Mutisieae. Here, I excluded both Barnadesieae, Nassauvieae, and Onoserideae (as well as Gochnatieae, Stifftieae, the Dicoma group, and the Pertya group) from Mutisieae, and recognized only 26 genera (which includes the Gongylolepis group, and the Hyalis group) and about 260 species within Mutisieae, which as somewhat defined perhaps more approximates monophyly that earlier classification systems.

1. Few-branched herbs with corymbiform capitulecence; capitula 3-5.5 mm; cypselae stout-stipitate-glandular, rounded apically, epappose. **1. Adenocaulon**

1. Acaulescent scapose herbs; capitula ≥ 10 mm; cypselae glabrous to inconspicuously short-glandular or papillose, constricted apically to rostrate, pappus of many elongate bristles.

2. Scapes ebracteolate.

3. Leaf surfaces discolorous; corollas usually white to pinkish; marginal florets radiate or sometimes indistinctly bilabiate, without staminodia, corollas included within involucres or slightly longer than phyllaries. **2. Chaptalia** p.p.

3. Leaf surfaces concolorous; corollas usually red or orange, sometimes yellow or pink; marginal florets bilabiate, with staminodia, corollas well-exserted from involucres.

3. Gerbera

2. Scapes bracteolate.

4. Phyllaries glabrous; cypselae glabrous; capitula usually isomorphic and chasmogamous. **2. Chaptalia** (p. p., C. runcinata)

4. Phyllaries arachnoid-lanate to glabrate; cypselae densely papillose; capitula dimorphic, with alternating chasmogamous and cleistogamous phases.

4. Leibnitzia

1. Adenocaulon Hook.

Por J.F. Pruski.

Erect or ascending, perennial rosulate herbs to c. 1 m, rhizomes short and stout; stems simple or few-branched in the capitulescence, exalate or winged, arachnoid-pubescent, usually with stipitate-glandular trichomes especially distally. Leaves mostly basal, a few also caudine, alternate, short- to long-petiolate or the distal ones sessile; blade simple to infrequently lyrate, venation pinnate, trinerved from base, or 5-plinerved (camptodromous, with a basal pair of veins and a well-developed suprabasal pair), adaxial surface glabrous or nearly so, abaxial surface white-tomentose, base often cordate to truncate or hastate, margins entire to dentate. Capitulescence terminal, narrowly to open-corymbiform, few-several(-numerous)-capitulate; peduncles often elongate. Capitula small, hemispherical, disciform, 4-17-flowered; involucre 3-8 mm diam., campanulate; phyllaries few, broad, subequal, 1(-2)-seriate, herbaceous, sometimes connate basally, reflexed in fruit; receptacle flat or convex, e paleate. Marginal florets uniseriate, pistillate, usually with minute staminodia; corolla very small, subbilabiate (with inner lip narrower than outer lobes; nearly subactinomorphic in Mesoamerica), or bilabiate (3+1),
campanulate, deciduous or infrequently persistent, tube short and broad, lobes recurved, inner lip (when distinct) entire to bifid; style branches short-ovate, recurved, abaxially weakly papillose, apex obtuse to rounded. Disk florets functionally staminate; corolla funnelform or campanulate, deeply 5-lobed; anthers short-caudate (strongly sagittate) basally, filaments glabrous, tails slightly distinct, apical appendage triangular-ovate or minute, incurved, somewhat demarcated from the thecae, apex broadly obtuse to acute or sometimes merely mucronulate; pollen subprolate; style unbranched, ovary rudimentary, glabrous. Cypsela obovoid, often compressed (Mesoamerica), rounded apically, indistinctly few-striate, viscid stipitate-glandular, carpodium annular; pappus absent. $x = 23$. 5 spp. 3 species in the Americas (Northern North America, Mesoamerica, and south-temperate South America) and 2 species in Asia.

The genus *Adenocaulon*, by its subrosulate habit, minute corollas, and exserted stipitate-glandular epappose cypsela, is readily recognizable. Blake (1934) provided a synopsis of *Adenocaulon*, which was monographed by Bittmann (1990a, 1990b), who recognized 5 species. *Adenocaulon* is similar to, but differs from, monotypic Patagonian *Eriachaenium* Sch. Bip. most notably by stipitate-glandular (vs. pilose) cypsela. The viscid stipitate-glandular cypselae of *Adenocaulon* are adapted for animal (possibly bird) dispersal.

*Adenocaulon* was treated by Nash (1976c) as a member of tribe Inuleae, but by microechinate pollen and a continuous stigmatic surface is misplaced there. More recently, *Adenocaulon* was treated as having problematic placement probably within Nassauvieae (sub Nassauviinae) by Hind (2007), but was confirmed as Mutisieae by Katinas et al. (2008).


Herbs 30-75 cm, rhizome bearing 1-few stems, roots fleshy-fibrous; stems sparsely leafy, subterete to angled, narrowly winged proximally by decurrent leaf base, thinly arachnoid-tomentose to glabrate, without stipitate-glandular trichomes, wings 1-2 mm diam., arachnoid-tomentose on one side. Leaves (2-)5-27 × (0.5-)1.7-10 cm, lyrate-pinnatifid (obovate in outline) or distal ones simple and lanceolate, chartaceous, venation pinnate, surfaces bicolorous, basally attenuate, tapering into winged petioliform base 3-10 cm, margins generally with 2-4 pairs lobes cut about $\frac{1}{2}$+ to rachis, lobes 0.5-4.5 × 0.7-3.5 cm, deltoid to ovate, entire to denticulate, lobe apex acute to rounded, terminal lobe the largest, 2-6 × 2-9 cm, deltate and subcordate, apex
acute to obtuse, rachis 0.5-1 cm; distal stem leaves 2.5 × 0.5-2 cm, slightly lyrate-pinnatifid to more commonly unlobed and sessile. Capitulescence 4-9-capitulate, 1-2 branched, branches without stipitate-glandular trichomes, often subtended by a sessile linear bracteole to c. 5 mm, the terminal capitulum much longer-pedunculate than the proximal-lateral ones; peduncles 0.5-4 cm, thinly arachnoid-tomentose. Capitula 3-5.5 × 3-5 mm (shorter at anthesis to much longer in fruit); involucre to c. 2 mm; phyllaries 6-8, 1.3-2 x 0.8-1.2 mm, triangular-lanceolate, thinly arachnoid, apex acute. Marginal florets 5-8; corolla 0.5-0.8 mm, white to ochroleucous or sometimes violet-tipped, 4-lobed, glabrous, persistent in fruit, tube 0.2-0.4 mm, lobes 0.3-0.4 mm, the recurved tips sometimes touching the glands of the distal portion of cypselae; style shaft 0.5-0.9 mm, branches 0.2-0.3 mm, apex broadly obtuse. Disk florets 5-8; corolla 1.9-2.2 mm, white to ochroleucous or sometimes violet-tipped, glabrous, tube and throat 1.1-1.2 mm, poorly differentiated, lobes 0.8-1 mm; anthers 0.6-1 mm, tails 0.1-0.2 mm, appendage a minute mucro < 0.1 mm; style apex globular, ovary c. 1 mm. Cypselae 4.5-5.5 × 2-3 mm, much longer than the disk florets and well-exserted from involucre, greenish to brownish, moderately stout-stipitate-glandular, less so proximally, glandular trichomes 0.2-0.3 mm. Flowering Sep-Nov. *Oak forest, pine-oak forests, thickets, volcano slopes.* Ch (Breedlove y Strother 46228, MO); G (Standley 61774, NY). 1900-2700 m. (Endemic.)

*Adenocaulon lyratum* is the sole species of the genus with eglandular stems and lyrate leaves. The Guatemala voucher (*Standley 61774, NY*) was collected in January, but was not in anthesis, but rather in late fruit.

2. **Chaptalia** Vent. nom. cons.

*Leria* DC. non Adans, *Thyrsanthema* Neck. ex Kuntze

Por J.F. Pruski.

Acaulescent scapose perennial rosulate herbs, rarely short-caulescent, fibrous-rooted, sometimes rhizomatous. Leaves radical, alternate, mostly dilated at stem; blade simple to lyrate-pinnatifolobed, chartaceous, pinnately veined, discolorous, abaxial surface usually green (Mesoamerica), abaxial surface usually tomentose. Capitulescence scapose; scapes (peduncles) monocephalous lanuginose-tomentose, commonly ebracteate. Capitula usually isomorphic and chasmogamous (rarely cleistogamous in south America), heterogamous, usually radiate-filiform-subactinomorphic-bilabiate, many-flowered, often nutant; involucre cylindrical or turbinate to campanulate or hemispherical; phyllaries distinctly graduated, 3-7-seriate, often elongating in fruit, usually linear-lanceolate, scarious, usually at least partly lanuginose-tomentose, sometimes
puprlish distally, fully reflexed and pointing downward when past fruit (rarely so when fruit attached); receptacle flat to convex, epealeate, glabrous, in Mesoamerica the post-fruitting receptacle 2-8 mm diam. Florets trimorphic in Mesoamerica (occasionally only dimorphic by lacking submarginal pistillate florets) usually with many outer pistillate florets and fewer central bisexual (or sometimes functionally staminate) florets, corolla white to pinkish or sometimes limb tingled puprlish abaxially, often sparsely papillose. Marginal florets 1-2(-3)-seriate, pistillate, typically without staminodia; corolla radiate (3 + 0, limb with inner lip obsolete) or less commonly indistinctly bilabiate (limb with a reduced inner 2-lobed lip), limb not typically well-exserted from involucre; style branches shorter than to about as long as limb, mostly filiform, smooth. Submarginal (intermediate) florets (1-)few-seriate, pistillate; corolla short-filiform-subactinomorphic (usually basically eradiate by extreme limb reduction) or sometimes with a small limb obviously smaller than in marginal florets; style usually longer than corolla. Central florets, bisexual (Mesoamerica) or sometimes functionally staminate; corolla usually slightly tubular-bilabiate (3 + 2, lobes usually slightly irregular, erect or ascending); anthers mostly included, filaments glabrous, tails long, slender, smooth, apical appendage narrowly ovate; pollen prolate; style branches slightly exserted, short-linear, abaxially papillose, apex obtuse. Cypselae fusiform, slightly compressed, commonly rostrate or sometimes merely constricted apically, 4-12-costate, glabrous, papillose (or inconspicuously short-glandular), inflated-setulose, or short-setulose, rostrum usually as long as or longer than cypselae body, trichomes relatively short, apex rounded or obtuse to less commonly acuminate; pappus of many (50+) elongate scabrid capillary bristles, bristles few-seriate, stramineous to pinkish, typically persistent, basally connate. x = 24. Aprox. 60 spp. Tropical and subtropical America.

Regional treatments of Neotropical Chaptalia, which is recognized here as a matter of convenience, were provided by Burkart (1944) and Nesom (1995). In the Neotropics, Chaptalia by its scapose habit and radical leaves to belongs to the Gerbera group, which includes Leibnitzia, Gerbera, and Trichocline. Burkart (1944) noted that cleistogamous capitula in Chaptalia occur sporadically in a few South American species. Thus, presence of seasonally cleistogamous capitula in the similar Leibnitzia from does not diagnose it from Chaptalia. Leibnitzia differs from Chaptalia by more densely pubescent cypselae always with pointed trichomes, and most species of Gerbera differ from most species of Leibnitzia and Chaptalia by marginal florets usually with staminodia. South American Trichocline differs from Chaptalia by capitula with yellow bilabiate (albeit usually dimorphic in size) corollas, by apically truncate erostrate cypselae, and by sometimes papillose anther filaments. It should be noted that short-caulescent white-trimorphic-flowered Chaptalia oblonga D. Don was referred to Trichocline by
Burkart (1944), but returned to *Chaptalia* by Zardini (1975). Thus, the generic limits within the *Gerbera* group are perhaps neither stable nor natural, and *Chaptalia* may perhaps best treated within an expanded *Gerbera* (which has priority by 2 years over African *Perdicium*), as done by Schultz Bipontinus (1856) and as recommended by Hansen (1990).


1. Scapes 3-10-bracteolate; phyllaries mostly glabrous; leaves often spreading laterally and not ascending.

3. *C. runcinata*

1. Scapes ebracteate or rarely 1-2-bracteolate; at least some phyllaries tomentose, villous, or lanuginose; leaves mostly ascending.

2. Capitula usually erect in bud; leaf blades 0.6-2.2 cm diam.; involucres 6-10 mm diam. and turbinate at anthesis.

1. *C. albicans*

2. Capitula nutant in bud; leaf blades 0.9-7(-8.5) cm diam.; involucres 10-15 mm diam. and turbinate to campanulate at anthesis.

3. Leaves subsessile or with winged petioles, blades lyrate-pinnatifid; mature cypselae ≤ 0.8 mm diam., long-rostrate, rostrum usually 2-3× longer than body; central florets with corollas very slightly tubular-bilabiate, lips 1-1.5 mm; styles of submarginal florets longer than corollas.

2. *C. nutans*

3. Leaves long-petiolate, petioles exalate in proximal ½-3/4, blades usually unlobed or sometimes sublyrate proximally; mature cypselae 0.9-1.3 mm diam., short-rostrate, rostrum about as long as to shorter than body; central florets with corollas distinctly tubular-bilabiate, lips 2-3 mm; styles and corollas of submarginal florets subequal.

4. *C. transiliens*

1. *Chaptalia albicans* (Sw.) [either "Vent. ex" or "Steudel ex"]


Herbs 5-35 cm. Leaves mostly ascending, subsessile and narrowed to a petiolariiform base usually c. ¼ of leaf length; blade 2-10(-16) × 0.6-2.2 cm, oblanceolate to narrowly obovate, adaxial surface glabrous or sparsely floccose-tomentose, abaxial surface densely gray-tomentose, secondary venation indistinct or distinct abaxially, base attenuate, margins subentire or retrorse-denticulate, infrequently sinuate or crispate, apex obtuse to rounded, apiculate. Capitulescence of 1-3(-4) scapes per plant; scape (peduncle) 5-20 cm at anthesis, elongating to 10-35 cm in fruit, ebracteate, densely white-tomentose to glabrous proximally, dilated apically, capitulum usually erect in bud, flower, and fruit. Capitula 10-15 mm at anthesis, elongating to 20-26 mm in fruit, radiate-tubular-bilabiate; involucre 6-10 mm diam. and turbinate at anthesis, 15-25 mm diam. and campanulate in fruit; phyllaries 4-5-seriate, floccose-tomentose or (at least the inner series) distally glabrate; outer series 2-5 × c. 0.8 mm; gradually grading to inner series 8-12(-20 in fruit) × 1-1.8 mm. Marginal florets 13-21, 1(-2)-seriate; corolla 8.5-11 mm, short-radiate, tube slightly longer than limb, limb c. 4 × 0.2-0.3 mm, about as long as phyllaries to slightly exserted at anthesis, apex sometimes bifid; style slightly shorter than corolla, branches c. 1 mm. Submarginal florets 10-15; corolla 2.5-4 mm, filiform and without obvious limb; style longer than corolla. Central florets c. 10; corolla 6-9 mm, slightly tubular-bilabiate, lips 0.5-1 mm; anthers 1.5-2 mm; style branches c. 0.5 mm. Cypselae 8-11 mm, long-rostrate, body 4-5 mm, brown, 5-costate, glabrous or costae inconspicuously short-glandular, costae and rostrum tan, rostrum in fruit longer than body, carpopodium white; pappus 7.5-10.5 mm, usually reaching to about top of involucre or sometimes slightly exserted, stramineous. 2n = 48. Flowering Mar-Nov. *Secondary forests, pine forests, rocky hillsides, savannas.* Ch (Breedlove 51235, MO); Y (Tapia et al. 1722, MO); ?C (Martinez et al., 2001: 24 sub *Chaptalia dentata*); B (Whitefoord 2152, MO); G (Heyde y Lux 3433, NY); H (Yuncker 5784, MO); N (Henrich y Moreno 155, MO). 25-1500 m. (SE Estados Unidos [Florida], Mexico, Mesoamerica, Cuba, Jamaica, Hispaniola, Puerto Rico, Bahamas.)

Grisebach (1861) recognized *Chaptalia albicans* (sub *Leria*) as distinct from *C. dentata* (L.) Cass., the later differing by leaves "regularly sinuate." Millspaugh y Chase (1904) recognized *C. albicans*, but Urban (1902-1903), who was subsequently followed by most floristicians, treated *C. albicans* in synonymy of *C. dentata*. Urban (1902-1903) described *C. dentata* sens. lat. as having
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cypselae "scabridis v. laevibus." Chaptalia albicans was resurrected from synonymy of C. dentata by Nesom (1984), who circumscribed C. albicans as having inconspicuously glandular cypselae. The upper elevational range given for the species by Nash (1976g) resulted from inclusion of misidentified material of Leibnitzia lyrata.

Burkart (1944) reported Chaptalia albicans in Guatemala under the name Chaptalia leiocarpa and referred the name C. albicans to synonym of C. dentata. Most reports of C. dentata (which in the strict sense is characterized by obviously papillose cypselae) in Mesoamerica (e.g., Nash, 1976g) are based on materials of either C. albicans or Leibnitzia lyrata. Because neither C. dentata nor Leibnitzia lyrata are known from the Yucatan Peninsula, it seems possible that the report of C. dentata in Campeche by Martinez et al. (2001) is in reference to material of C. albicans.

Heyde y Lux 3433 (F), an isotype of Chaptalia crispula, is a mixture of Chaptalia albicans and C. nutans.


Herbs 10-65(-85) cm. Leaves mostly ascending, subsessile or with winged petiole; blade (3-5)5-25 × 2.5-7(-8.5) cm, lyrate-pinnatifoliated, oblanceolate-spatulate in outline, adaxial surface glabrous or loosely arachnoid, abaxial surface loosely white to gray lanuginose-tomentose, secondary venation distinct abaxially, proximal lobes 2-5 per side, usually 1-1.5 × 1.5-2 cm, shallow and rounded, margins denticulate, the terminal lobe about ½ of leaf length, base cuneate to truncate, margins of terminal lobe subentire to crenate or dentate, the apex acute to rounded; petiole usually (0-)1-10(-18) cm, narrowed proximally, distal portion often grading into the lobed blade base. Capitulescence of 1-3(-6) scapes per plant; scape (peduncle) to 65(-85) cm, ebracteate (rarely 1-2-bracteolate), lanuginose-tomentose to loosely so basally, not dilated apically,
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capitulum nutant in bud and fruit, sometimes erect in flower. Capitula (10-)15-20 mm at anthesis, elongating to 20-32(-40) mm in fruit, radiate-tubular-bilabiate; involucre 10-15 mm diam. and turbinate to campanulate at anthesis, to 40 mm diam. and broadly campanulate to hemispherical in fruit; phyllaries c. 5-seriate, loosely arachnoid-lanuginose or with greenish subglabrous mid-zone proximally; outer series 4-6 × c. 1 mm, rarely with a few marginal minute papillae; gradually grading to inner series 12-17(-30 in fruit) × 0.8-2 mm. Marginal florets 18-34, 1(-2)-seriate; corolla 9-13 mm, radiate, slightly longer than phyllaries, tube and limb subequal or tube longer than limb, limb 0.3-0.6 mm diam., flat and margins not involute, apex 2-4-dentate, teeth 0.5-1.5(-3) mm, sometimes irregular; style shorter than corolla, branches 0.8-1.4 mm.

Submarginal florets 50-100+; corolla usually 5-7 mm, filiform and without obvious limb; style longer than corolla. Central florets: corolla 10-12 mm, very slightly tubular-bilabiate, lips 1-1.5 mm; anthers c. 1.5 mm; style branches c. 0.3 mm. Mature cypselae 12-18 mm, long-rostrate, body 4-5 × ≤ 0.8 mm, brownish, 5(-8)-costate, subglabrous to sparsely short-papillose, costae and rostrum tan, rostrum 8-13 mm, usually 2-3× longer than body, filiform; pappus 10-12(-15) mm, about as long as to exserted to 10 mm from involucre, stramineous to pinkish. 2n = 48 (?50).

Flowering Year-round. Cafetales, clearings, cultivated areas, disturbed areas, disturbed forest, oak forests, open forests, pastures, pine-oak forests, potreros, roadsides, rock crevices, savannas, steep rocky slopes, streamside. T (Conrad et al. 2801, MO); Ch (Breedlove 39993, MO); B (Schipp 1131, MO); G (Aguilar 118, MO); H (Yuncker et al. 5639, NY); ES (Rosales 1267, MO); N (Seymour 2780, MO); CR (Skutch 2724, NY); P (de Nevers et al. 7622, MO). 0-1500(-2000) m. (Mexico, Mesoamerica, Colombia, Venezuela, Guyana, Surinam, Ecuador, Peru, Bolivia, Brazil, Uruguay, Paraguay, Argentina, Cuba, Jamaica, Hispaniola, Puerto Rico, Virgin Islands, Lesser Antilles, Trinidad and Tobago.)

*Chaptalia nutans* is the most common and widespread species of the genus. However, reports by Burkart (1944) and Simpson (1975) of *Chaptalia nutans* in the United States are, in the strict sense, based on material now seemingly best referred to *C. texana*, which had earlier been treated in synonymy (e.g., Simpson, 1975) or as a variety (e.g., Burkart, 1944) of *C. nutans*.


Herbs 6-28 cm. Leaves often spreading laterally and not ascending, subsessile and narrowed to a petiolariform base; blade 1.5-8 × 0.5-1.5 cm, oblanceolate to obovate, adaxial surface glabrous, abaxial surface densely white-tomentose, venation indistinct abaxially, base attenuate, margins retrorse-dentate (subruncinate), dentations 4-8 per margin, apex acute to obtuse. Capitulescence of 1-2(-3) scapes per plant; scape (peduncle) 6-15 cm at anthesis, elongating to 8-27 cm in fruit, bracteolate, arachnoid-tomentose to basally loosely so, sometimes slightly dilated apically, capitulum usually erect in bud, flower, and fruit, scape sometimes flexuous; bracteoles 3-10, 3-7 mm, in distal ¼ of scape, appressed or ascending, lanceolate, glabrous. Capitula 10-15 mm at anthesis, elongating to 15-20 mm in fruit, radiate-tubular-bilabiate, chasmogamous (Mesoamerica) or rarely cleistogamous (reported only in South America populations); involucre 5-9 diam. and turbinate at anthesis, 10-15 mm diam. and broadly turbinate in fruit; phyllaries c. 4-seriate, mostly glabrous; outer series 3-5 × 0.8-1 mm; gradually grading to inner series 11-14(-18 in fruit) × 0.9-2 mm. Marginal florets 8-15(-20), 1-seriate; corolla 7-8 mm, short-radiate (Mesoamerica), rarely eradiate when capitula cleistogamous, tube 2.5-3.5 mm, limb usually c. 4.5 × 0.3-0.7 mm diam., about as long as phyllaries, apex entire or weakly 3-4-denticulate; style shorter than corolla, branches 0.8-1 mm. Submarginal florets c. 10; corolla c. 2.5 mm, filiform and without obvious limb; style much longer than corolla. Central florets 5-10; corolla 5.5-6 mm, slightly tubular-bilabiate, lips c. 1 mm; anthers c. 2 mm; style branches c. 0.6 mm. Cypselae 6-10 mm, rostrate, body reddish or sometimes brown, sometimes maculate, 5-costate, mostly glabrous, papillose near carpodium, rostrum shorter than to about as long as body; pappus 6-9 mm, usually reaching to about top of involucre, stramineous. Flowering Jul-Aug. Rocky areas, savannas. CR (Grayum 12805, MO); P (Stern et al. 1189, MO). 800-1100 m. (Mexico, Mesoamerica, Colombia, Venezuela, Ecuador, Bolivia, Brazil, Uruguay, Paraguay, Argentina.)

Although Burkart (1944) recognized two infraspecies, the non-typical variety is here recognized as Chaptalia graminifolia (Dusén ex Malme) Cabrera. Burkart (1944) noted that cleistogamous capitula occur occasionally in South American populations of C. runcinata. Katinas et al. (2014) treated Chaptalia runcinata in synonymy of C. piloselloides (Vahl) Baker, which is here excluded from Mesoamerica and taken here as a southern South American endemic.


Herbs 12-56 cm. Leaves mostly ascending, long-petiolate; blade (2-)4-23 × 0.9-3(-5) cm, ovate-elliptic to spatulate, usually unlobed or sometimes sublyrate proximally, chartaceous to thickly so, adaxial surface glabrate, abaxial surface loosely gray-tomentose, secondary venation
indistinct or distinct abaxially, base cuneate to nearly truncate, margins denticulate, usually unlobed, sometimes with 1(-3) shallow proximal lobes per side, the apex acute to rounded; petiole 2-10 cm, exalate in proximal ½-3/4, often narrowly winged distally, usually about ½+ of leaf length. Capitulecence of 1-2 scapes per plant; scape (peduncle) 12-56 cm, ebracteate, villous to sparsely so basally, not dilated apically, capitulum nutant in bud, mostly erect in flower and fruit. Capitula 17-25 mm at anthesis, radiate (or indistinctly bilabiate)-tubular-bilabiate; involucre 10-20 mm diam. and campanulate at anthesis, becoming 15-25 mm diam. and hemispheric in fruit; phyllaries 3-4-seriate, arachnoid-villous, not elongating in fruit; outer series 3-5 × 0.5-1.3 mm, margins often with a few minute stipitate-glands; gradually grading to inner series 14-20 × 1-1.8 mm. Marginal florets 11-21(-32), 1-seriate; corolla 11-17 mm, radiate or sometimes indistinctly bilabiate with inner lobes 0.5-2 mm, included within involucre or slightly longer than phyllaries, tube slightly longer than limb, limb 0.3-0.7 mm diam., margins sometimes slightly involute, apex truncate to minutely 2-3-denticulate, teeth 0.1-0.2 mm; style shorter than corolla, branches 1-1.7 mm. Submarginal florets nearly as many as marginal florets; corolla usually 8-9 mm, tube filiform, with an erect linear limb to c. 2.5 mm; style and corolla subequal. Central florets: corolla 9-11 mm, distinctly tubular-bilabiate, lips 2-3 mm, ascending; anthers 2-2.5 mm; style branches c. 0.6 mm. Mature cypselae 7-11 mm, short-rostrate, body 4.5-5.5 × 0.9-1.3 mm, brownish, 5-6-costate, papillose, costae and rostrum tan, rostrum 2.5-5.5 mm, about as long as to shorter than body, broad-based and grading into body, papillae with apex pointed; pappus 9-11 mm, about as long as to exserted to 2 mm from involucre, stramineous. Flowering mostly Jul-Nov (+ Jan, Apr). Oak forests, pine-oak forests. Ch (Matuda 4686, MO); G (Nesom, 1995: 166). 1600-3200 m. (Mexico, Mesoamerica.)

Previously, Mesoamerican material of Chaptalia transiliens was usually determined (e.g., Nash, 1976g) as the similar C. nutans. By its sometimes sublyrate leaf blades and papillose cypselae, C. transiliens is also similar to C. texana Greene. Chaptalia transiliens differs from both C. nutans and C. texana, however, by central florets with distinctly tubular-bilabiate corollas. By central florets with distinctly tubular-bilabiate corollas, C. transiliens seems similar to central Mexican C. hololeuca Greene.


Por J.F. Pruski.
Acaulescent scapose perennial rosulate herbs, rootstock villose to lanate, becoming woody. Leaves radical, alternate, mostly petiolate; blade oblanceolate or elliptic to ovate or orbicular, simple to pinnatifid, chartaceous to subcoriaceous, pinnately veined, abaxial surface often villose or tomentose. Capitulescence scapose, 1(-few) per plant, sometimes precocious; scapes (peduncles) monocephalous, bracteate or ebracteate, capitulum erect (infrequently nutant), often villose or tomentose distally. Capitula chasmogamous, heterogamous, bilabiate-tubular bilabiate (rarely disciform), many-flowered; involucre turbinate to campanulate or hemispherical; phyllaries distinctly graduated, 2-several-seriate, usually linear-lanceolate, scarios, at least the outer ones villose-tomentose, margins glabrous; receptacle flat, epeate, glabrous. Florets trimorphic (Mesoamerica) or dimorphic, corolla white, yellow, or reddish, glabrous (rarely papillose, e.g. Gerbera hieracioides). Marginal florets 1-seriate, pistillate, typically with staminodia (absent in sect. Parva, vestigial in sect. Piloselloides); corolla long-bilabiate (3 + 2) or rarely tubular, outer lip much longer than phyllaries and well-exserted from involucre, apex (2-)3-denticate, inner lobes linear, often curled; style often U-shaped distally, branches very short, elliptic-ovate papillose, apex obtuse. Submarginal (intermediate) florets (when present) 1-(2)-seriate, pistillate; corolla bilabiate (3 + 2), slender, about as long as or longer than the style, outer lip non-radiating, distinct but smaller than in marginal florets. Central florets many, bisexual; corolla tubular-bilabiate (3 + 2), much shorter than the corolla of marginal series; anther filaments glabrous, tails long, smooth to ciliate, apical appendage narrowly ovate; style branches short-oblong, apex obtuse, abaxially slightly papillose. Cypselae elliptic to fusiform, slightly compressed, brownish, 4-10-costate, merely constricted apically to long-rostrate, setose or rarely subglabrous, rostrum (when distinct) usually not longer than body, trichomes narrowed apically; pappus of many elongate scabrid capillary bristles, bristles pluriseriate, white to reddish. x = 23, 24, 25. Aprox. 30-35 spp. Africa, Asia, Andean South America.

Gerbera is recognized here in the restricted sense of Hansen (1985) and is mostly African and Asian. Hansen (1990), on the other hand, recommended reducing all genera of the complex to synonymy of Gerbera. Hansen (1985) recognized six sections and reduced Piloselloides to synonymy. Gerbera is closely related to Chaptalia and Leibnitzia, which are each recognized here for convenience-sake, although previously Schultz Bipontinus (1856) reduced Chaptalia to synonymy of Gerbera and treated the American species of Leibnitzia as a Gerbera.

Gerbera differs from Chaptalia, alas perhaps only artificially so, by well-exserted marginal florets usually with staminodia and styles usually U-shaped distally. Gerbera was reported in the Americas by Zardini (1974), based on South American G. hieracioides (Kunth) Zardini, which
has acute-tipped cypsela trichomes and marginal floret staminodia, thus differing from *Trichocline*. However, *G. hieracioides* was taken as intermediate between *Gerbera* s. str. and *Trichocline* s. str. by Hansen (1990) who studied many characters. Alternatively, *G. hieracioides* may be viewed as the sole species of *Gerbera* s. str. native to the Americas. Mexican *C. hintonii* was recognized by Katinas (2004) as *Gerbera*, however, because *C. hintonii* lacks well-marked staminodia I follow Nesom (1995) are treat it as *Chaptalia*.

The species of *Gerbera* sect. *Gerbera* are characterized by bracteolate scapes and 1-seriate pistillate florets (Hansen, 1985). *Gerbera jamesonii* was treated by Hansen (1985) as a member of *G. sect. Lasiopus*, which differs form the typical section by ebracteate scapes and biseriate pistillate florets.


1. *Gerbera jamesonii* Adlam, *Gard. Chron.*, ser. 3, 3: 775 (1888). Neotype (designated by Hind et al., 1993): South Africa, Transvaal, *Bolus 7611* (K, photo en MO!). Illustr.: Hind et al. en Bosser et al. (editores), *Fl. Mascareignes* 109: 13, t. 1 (1993). N.v.: Margarita de Transvaal, H. Showy herbs 13-35(-50) cm. Leaves petiole, lyrate-pinnatifolobed; blade 9-35 × 3-14 cm, oblong-spatulate in outline, surfaces concolorous, adaxial surface strigillose to subglabrous, abaxial surface thinly villous to glabrous, lateral lobes usually 2-5 per side, 1-5 × 0.5-3 cm, lanceolate or triangular to subquadrangular, lobe margin sinuate to irregularly few-dentate, the terminal lobe triangular, apex obtuse to rounded; petiole usually (2-)7-25 cm. Capitulescence of 1+ scape per plant; scape (peduncle) 13-35(-49) cm, ebracteate, not dilated apically, capitulum erect. Capitula 10-20 mm; involucre 20-30 mm diam., hemispherical; phyllaries 5-15 × 1-2 mm, c. 3-seriate, arachnoid-tomentose or inner series glabrate, apex acminate. Florets trimorphic, corolla usually red or orange, sometimes yellow or pink, paler abaxially. Marginal florets 30-35, 1-seriate, staminodia present; corolla 20-40 mm, tube 4-9 mm, outer lip 1-3(-7) mm diam., inner lobes 2-4 mm; staminodia linear, often resembling inner corolla lobes; style U-shaped distally, branches 0.2-0.3 mm. Submarginal florets many, 1-2-seriate; corolla usually 5-10 mm, tube 3-7 mm, outer lip 2-3 mm, inner lobes 1-3 mm. Central florets: corolla 5-10 mm, tube 3-7 mm, outer lip 2-3 mm, recurved, inner lobes 1-3 mm; anthers 4-5 mm, exserted; style U-shaped distally. Cypselae 7-12 mm, fusiform, short-rostrate, setulose, rostrum 2-6 mm; pappus 6-8 mm,
stramineous. 2n = 48, 50. Flowering Apr, Aug, Dec. Widely cultivated as an ornamental, sometimes persisting or escaping. G (CAMH 851, USCG); H (Nelson Sutherland, 2008: 174); ES (Berendsohn y Araniva de González, 1989: 290-7); N (Guzmán y Castro 36, MO); CR (Standley, 1938: 1478); P (D'Arcy y D'Arcy 6511, MO). 100-1500 m. (South Africa; widely cultivated: Estados Unidos, Mexico, Mesoamerica, Colombia, Venezuela, Peru, Brazil, Chile, Argentina, Cuba, Jamaica, Hispaniola, Puerto Rico, Lesser Antilles; Africa, Asia, Australia, New Zealand, Pacific Islands.)

Hansen (1985) designated Adlam s.n. (SAM) as the lectotype, but that collection is labeled "Natal" and conflicts with the protologue, whereas the neotype is from Transvaal, the province immediately to the north of Natal, and matches the locality given in the protologue.


Anandria Less., Cleistanthium Kunze

Por J. F. Pruski.

Acaulescent scapose perennial rosulate herbs, fibrous-rooted; plants dimorphic, a vernal (spring) phase with reduced leaves and chasmogamous radiate capitula and an autumnal phase with fully developed leaves and cleistogamous subradiate capitula. Leaves radical, alternate, petiolate, appearing before or with first capitula; blade simple to lyrate-pinnatifid, chartaceous, pinnately veined. Capitulescence scapose, 1-11 per plant; scapes (peduncles) monocephalous, bracteate distally, sometimes dilated apically, erect in bud, flowering, and fruit. Capitula dimorphic, heterogamous, with alternating chasmogamous (vernal; some corollas radiating) and cleistogamous (autumnal; corollas not radiating) phases; involucre cylindrical to campanulate; phyllaries distinctly graduated, 3-4-seriate, linear-lanceolate or lanceolate, apex acute to acuminate, spreading or moderately reflexed past fruit; receptacle flat to convex, eaplate, glabrous. Florets usually dimorphic within individual capitula, corolla whitish or pinkish to purplish. Marginal florets 1-seriate, pistillate, typically without staminodia, corolla usually pinkish to purplish; corolla in the vernal chasmogamous phase radiate (3 + 0, limb with inner lip obsolete) or infrequently indistinctly bilabiate, limb and tube subequal, outer lip well-exserted from involucre, apex 3-denticulate, inner lobes small; corolla in the autumnal cleistogamous phase with limb greatly reduced. Central florets 6-20+, bisexual, corolla usually whitish; corolla in the vernal chasmogamous phase tubular-bilabiate (3 + 2); corolla in the autumnal cleistogamous phase slightly tubular-bilabiate; anther tails smooth, filaments glabrous, apical appendage narrowly ovate; style branches relatively short, abaxially papillose, apex rounded.
Cypselae fusiform or subfusiform, rostrate or subrostrate, 5-8+ costate, setulose, trichomes elongate, fine-slender, sharp-pointed; pappus of many (50-80) elongate stramineous scabrid capillary bristles. \(x = 23\). Aprox. 6 spp., 2 spp. in the Americas, 4 spp. in Asia.

*Leibnitzia* is often placed in *Chaptalia* of the *Gerbera* generic group (e.g., Simpson y Anderson, 1978). Pruski (2004b) keyed the North American Mutisioideae and followed Simpson y Anderson (1978) by not recognizing *Leibnitzia*. Our species was validated by Schultz Bipontinus (1856) in *Gerbera*, with *Chaptalia* then a generic synonym, but *Leibnitzia* differs (Jeffrey, 1967; Nesom, 1983; Hansen, 1988) from *Gerbera* and most species of *Chaptalia* by its combination of dimorphic plants with alternating chasmogamous (spring) and cleistogamous (autumnal) phases and sharply pointed cypsela trichome apices. Jeffrey (1967) was the first to note that the formerly Asian endemic *Leibnitzia* s. str. is found in the Americas, but the first formal combination based on American material was made by Nesom (1983), who revised the American species. The Asian species of *Leibnitzia* were revised by Hansen (1988).


Herbs 5-50(-65) cm. Leaves petiolate; blade 2-13 × 0.7-4.5 cm, simple to lyrate-pinnatifid, elliptic to oblancoate or ovate in outline, adaxial surface glabrous or glabrate, abaxial surface usually thinly gray-tomentose, secondary venation slightly distinct on broader blades, base attenuate to obtuse, margins dentate to retrose-serrate, lobes usually 0-3 pairs per side, shallow and rounded, apex acute to rounded, apiculate; petiole 1-9 cm. Capitulescence of 1-4 scapes per
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plant; scape (peduncle) 5-50(-64) cm, sometimes dilated apically; bracteoles 3-15, 5-10 mm, appressed or ascending, filiform to linear-lanceolate, glabrous to loosely arachnoid. Capitula 10-25 mm; involucre (4-)7-15 mm diam., cylindrical to turbinate; phyllaries arachnoid-lanate; outer phyllaries 2.5-5 × 0.4-0.7 mm, linear-lanceolate or lanceolate; quickly grading into inner phyllaries 7-20 × 1-3 mm, lanceolate. Marginal florets 6-15; chasmogamous bilabiate corolla 9-13 mm, tube and limb subequal, outer lip sometimes with involute margins, inner lobes 0.7-2 mm; cleistogamous corolla 4-8 mm, filiform, outer lip c. 1.5 mm, inner lobes c. 0.5 mm; style branches 0.5-0.8 mm. Central florets 6-10; corolla 5.5-8.5 mm, outer lip 1-1.8 mm, inner lobes subequal but curved; anthers 2-2.5 mm; style branches c. 0.4 mm. Cypselae 6-10 mm, fusiform, rostrate, c. 8-nerved, densely setulose at maturity, rostrum about ¼-1/2 as long as body, trichomes 0.1-0.2(-0.3) mm, carpopodium c. 0.2 mm, broad-cylindrical; pappus 5-12 mm. 2n = 46. Flowering May-Aug. Disturbed areas, oak forests, pajonal, pine forests. G (Smith 602, MO). 2100-3400 m (SW Estados Unidos, Mexico, Mesoamerica.)

Although Nesom (1995) cited the illegitimate Don name as the basionym of *Leibnitzia lyrata*, this combination should be cited (e.g., ICBN, 2006, Art. 33.7, Ex. 22) as based the Schultz Bipontinus replacement name. Priority of simultaneous validated *Gerbera lyrata* over *Gerbera seemannii* appears to have been established in Barkley et al. (2006). The other American species, *L. occimadrensis* G.L. Nesom, differs from *L. lyrata* by pappus bristles 5-6 mm (chasmogamous and cleistogamous phases) and its narrower rostrum.

Plants of the chasmogamous phase of *L. lyrata* have shorter peduncles, smaller capitula, and shorter pappus bristles, whereas plants of the cleistogamous phase have longer peduncles, larger capitula, and longer pappus bristles. In Mesoamerica, *L. lyrata* is known to me only from chasmogamous small-capitulate material that Nash (1976g) referred to *Chaptalia dentata*. Material from Mesoamerica tends to have narrower involucres in the chasmogamous phase than does northern material of the chasmogamous phase.

**XVII. Tribus Nassauvieae Cass.**

*Jungieae* D. Don, *Nassauvieae* Dumort. (unranked sub "trib. 4"), *Nassauviinae* Less.,


Por J.F. Pruski (tribal description, discussion, key, etc.).

Annual to perennial herbs to shrubs or sometimes vines. Leaves simple to pinnatifid, alternate or rosulate, sometimes clustered on brachyblasts, venation pinnate or sometimes palmate, glabrous
or pubescent, margins sometimes spiny. Capitulescence monocephalous, corymbiform, paniculate, or glomerate. Capitula homogamous, bilabiate or infrequently subdiscoid (e.g., *Moscharia*); phyllaries imbricate or sometimes subimbricate, 1-6+-seriate; receptacle epaleate or paleate, glabrous to pubescent. Florets bisexual, typically isomorphic or in larger capitula the corollas of inner florets smaller than the outer florets, rarely becoming dimorphic with corollas of inner florets drastically smaller than the outer florets or with inner capitula of glomerules subdiscoid; corolla bilabiate (3+2) or rarely subactinomorphic or tubular-bilabiate (e.g., *Lophopappus*, *Polyachyrus*, *Proustia*), outer lip slightly spreading, apex typically 3-dentate, inner lip usually deeply bifid; anthers typically long-caudate (with sterile tails), tails smooth or papillose, apical appendage elongate, usually stout, flat and not ornamented, pollen prolate or (e.g., *Leucheria* and *Triptilion*) subprolate or spheroidal, usually subpsilate to microechinate; style trunk glabrous, branches bifid, slender, abaxially glabrous or rarely papillose, stigmatic surface continuous, apex typically truncate, infrequently rounded, with a well-developed tuft of collecting papillae. Cypselae cylindrical or fusiform, rarely compressed, glabrous or pubescent, rarely rostrate, carpodium annular; pappus generally of many (1-)2-4-seriate bristles or paleaceous, scabrid to plumose, rarely epappose (e.g., *Panphalea*). 26 genera and approx. 319 spp. Endemic to the Americas and centered in South America. 3 genera and 14 spp. occur in Mesoamerica.

Nassauvieae (see discussion under Mutisieae) was described by Cassini (1819b), treated by Bentham y Hooker (1873), Cabrera (1977), and Bremer (1994) as Mutisieae subtribe Nassauviinae, but was resurrected from synonymy of Mutisieae by Pruski (2004a, 2004b), who stressed the style branches as distinguishing it from Mutisieae s. str.

More recently, Nassauvieae was treated as Mutisieae subtribe Nassauviinae by Hind (2007), but Katinas et al. (2008) recognized tribe Nassauvieae. Nassauvieae are characterized by typically bilabiate capitula usually with isomorphic florets and by slender, apically tufted-papillose, typically truncate-tipped style branches.


1. Capitula with paleate receptacles; leaf blades palmately 3-5-veined from very base. **2. Jungia**
1. Capitula with epaleate receptacles; leaf blade venation pinnate.
2. Corollas white to pink or brown; phyllaries graduate, 2-6 seriate; caudices generally tomentose.

1. **Acourtia**

2. Corollas usually yellow, or when white the phyllaries subequal and 1(-2)-seriate; caudices not commonly tomentose.

3. **Trixis**

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**1. Acourtia** D. Don

*Dumerilia* Less., non. Lag. ex DC.; *Perezia sect. Acourtia* (D. Don) A. Gray

Por J.F. Pruski y L. Cabrera.

Perennial scapose or caulescent herbs to less commonly vining shrubs; rhizomatous or very rarely tuberous, rhizomes and caudex generally tomentose; stems (when present) erect, generally branching only distally in the capitulescence, subterete or striate distally, very rarely winged, glabrous to tomentose, occasionally stipitate-glandular, leaves rosulate or cauline. Leaves simple to pinnatifid, alternate or rosulate, sessile to long-petiolate; blade thin-chartaceous to more commonly stiffly chartaceous to subcoriaceous, venation pinnate, green and concolorous or abaxial surface sometimes purplish, surfaces glabrous to tomentose, base sometimes auriculate, margins callose-thickened or not so; petiole when present winged or not so. Capitulescence mostly terminal, corymbiform or thyrsoid-paniculate, commonly many-capitulate, sometimes glomerate, rarely monocephalous, when scapose generally more than one scape per plant; branches and peduncles generally bracteolate or sometimes leafy. Capitula typically bilabiate; involucre cylindrical to campanulate; phyllaries imbricate, graduated, 2-6-seriate, sometimes apically reddish or purplish, usually glabrous, margins sometimes ciliate, apex attenuate to rounded, occasionally mucronate; receptacle epaleate, glabrous to puberulent. Florets 4-55; corolla bilabiate (rarely subactinomorphic), white to pink or brown, often puberulent, outer lip slightly longer than the inner lip, inner lobes reflexed; anther tails glabrous, usually about half as long as thecae, those of adjacent thecae appressed but not connate; style branches somewhat elongate. *Cypselae* generally cylindrical-fusiform, apex narrowed but never long-rostrate, usually hispidulous, vestiture generally of twin-hairs and short-stipitate or subsessile glandular trichomes; pappus of many subequal bristles, bristles (1-)2-3-seriate, scabrid, stramineous to brown, slightly shorter than corolla. \( x = 26, 27, 28 \). Aprox. 76 spp. SW United States, Mexico (center of diversity), Mesoamerica.

*Acourtia* differs from *Perezia*, into which it had been historically treated in synonymy, by its rust-colored (vs. glabrous or white) trichomes. Gray (1883) and Bacigalupi (1931) treated *Perezia
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sect. *Acourtia*, in which they included both caulescent and scapose species. *Acourtia* was resurrected from synonymy of *Perezia* by Reveal y King (1973), who included only caulescent species, specifically excluding the scapose Central American species. Nash (1976g) recognized three caulescent species in Guatemala as *Acourtia* (following Reveal y King, 1973) and two scapose species as *Perezia*, but Turner (1978) subsequently transferred the scapose species to *Acourtia*. The typical species group of *Acourtia*, those treated by Reveal y King (1973), is caulescent, centered in Mexico, and contains about 60 species (Turner, 2009).

The scapose group of about 16 species is concentrated in southern Mexico and Mesoamerica and was revised by Turner (1978) and Cabrera (1992). Leaf shape was used an important feature in the species key to scapose species by Turner (1978), but field studies are needed to determine variation in leaf shape among individuals and populations of *A. nudicaulis*, and the segregates *A. hondurana* and *A. molinana*.

The type collection of scapose *A. molinana* occurs within a few kms of Nicaragua, where the genus is to be expected.


1. Plants caulescent; leaves sessile to short-petiolate; leaf blade margins not callose-thickened; cypselae glandular.

2. Leaves sessile, broadly auriculate-clasping.

3 Florets (8-)10-13 (-18) per capitulum; involucres campanulate or narrowly so; phyllaries 4-5-seriate, the inner ones to 2.5 mm diam.

1. *A. carpholepis*

3 Florets 4-7 per capitulum; involucres cylindrical to turbinate; phyllaries 3-4-seriate, the inner ones ≤ 2 mm diam.

4. *A. guatemalensis*

2. Leaves subsessile to short-petiolate, basally cuneate to cordate, the distal leaves never broadly auriculate-clasping.
4. Leaves entire to denticulate-serrulate, lanceolate to elliptic-lanceolate, apices acuminate to acute; capitulescences openly corymbiform-paniculate, capitula never subglomerate; peduncles 10-30 mm; florets (10-)14-25 per capitulum; phyllaries usually glandular-puberulent and hirtellous, generally acuminate to acuminate apically.  

2. A. coulteri

4. Leaves dentate-serrate, generally oblanceolate to obovate, apices usually obtuse; capitulescences thyrsoid-paniculate, ultimate capitula subglomerate; peduncles 0-1 mm; florets 4-6(-7) per capitulum, phyllaries subglabrous, eglandular, rounded to broadly acute apically.

8. A. reticulata

1. Plants scapose; the basal leaves petiolate; leaf blade margins often callose-thickened; cypselae eglandular.

5. Peduncles stipitate-glandular; basal leaves lyrate-pinnatifid; capitulescences sometimes leafy; leaf blade margins not callose-thickened.  

3. A. glandulifera

5. Peduncles eglandular; basal leaves simple (unlobed) to pinnatifid-pinnatifid; capitulescences not leafy; leaf blade margins usually callose-thickened.

6. Leaves usually runcinate-pinnatifid-pinnatifid or lyrate-pinnatifid-pinnatifid to sometimes subpandurate or simple (unlobed), when simple then usually in rosettes also containing pinnatifid-pinnatifid or subpandurate leaves or with blades usually obviously attenuate onto petiole, adaxial surfaces glabrous to sometimes sparsely pilose with non-flagelliform trichomes.  

7. A. nudicaulis

6. Leaves always simple, adaxial surfaces glabrous or pilose with flagelliform trichomes.

7. Leaf blades elliptic-ovate to ovate or less commonly elliptic, adaxial surfaces pilose with flagelliform trichomes; the bases rounded to cuneate or less commonly attenuate; florets 10-20 per capitulum; involucres 8-9.5 mm, corollas 7-8.5 mm.

5. A. hondurana

7. Leaf blades orbicular to broadly ovate-cordiform, adaxial surfaces glabrous, the bases cordate; florets 4-6 per capitulum; involucres 5-7 mm, corollas 5.5-6.5 mm.

6. A. molinana


Hierbas caulescentes 1-2 m; tallos clambering, puberulentos distally, sometimes deflected at the nodes. Hojas simplices, sésiles; lamina 3-13 × 1.5-6.5 cm, lanceolada a eliptico-ovovada,
thinly chartaceous, el haz glabra a puberulento, en envés glandular-punteado y puberulento, la base broadly auriculado-abrazadoras, los margens denticulada a dentada, not callose-thickened, el ápice agudo a acuminado. Capitulescencia terminales a axilares, corimbiformes, subglomerata, each subglomerule con 3-8 cabezuelas; pedunculos 0.5-3 mm. Capítulos 11-16 mm; involucro 8-10 mm, campanulado or narrowly so; filarios 4-5-serrado, dorsalmente glabras, ligera a copiosamente seríceo-ciliadas en los margenes, obtusas a redondeadas en el ápice; las más externas filarias 1.3-3 × 1-1.2 mm, ovadas a lanceoladas; las internas 8-10 × 1.2-2.5 mm, oblongas a oblanceoladas. Flósculos 10-13(-18); corola 7-10 mm, lilas, glandular-puberulentas, el tubo y la garganta 3.5-5 mm, labio exteriore 3.5-5 mm; las tecas y el apéndice de anteras 3-4 mm, las colas 1-1.5 mm; las ramas de estilos c. 1 mm. Cypselae 3-5 mm, glandular punteados; papus bristles 8-9 mm, blanquecino. 2n = 54. Flowering Dec-Jan. Bosque de pino o encino. Ch (Ghiesbreght 525, MO). c. 2000 m. (C + S México.)

The Guatemalan material referred to and illustrated as A. carpholepis by Nash (1976g: 591, t. 136) was described by Turner (1993) as A. guatemalensis B.L. Turner. Thus, the figure labeled A. carpholepis by Nash (1976g) is cited below as representing A. guatemalensis, which it matches by its fewer-flowered capitula and 3-4-seriate phyllaries.

Linden 439 (GH) from Chiapas, a syntype of Perezia carpholepis, was cited by Gray (1852) as a syntype of the earlier Perezia patens A. Gray. Galeotti 2001 (GH), a syntype of Perezia carpholepis, was cited by Gray (1852) as a syntype of the earlier Perezia patens A. Gray, but excluded from Perezia carpholepis by Bacigalupi (1931), who cited it as a paratype of Perezia lobulata Bacig. Both A. patens (A. Gray) Reveal et R.M. King and A. lobulata are excluded from the flora of Mesoamerica.


Vernonia zaragozana B.L. Turner.

Caulescent herbs 0.5-1 m; stems stiffly erect, simple to rarely few-branched, leafy, slightly hispidulous and usually glandular at least distally. Leaves simple, subsessile or short-petiolate; blade 3-10 × 0.5-2(-2.6) cm, lanceolate to elliptic-lanceolate, chartaceous, adaxial surface glabrous to puberulent, abaxial surface puberulent, base narrowly cuneate to obtuse, the distal leaves never broadly auriculate-clasping, margins entire to denticulate-serrulate, not callose-thickened, apex acuminare to acute; petiole c. 0.1 cm. Capitulescence openly corimbiform-paniculate, pyramidal or sometimes flat-topped, several-capitulate, capitula never subglomerate,
flowering branches exserted from subtending distal axillary leaves; peduncles 10-30 mm, pubescent, 1-3-bracteolate; bracteoles 1-1.5 mm, lanceolate, puberulent. Capitula 10-14 mm; involucre 6-8 mm, cylindrical to turbinate; phyllaries 2-3-seriate, lanceolate, usually glandular-puberulent and hirtellous, generally acute to acuminate apically; outer phyllaries c. 2 × c. 1 mm; inner ones 6-8 × c. 1 mm; receptacle sparingly setulose. Florets (10-)14-25; corolla 7-10 mm, white to violet, tube and throat 3-5 mm, outer lip 4-5 mm; anther thecae and appendage c. 5 mm, tails c. 2 mm; style branches c. 1 mm. Cypselae 3-6 mm, glandular-pubescent, often also with a few simple setae; pappus bristles 7-9 mm, stramineous. Flowering Aug. *Open pine, oak, and juniper forests.* Ch (Sántiz 727, MO); G (Seler 3069, GH). 1300-1600 m. (C. Mexico, Guatemala.)

*Acourtia coulteri* was treated by Simpson y Anderson (1978) as a synonym of *A. wrightii* (A. Gray) Reveal et R.M. King, which differs from *A. coulter* by broader serrate leaves and shorter peduncles. *Acourtia coulteri* is disjunct from central Mexico to Mesoamerica.


Scapose herbs 0.5-1 m. Leaves dimorphic; basal ones lyrate-pinnatifid to near midrib, petiolate, blade 25-35 × 15-22 cm, obovate to spatulate in outline, thinly chartaceous, each side 3-7 pinnately lobed, midrib prominent abaxially, adaxial surface glabrous, abaxial surface glabrous or midvein sericeous proximally, the base decurrent, margins serrulate-denticulate, not callose-thickened, lateral lobes 2-7 × 1.5-5.5 cm, dome-shaped to ovate, terminal lobe about ½ of entire leaf length and much larger than the lateral lobes, ovate to orbicular, apex acute to obtuse, petiole 3-20 cm, winged at least distally, hirsute to sericeous; leaves of capitulescence 2.5-4 × 1.5-2.5 cm, bracteate, ovate, simple, sessile, glabrous, base cordate-aunculate. Capitulescence openly corymbiform, sometimes leafy, scapes several, 50-100 cm, 30-95-capitulate, basally villous, branches stipitate-glandular, glandular-trichomes 0.1-0.2 mm; peduncles 5-18(-25) mm, stipitate-glandular, 1-3-bracteolate; bracteoles 1-2.5 mm, linear-lanceolate. Capitula 10-12 mm; involucre 8-10 mm, cylindrical to turbinate; phyllaries 3-4-seriate, glandular-puberulent, apically acute or obtuse, mucronulate; outer phyllaries 1-2 × 0.7-1.3 mm, elliptic to ovate; inner ones 8-10 × 1.1-1.4 mm, oblanceolate; receptacle slightly setose. Florets 10-12; corolla 7.3-9.3 mm, white, tube and throat 4.3-5.3 mm, outer lip 3-4 mm; anther thecae and appendage c. 2 mm, tails 1.5-2 mm; style branches 1.2-1.8 mm, apex sometimes rounded. Cypselae 4-5.2 mm, cylindrical, setulose,
eglandular; pappus bristles 5.3-6.3 mm, 1-seriate, stramineous to brownish. Flowering Dec-Jan. *Canyons, river banks*. G (Perez 1648, USCG). 1000-1200 m. (Endemic.)

This is our sole acaulescent species with stipitate-glandular peduncles.


Caulescent hierbas a bejucos 1-2 m; tallos glabros o weakly glandular-puberulentos. Hojas simples, sésiles; lamina 4-17 × 2-7 cm, lanceolada a ovado-elíptica, thinly chartaceous, el haz puberulento, el envé inconspicuamente glandulare, la base broadly auriculado-abrazador, los margens espinuloso-denticulado, not callose-thickened, el ápice agudo a acuminado. Capitulección terminal, corimbosas, subglomerata, cabezuelas 5-10 per glomerule, subsésiles a cortamente pedunculadas; pedúnculos generalmente 1-2 mm, pubescente. Capítulos 13-14 mm; involucro 7-9.5 mm, cilíndrico a turbinate; filarios 3-4-seriado, glabras, cortamente ciliadas; las más externas 1.5-2 × 1.2-1.5 mm, ovado-lanceoladas a oblongas, acuminadas a obtusas; las más internas 7-9.5 x 1.5-2 mm, oblanceoladas a obovadas, obtusas. Flósculos 4-7; corola c. 8 mm, lila; las tecas y el apéndice de anteras 4-5 mm, las colas c. 2 mm; las ramas de estilos 1-1.5 mm. Cypselae 5-6 mm, glandular-pubescentes, often also with a few simple setae; pappus bristles 9-10 mm, blanquecino. Flowering Nov-Dec. *Bosque de Encino, brushy hillsides*. G (Steyermark 50593, F). 1400-2200 m. (Endemic.)

Nash (1976g) treated material referred here to as *A. guatemalensis* as the very similar *A. carpholepis*, which appears to be endemic to Mexico.


*Acourtia belizeana* B.L. Turner.

Scapose herbs 0.15-0.35(-0.45) m. Leaves always simple (unlobed), petiolate; blade 3-8 × 1.7-4.5 cm, elliptic-ovate to ovate or less commonly (at lower elevations) elliptic, unlobed, stiffly chartaceous to subcoriaceous, adaxial surface pilose with flagelliform trichomes, trichome abruptly narrowed with base about 3-4x as broad as apex, abaxial surface sparingly pilose to subglabrate, basally rounded to cuneate and very short-decurrent or less commonly (at low elevations) attenuate onto petiole, margins uniformly dentate-serrate, callose-thickened, apically acute to obtuse; petiole 1-5.5 cm, typically exalate. Capitulección usually narrowly
A courtia hondurana is an entire-leaved segregate of the widespread A. nudicaulis. A courtia hondurana usually has elliptic-ovate leaves. The elliptic-leaved material once called A. belizeana has stramineous pappus bristles, small capitula, a diffuse capitulescence, but is provisionally treated in synonymy of A. hondurana, as in Cabrera (1992).

The report by CONABIO (2009) of A. molinana (as the synonymous A. belizeana) in Mexico is erroneous, and if based on material rather than a literature misattribution, I would presumably refer such material to A. nudicaulis. The type locality of A. hondurana is only a few kms W of the border with Nicaragua (Madriz), where this species is to be expected.


Scapose herbs 0.2-0.5 m, herbage glabrous or nearly so. Leaves always simple (unlobed), long-petiolute; blade 4-18 × 4.5-13 cm, orbicular to broadly ovate-cordiform, chartaceous to stiffly so, adaxial surface glabrous, abaxial surface glabrous or midvein (and sometimes proximal parts of smaller veins) sericeous or hirsute, base cordate, auricles usually 2-3 cm, margins dentate-serrate or denticulate, sometimes crenulate, usually callose-thickened, apically obtuse to rounded; petiole 5-14 cm, exalate. Capitulescence openly corymbiform or corymbiform-paniculate, not leafy; scapes 1 or 2 per plant, 20-50 cm, 10-50-capitulate, ebracteate or bracteolate at the nodes; peduncules 3-16 mm, glabrous, eglandular, sometimes 1-bracteolate; bracteoles 1-2.5 mm, linear-lanceolate. Capitula 7-9 mm; involucre 5-7 mm, cylindrical; phyllaries 3-seriate, glabrous or nearly so, margins ciliolate, apically obtuse to rounded; outer phyllaries 1-1.5 × 0.7-1
mm, elliptic to broadly ovate; inner ones 5-7 × 0.8-1.2 mm, lanceolate or oblanceolate; receptacle slightly setose. Florets 4-6; corolla 5.5-6.5 mm, cream-colored, tube and throat 3-3.5 mm, outer lip 2.5-3 mm; anther thecae and apical appendage c. 2 mm, tails c. 1 mm; style branches c. 0.8 mm. Cypselae 2-4.2 mm, cylindrical, pilose-hirsute, eglandular; pappus bristles 5-6 mm, 1-2-seriate, stramineous. Flowering Feb, Jun-Aug. Rocky streams, streamsides. H (Molina 30856, MO). 100-1800 m. (Endemic.)

_Acourtia molinana_ is an entire-leaved segregate of the widespread _A. nudicaulis_. Two collections of _A. molinana_ from near the Copán Ruinas occur within a few kms of Guatemala, where this species is to be expected. _Acourtia molinana_ is also to be expected in Nicaragua. The report by CONABIO (2009) of _A. molinana_ in Mexico, on the other hand, is erroneous. _Acourtia molinana_ is sympatric with the widespread _A. nudicaulis_, but _A. molinana_ differs by its leaves consistently basally cordate. Robert King was the first to note that Molina's name was an illegitimate later homonym, but King's intended nom. nov. apparently remains in schedula.


Scapose herbs 0.15-0.7 m. Leaves highly variable, petiolate, usually runcinate-pinnatifid-pinnatifolobed or lyrate-pinnatifid-pinnatifolobed (sometimes to midrib or nearly so) to sometimes subpandurate or simple (unlobed), when simple then usually in rosettes also containing pinnatifid-pinnatifolobed or subpandurate leaves or with blade usually obviously attenuate onto petiole; blade (3.5-)5-40 × (1.5-) 2.5-12 cm, usually oblanceolate to elliptic in outline, when unlobed sometimes ovate, stiffly chartaceous to subcoriaceous, adaxial surface green, glabrous to sometimes sparsely pilose with non-flagelliform trichomes, trichome gradually narrowed apical with base about twice as broad as apex, abaxial surface green, glabrous or sometimes purplish, glabrous or proximal portion of midrib pilose, base various, runcinate, lyrate, subpandurate, or attenuate onto petiole, each margin usually 1-4-lobed basally, margins dentate-serrate and often irregularly so, usually callose-thickened, lateral lobes 0.5-4 × 1-2.5 cm, broadly dome-shaped to ovate, terminal lobe (when leaf pinnatifid-pinnatifolobed or subpandurate) usually about 1/3-1/2 of entire leaf length and much larger than the lateral lobes, generally triangular to ovate or cordiform; petiole (0.5-)1-13 cm, sometimes winged distally, villous to glabrate. Capitulescence openly corymbiform-paniculate, pyramidal or sometimes flat-topped, not leafy; scapes 1-3 per
plant, 15-70 cm, generally longer than the leaves, 3-30-capitulate, basally villous, ebracteolate or bracteolate especially at the nodes; peduncles 5-45(-100) mm, glabrous or sometimes sparsely puberulent, eglandular, 1-4-bracteolate; bracteoles 2-3 mm, linear-lanceolate. Capitula 8-13 mm; involucre 7-9(-10) mm, cylindrical-turbinate to narrowly campanulate; phyllaries 3-5-seriate, glabrous or nearly so, margins often ciliolate, apically broadly obtuse to rounded, sometimes mucronate; outer phyllaries 1-2.5 × 0.7-1.5 mm, orbicular to deltate; inner ones 7-9(-10) × 1-1.7 mm, lanceolate to oblanceolate; receptacle hispidulous. Florets 10-13; corolla 6-9 mm, white or pinkish-white, tube and throat 3-4.5 mm, outer lip 3-4.5 mm; anther thecae and apical appendage 3-3.5 mm, tails 1-1.2 mm; style branches c. 1.2 mm. Cypselae 3.5-5.5 mm, cylindrical, setulose, eglandular; pappus bristles 5-7(-8) mm, generally brownish. 2n = 56. Flowering (Oct-)Nov-Apr. 

Forests, brushy slopes, oak forests, pinares, pine-oak forests, on rocks, river valleys, sandy hills, steep slopes, Ch (Breedlove 33421, NY); G (Pruski et al. 4543, MO); H (Pittier 1829, F); ES (Villacorta y Lara RV-02637, MO). 600-2500 m. (Endemic.)

_Acourtia nudicaulis_ is our most widespread acaulescent species. As noted by Bacigalupi (1931), the leaf shape of _A. nudicaulis_ is highly variable, often even on the same plant. Most leaves of most rosettes are pinnatifid-pinnatilobed or subpandurate, but sometimes simple, which when they are simple are usually obviously attenuate basally onto petiole. _Acourtia hondurana_ is a consistently entire-leaved segregate of the widespread _A. nudicaulis_, but field studies in these scapose species are needed as plants called _A. hondurana_ may simply be ecotypes of the widespread _A. nudicaulis_. The collections from Chiapas plotted by Turner (2009) as _A. scapiformis_ (Bacig.) B.L. Turner have been re-determined as _A. nudicaulis_. Turner (1978: 460) incorrectly listed the fragments of K in GH as holotype, but protologue clearly designated "herb. Hook." as holotype.


_Acourtia reticulata_ var. _maculata_ B.L. Turner, _Perdicium mexicanum_ Sessé et Moc. (non _Proustia mexicana_ Lag. ex DC.), _Perezia reticulata_ (Lag. ex D. Don) A. Gray.

Caulescent herbs 1-2 m; stems stiffly erect, branched, leafy, glabrous to distally hispidulous, eglandular. Leaves simple, subsessile; blade 3-12(-15) × 2-5(-7) cm, generally oblanceolate to obovate, stiffly chartaceous, veins reticulate, surfaces sparsely puberulent, also glandular abaxially, base narrowly obtuse to cordate, the distal leaves never broadly auriculate-clasping,
margins dentate-serrate, not callose-thickened, apex usually obtuse; petiole 0.1-0.3 cm. Capitulescence thyrsoid-paniculate, many-capitulate, ultimate capitula subglomerate, glomerules on axillary branches 1-10 cm, branches shorter than to slightly longer than the subtending leaves; peduncles 0-1 mm, puberulent. Capitula 13-16 mm; involucre 7-9 mm, cylindrical to turbinate; phyllaries 4-5-seriate, rounded to broadly acute apically, subglabrous, eglandular; outer phyllaries 2-3 × c. 1 mm, deltate-ovate; inner ones 7-9 × c. 1.5 mm, lanceolate to oblanceolate. Florets 4-6(-7); corolla 8-9 mm, white to violet, tube and throat 4-5 mm, outer lip c. 4 mm; anther thecae and appendage c. 4 mm, tails c. 2 mm; style branches c. 1 mm. Cypselae 4-6 mm, glandular-pubescent; pappus bristles 9-10 mm, stramineous, sometimes subclavate distally. Flowering Oct-Nov. Brushy slopes, rocky areas, open forest of pine, oak, or juniper, forest edges. Ch (Breedlove y Strother 46379, MO); G (Castillo s.n., MO). 1100-1800 m. (Mexico, Guatemala.)

_Acourtia reticulata_ is similar by apically rounded phyllaries to the earlier _A. fruticosa_ (Lex.) Turner. _Acourtia reticulata_ is also similar to _Acourtia humboldtii_ (Less.) B.L. Turner (syn. _A. formosa_ D. Don, _Dumerilia alamani_ DC., _Proustia mexicana_ Lag. ex D. Don, and _Trixis latifolia_ Hook. et Arn.), but this more northerly species is distinguished by its acuminate phyllaries. The "lectotype" selection by Turner (1993) upon MA 3082 (as microfiche!) is not accepted because this specimen is not original material and was not seen by David Don; it is thus unavailable as lectotype. McVaugh (2000: 172) cited the holotype as at G.

**2. Jungia** L. f., nom. et orth. cons. (non Heist. ex Fabr., nom. rej.)


Por J.F. Pruski.

Perennial herbs to shrubs or lianas, rarely rosulate-scapose; stems erect or climbing to trailing, simple to few(-several)-branched, exalate, pseudostipulate or not so, often ferruginous or tomentose, sometimes fistulose; herbage glabrous to tomentose, trichomes simple, usually eglandular, also sometimes heterotrrophic with stipitate-glands (especially in dry habitats), the non-glandular trichomes much longer than the short stipitate-glands. Leaves simple, alternate, mostly petiolate or capitulescence leaves sessile; blade ovate to suborbicular and palmately 5-11-lobed (rarely oblong with pinnate venation), base typically cordate or capitulescence leaves tapering, abaxial surface often tomentose; petiole generally elongate, often about as long as blade. Capitulescence terminal and axillary, generally corymbiform-paniculate (often subglomerulate) to less commonly open-corymbiform. Capitula bilabiate; involucre typically noticeably shorter than
florets, cylindrical to campanulate or hemispherical, often subtended a few lanceolate 
subinvolucral bracts to about ½ as long as involucre, bracts pinnate-veined or 1-veined; phyllaries 
mostly 6-12, more or less subimbricate, subequal, 1(-2)-seriate, often subtending an individual 
floret, stiffly erect but persistent and reflexed in fruit, linear-lanceolate to oblong, nervation 
parallel, often complicate at least proximally; receptacle flat, paleate, glabrous or short-setulose; 
paleae resembling phyllaries but thinner and glabrous or slightly pubescent, conduplicate, 
persistent, each subtending an inner floret, margins scarious. Florets 6-130, isomorphic, 2- 
several-seriate; corolla bilabiate (3 + 2), usually white, sometimes yellow or infrequently pinkish, 
tube and throat usually subequal, together about as long as to longer than lips, throat narrowly 
campanulate, limb divided well above level of involucre, outer lip usually spreading (outer lip of 
inner florets spreading or revolute), 4-nerved, 3(-4)-dentate to infrequently subentire, inner lip 
revolute, usually deeply bilobed to base (Mesoamerica), each lobe 2-nerved; anthers usually 
about ½ as long as corolla and partly exerted from throat, tails smooth, those of adjacent thecae 
free, apical appendage elongate, mostly oblong; style branches truncate, with an apical crown of 
sweeping hairs. Cypselae cylindrical to fusiform, often subrostrate or rostrate, usually 4-5-costate, 
glabrous or pubescent with (linear to rounded) twin hairs, rostrum sometimes also stipitate-
glandular; pappus of many subequal, plumose to less commonly barbellate, capillary bristles, 
bristles 1-few-seriate, sometimes connate basally, persistent or sometimes deciduous as a unit or 
in groups, usually stramineous (Mesoamerica), sometimes gray or rarely reddish. \(x = 7, 9, 10\). 
Aprox. 27 spp. Mexico, Neotropics south to Argentina and Uruguay. 

*Jungia* was revised by Harling (1995), who recognized 26 species, 24 South American 
endemic, one Mexican endemic, and our species in both regions and Central America. Harling 
(1995) placed 17 spp. in *J.* sect. *Dumerilia* (Lag. ex DC.) Harling, which is characterized by 
rostrate cypselae that are usually pubescent; our species, the generitype, is one of six species in 
the nominante section, which has glabrous erostrate cypselae. 

In its protologue, *Tostimontia* was distinguished from *Jungia* by subpeltate leaves, but 
matches it by basally connate barbellate-plumose pappus bristles. *Tostimontia* and was reduced to 
synonymy of *Jungia* by Katinas et al. (2008).


Vining shrubs to lianas 2-4(-10) m; stems ascending to scandent or climbing, sometimes decumbent, striate, nodes not pseudostipulate, internodes often elongate, densely villous to ferruginous-tomentose, trichomes usually 0.5-1(-2) mm; herbage eglandular. Leaves long-petiolate; blade 4-9(-11) × 5-11(-14) cm, suborbicular-cordate, shallowly palmately 5-7(-9)-lobed, chartaceous, palmately 3-5-veined from very base, also typically with only one other pair of secondary veins usually > 1 cm above base, surfaces slightly discolorous, adaxial surface villosulous or villous, abaxial surface villous to densely ferruginous-tomentose, base cordate, marginal lobes (in larger leaves) usually 2-3 × 1-1.5 cm (the basal pair of lobes the smallest, the terminal lobe the largest), broadly round-triangular, crenulate, usually without mucronulate teeth, apex obtuse to rounded; petiole 2-9 cm, tomentose. Capitulescence rounded or pyramidal, somewhat densely corymbiform-paniculate, distal few nodes with flowering lateral branches 2-10 cm, usually longer than subtending bracteate leaf, capitula often subsessile in subglomerules of 3-20+ (some subterminal individual capitula short-pedunculate), subglomerules of capitula secondarily loosely clustered, individual clusters 2-8(-12) cm diam.; peduncles 0-6(-10) mm, tomentose, sometimes peduncles and distal branchlets with 1-few linear-lanceolate to narrowly oblanceolate bracteoles ≤ 5 mm. Capitula 9-11 mm; involucre 3-5 mm diam., cylindrical to turbinate, subtending subinvolutral bracts 2-6, usually 1.5-3.5 × 0.5-1 mm, unequal, lanceolate to oblong; phyllaries 6-9, usually 4-5.5 × 1.3-2.3 mm, subequal, 1(-2)-seriate, usually 3-nerved, often complicate at or near lateral nerves, tomentulose medially with glabrous margins, apex broad, usually obtuse to rounded, apiculate; receptacle setose, setae 1-2 mm, interspersed with paleae; paleae c. 4 mm, 1-nerved, apically brownish-pubescent, otherwise glabrous and stramineous. Florets 7-11; corolla 5.5-8.5 mm, white, tube and throat 3.5-5 mm, throat glabrous internally, outer lip of limb 2-3.5 × 0.7-1.2 mm, inner lobes 1.5-2.5 mm, both lips setose to setulose distally; anthers 3.5-4 mm, thecae longer than appendage and tails; style branches c. 1 mm. Cypselae 2.2-3.5 mm, cylindrical, truncate at apex, glabrous, carpopodium c. 0.3 mm, bulbous, stramineous; pappus bristles 50-60, 5-6 mm, thinly plumose, lateral cilia c. 0.5+ mm. Flowering Jan-Jun(, Sep-Nov). Montane forests, cloud forests, pine forests, tree stumps and logs, subpáramo. Ch (Breedlove 34113, MO); G (Türckheim 8410, NY); ES (Martínez 893, MO); CR (Pruski et al. 3899, MO); P (Davidson 559, MO). 1400-3100 m. (Mesoamérica, Colombia, Venezuela.)

Plants of Jungia ferruginea at higher elevations are often seen only trailing on the ground. Reports of J. ferruginea in the Andes south of Colombia are based on misdeterminations. South
American *J. paniculata* (DC.) A. Gray is occasionally treated as a synonym (this is partly the source of some erroneous distribution reports), but *J. paniculata* differs from our species by pseudostipulate nodes.

The species most similar to *J. ferruginea* is northern Andean *J. coarctata* Hieron., which is provisionally recognized here and basically seems to differ by leaf margins with mucronulate teeth and phyllary apices often acute. Although some material from Cerro Punta, Panama (e.g., *D'Arcy 10788*, MO; *D'Arcy et al. 13175*, MO) displays these supposed distinguishing features of *J. coarctata* as circumscribed by Harling (1995), such material is nevertheless referred here to *J. ferruginea* under which at present I prefer not synonymize *J. coarctata*.

Mexican *J. pringlei* Greem. differs from our species by pubescent rostrate cypselae, barbellate pappus bristles, and phyllaries acute to attenuate apically.

### 3. Trixis P. Browne

*Bowmania* Gardner, *Castra* Vell., *Prionanthes* Schrank, *Tenorea* Colla (non Raf.)

Por J.F. Pruski.

Perennial herbs to shrubs; caudex not commonly tomentose; stems erect to scandent, winged (from decurrent base of leaf margins) or exalate; herbage usually pubescent, often heterotrichous, trichomes usually simple (infrequently substellate-dendroid), eglandular and/or stipitate-glandular, the non-glandular trichomes mostly much longer than stipitate-glands. Leaves simple, alternate; blade linear-lanceolate to ovate, thinly chartaceous to subcoriaceous, venation pinnate. Capitulescence terminal, monocephalous or more commonly corymbiform or paniculate. Capitula bilabiate; involucre typically noticeably shorter than florets, often cylindrical (and then often turbinate in fruit) to infrequently subhemispherical at anthesis, sometimes subtended a few subinvolucral bracts with pinnate venation; phyllaries 5-13+, imbricate or subimbricate, graduate to subequal, 1-5-seriate, stiffly erect but reflexed in fruit, mostly oblong, venation parallel, often complicate at least proximally and then often closely subtending an individual floret, margins often finely ciliolate (Mesoamerica); receptacle flat, epaleate, often setose to densely so. Florets 4-60, isomorphic, 2-few-seriate, the inner series usually slightly smaller; corolla bilabiate, yellow to less commonly white or rarely orangish, tube and throat usually subequal, together about as long as to longer than lips, throat narrowly campanulate, inner surface of throat mostly subglabrous to sparsely short-setulose, setae usually included, limb divided well above level of involucre, outer lip spreading to tardily or quickly revolute (limb of inner florets usually more strongly revolute), 3-dentate or subentire, inner lip usually deeply bilobed to base, lobes narrow;
anthers usually about ½ as long as corolla and partly exserted from throat, tails smooth or setulose, apical appendage elongate, mostly oblong; style branches truncate, with an apical crown of sweeping hairs. Cypsela usually cylindrical to subfusiform, mostly subrostrate with a distal non-costate constriction, apical annulus flaring, body brown to black, often 5-costate, costae stramineous, setulose and/or stipitate-glandular; pappus of 60-80+ subequal scabrid capillary bristles, bristles few-seriate, persistent, often stramineous or fulvous. $x = 9$. Aprox. 40 spp. SW United States, Mexico, Neotropics south to central Argentina and central Chile; 5 spp. in Mesoamerica.

The Mexican and Central American species of *Trixis* were revised by Robinson y Greenman (1904) and Anderson (1972), with Anderson treating 18 species. Subsequently Turner (2009) recognized three additional Mexican species, including *T. anomala* endemic to Chiapas. Katinas (1996) recognized 21 species in South America, of which two also occur in Mesoamerica. Material from Chiapas occasionally determined and distributed as *T. silvatica* B.L. Rob. et Greenm. has been redetermined as *T. chiapensis*. In the genus description I characterize the phyllaries in *Trixis* as 1-5-seriate (as in Katinas, 1996), yet with the involucre often subtended by distinct subinvolucral bracts (the "accessory bracts" of Anderson, 1972).

Throughout much of Mesoamerica the widespread *Trixis inula* is the only reported species, but *T. divaricata* is known from Costa Rica and several other species are endemic to Chiapas and Guatemala.


1. Involucres without distinct subinvolucral bracts; phyllaries unequal, graduate, 3-5-seriate.

   1. **T. anomala**

   1. Involucres subtended by subinvolucral bracts usually distinct in texture from and usually not gradually grading in size into phyllaries; phyllaries subequal, 1(-2)-seriate.

   2. Leaf blades auriculate; capitula often nodding; corollas white; cypselae densely stipitate-glandular, basically without twin hairs; throats internally long-setose, setae often exserted.

   3. **T. divaricata**

   2. Leaf blades never auriculate; capitula erect; corollas yellow; cypselae densely setulose with twin hairs, usually also stipitate-glandular to sparsely so; throats mostly subglabrous to sparsely short-setulose internally, setae included.
3. Stems winged; leaves usually sessile to subsessile; outer lips of corollas commonly revolute; receptacle with trichomes 2-6 mm.  

2. T. chiapensis

3. Stems exalate; leaves petiolate; outer lips of corollas usually spreading; receptacle with trichomes 0.5-3.5 mm.

4. Leaf blades chartaceous, usually 5-10 faint secondary veins per side, tertiary reticulum distinct, abaxial surface sparsely strigose or sparsely pilose to glabrate; peduncles usually strigillose; subinvolucral bracts unequal. (widespread).

4. T. inula

4. Leaf blades stiffly chartaceous, usually 6-8 secondary veins per side, tertiary reticulum slightly distinct, abaxial surface villous to dense tomentose; peduncles villous to dense tomentose; subinvolucral bracts subequal. (Chiapas and Guatemala).

5. T. nelsonii


Shrubs c. 3 m; stems erect, exalate, villous to densely so, trichomes subappressed to loosely ascending; herbage usually heterotrichous, the non-glandular vestiture usually more apparent, the stipitate-glands to c. 0.1 mm, sparse. Leaves petiolate; blade 7-19 × 2-5 cm, elliptic-lanceolate, chartaceous, 7-15 secondary veins per side, tertiary reticulum slightly distinct, adaxial surface smooth, sparsely strigose-pilose, abaxial surface pilose to villous, midrib 1-1.8 mm diam. basally on abaxial surface, noticeably raised, base cuneate, never auriculate, margins denticulate to remotely so, apex acuminate; petiole 0.2-0.7 cm. Capitulescence corymbiform, capitula erect; peduncles 1-9 mm, villous. Capitula 15-18 mm; involucre 5-8 mm diam., narrowly turbinate, without distinct subinvolucral bracts that differ from phyllaries; phyllaries 13+, unequal, graduate, 3-5-seriate; the outer few series of phyllaries 1-6 × 0.5-1.2 mm, lanceolate to elliptic-lanceolate, some excurrent onto peduncle, gradually grading to inner phyllaries; inner series of phyllaries 9-11 × 1-1.8 mm, subequal but not clearly in a single series, slightly curved in x-section, strigose-pilose, apex acuminate; receptacle glabrous or with trichomes < 0.5 mm, sparse. Florets 8-12; corolla yellow, tube and throat 5-7.5 mm, outer lip of limb 3-4 × 1.2-1.3 mm, revolute, inner lobes coiled, lips sparsely setulose apically; anther tails 1.5-2 mm, appendage oblong, nearly as long as thecae; style branches 1.6-1.8 mm. Cypselae 4-6 mm, moderately setulose with stipitate-glands, also usually with twin hairs especially proximally, subrostrum about 1/3-1/2 the length of cypselae; pappus bristles 8-10 mm. Flower Mar-Apr. Montane forests. Ch (Breedlove 24753, MO); G (Velez 99.6983, MO). 1600-1800 m. (Endemic.)
Trixis anomală occurs as far west as Cerro Baul (on the Chiapas-Oaxaca border), and thus may be expected to occur in Oaxaca as well.


Shrubs 0.5-3 m; stems ascending or scandent, much-branched, winged, sometimes exalate in capitulescence or when internodes short, heterotrichous (glandular and non-glandular trichomes), puberulent to lanate, wings usually 1.5+ mm diam., non-glandular trichomes to 1+ mm; herbage with stipitate-glands usually 0.1-0.3 mm. Leaves sessile to subsessile or the capitulescence leaves sometimes petiolate; blade 2.5-15(-21) × 1.5-4.5(-6.5) cm, lanceolate to elliptic, stiffly chartaceous, usually 8-12 secondary veins per side, tertiary reticulum indistinct, both surfaces densely hirsutulous with stipitate-glands, homotrichous (stipitate glands only) or heterotrichous (also with non-glandular trichomes), adaxial surface smooth, often also sparsely pilose, abaxial surface often also pilose or villous to sometimes tomentose, base generally decurrent onto stem as wings, never auriculate, margins subentire to denticate, apex acute to acuminate, slightly apiculate; petiole (0-)0.3-2.2 cm. Capitulescence densely corymbiform, capitula erect; peduncles 3-20(-30) mm, densely glandular, also puberulent to pilose or villous. Capitula 12-22 mm; involucre 6-8 diam., subtending subinvolucral bracts 4-5, 6-20 × 1.5-9 mm, unequal, the outer sometimes the largest, linear-lanceolate to elliptic, half as long as to distinctly larger than involucre, stiff-chartaceous, margins revolute, distinct in texture from and not gradually grading in size into phyllaries; phyllaries 8-11(-13), 9-16 × 1.1-2.7 mm, subequal, 1-seriate, densely glandular, usually also pilose, apex acute to acuminate; receptacle with trichomes 2-6 mm. Florets (13-)16-24; corolla yellow, usually sparsely setulose or papillose, tube and throat 6-9 mm, outer lip of limb 3.5-6 × 2-2.5 mm, spreading to more commonly quickly revolute, inner lobes 3-4.5 mm, lips setose apically; anther tails 1.5-2 mm; style branches 1.5-2 mm. Cypsela 5-9.5 mm, densely setulose with twin hairs, sometimes also sparsely stipitate-glandular; pappus bristles 7-11 mm. 2n = 54. Flowering Oct-Jan, Apr. Deciduous forests, thickets, oak forests, roadsides. Ch (*Anderson y Anderson 5486*, NY); G (*Williams et al. 41365*, MO). 600-1600 m. (Endemic.)

*Trixis chiapensis* is similar to the often wing-stemmed *T. silvatica* (endemic to Oaxaca), from which it differs in thicker leaves, thicker subinvolucral bracts, and stipitate-glands ≥ 0.1 mm.

Perdicium flexuosum Kunth, Prionanthes antimenorrhoea Schrank, Trixis antimenorrhoea (Schrank) Mart. ex Kuntze, Trixis antimenorrhoea var. divaricata (Kunth) Kuntze, Trixis antimenorrhoea var. petiolata Kuntze, Trixis diffusa Rusby

Trixis flexuosa (Kunth) Spreng.

Shrubs 1-3 m; stems weakly ascending to scandent, branched at nearly right angles, exalate, sparsely pilose to tomentose, indistinctly heterotrichous, the non-glandular vestiture more apparent; herbage when glandular with stipitate-glands usually < 0.1 mm. Leaves sessile; blade 4-11(-18) × 1-3.5(-5) cm, lanceolate, thinly chartaceous, secondary veins usually 10-12 per side, not prominent, tertiary reticulum slightly distinct, adaxial surface smooth, sparsely strigillose- pilosulose, abaxial surface sparsely pilose to whitish arachnoid-tomentose, base cuneate and mostly auriculate, auricles rounded, margins subentire to sometimes minutely denticulate, apex attenuate. Capitulescence an open leafy corymbiform-panicle, capitula often nodding; peduncles 5-30 mm, pilose to densely villous. Capitula 10-16 mm; involucre 4-8 diam., often turbinate in fruit, subtending subinvolucral bracts 4-7, 3.5-8 × 1-1.5 mm, unequal, linear-lanceolate, usually 1/4-2/3 as long as involucre, somewhat grading in size and texture into phyllaries but nevertheless with the largest subinvolucral bract green-mid-ribbed and distinctly shorter than phyllaries proper; phyllaries 8, 8-12 × 1-2 mm, subequal, 1-seriate, pilose, apex acute to acuminate or rarely attenuate; receptacle with trichomes 0.5-0.7 mm. Florets 9-14; corolla white, tube and throat 5-7 mm, throat internally long-setose, setae often (Mesoamerican and some South American material) exserted from throat, outer lip of limb 3.5-5 × 1.5-2 mm, quickly revolute to recurved, inner lobes 2-4 mm, lips usually setulose apically; anther tails 2-3 mm; style branches 1.5-2 mm. Cypselae 4-7 mm, densely stipitate-glandular, basically without twin hairs; pappus bristles 7-10 mm.

Flowering Jan-Mar. Streamsides, thickets. CR (Skutch 2491, MO); P (Anderson 1972: 13). 600-900 m. (Mesoamerica, Colombia, Venezuela, Ecuador, Peru, Bolivia, Brazil, Uruguay, Paraguay, Argentina, Hispaniola.)

Klatt (1892) and Blake (1937) first reported Trixis divaricata in Central America, and Anderson (1972) recognized Trixis divaricata, but cited no vouchers. In Costa Rica, T. divaricata is known to me from only three collections made between 1936-1966 near San Isidro de El General. Trixis divaricata is not known from geographically intermediate Panama. Although the protologue illustration of Prionanthes antimenorrhoea Schrank depicts a plant without obviously auriculate leaves, I follow Katinas (1996) and treat this merely as a deviant of the usually auriculate-leaved species. Katinas (1996) recognized two infraspecies within Trixis
antimenorrhoea, but here I recognize the species (albeit sub *T. divaricata*) in the broad sense without making judgment on placement of *T. discolor* D. Don. The synonymy here gives only the more common names, but full synonymy of *T. divaricata* is given in Katinas (1996) sub *T. antimenorrhoea* subsp. *antimenorrhoea*.


Shrubs 0.7-4 m, sometimes virgate; stems ascending to scandent, much-branched, exalate, often pale-colored, strigillose to glabrate, infrequently pilose; herbage glabrous or indistinctly heterotrichous, the non-glandular vestiture usually more apparent, the stipitate-glands to c. 0.1 mm, sparse. Leaves petiolate; blade 2-9(-16) × (0.8-)1.5-3(-6.5) cm, usually lanceolate to elliptic (infrequently obovate), chartaceous to sometimes thinly so, usually 5-10 faint secondary veins per side, tertiary reticulum distinct, adaxial surface usually smooth, sparsely strigillose or sparsely pilosulose to more commonly glabrate, abaxial surface sparsely strigose or sparsely pilose to sometimes glabrate, base attenuate to obtuse, never auriculate, margins subentire to less commonly denticulate, sometimes slightly revolute, apex acute to acuminate, infrequently obtuse; petiole 0.1-0.7 cm. Capitulescence moderately densely corymbiform, capitula erect, 3-10 per cluster; peduncles 5-20 mm, sometimes leafy-bracteate, usually strigillose to sometimes pilosulose, bracts to c. 20 × c. 4(-6) mm, elliptic-ovate. Capitula 13-19 mm; involucre 5-8 mm diam., turbinate to campanulate in fruit, subtending subinvolucral bracts 3-5, 3-14 × 0.8-3 mm, unequal, linear to elliptic-lanceolate, usually 1/3-3/4 as long as involucre, distinct in texture from and not gradually grading in size into phyllaries, venation reticulate; phyllaries usually 8, 9-15 × 1-2 mm, subequal, 1(-2)-seriate, strigillose to densely so, sometimes glabrate or even
heterotrichous with appressed non-glandular trichomes and patent short-stipitate glands, base subgibbous, apex acute to obtuse; receptacle with trichomes 0.5-1.5 mm. Florets 8-15; corolla yellow, sparsely papillose, tube and throat 5-9 mm, outer lip of limb 4-7.5 × 2-3 mm, spreading, inner lobes 3-5 mm, not always cut to base, lips setulose apically; anther tails 1.5-2 mm; style branches 1.5-2.5 mm. Cypselae 4.5-8.5 mm, 5-costate, densely setulose with twin hairs, also stipitate-glandular distally; pappus bristles 7-10.5 mm. 2n = 54, 56. Flowering mostly Nov-Jun. Bosque seco, brushy slopes, deciduous forests, dry rocky river beds, forest borders, montane forest, pastures borders, pine-oak forests, roadsides, sandy open areas, secondary growth, streamsides, thickets. Ch (Pruski y Ortiz 4181, MO); Y (Gaumer 397, MO); C (Lundell 1253, MO); QR (Cabrera et al. 11144, MO); G (Deam 324, MO); H (Thieme 5326, NY); ES (Standley 21248, MO); N (Friedrichsthal 989, NY); CR (Skutch 4247, MO); P (Allen 201, MO). 0-2500 m. (SW United States, Mexico, Mesoamerica, Colombia, Venezuela, Cuba, Jamaica, Hispaniola.)

As noted by Anderson (1971), the names *Trixis frutescens* or *T. radialis* Kuntze were incorrectly used (pre-1971) for our species. More complete synonymy is given by Anderson (1972). Article 32 example 10 of McNeill et al. (2006) allows for "implicit reference to a Linnaean binomial", thus *Trixis inula* is considered a nom. nov. for *Inula trixis*.

The large subinvolucral bracts of Anderson (1972) apparently correspond to what I characterize here as the leafy bracts of the peduncles. I have seen no subinvolucral bracts as long as those in Anderson (1972). Plants from the Yucatan and Caribbean tend to have phyllaries apically strigillose to nearly glabrate, whereas those from the Pacific tierra caliente are often obviously strigillose and/or stipitate-glandular (as indicated by the epithet of synonymous *T. adenolepis*). Plants with large obovate thinly chartaceous denticulate leaves, when encountered, are mostly in southern Mesoamerica and northern South America.


*Trixis amphimalaca* Standl. et Steyerm.

Shrubs 0.5-1.6 m; stems erect to ascending, much-branched, exalate, villous to dense tomentose, non-glandular trichomes usually to c. 0.6 mm; herbage usually indistinctly heterotrichous, the non-glandular vestiture usually more apparent, the stipitate-glands to c. 0.1 mm, sparse. Leaves petiolate; blade (2-)3-7(-10) × 1-2(-3.5) cm, usually elliptic to oblong, stiffly chartaceous, usually 6-8 secondary veins per side, tertiary reticulum slightly distinct, adaxial surface rugulose, sparsely pilose, abaxial surface villous to dense tomentose, base narrowly
cuneate to obtuse, never auriculate, margins subentire to denticulate, apex acute to obtuse, slightly apiculate; petiole 0.2-1.5 cm. Capitulescence densely corymbiform, capitula erect; peduncles 1-11 mm, villous to dense tomentose. Capitula 12-18 mm; involucre 5-8 diam., quickly turbinate in young fruit, subtending subinvolutural bracts 4-6, 5-12 × 1-5 mm, +/- subequal, lanceolate to obovate, usually 1/3-2/3 as long as involucre, distinct in texture from and not gradually grading in size into phyllaries; phyllaries usually 8, 10-15 × 1.5-3 mm, subequal, 1-seriate, usually pilose to strigose, sometimes hirtellous with stipitate-glands more abundant than non-glandular trichomes, apex acute; receptacle with trichomes to c. 3.5 mm. Florets 12-19; corolla yellow, sparsely setulose or papillose, tube and throat 7-10 mm, outer lip of limb 5.5-8 × 2.4-3 mm, spreading or sometimes recurved, inner lobes 4-6 mm, lips setose apically; anther tails 1.5-2.5 mm; style branches 1-2.5 mm. Cypselae 5-11 mm, densely setulose with twin hairs, usually also sparsely stipitate-glandular; pappus bristles 8.5-12 mm. Flowering Dec-Feb. 

Deciduous forests, cloud forest, pine-oak forests, roadsides. Ch (Breedlove 48883, MO); G (Standley 82538, F). 700-2300 m. (Endemic.)

Trixis nelsonii occurs as far west as Cerro Baul (on the Chiapas-Oaxaca border), and thus may be expected to occur in Oaxaca as well.

XVIII. Tribus Neurolaeneae Rydb.

Neurolaeninae Stuessy, B.L. Turner et A.M. Powell.

Por J.F. Pruski.

Perennial herbs or shrubs to small trees, sometimes vining; herbage without secretory cavities or latex. Leaves alternate or opposite, infrequently whorled, sessile or petiolate; blade unlobed to lobed but rarely pinnatifid, often punctate-glandular, adaxial surface trichomes often tuberculate-based. Capitulescence terminal or axillary, monocephalous to corymbiform or paniculate, open to congested. Capitula radiate or discoid; involucre cylindrical to hemispherical; phyllaries 4-many, imbricate, (1-)3-8-seriate, usually partly herbaceous, all not yellow-scarious; clinanthium convex to conical, typically paleate; paleae often conduplicate, usually thin-chartaceous or scarious, sometimes trifid. Ray florets 1(-3)-seriate, pistillate; corolla typically deciduous, limb with adaxial surface cells weakly mamillose, apex often trilobed. Disk florets bisexual (Mesoamerica) to functionally staminate in Heptanthus; corolla funnelform to campanulate, tube-throat transition zone indistinct or abrupt, mostly 5-lobed, glabrous, glandular, or setulose-spiculiferous, tube dilated basally to sometimes only weakly so, throats without fibers embedded in nerves, with colored resin in ducts, ducts solitary along nerves of disk corolla throat or infrequently in
Enydra sometimes seemingly paired by included longitudinal pale-drying line, lobes short to long, cells of inner surface nearly smooth; anthers ecaudate, filaments glabrous, thecae usually pale-colored or sometimes black, endotheicum pattern polarized, apical appendage usually ovate, concave-keeled, glandular or eglandular; style exappendiculate or nearly so, base nodular, part-immersed arising from within nectary on small stipe, branch somewhat flattened, with stigmatic surfaces 2-banded, apex convex or rounded to sometimes acute or attenuate-tipped. Cypselae isomorphic, prismatic, never alate, never obcompressed, brown to black, carbonized, walls without raphids, often 5-costate but without small longitudinal striatulae interrupting the dotted carbonized layer, apex truncate; pappus of numerous capillary bristles or of 10-25 short to elongate scales radially arranged, rarely epappose. 5 genera and aprox. 165 spp. Mostly neotropical, a few species also paleotropical.


The circumscription of Neurolaeninae basically followed here is that of Panero (2007) who recognized a resurrected Neurolaeninae as containing Calea, Enydra, and Neurolaena and two additional extra-Mesoamerica genera. Turner (2014-NEURO) followed the tribal circumscription of Panero (2007), but that circumscription is slightly modified here by the recognition of Tyleropappus Greenm. as distinct from Calea as in Pruski (1997). Schistocarpha, placed adjacent to Neurolaena by Rydberg (1927), was placed by Panero in tribe Millerieae, which differs from Neurolaeninae by longitudinally microstriatulate cypselae. Despite being placed in different tribes, Neurolaena is nevertheless reminiscent of Schistocarpha (Millerieae), which differs further by opposite leaves and white ray corollas. Staurochlams, Tetrachyron, and Unxia, included by Robinson (1981) in Neurolaeninae, were excluded by Panero (2007) to Coreopsideae, Verbesininae, and Millerieae respectively.

1. Aquatic or wetlands herbs; stems fistulose; capitulescences of 1-few capitula subsessile and solitary in distal few nodes, axillary or appearing axillary.

2. Enydra

1. Terrestrial herbs to shrubs or small trees; stems with pith solid; capitulescences mostly pluricapitulate and terminal.

2. Leaves opposite or whorled; corollas glabrous or glandular, not pubescent with non-glandular helianthoid trichomes; disk corolla tubes and throats typically well-differentiated; pappus scales few to many, 1-seriate.

1. Calea

2. Leaves alternate; corollas often pubescent with non-glandular helianthoid trichomes; disk corolla tubes and throats not very well-differentiated; pappus bristles numerous, 1-2-seriate.

3. Neurolaena

1. Calea L.


Por J.F. Pruski.

Subshrubs, shrubs, or small trees, less commonly vines or perennial herbs from xylopodia; stems subterete, branching trichotomously, erect to scandent or climbing, typically leafy distally or infrequently only proximally or basally, glabrous to tomentose, pith typically solid throughout; herbage glabrous or with simple helianthoid trichomes, shorter moniliform, and/or sessile punctate glands. Leaves opposite or infrequently whorled, typically petiolate; blade broad or much less commonly linear, usually chartaceous to stiffly so, less commonly coriaceous or subcarnose, venation usually trinerved from near base with the larger secondaries typically continuing well past mid-blade, infrequently pinnately veined, surface glabrous to pubescent, abaxial surface often glandular, base attenuate to obtuse or sometimes cordate, margins entire to more commonly serrate or crenate, rarely pinnatifid, apex attenuate to rounded. Capitulescence mostly pluricapitulate (ours), terminal or sometimes axillary, usually thyrsoid-paniculate, umbellate, or corymbiform, sometimes monocephalous; peduncles typically present or infrequently ultimate capitula sessile-ternate. Capitula radiate or discoid, 2-175-flowered; involucre cylindrical to hemispherical; phyllaries several to many, imbricate, 2-8-seriate, often unequal and graduate, sometimes subequal or obgraduate, often more or less of similar dry scarious-chartaceous texture, occasionally outer phyllaries herbaceous or herbaceously tipped to even squarrose, appressed or outer ones sometimes spreading or reflexed, usually at least mid-series to inner series yellow or stramineous with c.
3-13 brownish or reddish striations; clinanthium convex to conical, paleate, rarely epaleate; paleae conduplicate but never keeled, sometimes cymbiform, scarious, usually yellowish or stramineous, midrib darker, infrequently indistinctly few-striate, often trifid in distal third. Ray florets pistillate; corolla limb commonly yellow or rarely white or orange, generally longer than the tube and exserted from involucre, glabrous or glandular, not pubescent with non-glandular helianthoid trichomes, limb often oblong and c. 5-11-nerved, abaxial surface often glandular, apex entire to 3-lobed. Disk florets bisexual; corolla usually funnelform or campanulate, typically yellow, less commonly white or purplish, glabrous or glandular, not pubescent with non-glandular helianthoid trichomes, tubes and throats typically well-differentiated, tube often shorter than limb, obviously dilated basally, throat with resin ducts solitary along nerves, lobes erect or spreading, typically much shorter than throat but occasionally as long as or much longer than throat; anthers exserted, yellow to sometimes brown post anthesis, the apical appendages deltoid, glabrous or glandular abaxially, bases rounded or sagittate, pollen usually yellowish; style branches generally strongly recurved, apex usually acute to rounded, sometimes obviously papillose or apiculate. Cypselae of ray and disk florets similar, usually prismatic, usually obconic, commonly brown or black, carbonized by deposition of phytomelanin secretions on radial and tangential epidermal cells walls but the periclinal cell walls lighter in color, resulting in irregularly darkening patterns, without well-defined pale longitudinal microstriations, glabrous, glandular, and/or densely pubescent with antrorse bifid trichomes; carpophidum commonly sculptured, occasionally not so, pale; pappus of 8-30 subequal stramineous, moderately thickened scales, typically 1-seriate, in most species of c. 18-25 linear-lanceolate scales with apex long-attenuate, commonly more than half as long as the disk corollas and longer than the mature cypselae, less commonly of 8-16 unequal scales shorter than the corollas and shorter than to about as long as mature cypselae.

Mexico, Central America, South America except for Chile, Jamaica, Trinidad-Tobago; one species naturalized in tropical Africa; Aprox. 150 species.

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... Millerieae, Oteiza (tribe Millerieae), and Tetrachyron (Heliantheae subtribe Verbesininae) were resurrected from synonymy of neotropical Calea, respectively, by Robinson (1978), Fay (1975, 1978), and Wussow y Urbatsch (1979). From among similar genera, Calea is distinguished by non-setose corollas, corollas with resin ducts solitary along nerves, pale anthers, ray and disk cypselae similar and non-microstriatulate, and by a pappus of subequal scales.

Calea was treated as a member of Heliantheae subtribe Galinsoginae by Bentham y Hooker (1873) and Stuessy (1977), but Robinson (1981) excluded Calea from Galinsoginae and placed it in Heliantheae subtribe Neurolaeninae. Earlier, Rydberg (1927) described Neurolaeneae as containing Neurolaena and Schistocarpha (now Millerieae, syn. Galinsoginae), but not Calea. Here, I follow Panero (2007), who recognized a more narrowly defined Heliantheae excluding a resurrected Millerieae (including synonymous Galinsoginae) and placed Calea in Neurolaeneae, also reinstated by Panero (2007) at the tribal level.

Wussow et al. (1985) provided a fine regional monograph and discussion of Calea in Mesoamerica; and seven of eight names they used are recognized here in some form or another, but three of their synonyms are reconstituted and one of their species is rejected from Mesoamerica. Because species circumscriptions vary greatly from treatment to treatment, common names (e.g., those in González, 1994) cannot always be applied to individual species, but on the other hand several common names seem to refer to more than a single species.

Calea oaxacana (B.L. Turner) B.L. Turner appears to be endemic or at least centered near Tehuantepec in Pacific slope Oaxaca, only about 150 kms west of Chiapas, where it should be looked for. By relatively short pappus scales that are never long-attenuate apically, radiate-capitulate C. oaxacana is moderately similar to widespread C. ternifolia, but differs from it by short disk corolla lobes.

1. Simple-stemmed perennial herbs leafy only proximally, stems dying back to the soil; capitula radiate; ray florets 12-25, corollas orange.  

5. *C. megacephala*

1. Branched shrubs leafy distally, stems persistent, producing new growth from axillary buds; capitula discoid or radiate; ray florets 0-8, corollas yellow to white.

2. Pappus scales lanceolate to oblanceolate or oblong, shorter than to about as long as mature cypselae, apices acute to rounded, less commonly acuminate, never long-attenuate.

3. Leaf blade abaxial surfaces eglandular, with secondary and tertiary veins immersed.

6. *C. nelsonii*

3. Leaf blade abaxial surfaces glandular, secondary and tertiary veins raised abaxially.

4. Capitulescences cymose, 1-4-capitulate; capitula more or less conspicuously short-radiate; ray florets 8; corollas yellow; phyllaries subequal or obgraduate with the outer phyllaries herbaceous and villous; rare.

2. *C. crocinervosa*

4. Capitulescences compound, usually dense corymbiform-umbellate, with each stalked cluster usually several-many capitulate; capitula discoid or inconspicuously short-radiate; ray florets 0-3; corollas typically white to
ochroleucous; phyllaries strongly graduated, typically all scarious and subglabrous; common.  

8. **C. ternifolia**

2. Pappus scales linear-lanceolate, longer than mature cypselae, apices long-attenuate.  

5. Capitula radiate.  

10. **C. urticifolia**

5. Capitula discoid.  

6. Leaf blades linear-lanceolate, 0.1-0.4(-0.6) cm diam.

3. **C. fluviatilis**

6. Leaf blades lanceolate or narrowly elliptic to nearly orbicular, (0.7-)1-6(-8) cm diam.

7. Leaf blade surfaces eglandular; peduncles (1-)3-12 cm; capitulescences cymose to umbellate, 1-7-capitulate, well exserted from subtending leaves, never pluricephalous nor subglomerate; capitula globose, (30-)50-80-flowered.  

4. **C. longipedicellata**

7. Leaf blade abaxial surfaces glandular; peduncles 0.1-3.5 cm; capitulescences compound-paniculate and pluricephalous or rarely subglomerate and held within subtending leaves; capitula cylindrical to broadly campanulate, 8-26-flowered.

8. Capitulescences subglomerate; phyllaries subequal to slightly obgraduate; leaf blades subcoriaceous; rare.  

1. **C. crassifolia**

8. Capitulescences compound-paniculate and pluricephalous; phyllaries imbricate, typically graduate to nearly subequal; leaf blades stiff-chartaceous; common.

9. Leaf blades broadest near the middle; capitulescences umbelliform; style branch apices typically broad and obtuse, never apiculate.  

7. **C. prunifolia**

9. Leaf blades broadest in basal third; capitulescences corymbiform; style branch apices typically apiculate.

9. **C. trichotoma**


Rare shrubs 1.5-2.5 m; stems persistent, producing new growth from axillary buds, subterete, densely hispid-hirsute, trichomes 0.3-0.6+ mm. Leaves opposite, sessile or thickly short-petiolate; blade 4-7 × 3-6 cm, ovate to broadly deltoid-ovate, broadest below the middle,
subcoriaceous, trinerved from near base, areolae pellucid and veins dark, surfaces nearly concolorous, adaxial surface scabrous, smooth, abaxial surface hispidulous, also densely glandular, venation obviously reticulate with veins raised, base subcordate to rounded, teeth 7-9 per side, broader than deep, margin coarsely crenate-serrate, apex broadly obtuse; petiole 0.0-0.3 cm. Capitulescence subglomerate and held within subtending leaves, glomerules to 1.5 × 2.5 cm, subsessile, 3-9-capitulate; peduncles 0.1-0.3 cm, hirsute or hirsutulous. Capitula 7-9 mm, discoid, campanulate, 20-26-flowered; involucre 6-7 × 3-5 mm, campanulate; phyllaries subequal to slightly obgraduate, 3-seriate; outer phyllaries 4-6, 6-8 × 2-2.7 mm, ovate or oblong, herbaceous-foliaceous, squarrose, spreading, both surfaces pilose-hirsute, apex acute; inner phyllaries 5-7 × 2-2.5 mm, ovate, chartaceous-scarious, stramineous, 5-7-striate, glabrous or at least subglabrous, apex acute to obtuse; clinanthium c. 1.5 mm, low-conic; paleae c. 4 mm. Ray florets 0. Disk florets 20-25; corolla 4-4.8 mm, funnelform, yellow, glabrous, tube and limb subequal, tube 2-2.4 mm, lobes c. 0.8-1.1 mm, triangular-lanceolate, slightly shorter than throat; anthers partly exserted; style branches to c. 1 mm, apex obtuse. Cypselae 2.4-2.7 mm, obconic, weakly prismatic, setulose-hispidulous, eglandular, carpododium moderately asymmetric, those of the inner cypselae slightly stipitate; pappus scales 20-23, 4-4.5 mm, about as long as disk corollas, linear-lanceolate, apex attenuate. Limestone ridges. Flowering April. G (Steyermark 45627, GH). 200-700 m. (Endemic.)


Rare branched shrubs to c. 1 m, stems persistent, producing new growth from axillary buds; stems leafy distally, pilose-tomentose, internodes about as long as leaves or distal internodes shorter than leaves. Leaves opposite, short-petiolate; blade 2-5 × 1.5-6 cm, deltate-ovate, trinerved from near base, adaxial surface scabridulous to glabrate, abaxial surface closely villous at least on veins, also densely glandular, venation obviously reticulate with veins raised, base broadly cuneate to truncate, margin coarsely crenate, crenations rounded, apex obtuse to rounded; petiole 0.1-0.3 cm, pilose. Capitulescence cymose, 1-4-capitulate; peduncles 0.2-0.8 cm, tomentose. Capitula 8-11 mm, more or less conspicuously short-radiate; involucre 7-10 × 5-7 mm, broadly campanulate to nearly hemispherical; phyllaries 16-20, c. 3-seriate albeit subequal or obgraduate; outer phyllaries 3-5, broadly ovate to nearly orbicular, herbaceous, villous; inner phyllaries lanceolate-ovate to lanceolate, chartaceous to scarious, sparsely villous to glabrate, sometimes also glandular; receptacle convex; paleae c. 6 mm,
oblung to lanceolate, sometimes trifid. Ray florets c. 8; corolla yellow, tube c. 2.5 mm, limb c. 4.5 mm, oblong to obovate, 5-nerved, glandular abaxially. Disk florets 20-25; corolla c. 4.8 mm, narrowly funnelform to narrowly campanulate, yellow, tube, throat, and lobes more or less subequal, glabrous except for glandular limb, tube c. 1.5 mm, lobes c. 1.5 mm, lanceolate; style branches c. 1.5-1.8 mm, apex short-penicellate. Cypselae (immature) c. 2 mm, obconic, weakly prismatic, setulose-hispidulous, also glandular, carpodipodium moderately asymmetric, those of the inner cypselae slightly stipitate; pappus scales c. 16, c. 2 mm, about as long as mature cypselae, reaching to about base of disk lobes, broadly lanceolate to oblanceolate, apex obtuse, erose. Flowering Oct. *Curatella savanna*. Ch (Breedlove y Davidse 54237, CAS). 30 m. (Endemic.)

The crenate leaves with rounded crenulations of *C. crocinervosa* are reminiscent of those of *C. megacephala* from the same general Pacific coastal zone. Also, the leafy bracteate yellow-flowered radiate capitula of *C. crocinervosa* are reminiscent of those of widespread *C. urticifolia* and the moderately-short obtuse-tipped pappus scales and the moderately glandular disk corollas are reminiscent of those of widespread *C. ternifolia*; and indeed Turner (2014-NEURO) has suggested that *C. crocinervosa* is a tetraploid hybrid derived from *C. ternifolia* and *C. urticifolia*.


Rare branched subshrubs 0.2-1 m, stems persistent, producing new growth from axillary buds; stems few-several from woody base, erect, leafy distally, simple to more commonly several-branched, glabrous to minutely hispidulous, internodes usually about ½ as long as leaves; herbage trichomes minute 0.1-0.2 mm, usually antrorse or appressed and not obviously patent. Leaves subsessile or short-petiolate; blade 1.3-4(-5.5) × 0.1-0.4(-0.6) cm, linear-lanceolate, stiffly chartaceous, triplinerved from near base, lateral veins reaching to near midblade, submarginal, secondary and tertiary veins slightly dull-red pellucid, adaxial surface glandular-punctate otherwise glabrous, abaxial surface glabrous to strigillose, also glandular-punctate, secondary veins slightly raised, tertiary veins indistinct, base cuneate to narrowly so, margins few-serrulate, subrevolute, apex acute to acuminate; petiole 0-0.2 cm. Capitulescence corymbiform, 3-8-capitulate, not well-exserted; peduncles 0.5-1.5(-2) cm, usually shorter than subtending leaves, slender, hispidulous and sparsely glandular. Capitula 7-9 mm, discoid; involucre 5.6 × 4.5 mm, turbinato to narrowly campanulate, sometime indistinctly double; phyllaries usually slightly graduate with outer phyllaries at least half as long as inner,
infrequently obgraduate, 3-4-seriate; outer series of phyllaries c. 4, 3-5.5(-6.5) × 0.7-1.4 mm, decussate, lanceolate to triangular-pyiform, appressed or outer two sometimes spreading, herbaceous distally or nearly throughout, 1-3-striate, sparsely glandular, margins proximally ciliolate, apex acute to obtuse, callous-tipped; inner phyllaries c. 10, 5-6 × 1.5-2.7 mm, ovate grading to lanceolate, yellowish throughout or sometimes distally purplish, 3-7-striate, glabrous, apex obtuse to rounded; clinanthium 1-1.5 × c. 1 mm, short-conic; paleae 4-5 mm, lanceolate to oblanceolate, trifid, attenuate. Ray florets 0. Disk florets 13-25; corolla 4.7-5.2 mm, narrowly campanulate, yellow, glabrous, tube 1.6-2.3 mm, slightly shorter than limb, throat shorter than tube, lobes 1.6-2 mm, about as long as to nearly twice as long as throat, narrow-lanceolate, subequal to infrequently slightly unequal, ascending; anthers c. 2.2 mm, endothecium polarized, theca base sagittate; style base sometimes bulbous, branches c. 1 mm, narrowed to an acute to attenuate-cuspidate portion 0.1-0.2 mm. Cypselae 2-2.2 mm, obconic, hirsutulous, eglandular, carpopodium strongly asymmetric; pappus scales c. 20, 3.5-4.7 mm, linear-lanceolate, reaching to middle of disk corolla lobes, longer than mature cypselae, scabridulous, apex long-attenuate. Flowering May, July-Sep, Dec.

Among large boulders, rocky river beds. B (McDaniel 14442, MO). 400-600 m. (Endemic.)

Lundell 6787 (MICH, NY) gives granite as the substrate, and if C. fluviatilis is restricted to granite this may be the cause of its seeming narrow endemcity on Mountain Pine Ridge.


Isotype: Mexico, Oaxaca, Nelson 898 (US!). Illustr.: None. N.v.: Chiltota, H.

Infrequent branched subshrubs to thin shrubs 0.5-2.5(-4.5) m, stems persistent, producing new growth from axillary buds; stems usually few and elongate, sometimes branched at base from woody caudex, erect to scandent, leafy distally, often maroon, usually sparsely leafy and few-branched, glabrous to slightly puberulent, mid-stem internodes often longer than leaves; herbage sometimes maroon, glabrous or infrequently scabridulous-strigillose. Leaves opposite or rarely distal most internodes reduced leaves appearing ternately whorled, short-petiolate; blade (2-)3-10 × (0.7-)1.5-4.4 cm, lanceolate or narrowly elliptic to ovate or obovate, chartaceous-subcarnose, trinerved from near base, secondary and tertiary veins slightly pellucid, adaxial surface sometimes nitiduous, eglandular, otherwise glabrous or scabridulous with trichomes subappressed, subsidiary cells sometimes bulbous, abaxial surface eglandular, otherwise glabrous or sometimes indistinctly scabridulous-strigillose with appressed trichomes, venation weakly reticulate, secondary veins raised, tertiary veins much less distinct, base cuneate to short-acuminate, margins subentire to remotely serrulate or crenulate with 2-4
teeth per side, apex acute or acuminate to infrequently obtuse or rounded; petiole 0.1-0.8 cm, often maroon, glabrous or sometimes slightly puberulent. Capitulescence typically openly cymose to umbellate, sometimes monocephalous, 1-7-capitulate from congested 2-3 distal-most nodes, well-exserted from subtending leaves, never pluricephalous nor subglomerate; peduncles (1-)3-12 cm, hirsutulous-pilosulose, sometimes slightly broadened apically. Capitula 9-15 mm, globose, (30-)50-80-flowered; involucre 9-12 × 9-13 mm, broadly campanulate or hemispherical, always double; phyllaries obgraduate or subequal, less commonly moderately graduate, 3-4-seriate, dimorphic; outer phyllaries 4(-8), 8-15(-19) × 4-9 mm, decussate, elliptic to obovate, ascending to spreading, subcarnose-herbaceous throughout to sometimes thickly tan-scarious proximally, glabrous or sometimes sparsely scabridulous-strigillose proximally, margins entire or infrequently 1-2-serrulate, apex obtuse to rounded; inner phyllaries 9-12+, 6-10 × 2.3-5 mm, oblong to obovate, appressed, scarious with distal 2-3+ mm membranous-scarious and often maroon, glabrous, apex obtuse to rounded; clinanthium 3-4 × 3-5 mm diam., dome-shaped; paleae 4.5-5.5 mm, reaching only to about top of disk corolla tubes, lanceolate, entire or trifid, abrupt-attenuate. Ray florets 0. Disk florets (30-)50-80, moderately exserted above involucre; corolla 6-7.3 mm, cylindrical-funnelform, yellow, glabrous (ours) or in Oaxaca throat rarely glandular, tube 2.4-3.8 mm, about as long as limb, throat about 2× as broad as tube but neither flaring nor spreading, lobes 0.9-1.4 mm long, lobes shorter than throat, erect to ascending; anthers c. 2.6 mm, theca base sagittate; style branches 1.3-1.8 mm, narrowed to an attenuate-cuspidate portion c. 0.2 mm, sweeping hairs with acute apex, nectary c. 0.6 mm. Cypselae 2-2.5 mm, obconic, prismatic, glabrous; pappus scales 20-25, 5-6(-6.5) mm, linear-lanceolate, usually reaching to near base of corolla lobes, longer than mature cypselae, apex long-attenuate. Flowering Mar, May-Nov. Grazed hillsides, montane forests, pine forests, rocky areas, savannas. Ch (Breedlove 28126, TEX); B (Schipp 558, S); G (Pruski et al. 4545, MO); H (Molina y Molina 31074, NO). 0-1000 m. (Mexico [Oaxaca, Veracruz], Mesoamerica.)

_Calea longipedicellata_ is appears to be most common or at least well-collected in Belize, and elsewhere is moderately infrequent in the Gulf-Caribbean watershed eastward into the Isthmus de Tehuantepec of Oaxaca (near Matias Romero and Choápam) and Veracruz (the southern slopes of Volcán Sta. Marta), Mexico and westward into Olancho (NE of Catacames), Honduras.
Isolectotype (designated by Wussow et al., 1985): Mexico, Chiapas, *Nelson 2884* (US!).  
Illustr.: None. N.v.: None.

*Calea megacephala* var. *pachutlana* B.L. Turner, *Tonalanthus aurantiacus* Brandeg.

Uncommon simple-stemmed perennial herbs 0.3-0.7 m, stems dying back to the soil; stems leafy basally or only proximally in 4-6 usually closely spaced internodes, occasionally leafy to mid-stem, erect, subterete, striate-angulate, hirsute-pilose; internodes 1-2 cm, much shorter than leaves, occasionally to 6 cm and then about half as long as leaves. Leaves opposite, winged petiolate; blade 5-12 × 1.5-9 cm, deltate to rhombic-ovate, thin-chartaceous, prominently trinerved from basal acmination, veins slightly pellucid, surfaces eglandular, adaxial surface sparsely hirsute-seabridulous, abaxial surface hirsute-pilose to glabrate, trichomes multicellular with stout bases and elongate terminal cells, base cuneate to truncate then abruptly contracted and attenuate-decurrent onto petiole, sometimes with margins coarsely crenate to sometimes irregularly dentate, teeth or crenulations 2-5 mm, usually obtuse to rounded but sometimes mucronulate, infrequently each side of the base with 1-2 ovate lobules 10-20 mm long, apex of proximal leaves obtuse to rounded grading to that of distal leaves acute; petiole 1-7 cm, usually about half as long as blade, nearly winged to base, the winged portion distally to 1+ cm diam., gradually narrowing proximally to c. 0.2 cm diam. Capitulescence terminal with capitula borne single on 1(-4) leafless peduncles 16-55 cm, hirsute-pilose to sparsely so proximally, trichomes 0.3-2+ mm. Capitula (12-)15-22 mm, radiate, the disk short-conical, ; involucre 12-20 mm diam., hemispherical; phyllaries 16-22, 3-4-seriate, subequal to weakly graduated, appressed; outer 2-6 phyllaries 7-17 × 3.5-4.5 mm, nearly as long as to about half as long as the inner, elliptic-ovate to oblong, herbaceous, green but paler proximally, hirsute-pilose, apex acute to rounded; inner phyllaries 11.5-20 × 4-5 mm, lanceolate-ovate, striate, stramineous but apex often purple- scarious, usually hirtellous or seabridulous, apex acute to rounded; clinanthium conical, to c. 11 × 5 mm; paleae 6.5-10 × c. 1 mm, lanceolate, conduplicate proximally, stramineous-yellowish, apex acuminate to attenuate, subentire or sometimes trifid. Ray florets 13-22, style well-exserted from tube; tube 5.5-8 mm, slender, glabrous, limb 8-15 × 4-6 mm, oblong, sometimes lateral tearing at base and appearing bilabiate, orange drying yellow, 11-13-nerved, all nerves equally thick, calyx nerves not prominent, adaxial surface papillose, apex unevenly lobed. Disk florets 35-60; corolla 9-11 mm, narrowly funnelform, yellow or yellow-orange to sometimes reddish apically, glabrous, tube 3-4 mm, throat longer than tube, lobes 2-3.5 mm, triangular-lanceolate to lanceolate, erect; anthers not exserted; style branches c. 2.5 mm, ascending and not strongly recurved,
sometimes long-papillose apically or abaxial-distally. Cypselae 4-5 mm, oblong, compressed, black, the faces densely strigose-hirsute as well as short papillate, eglandular, carpopodium stramineous, strongly asymmetric; pappus scales 12-20, 4.5-6 mm, slightly longer than mature cypselae and reaching to about distal third of disk corolla throat, lanceolate, typically with midrib dark and thick especially proximally, margins and abaxial surface imbricate-scabridulous or fimbriate. $2n = 38$. Flowering Jul-Nov. Pacific watershed disturbed areas, pastures, pine-oak forests, seasonal evergreen forests. Ch (Urbatsch y Wussow 3338, LSU). (100-600-1100 m. (Mexico [Oaxaca], Mesoamerica.)

Cockerell (1915) provided a full description of Calea megacephala and Rzedowski (1968) placed Tonalanthus aurantiacus in synonymy. Sundberg et al. (1984) and Wussow et al. (1985) cited the future type of Turner's var. pachutlana as C. megacephala. The shorter peduncles and shorter peduncular trichomes characters used by Turner (2008) to diagnose the variety may be found in typical material from southeastern Oaxaca and Chiapas, thus no infraspecies are recognized here.


Rare branched subshrubs to shrubs 0.3-1 m, stems persistent, producing new growth from axillary buds; stems erect or ascending, few from caudex, leafy distally, striate-sulcate, glabrous to sparsely hirsutulous in sulcae especially near the nodes; sometimes sparsely hirsutulous near the nodes; herbage mostly completely glabrous or at least subglabrous, always eglandular. Leaves opposite, petiolate; blade 2.5-6 × 1.2-4.5 cm, rhombic-ovate or lanceolate-ovate, subcarnose-chartaceous or at least drying so, trinerved from near base, surfaces smooth, pale green, concolorous, eglandular, otherwise glabrous to sparsely appressed-hirtellous with trichomes c. 0.1 mm, secondary and tertiary venation immersed, secondary and tertiary veins obviously pellucid, tertiary veins sometimes drying darker than abaxial surface, base cuneate to obtuse, margins coarsely crenate or serrate, apex obtuse or acute to acuminate; petiole 0.3-0.7 cm. Capitulescence dense corymbiform, sometimes in convex compound panicles, not at all held well above subtending leaves, the terminal clusters 1-3.5 cm diam., several-many capitulate; peduncles mostly 0.1-0.3 cm. Capitula 7-8 mm, inconspicuously short-radiate; involucre 5-7 × 2-4 mm, cylindrical to narrowly campanulate; phyllaries strongly graduated, scarious, glabrous, pale yellowish, pale-striate, 3-5-seriate; outer phyllaries 1-2 × 1-1.5 mm, triangular-lanceolate, apex usually acute; inner phyllaries 5-7 × 2-2.5, ovate to oblong, apex rounded or obtuse; paleae 5-5.5, oblong, reaching to about top of disk corolla tube,
conduplicate, nerves sometimes drying obviously resinous, apex obtuse to truncate. Ray florets 2-3, inconspicuous; corolla 3.5-4 mm, white or ochroleucous, outwardly curved or at least drying so, eglandular and glabrous, limb c. 2 mm; style about as long as to longer than corolla. Disk florets 4-7, corollas slightly exserted from involucre; corolla 4.5-4.5 mm, broadly campanulate, white or ochroleucous, eglandular and glabrous, tube longer than pappus and about as long as to slightly longer than limb, throat 0.5-0.8 mm long, shorter than either tube or lobes, lobes 1-1.5 mm, lanceolate; anthers mostly exserted. Cypselae 1.5-2.2 mm, obconic, weakly prismatic, sparsely setose, eglandular; pappus scales 8-12, 1-1.5 mm, held within involucre, oblong, never linear-lanceolate, apex obtuse, never long-attenuate, scales shorter than either mature cypsela or disk corolla tube. 2n = c. 36. Flowering Jul-Sep. Pinares, savannas. Ch (Purpus 9105, MO). 100-600 m. (Endemic.)

King 2982 (NY), the chromosome voucher, was collected within 10 miles of the border with Oaxaca, where this species should be expected. Wussow et al. (1985) treated C. nelsonii in synonymy of C. ternifolia.


Calea chocoensis Cuatrec., Calea pittieri B.L. Rob. et Greenm.

Common branched shrubs or vines 1-6 m, stems persistent, producing new growth from axillary buds; stems erect or ascending to lax or scandent, leafy distally, striate, puberulent to hirsutulous-pilose, internodes from about half as long as to as long as leaves. Leaves opposite, petiolate; blade 1.5-10(-12.5) × 1-5.5(-6.5) cm, elliptic to broadly ovate or infrequently nearly orbicular, broadest near the middle, stiff-chartaceous, 3(-5)-nerved from above base, surfaces concolorous, adaxial surface scabrous or sometimes glabrous, smooth to rugulose, abaxial surface glandular, otherwise subglabrous to moderately hirsute-pilose, venation sometimes moderately reticulate, base cuneate to obtuse or sometimes rounded but typically with a small acumen, margins sometimes subrevolute, typically entire or subentire to serrulate or sometimes serrate with up to about 8 serrations per side, apex usually obtuse or rounded to less commonly acute; petiole 0.2-1.6 mm, subglabrous to pubescent. Capitulescence on distal part of plant with overall aspect being compound-paniculate and pluricephalous, typically of few-many branchlets each apically umbellate by extremely shortened internodes with peduncles obviously decussate and not in same plane of symmetry, 7-45-capitulate, sometimes capitula obviously axillary and arising directly from distal nodes, maturation of capitula basically
synchronous; peduncles (0.3-)0.5-3.5 cm, subequal, sparsely to densely hirsute-villous, often glandular. Capitula discoid, cylindrical or very narrowly campanulate, 5-18(-26)-flowered; involucre 5.2-8 × 2.5-4.5 mm, cylindrical or very narrowly campanulate, florets weakly exserted and usually only slightly longer than involucre; phyllaries imbricate, typically graduate or occasionally nearly subequal, 3-5-seriate; outer phyllaries 2-4(-8), 1.5-4(-6) × 1-3(-4) mm, often much smaller than inner phyllaries but sometimes becoming large and somewhat foliar, oblanceolate to deltate-ovate or spatulate, at least herbaceousely tipped but sometimes nearly herbaceous throughout, nervation often faint, lightly to densely pubescent, apices commonly obtuse to rounded or sometimes acute; inner phyllaries 3-7(-8) × 1.5-2.5(-3) mm, grading from ovate-elliptic to lanceolate, scarious, yellowish or greenish-white, mostly 5-7-striate, glabrous or nearly so, apex obtuse to acuminate, hyaline-membranous; clinanthium 0.7-2 × 0.5-1 mm, low conical; paleae 4.5-6(-7) × c. 1.5 mm, lanceolate, conduplicate but never keeled, thin-scarious, pale yellow, slightly trifid. Ray florets 0. Disk florets 5-26; corolla 4.4-5.8 mm, funnelform, yellow, glabrous, tube shorter than limb, throat gradually broader than tube, lobes 1-1.7(-2) mm, triangular-lanceolate to lanceolate, typically obviously shorter than throat but ranging from about half as long as to nearly as long as throat, ascending to slightly spreading; anthers 1.6-2.2 mm, often half exserted from throat but not usually fully exserted, appendages glandular abaxially; style 4.8-6.4 mm, branches 0.8-1.5 mm, apex typically broad and obtuse, never apiculate. Cypselae 1.6-2.7 mm, obconic, prismatic, setulose or puberulent or sometimes glabrous, eglandular; pappus scales 18-27, 3.5-5(-5.7) mm, about as long as disk corollas, longer than mature cypselae, linear-lanceolate, apex long-attenuate. 2n = 38.

Flowering mostly June-Feb. Borde de bosque, bosque húmedo, exposed limestone areas, forest openings, roadsides, rocky hillsides, savannas, scrub forests, strand vegetation, thickets. N (Atwood y Moore 381, MO); CR (Pruski 442, LSU); P (Croat 6729, MO). 0-1600 m. (Mesoamerica, Colombia, Venezuela, Ecuador.)

Hemsley (1881: 209) and Klatt (1892: 208; 1896: 290) recognized C. prunifolia as occurring in Costa Rica, but Robinson y Greenman (1899) excluded C. prunifolia from Costa Rica and described C. pittieri based upon three of the nine collections cited by Klatt (1892). Calea pittieri and C. prunifolia were each recognized by Canne (1975), each reduced to synonymy of C. jamaicensis by Wussow et al. (1985), but are treated here as in Pruski (1982, 1997), who recognized C. prunifolia as continental, and treated C. jamaicensis as endemic to Jamaica and characterized by glandular cypselae. The Friedrichsthal material cited as Guatemalan by Hemsley (1881) and Klatt (1896) is instead presumably from either Nicaragua or Costa Rica (then part of the Capitanía General de Guatemala) and C. prunifolia remains
unknown in present-day Guatemala. The report by Pruski (1982) of *Calea prunifolia* in Peru is based on material now referred to *C. umbellulata* Hochr.


Common branched shrubs 0.5-3 m, stems persistent, producing new growth from axillary buds; stems erect to arching, leafy distally, glabrous to pilose-tomentose, trichomes usually spreading to antorse or retrorse, internodes sometimes more than twice as long as internodes. Leaves opposite or infrequently ternately whorled, petiolate to subsessile; blade 1.5-8.5(-12) × 0.7-5(-7) cm, lance-ovate to elliptic or ovate to sometimes cordiform-orbicular, chartaceous to stiff-chartaceous, infrequently thin-chartaceous, trinerved from near base, secondary and tertiary veins pellucid, surfaces concolorous to sometimes obviously discolorous, adaxial surface smooth to rugose, scabrous or hispid-pilose to subglabrous, sometimes glandular, abaxial surface glandular, otherwise hirsutulous-pilose to tomentose or infrequently very sparsely puberulent, venation often strongly reticulate with veins raised but tertiary veins typically pale and infrequently dark-drying, base cuneate to subcordate, margins coarsely crenate to serrate or infrequently subentire, crenations occasionally to 6 mm, apex obtuse to acuminate; petiole 0.1-1.5 cm, glabrous to densely pubescent, often also glandular. Capitulescence compound-paniculate and pluricephalous, each branch usually dense
corymbiform-umbellate, with several to many stalked clusters 1-5 cm diam., clusters terminal or sometimes also axillary, clusters usually several-many capitulate with the central capitulum on the shortest peduncle, when capitulescence lateral then on small-leaved branchlets mostly 5-15 cm, sparsely puberulent to tomentose, sometimes also glandular; peduncles 0.1-1(-2) cm, sparsely puberulent to tomentose, sometimes also glandular. Capitula 5-9 mm, discoid or inconspicuously short-radiate, 5-16(-21)-flowered; involucre 4-6(-7.5) × 2.5-4(-5) mm, cylindrical to broadly campanulate; phyllaries 11-24, strongly graduated, typically all scarious and subglabrous, whitish or pale yellowish, striate, margins narrowly hyaline, entire or occasionally becoming lacerate post-fruit, occasionally phyllaries only moderately graduated with the outer ones sometimes nearly half as long as the inner, 4-6-seriate, closely appressed or outer sometimes only loosely so; outer phyllaries 1-2(-3.5) × 0.5-1.5(-2) mm, typically very reduced and suborbicular or broadly triangular to ovate, mostly scarious and subglabrous, occasionally moderately elongate and oblong with an herbaceous apex villous and glandular; outer series and mid-series phyllaries typically with acute to broadly rounded ciliolate hyaline margins often drying dark and thus appearing as arches or semicircles; mid-series phyllaries typically strongly convex adaxially; inner phyllaries 2.5-6(-7.5) × 1-2.5, ovate to elliptic or oblong, subglabrous, never as broad as involucre, apex broadly rounded or merely obtuse; receptacle 0.5-1 × 0.5-1 mm, convex-conical; paleae 4-6.5 mm, oblong to oblanceolate, usually slightly longer than cypselae with pappus, strongly conduplicate, apex obtuse to acuminate, sometimes trifid. Ray florets 0-3, inconspicuous, shorter than to about as long as disk florets; corolla typically white to ochroleucous or infrequently pale yellow, strongly outwardly curved or at least drying so, limb c. 2 mm, often glandular abaxially; style typically shorter than corolla. Disk florets mostly 5-13(-18), with corolla lobes of outer ones often spreading laterally from constricted involucre apex; corolla 3.2-5.2 mm, campanulate or sometimes even drying rotate, typically white to ochroleucous to infrequently bright yellow, glandular especially near the short throat, tube 1.3-2 mm, often glandular, throat 0.5-0.7 mm long, minute, much shorter than either tube or lobes, dilated, lobes 1.5-2.5 mm, lanceolate to linear-lanceolate; anthers exserted and basically fully visible, pollen white or ochroleucous. Cypselae 2-3.5 mm, obconic, weakly prismatic, sparsely to densely setose-hirsute, also sometimes glandular, the inner cypselae slightly narrower and substipitate; pappus scales 8-14, 0.8-1.8(-2.6) mm, usually oblanceolate or oblong, never linear-lanceolate, sometimes partly purplish, apex acute to rounded, less commonly acuminate, never long-attenuate, scales shorter than to about as long as mature cypsela, usually shorter than disk corolla tube, very infrequently reaching to base of the long disk corolla lobes, at anthesis typically not or only
extreme apex visible within the involucre of tightly appressed phyllaries, usually only exposed throughout most or all of their length by cypselae maturation and spreading of inner phyllaries. 

2n = 38. Flowering year round with a peak from Jun-Jan. *Bosque secundario, brushy slopes, campo abierto, disturbed areas, dry hillsides, exposed limestone areas, pastures, pine-oak forests, roadsides, rocky areas, savanna, scrub-forests, thickets. T (Ventura 20916, MO); Ch (Cronquist 967, NY); Y (Darwin et al. 2187a, NO); C (Martínez et al. 31432, MO); QR (Turner, 2014-NEURO: 18); B (Schipp 773, NY); G (Pruski et al. 4548, MO); H (Pruski et al. 4539, MO); ES (Standley 19098, US); N (Molina 23025, MO); CR (Brenes 3665, NY). 0-2400 m. (Mexico, Mesoamerica.)

Most material of *C. ternifolia* was long-called *C. zacatechichi* (e.g., Robinson y Greenman, 1896; Blake et al. 1926; Pruski y Urbatsch, 1980), which is an auditory hallucinogen. *Calea ternifolia* was described from material thought to be from Colombia, but Pruski (1982) and Wussow et al. (1985) gave it as typified by material from Mexico and as an earlier name for *C. zacatechichi*. *Calea ternifolia* var. *calyculata* was recognized by Wussow et al. (1985) and Turner (2014-NEURO) recognized *C. ternifolia* var. *hypoleuca* (B.L. Rob. et Greenm.) B.L. Turner, but each are excluded here from synonymy and recognized as *C. albida* A. Gray and *C. hypoleuca* B.L. Rob. et Greenm., respectively.

*Calea ternifolia* as circumscribed here typically has moderately short pappus scales, compound dense corymbiform-umbellate capitulescences, and ochroleucous corollas. *Calea ternifolia* does vary greatly, however, in characters that are elsewhere useful taxonomically; e.g., leaf pubescence, flower number, and the involucre shape. Some other notable synonyms include thin-chartaceous leaved *C. liebmannii* and the yellow-flowered plants described by Standley y Williams (1950). There appears to be a general tendency for plants from the southeastern portion of its range to have relatively long pappus scales and to be discoid-capitulate, as in the type of synonymous *C. dichotoma*. On the other hand, one-time synonym eglandular-leaved subglabrous *C. nelsonii* and the segregate *C. crocinervosa*, each endemic to Pacific slope Chiapas near Tonalá, are recognized here as distinct.


*Calea peckii* B.L. Rob.

Common branched shrubs or vines 0.5-3.5 m, stems persistent, producing new growth from axillary buds; stems erect or ascending to arching or scandent, rarely prostrate, leafy distally, striate, puberulent to pilose-tomentose, internodes often about as long as leaves. Leaves
opposite or infrequently ternately whorled, petiolate; blade 2-7.5 × 1.5-5.5 cm, lance-ovate to broadly ovate or triangular-ovate, broadest in basal third, stiff-chartaceous, 3-nerved from near base, secondary and tertiary veins darker than areolae to thinner leaf forms sometimes clearly pellucid, surfaces concolorous to discolorous, adaxial surface scabrous to hirsutulous or softly short-pilose, sometimes glabrous, smooth, abaxial surface glandular, otherwise subglabrous or very sparsely puberulent to densely tomentose, sometimes ntidous, venation often obviously reticulate, base obtuse or sometimes rounded or subcordate, margins subentire to few-serrate or coarsely crenate-serrate, apex acute or acuminate to obtuse, less commonly attenuate; petiole 0.2-0.9 cm, pubescent to somewhat tomentose. Capitulescence on distal part of plant with overall aspect being compound-paniculate and pluricephalous, typically of few-many branchlets each apically cymose or corymbiform-umbellate and 3-10-capitulate, sometimes capitula obviously axillary and arising directly from distal nodes, all capitula typically pedunculate or axillary branchlets very rarely with capitula subsessile in ternate glomerules; peduncles (0.1-)0.3-1.5(-2) cm, pubescent to tomentose. Capituloid, cylindrical to broadly campanulate, (8-)12-20-flowered; involucres 5-8 × 2.8-6 mm, cylindrical or turbinate to more commonly campanulate to broadly campanulate, florets moderately well-exserted and involucre usually reaching to about base to mid-point of the disk corolla lobes; phyllaries moderately imbricate, moderately graduate to nearly subequal, 3-4-seriate; outer 2-8 phyllaries 2-5.5 × 0.5-2.2 mm, lanceolate to broadly ovate, often spreading or even squarrose, herbaceous or at least herbaceous-tipped, often about half as long as the inner, often 3-nerved, puberulent to tomentose, also glandular, apices acute to obtuse; inner phyllaries 3-8 × 1.5-3.1 mm, lanceolate to lanceolate-ovate, appressed, scarious to somewhat hyaline-membranous distally, yellowish or sometimes purple-tinged, striate, glabrous or nearly so, apex obtuse to acute; clinanthium c. 1 × 1 mm, low conical; paleae 4.5-6 × 1-1.5 mm, lanceolate to elliptic-lanceolate, scarious, pale yellow, trifid. Ray florets 0. Disk florets (8-)12-20; corolla 4.3-6.2 mm, funnelform-campanulate, yellow, glabrous or very infrequently limb sparsely glandular (on Gulf of Honduras islands), tube usually about as long as limb, throat typically shorter than either tube or lobes, throat abruptly broader than tube, lobes 1.5-2.7 mm, lanceolate, as long as to longer than lobes, ascending to slightly spreading but not reverse-coiled; anthers usually fully exserted with distal parts of filaments often visible, appendage typically glandular; style branches 1-1.5 mm, apex typically with apiculate tip c. 0.1 mm or less commonly merely acute to acuminate. Cypselae 1.7-2.7 mm, narrowly obconic, pinnatifid, typically completely eglandular, very rarely glandular (on Gulf of Honduras islands), otherwise also setulose or hirsutulous; pappus scales 20-27, 4-5.8 mm, longer than mature cypselae, about 2/3 as long as
to nearly as long as disk corollas, usually reaching to about middle of corolla lobes, linear-lanceolate, apex long-attenuate. $2n = 38$. Flowering year round with an apparent peak from May-Oct. Bosque secundario, brushy slopes, campo abierto, dry hillside areas, exposed limestone areas, Mayan ruins, pastures, pine forest, roadsides, rocky areas, sandy beaches, savanna, selva baja subcaducifolia, thickets. T (Cowan y Magaña 3217, NY); Ch (Pruski y Ortiz 4186, MO); Y (Chan 6849, MO); C (Cabrera y Cabrera 13455, MO); QR (Taylor y Taylor 12598, NY); B (Lundell 4867, LD); G (Türckheim II 688, PR); H (Harmon y Dwyer 3982, MO); N (Molina 14867, NY); CR (Burger y Burger 7880, MO). 0-1700 m (S. Mexico [Veracruz], Mesoamerica)

Wussow et al. (1985) treated C. trichotoma and C. peckii in synonymy of the generitype C. jamaicensis (L.) L., but Pruski (1997) resurrected C. trichotoma from synonymy. Here C. jamaicensis is excluded from Mesoamerica and is interpreted as a Jamaican endemic differing by consistently glandular cypselae. Many low-elevational plants have leaves abaxially subglabrous or very sparsely puberulent with weakly raised tertiary veins and few-flowered narrow capitula, thus matching the type of C. peckii, but these forms blend into the typical forms, and C. peckii is treated here in synonymy.


Common branched shrubs or vines 0.6-2(-7) m, sometimes woody near base only, stems persistent, producing new growth from axillary buds; stems usually sprawling or arching, leafy distally, striate or young stems often costate-sulcate to hirtellous to pilosulose to occasionally densely pilose-hirsute, young branches often purplish, pith sometimes fistulose. Leaves opposite, petiolate; blade $3-10(-13) \times 1.3-7(-9.5)$ cm, lanceolate to ovate, chartaceous,
prominently trinerved from near base, secondary and tertiary veins often pellucid, distal leaves
sometimes purplish, surfaces more or less concolorous or infrequently griseous abaxially,
adaxial surface usually scabrous or hirtellous, but varying from hirsute to glabrate, rugose,
abaxial surface always glandular, otherwise subglabrous to more commonly pilose-hirsute,
venation reticulate, base cuneate to obtuse, rarely rounded or subcordate, margins subentire to
more typically coarsely crenate or serrate with 6-12 teeth per side, apex acute to acuminate;
petiole 0.3-1(-1.5) cm, hirsute. Capitulescence cymose or umbellate with peduncles often
originating in same plane of symmetry, terminal or sometimes also axillary, often held within
subtending leaves, the terminal clusters 2-5 cm diam., usually 4-10-capitulate, very
infreqently terminal capitula ternate-subglomerate with cluster subtending by leafy bracts
longer than outer phyllaries; peduncles (0.1-)1-2.5(-3.5) cm, arising from short axillary
branchlets or directly from axils, glabrous to tomentose. Capitula 6-9(-12) mm, radiate;
involucre 4.5-9 × 3-7(-12) mm, typically campanulate but varying from cylindrical-turbinate to
hemispherical; phyllaries usually moderately graduated with the outer phyllaries about half as
long as to nearly as long as inner phyllaries, 4-5-seriate; outer phyllaries 2-6, (1-)3-7 × 1-2.5(-
3.5) mm, lanceolate to oblong or rarely even pyriform, ascending to spreading, herbaceous or
at least herbaceous-tipped, sometimes squarrose, usually 3-nerved, typically hirsutulous at
least distally, sometimes glandular, apex acute to obtuse; mid-series and inner phyllaries 5-9 ×
2-4 mm, lanceolate to ovate, appressed, scarious to sometimes hyaline-membranous distally, 7-
13-striate, yellowish to sometimes rose-colored or purplish distally or in bud nearly
throughout, apex obtuse to rounded; clinanthium to c. 2 × 1.5 mm, low-conical; paleae 5-7 ×
1.3-2.5 mm, lanceolate, conduplicate, sometimes trifid, scarious. Ray florets 3-5(-8),
moderately conspicuous and slightly exserted from the involucre, longer than the disk florets;
corolla yellow or pale-yellow, often drying ochroleucous and contrasting to disk corolla color,
tube 2-3 mm, limb 3-7(-10) × 1.5-3(-4) mm, oblong to broadly obovate, spreading or soon
down-turned, 5-7(-9)-nerved, (2-)3 calyx veins leading to middle of each of the (2-)3 apical
lobes often slightly thicker than nerves, lobes to 1(-2) mm, apex rounded to acute, that of
central lobe sometimes emarginate, abaxial surface eglandular or infrequently with a few
scattered glands, apex obtuse to sometimes nearly truncate; style shorter than limb. Disk florets
12-30(-44), corollas moderately exserted from involucre; corolla 4.5-5.5 mm, campanulate,
yellow, glabrous or sometimes glandular, tube slightly shorter than limb, throat subequal to or
shorter than lobes, lobes 1-2(-2.4) mm, lanceolate, often about as long as throat, typically
spreading or recurved; anthers mostly exserted. Cypselae 1.5-3 mm, obconic, weakly
prismatic, setose-hirsute, eglandular; pappus scales 12-18(-23), (3-)3.5-4.4 mm or those of the
rays or those pre-anthesis sometimes shorter, typically distally visible within involucre, linear-lanceolate, apex long-attenuate, scales longer than mature cypsela and reaching to about base or middle of disk corolla lobes. \(2n = 38\). Flowering year round but mostly in Nov-Mar. *Brushy savanna, cultivated areas, disturbed areas, exposed limestone areas, forest borders, oak-pine forests, pastures, roadsides, savannas, scrublands, selva baja, streamsides, thickets, weedy fields.* Ch (Urbatsch y Pridgeon 2892, MO); Y (Gaumer 23209, MO); QR (Gaumer 2096, UPS); B (Schipp 757, Z); G (Aguilar 460, H); H (Harmon y Fuentes 5247, MO); ES (Nunez s.n. 25 Nov 1988 numbered as Reyna MLR01419, MO); N (Baker 2199, G); CR (Wussow y Pruski 106, LSU); P (Dodge y Allen 17335, MO). 0-1900 m. (Mexico, Mesoamerica; naturalized in Africa.)

*Calea urticifolia* is common from subtropical Mexico south to Panama, and has escaped in Africa (Lawalrée, 1982) from cultivation there as a medicinal. In the Americas there is a general trend from lanceolate-leaved plants mostly occurring in the north to ovate-leaved plants more commonly encountered in the southern part of its range. Blake et al. (1926) used the name *C. urticifolia var. axillaris* for the narrower leaved plants. Wussow et al. (1985) used the name *C. urticifolia var. yucatanensis* for plants with relatively large 50-flowered capitula to 12 × 12 mm on peduncles to 3.5 cm, but Strother (1999) reduced this variety to synonymy. Equally striking are unusually few-flowered plants from Honduras and Pacific slope Mexico that have capitula half the size of the Yucatan populations, but these small-capitulate plants too blend into typical forms. Some populations from Cayo, Belize have cuneate-based thin leaves and thinly-scarious faintly-striate inner phyllaries, which at best appears to be a regional race. Several populations in Heredia, Costa Rica have both inner and outer phyllaries with nervation extremely well-pronounced, but this feature may be an artifact of drying. Thus, *C. urticifolia* is treated here in the broad sense and without formal recognition of infrataxa. I have seen no authentic material of *Mocinna brachiata* and it is listed here only as a possible synonym.

2. **Enydra** Lour.


Por J.F. Pruski.

Aquatic or wetlands perennial herbs to 1 m, rooting at proximal nodes; stems terete, striate, fistulose. Leaves opposite, sessile or subsessile (ours) to short-petiolate; blade lanceolate to
elliptic or ovate, subcarnose-chartaceous, venation pinnate, surfaces glandular, otherwise
glabrous to pilose or tomentulose, margins entire to serrate. Capitulescence of 1-few capitula
in distal few nodes, capitula solitary and subsessile (ours) or rarely pedunculate, axillary or at
least usually appearing axillary by overtopping lateral branches. Capitula indistinctly radiate;
involute campanulate to globose; phyllaries obviously 2-seriate; outer phyllaries 4, decussate,
foliaceous, pluristriatulate; inner phyllaries much smaller and indistinct, strongly embracing
rays florets, inner margins overlapping; paleae resembling inner phyllaries, strongly embracing
disk florets, persistent, becoming indurate in fruit, variously glandular or pilose-ciliate
apically; clinanthium convex-conical, paleate. Corollas often opening green, maturing
ochroleucous. Ray florets 20-30, pistillate, 2-3-seriate; corolla limb small, not exserted form
involucre, white, yellow, or green, the dark nerves strongly contrasting in color to limb, apex
shortly to distinctly 3-lobed. Disk florets 10-40, bisexual; corolla funnelform to campanulate,
(4-)5-lobed, yellow or greenish, tube sparsely glandular, throat shorter than lobes, resin ducts
often obviously reddish, sometimes seemingly paired by longitudinal lines that dry pale, lobe
surfaces smooth; anthers brownish to purplish black, appendage often glandular; style branches
blunt-papillose. Cypselae obconical or ellipsoid, the cypsela-palea units obviously
obcompressed, grayish or black with pale striations, glabrous, base stipitate; epappose. $x = 11,
15$. Pantropical and less commonly subtropical, aprox. 4-6 spp.

The genus was revised by Snow (1980) who recognized four species. Lack (1980) and
Robinson (2006) respectively provided treatments of our species in tropical west Africa and
Ecuador. Our species was called *Enydra sessilis* (Sw.) DC. by Villaseñor (1989) and Turner
(2014-NEURO), but that species differs by short-petiolate leaves with cuneate bases, capitula
with fewer florets, and densely papillose palea apices.


*Cryptiospermum repens* P. Beauv., *Enydra anagallis* Gardner, *Enydra heloncha* DC.,
Hingtsha repens Roxb., Meyera fluctuans (Lour.) Spreng., Meyera guineensis Spreng.,
Tetraotis longifolia Reinw., Tetraotis paludosa Reinw., Wahlenbergia globularis Schumach.

Herbs 0.1-0.5(-1) m; stems free-floating or rooting at the nodes, succulent, often reddish, glabrous to villous-pilose, internodes often longer than leaves. Leaves sessile or subsessile; blade 2.5-7 × 0.5-1.5 cm, lanceolate to oblong, surfaces glandular, otherwise subglabrous to sometimes sparsely puberulent, base truncate to sub agitate, margins subentire or serrulate, apex acute to broadly obtuse. Capitulescence of few sessile axillary capitula. Capitula globose to hemispherical; involucre 5-9 mm diam., copulate; outer phyllaries 9-15 x 5-8 mm, twice or more as long as palesae, oblong or ovate, reticulate-veined, subglabrous, apex rounded; inner phyllaries and palesae 2-4 mm, apices subglabrous to sparsely papillose. Ray florets c. 33, 2-3-seriate; corolla 1-2 mm, tube longer than limb; style well-exserted, longer than limb. Disk florets c. 24; corolla 2-3 mm, yellowish-green. Cypselae 2-3.3 x c. 0.5 mm, black, glabrous or sparsely glandular. 2n = 22, 30. Flowering Nov-Feb, Jun. Lakes, marshy areas. T (Cowan 2336, MO). 0-50 m. (Mexico [Veracruz], Mesoamerica, Colombia, Ecuador, Peru, Bolivia, Brazil, Paraguay, Argentina; Africa, Asia, Pacific Islands.)


Calea Sw., non L.

Por J.F. Pruski.

Terrestrial coarse robust annual herbs to shrubs or small trees; stems to c. 20 diam. at base, erect, often unbranched proximally to much-branched distally, often sulcate-angled or at least striate, appressed puberulent to rough pubescent or tomentose, pith solid. Leaves simple, alternate, petiolate to subsessile; blade lanceolate to oblong-ovate, chartaceous to less commonly subcoriaceous, pinnately veined or sometimes trinerved from well above base, the proximal stem leaves sometimes with blade deeply 3(-5)-lobed in proximal half, the distal stem leaves with margins commonly subentire to dentate, surfaces usually pilosulose, abaxial surface also commonly glandular. Capitulescence mostly pluricapitulate and terminal on central axis or on branches from distal nodes, corymbiform-paniculate, usually convex. Capitula discoid or less commonly radiate, usually small to mid-sized, 12-60(-110)-flowered, pedunculate; involucre cylindrical to hemispherical; phyllaries lanceolate to ovate, imbricate, graduated, 3-4-seriate, outer ones with weakly herbaceous tips, inner ones scarious, often grading in color from outer ones pale green to inner ones yellow, often 3-striate, puberulent to glabrate; clinanthium convex-conical, paleate; palesae about as long as disk florets (most easily
seen in bud) or moderately shorter than disk florets, 1-nerved, typically not lobed. Ray florets 0(-10), pistillate; corolla tube about as long as limb, often pubescent with non-glandular helianthoid trichomes, limb slightly exserted, yellow to greenish, 3-4-veined, apex shortly 3-lobed. Disk florets 15-50(-100), bisexual; corolla funnelform, tube and throat not very well-differentiated, yellow or sometimes greenish-white, shortly 5-lobed, glabrous or often pubescent with non-glandular helianthoid trichomes, resin ducts solitary along nerves, lobes usually deltate to less commonly triangular-lanceolate; anthers brown or black; style branches recurved, with paired stigmatic lines, branch with stigmatic lines reaching to near apex or the acute apex, apex sometimes shortly attenuate-tipped with a crest of collecting hairs. Cypselae of ray and disk florets similar, narrowly obconical or somewhat prismatic, light brown to black, slightly 5-ribbed, puberulent, carpophidion well developed but small, slightly asymmetric; pappus of numerous stramineous bristles, about as long as corolla, 1-2-seriate, white to tawny. Aprox. 7-13 spp. Mexican and Central American with a single species extending into the West Indies and northern South America.

Rydberg (1927) provided a treatment for four of our species. Turner (1982) provided a synopsis of *Neurolaena*, and recognizing ten species, Turner (1998) recognized 12 species, and Turner (2014-NEURO) counted 11 species in Mexico. All species of the genus are moderately uncommon regional endemics, except for *N. lobata*, which is widespread in the neotropics and is far and away the most common species in Mesoamerica. Most extra-Mesoamerican Mexican species appear to be very narrowly defined segregates, and the species total of the genus thereby unclear. At one point the name *Pluchea symphytifolia* was thought to be the correct name for the common shrubby neotropical *P. carolinensis* (tribe Inuleae), but Khan y Jarvis (1989) placed this name in synonymy of *N. lobata*. By its radiate capitula and setulose-spiculiferous disk corollas *N. oaxacana* is reminiscent of *Schistocarpa* (Millerieae), which differs most obviously by opposite leaves, white ray corollas, and striatulate cypselae (Robinson y Brettell, 1973).


1. Capitula radiate.

2. Stems substrigillose; leaf blades narrowly oblanceolate, unlobed.

1. *N. cobanensis*
2. Stems densely sordid pilosulose; leaf blades trullate-ovate to sometimes suprabasally shallowly to deeply 3(-5)-lobed.  

5. *N. oaxacana*

1. Capitula discoid.

3. Involucres much shorter than disk florets; paleae reaching only to top of disk corolla tube; disk corolla lobes triangular-lanceolate.  

4. *N. macrophylla*

3. Involucres about as long as disk florets; paleae usually about as long as disk corollas; disk corolla lobes usually deltate.

4. Capitula 10-13 x 14-18 mm; peduncles 8-25 mm; outer phyllaries subsquarrose, spreading; mid-series phyllaries with acute apices.

6. *N. schippii*

4. Capitula 6-10 x 3-7(-8) mm; peduncles mostly 3-12 mm, outer phyllaries appressed to sometime slightly spreading, not subsquarrose; mid-series phyllaries usually with obtuse to rounded apices.

5. Outer phyllaries triangular-ovate, glabrous or sometimes very sparsely hirtellous and ciliolate, otherwise all phyllaries basically glabrous throughout; leaf blades unlobed, thin-chartaceous, weakly reticulate, abaxial surface abaxial surface sparsely hirtellous, also sparsely minute-glandular.

2. *N. intermedia*

5. Outer phyllaries usually triangular-lanceolate to linear-lanceolate, outer and mid-series phyllaries typically scabridulous or hirtellous at least in distal midzone grading inner phyllaries glabrous or sometimes sparsely scabridulous-hirtellous; leaf blades often deeply 3-lobed from near proximal third, moderately stiff chartaceous, obviously reticulate, abaxial surface strigillose-hirsutulous or hirsute to pilose-tomentulose, also densely glandular.

3. *N. lobata*
Capitula 8-9 x 5-6 mm, radiate; involucre 5-7 mm, campanulate, about 3/4 as long to as long as disk florets; phyllaries 3-4-seriate, evenly graduated, midzone dark, otherwise inconspicuously nerved, surfaces densely fine-puberulent, apex of outer phyllaries narrowly acute, apex of inner phyllaries of acute to broadly obtuse; paleae 6-7 mm, about 3/4 as long as disk florets, capitula thereby obviously paleate. Ray florets 8(-10); corolla 7-9 mm, yellow often drying green, limb 3.5-4.5 mm, about as long as tube, c. 5-nerved, abaxially glabrous. Disk florets 20-32, moderately exserted from involucre; corolla 5-6 mm, yellow, tube setulose or spiculiferous, lobes c. 0.8 mm, deltate. Cypselae 1.5-2 mm, weakly 4-5-prismatic, glabrous; pappus bristles 4-5 mm. Flowering Jan-Mar. 

Cloud forests, montane forests, selva mediana perennifolia. Ch (Reyes-Garcia et al. 4141, MO); G (Contreras 11273, MO); N (Williams et al. 24921, F); CR (Haber 19579, MO). 1300-1600 m. (Endemic.)

The gestalt of *N. cobanensis* is very reminiscent of sympatric *Telanthophora cobanensis* (Senecioneae).


*Neurolaena lobata* var. *indivisa* Donn. Sm.

Coarse perennial herbs or shrubs to 3+ m; stems scabridulous-hirtellous, trichomes 0.1-0.2(0.5) mm, more or less appressed. Leaves petiolate: blade 9-19(-21) x 2-7 cm, lanceolate to narrowly ovate, broadest just below the middle, unlobed, thin-chartaceous, venation pinnate, weakly reticulate, adaxial surface scabridulous, abaxial surface sparsely hirtellous, also sparsely minute-glandular, base attenuate and decurrent onto petiole, margins obscurely denticulate, apex acuminate to attenuate; petiole 0.5-2 cm, narrowly winged distally from tapering blade base. Capitulescence 5-25 cm diam., convex; peduncles mostly 3-11 mm, scabridulous-hirtellous, trichomes 0.1-0.2(0.5) mm, more or less appressed, minutely bracteolate. Capitula 8-10 x 4.7-7 mm, discoid; involucre 8-9 mm, about as long as disk florets, narrowly campanulate; phyllaries 4-5-seriate, evenly graduated, outer phyllaries glabrous or sometimes very sparsely hirtellous and ciliolate, otherwise all phyllaries basically glabrous throughout; outer phyllaries triangular-ovate, appressed to sometime slightly spreading, thinly herbaceous tipped, not subsquarrose; mid-series and inner phyllaries oblong, chartaceous-scarious, apex obtuse to rounded, moderately membranous-scarious; paleae 8-8.5 mm, linear-lanceolate, about as long as disk florets and capitula thereby more or less obviously paleate. Ray florets 0. Disk florets 12-18, not exserted from involucre; corolla 5.5-6.5 mm, very narrowly funnelform, glabrous throughout except for the glandular-tipped lobes, yellow,
lobes c. 0.6 mm, deltate; anthers c. 2.5 mm, black; style basal node 0.2-0.3 mm, branches c. 1 mm, apex triangular. Cypselae c. 2 mm, setose distally; pappus bristles c. 30, 5.5-6.5 mm.


The species is interpreted here narrowly and in the strict sense is endemic to Guatemala. However, if the very similar *N. lamina* (of the Gulf of Mexico watershed) were to be included in synonymy, the range of *N. intermedia* would extend northwards into Veracruz to the reserva Las Tuxtlas.


Robust annual to short lived perennial usually simple-stemmed herbs 1-5 m, sometimes shrubby; stems erect; few-branched, sometimes deflected at nodes distally, suberete to angled, striate, densely strigose when young. Leaves petiolate to subsessile; blade 8-37 × 1.5-16 cm, unlobed (especially distal leaves as represented on many herbarium specimens) or often mid-stem and proximal leaves deeply 3-lobed from near proximal third, lanceolate to ovate, broadest below the middle, moderately stiff chartaceous, pinnately veined or sometimes trinerved from well above base with the larger basal secondaries running into the basal lobes, obviously reticulate, adaxial surface scabrid, abaxial surface strigillose-hirsutulous or hirsute to pilose-tomentulose, also densely glandular, base cuneate to long-attenuate, margins subentire to serrate, basal lobes (when present) to c. 10 x 6 cm, occasionally secondarily short-lobed, apex acute to acuminate; petiole (0-)0.2-3 cm, winged distally from tapering blade base. Capitulescence to c. 15 cm diam., broader than tall, clusters of capitula loose to dense; peduncles mostly 5-12 mm, few-bracteolate, commonly hirsutulous, bracteoles 1-2 mm, linear-lanceolate. Capitula 6-9 x 3-6(-8) mm, discoid; involucre 5-6 mm, about as long as disk florets,
narrowly campanulate; phyllaries to c. 1.3 mm diam., 4-5-seriate, evenly graduated, (1-)3-nerved, outer and mid-series phyllaries typically scabridulous or hirtellous at least in distal midzone grading to inner phyllaries glabrous or sometimes sparsely scabridulous-hirtellous; outer phyllaries 1-2 mm, usually triangular-lanceolate to linear-lanceolate, appressed to sometime slightly spreading, not subsquarrose, pale green or yellowish-green, apex usually acute; mid-series and inner phyllaries to 7 mm, oblong, pale green to yellow, never herbaceous throughout, apex usually obtuse to rounded, sometimes noticeably broad-scarious, towards the southeastern part of its range sometimes body narrow and apex acute; clinanthium convex; paleae 5-6 mm, linear-lanceolate, usually about as long as disk florets and capitula thereby more or less obviously paleate, 1-nerved, obtuse, sometimes not reaching base of disk corolla lobes, but then with mid-series paleae rounded. Ray florets 0. Disk florets 15-50, usually only slightly exserted from involucre; corolla 4-5.5 mm, pale yellow or greenish-white, glabrous or setulose-spiculiferous at tube throat juncture, tube 2.2-3.2 mm, about as long as limb to sometimes longer than limb, lobes 0.6-0.7 mm, usually deltate, towards the southeastern part of its range sometimes triangular-lanceolate, reflexed, sometimes hispidulous or sparsely glandular; style branches 1-1.5 mm, rarely attenuate-tipped. Cypselae 1.5-2.5(-4) mm, cylindrical or obscurely 5-ribbed, hispidulous distally, very rarely also glandular; pappus bristles 30+, 4-5 mm. 2n = 22. Flowering year-round, but concentrated in Nov-Apr. Clearings, disturbed areas, cultivated areas, oak forests, pastures, quebradas, roadsides, secondary vegetation, streamsides, thickets. T (Pruski et al. 4238, MO); Ch (Pruski y Ortiz 4216, MO); Y (Villaseñor, 1989: 77); C (Lundell 1199, NY); QR (Chan 6324, MO); B (Schipp 20, NY); G (Tonduz y Rojas 107, MO); H (Ramos 137, MO); ES (Sandoval 1827, MO); N (Baker 2453, MO); CR (Wussow y Pruski 150, LSU); P (Antonio 1886, MO). 0-1700 m. (Mexico, Mesoamerica, Colombia, Venezuela, Guyanas, Ecuador, Peru, Bolivia, Brazil, Cuba, Jamaica, Hispaniola, Puerto Rico, Virgin Islands, Lesser Antilles, Trinidad and Tobago.)

This widespread mostly northern Neotropical weed is interpreted broadly here, but most material of it is consistent in traits diagnostic morphological. Some collections especially those from Costa Rica and Panama have nearly acute-tipped phyllaries narrower than typical, but are accepted here as *N. lobata*, the only regional discoid species. Otherwise, basically most noteworthy variation in *Neurolaena lobata* is centered in Chiapas.

In central and northern Chiapas nearly pilose-tomentulose-leaved mid- to high-elevation plants with weakly scabridulous outer phyllaries described as *N. fulva* are frequent, but its reduction to synonymy by Strother (1999) was followed by Turner (2014-NEURO). The shorter than usual paleate plants found along the Pacific coast are in this regard reminiscent *N.*
macrophylla and *N. jannaweissana*, but have rounded mid-series phyllaries and are referred to *N. lobata*. On the Gulf slopes of Chiapas plants with smaller less pubescent outer phyllaries are occasional, but do not appear to approach the extreme subglabrous triangular-ovate ones that diagnose *N. intermedia*.


Coarse perennial herbs or shrubs to small trees 1-4(-8) m; stems reddish-brown, sparsely appressed-puberulent to more densely so in capitulescence. Leaves petiolate; blade 15-40(-60) × 4-10(-15) cm, typically unlobed, oblanceolate to narrowly obovate, broadest just above the middle, thin-chartaceous, venation pinnate, weakly reticulate, adaxial surface scabridulous, abaxial surface glabrate or veins hirtellous, very sparsely minute-glandular, base long-attenuate and decurrent onto petiole, margins serrulate to serrate, apex acuminate; petiole 0.2-3 cm, narrowly winged distally from tapering blade base. Capitulescence 12-20 cm diam.; peduncles mostly 3-15+ mm, pilosulose-strigillose. Capitula 9-12 x 4-7 mm, discoid; involucre 5-7 mm, much shorter than disk florets, campanulate; phyllaries c. 4-seriate, evenly graduated, mostly 3-nerved, outer ones sparsely hirtellous-puberulent grading to inner ones subglabrous throughout, apex acute; paleae 5-6- mm, reaching only to top of disk corolla tube and the capitula thereby inconspicuously paleate. Ray florets 0. Disk florets 19-22, well-exserted from involucre; corolla 6-7 mm, yellow, minutely spiculiferous especially on tube and lobes, lobes c. 1 mm, triangular-lanceolate. Cypselae 2-2.5 mm, weakly prismatic, setulose distally; pappus bristles 6-7 mm. Flowering Jan-Mar. *Damp thicket, forest borders, mixed forests, secondary growth.* Ch (*Nelson 3766*, US); G (*Standley 68437*, MO). 900-1500(-?2000) m. (Endemic.)

Although Pacific-slope *Standley 68437* is in late flower/early fruit with the florets quite naturally at their longest and corollas beginning to fall, the attached paleae do appear to be much shorter than the disk florets, a character used to mark the species. Otherwise the species by large capitula and long leaves appears very similar to *N. schippii*.

Robust perennial herbs or shrubs 2-5 m; stems densely sordid pilosulose when young, trichomes patent. Leaves petiolate; blade (7-)12-35(-45) × 1.5-18 cm, trullate-ovate to sometimes suprabasally shallowly to deeply 3(-5)-lobed, broadest near the middle, thin-chartaceous, trinerved from well above base with the larger basal secondaries running into the basal lobes, moderately reticulate, adaxial surface scabridulous-hirtellous, abaxial surface hirsutulous, glandular, base long-attenuate and decurrent onto petiole, margins or lobes serrate, lobes acute-tipped, main pair of lateral lobes or lobules 0.3-10 x 0.3-3 cm, sometimes outwardly secondarily lobed, apex acute to attenuate; petiole 1-4 cm, winged from tapering blade base. Capitulescence 8-30 cm diam.; peduncles 2-22 mm, few-bracteolate, commonly hirsutulous, bracteoles 1-3 mm, linear-lanceolate. Capitula 5-7 x 4-8 mm, radiate; involucre 5-6 mm, about as long as florets, narrowly to broadly campanulate; phyllaries to c. 1.5 mm diam., 3-4-seriate, evenly graduated, appressed to outer phyllaries sometime slightly spreading, not subsquarrose, often drying faintly nerved, outer and mid-series phyllaries typically scabridulous or hirtellous grading to inner phyllaries subglabrous, margins of inner series sometimes narrow membranous-scarious, apex of outer phyllaries acute grading to that of inner phyllaries sometimes obtuse; clinanthium to 2 mm diam., convex; paleae reaching only to middle of the disk corollas throats to about as long as disk florets, capitula sometimes obviously paleate especially so after removal of the sometimes obscuring ray corollas. Ray florets 5-8; corolla drying yellow, tube 2.8-3 mm, limb 3-3.8 x 1-1.5 mm, 4-8-nerved. Disk florets 30-60; corolla 3.6-4.8 mm, broadly funnelform, yellow, tube setulose or spiculiferous, limb sparsely setulose or spiculiferous, lobes 0.5-0.6 mm, deltate, spreading, sometimes also sparsely glandular; style basal node c. 0.2 mm, branches c. 1 mm. Cypselae 1.4-2 mm, obscurely angled, setose distally; pappus bristles c. 40+, 3.5-5 mm. 2n = 22. Flowering Mar-May. Cloud forests, montane forests. Ch (Turner, 2014-NEURO: 10). 900-2300 m. (Mexico [Oaxaca], Mesoamerica).

*Neurolaena oaxacana* is occasional in the Gulf slopes in northwestern Oaxaca, but uncommon east of the Isthmus of Tehuantepec, where it occurs at near the Chiapas-Oaxaca border near Cerro Baul. Occasional plants of *N. oaxacana* having suprabasally deeply lobed leaves tend to also have to broadly campanulate capitula, proportionally longer paleae and pappus bristles, and 8-nerved ray corolla limbs. Such plants, nevertheless fall within the boundaries of *N. oaxacana* although seeming to be unusually vigorous growth forms. By its radiate capitula and setulose-spiculiferous disk corollas *N. oaxacana* is reminiscent of *Schistocarpha* (Millerieae), which differs most obviously by opposite leaves and white ray corollas.

Coarse perennial herbs c. 2.7 m; stems angled, sordid-pilosulose-hirsute, trichomes c. 0.2 mm, patent. Leaves petiolate; blade 15-45 × 4-10 cm, typically unlobed, broadly oblanceolate, broadest just above the middle, thin-chartaceous, venation pinnate, weakly reticulate, adaxial surface scabridulous, abaxial surface sparsely sordid-pilosulose, also glandular, base long-attenuate and decurrent onto petiole, margins obscurely denticulate, apex acuminate; petiole 1-2 cm, narrowly winged distally from tapering blade base. Capitulescence to 25 cm diam.; peduncles 8-25 mm, sordid-hirsute with patent trichomes. Capitula 10-13 x 14-18 mm, discoid; involucre 8-11 mm, about as long as disk florets, broadly campanulate; phyllaries 4-5-seriate, abruptly grading from outer series to the mid-series and inner series; outer phyllaries lanceolate, herbaceous, subsquarrose, spreading, sordid-puberulent, apex acuminate; mid-series and inner phyllaries triangular-ovate to ovate-oblong, subglabrous or weakly puberulent, margins very narrowly scarious, apices acute; paleae c. 10 mm, about as long as disk florets and capitula thereby more or less obviously paleate, apex triangular, incurved. Ray florets 0. Disk florets 60-100, not exserted; corolla 6-7 mm, narrowly funnelform, yellow, lobes c. 0.6 mm, deltate. Cypselae c. 2 mm, immature; pappus bristles 55-65, c. 7 mm, tawny. Flowering Mar. *Forested valley*. Ch (expected); G (expected); B (*Schipp S-735*, GH). 700-800 m. (Endemic.)

Turner (2014-Neuro: 16, 21) reported *N. wendtii* B.L. Turner as known only from the type in southeastern-most Veracruz, very near the Chiapas-Oaxaca border. *Neurolaena wendtii* is characterized by its discoid capitula with lanceolate subsquarrose sordid-puberulent outer phyllaries, and as such would key here to the similarly large-leaved moderately large-capitulate *N. schippii*. Also keying to *N. schippii* is *N. macrocephala* Sch. Bip. ex Hemsl., which is centered in Veracruz and which is characterized by its mid-series phyllaries that are rounded at the broadly membranous-scarious apex. Both *N. macrocephala* and *N. wendtii* are as well as *N. schippii* should be expected in both northern Chiapas and northern Guatemala.

XIX. Tribus **Onoserideae** Solbrig

*Onoseridae* Kunth (unranked), *Onoseridinae* Benth. et Hook. f.,

Por J.F. Pruski.

Monoecious or less commonly dioecious annual or perennial herbs to shrubs to treelets; stems erect to vining or trailing, ours exalate; herbage without latex, when pubescent the trichomes
simple and/or glandular-tipped. Leaves simple or divided, radical or alternate, sessile to long-petiolate; blade linear to suborbicular, surfaces glabrous or pubescent, often surfaces bicolorous, entire to toothed; petiole exalate or winged. Capitulecence terminal, mostly monocephalous, sometimes corymbiform or infrequently paniculate. Capitula medium-sized to large, 10-numerous-flowered, bilabiate-radiate and heterogamous and at least some florets bilabiate or sometimes discoid and homogamous and florets tubular-bilabiate to subactinomorphic, corollas often brightly colored (red, orange, purple, pink) but sometimes white tinged with purple; involucre turbinate to hemispherical; phyllaries linear-lanceolate or ovate, several-seriate, imbricate; clinanthium epalate, alveolate, glabrous or fimbriulate to setose or pilose. Marginal florets (when differentiated) sterile or pistillate but often with well-developed staminodia and often seemingly bisexual; corolla usually bilabiate, inner lip bifid or entire and corolla thus 3+2 or 3+1, infrequently 3+0, sometimes tubular-bilabiate or subactinomorphic; style usually well-exserted through staminodia, somewhat abaxially papilllose, apex rounded. Central florets bisexual or sometimes infrequently unisexual, functionally staminate or in Lycoseris sometimes pistillate and lacking staminodia; corolla tubular and subactinomorphic (0+5) or tubular-bilabiate (3+2 or 1+4), shortly to deeply 5-lobed, often paler colored than marginal florets; anther thecae long-caudate, calcarate, filaments sometimes papilllose, appendage tapering, flat, apex acute to truncate; pollen prolate (rarely spheroidal), microechinate; style as in marginal florets. Cypselae cylindrical or turbinate to subfusiform, erostrate, 4-10-costate, glabrous or pubescent; pappus many similar to more commonly somewhat heteromorphic (in length and width) bristles 2-4-seriate. 7 genera, 50+ spp., Mostly South American, 2 gen. and 7 spp. in Mesoamerica, one of these species even spreading northwards in Mexico.

The genera of Onoserideae have been historically recognized within Mutisieae (e.g., Cassini, 1819b; Cabrera, 1977; Bremer, 1994). Solbrig (1963) validated the tribe Onoserideae, treated earlier subtribe Onoserdinae Benth. et Hook. f. and as the unranked Onoseridae Kunth. Pruski (2004a, 2004b) resurrected Nassauvieae from synonymy of Mutisieae, prompting Panero and Funk (2007) to recognize Onoserideae, which appears to be sister to Mutisieae+Nassauvieae, and within which they treated six genera. The genera of Onoserideae were treated by Katinas et al. (2008) in broadly circumscribed tribe Mutisieae, and keyed together by them by their commonly tubular disk florets and papilllose style branches. More recently Panero y Freire (2013) recognized Onoserideae as containing seven genera.

1. Plants dioecious; corollas typically orange; anther filaments glabrous; style slightly broadened basally but without distinct basal node, involucres campanulate to hemispherical; leaf blades unlobed, 3-5(-7)-plinerved from above bases, margins entire to serrulate; petioles 0.2-1.1 cm, exalate. **1. Lycoseris**

1. Plants monoecious; corollas red (purplish-red, pinkish-red, oranges-red); anther filaments papillose; style with distinct bulbous basal node, involucres turbinate or in one species narrowly campanulate; leaves commonly lyrate-pinnatifid or lyrate-pinnatisect, palmately veined or at least the large terminal lobes palmately veined, margins irregularly sinuate-dentate; petiolariform bases often winged, ≥ 4 cm. **2. Onoseris**

**1. Lycoseris** Cass.

**Diazeuxis** D. Don

Por J. F. Pruski.

Showy dioecious subscandent to vining subshrubs or shrubs; stems subterete, striate, often lanate to arachnoid-floccose when young, becoming glabrous with age, subapical internodes commonly shorter than the long leaves. Leaves simple (unlobed), alternate, sessile or short-petiolate; blade lanceolate or oblanceolate to narrowly ovate or obovate, stiffly chartaceous (ours) to subcoriaceous, usually strongly 3-5(-7)-plinerved (camptodromous) from above base (ours) or infrequently venation pinnate, surfaces eglandular, the adaxial surface green and glabrous, the abaxial surface frequently white-tomentose, base sometimes narrowed into non-clasping subpetiole, margins entire to serrulate; petiole exalate. Capitulescence terminal, monocephalous to paucicephalous, the staminate plants typically with more capitula than pistillate plants, capitula pedunculate, sometimes nutant; peduncles stout. Capitula large, ovoid to globose, unisexual, heterogamous (with marginal florets sterile and disk florets fertile), numerous-flowered, pistillate capitula larger than staminate capitula; involucre campanulate to hemispherical; phyllaries graduated, pluriseriate, typically narrow, often arachnoid-pubescent, adaxial (inner) face usually glabrous or sometimes scabridulous, erect or reflexed (usually erect or spreading in fruit), the outer series becoming indurate basally, sometimes subherbaceous...
distally, the inner series thinner; receptacle flat, epaulette, setulose. Staminate capitula radiate or sometimes long-bilabiate+subactinomorphic; marginal florets 1-seriate, sterile but usually with staminodia, corolla radiate (3+0) or long-bilabiate (3+1), limb exserted laterally, apex 3(-4)-dentate, inner lip (when present) entire; disk florets functionally staminate, corolla subactinomorphic, funnelform, shortly 5-lobed, lobes subequal or sometimes unequal, erect or flexuous, anthers partially exserted, cream-colored, filaments glabrous, thecae basally long-caudate, tails free and entire, anther appendage elongate, acute, style undivided and becoming only slightly exserted, base slightly broadened, ovary sterile. Pistillate capitula disciform; marginal florets 1(-2)-seriate, typically sterile, corolla usually indistinctly filiform-subradiate, tube filiform-tubular, limb reduced, coiled or very slightly spreading, apex 3(-4)-dentate, ovary rudimentary; disk florets pistillate, staminodia lacking or rarely present, corolla filiform-subactinomorphic, very shortly 5-lobed, tube filiform-tubular, lobes subequal or sometimes unequal, style filiform, slightly broadened basally but without distinct basal node, branches short-ovate, flattened, spreading, margins papillose, apex obtuse. Florets unisexual; corolla glabrous, typically orange (although sometimes drying yellow), sometimes yellow-orange or reddish to violet, corollas of marginal florets sometimes darker than disk corollas. Cypselae cylindrical or sometimes fusiform, 5-10-costate (costae at base often broad, each sometimes sulcate distally), light brown, glabrous; pappus of many stramineous scabrid bristles, staminate capitula with fewer (5-50) c. 2-seriate broad bristles shorter than the corollas, pistillate capitula with many (150+) pluriseriate narrow sometimes fragile bristles nearly as long as the corollas. Aprox. 11 spp. Guatemala to Andean South America south to Bolivia and Brazil [Mato Grosso).

_Lycoseris_ and _Baccharis_ are the only consistently dioecious genera in the Mesoamerica, and Don (1830) cited _Lycoseris_ [sub _Diazeuxis_] as "without doubt the most remarkable genus of the whole family." South American Mutisiinae _Chaetanthera_ Ruiz & Pav. is rarely dioecious, but the dioecy in _Lycoseris_

_Lycoseris_ was revised by Egeröd y Stähl (1991), who recognized 11 species. _Lycoseris_ is notable for its dioecy, large usually orange-flowered capitula, and its distribution often in dry regions where it is among few Asteraceae to flower into the driest months of the year.


1. Adaxial (inner) surfaces pr phyllaries scabridulous.

3. _L. triplinervia_

1. Adaxial (inner) surfaces pr phyllaries glabrous.
2. Pistillate capitula with involucres 60-70 mm diam.; phyllary margins usually not obviously erose-ciliolate, apices of mid-series phyllaries of pistillate capitula broadly obtuse to rounded; leaf blades mostly 5(-7)-plinerved.

2. *L. grandis*

2. Pistillate capitula with involucres 13-20 mm diam.; phyllary margins usually obviously erose-ciliolate, apices acute to acuminate; leaf blades 3-5-plinerved.

1. *L. crocata*


*Carduus cernus* Bertol. [non (L.) Steud.], *Lycoseris squarrosa* Benth.

Scandent or arching shrubs 1-5 m; stems sparsely arachnoid-pubescent to quickly glabrate. Leaves short-petiolate; blade 6-16 × 2.2-4.5 cm, lanceolate to narrowly obovate, 3-5-plinerved from well above base, the distal pair of laterals terminating near blade apex, surfaces usually becoming concolorous, nitidous adaxially, abaxial surface glabrous or sometimes sparsely arachnoid-pubescent, base cuneate to narrowly rounded, margins entire or often serrulate distally, apex acuminate; petiole 0.5-0.7 cm. Capitulescence 1-6-capitulate; peduncles 1-3.5 cm, capitula sometimes subnutant.

Staminate capitula 18-21 mm, radiate or infrequently long-bilabiate+subactinomorphic; involucre 16-20 × 13-20 mm; phyllaries 4-6-seriate, c. 3+-striate, sparsely arachnoid-pubescent when young to commonly glabrous, adaxial (inner) surface glabrous, margins usually obviously erose-ciliolate, apex acute; outer phyllaries 6.5-8 × 2-2.5 mm, lanceolate-ovate, distal 3-5 mm reflexed (at anthesis); inner phyllaries 16-20 × 1.8-3.2 mm, linear-lanceolate to lanceolate, erect; marginal florets with staminodia and often an unbranched style, corolla 16-21 mm, radiate or infrequently long-bilabiate, tube and limb subequal, limb 2.5-3 mm diam., teeth c. 0.5 mm; disk florets: corolla 11-12 mm, lobes 1.5-2.5 mm, anthers 7-8.5 mm, the tails c. 2.5 mm, appendages c. 2 mm; receptacle post-anthesis to c. 6 mm diam.

Pistillate capitula 30-38(-45) mm; involucre 22-27(-35) × 23-39 mm; phyllaries 8-9-seriate, sparsely arachnoid-pubescent when young to commonly glabrous, adaxial (inner) surface glabrous, striate distally, margins usually obviously erose-ciliolate, apex acute to acuminate; outer phyllaries 12-15 × 4-5.5 mm, triangular-lanceolate, distal 4-9 mm reflexed (at peak flower); inner phyllaries 22-27(-35) × 2.8-4 mm, linear-lanceolate to narrowly ovate, erect; marginal florets: corolla 18-20 mm, indistinctly tubular-subradiate, limb 3.5-5 × 1-2 mm, ascending to recurved, teeth c. 0.5 mm, subequal, triangular; disk florets: corolla 18-20 mm, lobes 1-1.3 mm, style exserted 3-4 mm, branches c. 1 mm; receptacle post-fruit to c. 20 mm diam. Cypselae 5-11 mm; pappus bristles in staminate capitula 10-12 mm, in pistillate capitula c. 15 mm. Flowering [Nov-]Dec-Mar[Jun + Aug]. Deciduous forests, open rocky areas, pine-oak forest, roadsides, secondary forests, streamsides, thickets. B
Nash, 1976g: 434); G (Deam 326, MO); H (Harmon y Dwyer 3932, MO); ES (Egeröd y Stähl, 1991: 570); N (Baker 2316, MO); CR (Khan et al. 864, MO); P (Hunter y Allen 434, NY). 0-600 m. (Mesoamerica, Colombia.)


*Lycoseris macrocephala* Greenm.

Scandent shrubs 1-2.5 m; stems sparsely arachnoid-pubescent to subglabrate. Leaves short-petiolate; blade (6-)9-22 × 2-9.5 cm, elliptic-lanceolate to elliptic, mostly 5(-7)-plinerved from well above base, the distal pair of laterals terminating near blade apex, surfaces usually concolorous, abaxial surface loosely arachnoid-pubescent to glabrous, base cuneate to subtruncate, margins serrulate, apex acute; petiole 0.2-0.4(-0.5) cm. Capitulescence 1-4-capitulate; peduncles 1-3 cm. Staminate capitula 20-26 mm, radiate; involucre 15-24 × 19-30 mm; phyllaries 4-5-seriate, appressed or outer ones sometimes spreading, arachnoid-lanuginose distally, margins usually not obviously erose-ciliolate, adaxial (inner) surface glabrous, apex acute to obtuse; outer phyllaries 8-12 × 2-3 mm, triangular-lanceolate to lanceolate, subherbaceous distally; inner phyllaries 15-24 × 2-2.5 mm, spatulate to linear-lanceolate, 3-striate distally; marginal florets often with an elongate unbranched style and sometimes a few shorter staminodia, corolla 22-29 mm, radiate, tube and limb subequal, limb 2.5-3 mm diam., teeth c. 0.5(-1.5) mm; disk florets: corolla 16-17 mm, lobes 2.5-3 mm, anthers 8-10 mm, the tails, thecae, and appendages all subequal. Pistillate capitula 40-60 mm; involucre 33-40 × 60-70 mm; phyllaries 6-8-seriate, appressed or outer ones sometimes spreading, indistinctly pluristriate, arachnoid-lanuginose distally, margins usually not obviously erose-ciliolate. Adaxial (inner) surface glabrous; outer phyllaries 10-15 × 2-5 mm, lanceolate to oblong, sometimes displaced laterally in mature fruit (or when pressed) but apices not typically recurved, subherbaceous or darkened distally, apex acute to obtuse; mid-series phyllaries 25-30 × 6-7 mm, spatulate, apex broadly obtuse to rounded; inner phyllaries 33-40 × 2-4 mm, linear-lanceolate to lanceolate, apex acute; marginal florets: corolla 27-38 mm, indistinctly tubular-subradiate, limb 4.5-7 × 1-2 mm, ascending to recurved, teeth 1-2 mm, unequal; disk florets: corolla 24-35 mm, lobes 1.1-1.9 mm, style exserted to c. 5 mm, basal c. 2 mm slightly broadened, branches c. 0.5 mm. Cypselae to c. 10 mm; pappus bristles in staminate capitula 10-13 mm, in pistillate capitula 25-34 mm. Flowering Nov-Apr. Deciduous forests, streamsides, secondary forests, roadsides. CR (Zamora et al. 2095, MO). 0-900 m. (Endemic.)

*Lycoseris grandis* is known only from the Pacific watershed in central and northern Costa Rica.


Scandent to vining shrubs 1-6 m; stems arachnoid-lanate to floccose. Leaves short-petiolate; blade 6-16 × 2-5.3 cm, lanceolate to narrowly ovate, 3-plinerved from well above base, this pair of arching laterals terminating near blade apex, surfaces always discolorous, abaxial surface persistently white-tomentose, base attenuate or cuneate to sometimes obtuse, margins typically entire or subentire and slightly revolute, apex acuminate to attenuate; petiole 0.5-1.1 cm. Capitulescence 1-3-capitulate; peduncles 1-3 cm. Stamine capitula 18-26 mm, radiate or infrequently long-bilabiate+subactinomorphic; involucre 15-20 × 15-22(-30) mm; phyllaries 4-6-seriate, appressed and erect, usually 3-stripe, lanate to arachnoid-pubescent proximally, adaxial (inner) surface scabridulous, margins usually obviously erose-ciliolate, apex acute to acuminate; outer phyllaries 5-8 × 1.5-2.5 mm, triangular-lanceolate; inner phyllaries 15-20 × 1.5-2 mm, lanceolate; marginal florets usually with reduced staminodium and often an unbranched style, corolla 16-19 mm, radiate or sometimes long-bilabiate, tube and limb subequal, limb 2.5-3 mm diam., teeth c. 0.5-1.5 mm, subequal to unequal, inner lip (when present) usually 4-5 mm, longer than style; disk florets: corolla 12-14 mm, lobes 1.5-3(-3.5) mm, slightly unequal, anthers c. 7 mm; receptacle post-anthesis to c. 10 mm diam. Pistillate capitula 30-40(-50) mm; involucre 20-32 × 30-45 mm; phyllaries 8-9-seriate, appressed and erect, indistinctly pluristriate, lanate to arachnoid-pubescent proximally, adaxial (inner) surface scabridulous, margins usually obviously erose-ciliolate, apex acute to acuminate; outer phyllaries 7-13 × 4-5.5 mm, triangular-lanceolate; inner phyllaries 20-32 × 1-3 mm, linear-lanceolate to lanceolate; marginal florets: corolla 18-23 mm, indistinctly tubular-subradiate or tubular-bilabiate, limb 5-8 × 1-2 mm, sometimes nearly lobed to base, ascending to recurved, teeth 1.5-2(-5) mm, subequal to unequal, lanceolate, inner lip (when present) usually 4-6 mm; disk florets: corolla 18-22 mm, lobes 1.2-2 mm, style exserted to c. 4 mm, branches 1-1.5 mm; receptacle post-fruit to c. 25 mm diam. Cypselae 8.5-9 mm, fusiform; pappus bristles in stamine capitula 11-13 mm, sometimes slightly clavate distally, in pistillate capitula 14-20 mm. Flowering [Nov]-Dec-Mar[-Apr]. Cliffs, forest edges, secondary forests, savannas, thickets. P (Johnston 13334, MO). 0-100 m. (Mesoamerica, Colombia, Venezuela.)

Egeröd y Stähl (1991) describe the leaf margins of *Lycoseris triplinervia* as serrulate, but I find them to be typically entire or nearly so. *Lycoseris triplinervia* is similar to, and often misdetermined
as, Andean *L. trinervis*, which has leaves 5-plinerved and broader-based. Material from northwest of Panama previously determined as *L. triplinervia* has mostly been redetermined as *L. crocata*.

2. **Onoseris** Willd.

*Caloseris* Benth., *Centroclinium* D. Don, *Chaetachlaena* D. Don, *Chucoa* Cabrera,  

Por J.F. Pruski.

Showy annual or perennial leafy-stemmed herbs to treelets or lianas; stems with leaves mostly basal to mid-stem, ours leafy stemmed and never rostrate, erect to climbing or trailing, simple below capitulescence (ours) to branched, exalate, lanate or tomentose; herbage with trichomes simple and sometimes also heterotrichous with elongate patent stipitate glandular trichomes (especially in dry habitats). Leaves simple or pinnately divided (often described as simple with a lobulate petiole), radical or alternate, sessile to long-petiolate (ours with a petiolariform base $\geq 4$ cm); blade linear to hastate, ovate, or obovate, when pinnatifid typically with a very large terminal lobe (similar to the blade of simple leaves) and a few much smaller proximal lobes per side decreasing in size proximally, palmately veined or when pinnatifid at least the large terminal lobe palmately veined and the proximal lobes pinnately veined (ours) or in South America venation pinnate and leaves unlobed, surfaces usually bicolorous, adaxial surface usually loosely arachnoid to glabrate, occasionally arachnoid-lanuginose, abaxial surface arachnoid to lanate or tomentose, margins irregularly sinuate-dentate (ours) to entire; petiole or petiolariform base (often described as lobulate petiole) often winged, in pinnatifid species often grading into leaf blade. Capitulescence terminal, not leafy, corymbiform or paniculate (ours) to monoecephalous (sometimes scapose); peduncles mostly bracteolate distally. Capitula homogamous and tubular-bilabiate (often described as discoid) to more commonly heterogamous (long-bilabiate–subactinomorphic or long-bilabiate–tubular-bilabiate); involucre turbinate to campanulate or hemispherical; phyllaries evenly graduate, 4-12-seriate, often spreading laterally to reflexed post-fruit, linear-lanceolate or lanceolate (ours) to elliptic-lanceolate or sometimes ovate, often partly purplish, apex narrowly acute or attenuate (ours) to long-attenuate; receptacle flat, e Palestine, glabrous or fimbriate to setose or pilose. Florets homogamous to more commonly heterogamous; corollas usually dimorphic, long-bilabiate, tubular-bilabiate, and/or
subactinomorphic, the marginal ones mostly pinkish-red, reddish, or purple, the central ones pinkish or commonly yellowish. Marginal florets (usually present) 1-seriate, pistillate but often with well-developed staminodia and often seemingly bisexual; corolla long-bilabiate (3+1), outer lip elongate and often exserted from involucre, abaxially subglabrous to arachnoid-pubescent, apex 3-denticulate, inner lip linear, bifid or entire; style usually well-exserted through staminodia. Central florets bisexual; corolla subactinomorphic (0+5) or tubular-bilabiate (3+2 or 1+4), tube often rugulose-ridged, throat narrow, lobes subequal or unequal, when tubular-bilabiate usually with 3 or 4 subequal abaxial lobes and 2 or 1 adaxial (internal) lobes obviously longer (more deeply incised) than the abaxial lobes, erect or recurved; anther filaments papillose especially proximally, thecae long-caudate, tails smooth or papillose, apical appendage elongate, acute; style with distinct bulbous basal node, broadly branches oblong but seemingly short-ovate, often connivent proximally for much of their length, usually papillose abaxially or sometimes smooth, apex obtuse. Cypselae cylindrical to subfusiform, erostrate but sometimes narrowed apically, brownish, 4-6-costate, glabrous or pubescent, twin hairs elongate, fine-slender, sharp-pointed, carpopodium bulbous, stramineous; pappus of many scabrid capillary bristles, bristles subequal and typically isomorphic, occasionally with some clavate-tipped. \( x = 9 \). Aprox. 33 spp. Neotropics, about half of the spp. endemic to Peru.

*Onoseris* was revised by Ferreyra (1944) who recognized 25 species. By simple (below the capitulescence) stems, corymbiform to paniculate capitulescences, and broad leaves typically lyrate-pinnatifid with a palmately veined terminal lobe, our four species were treated by Sancho (2004) as members of *Onoseris* subgen. *Onoseris*. *Onoseris* subgen. *Hipposeris* is strictly South American and is comprised of species with narrow simple leaves with pinnate venation. The generic synonyms *Isotypus*, *Caloseris*, *Rhodoseris*, *Schaetzellia*, and *Seris* are typified by Mesoamerican *O. onoseroides* (or one of its taxonomic synonyms) and synonymous *Pereziopsis* is typified by the basionym of Mesoamerican *O. donnell-smithii*.

*Onoseris costaricensis*, *O. donnell-smithii*, and *O. onoseroides* are the only species of *Onoseris* with tubular-bilabiate capitula without radiating corolla limbs and with only isomorphic homogamous bisexual florets. These three species are thus considered each others closely relatives. *Onoseris silvatica* appears most similar to South American *O. fraterna* S.F. Blake and *O. peruviana* Ferreyra, and was keyed by Ferreyra (1944) adjacent to them. *Onoseris onoseroides* and *O. silvatica* are the only species of the genus occurring in both Central America and South America.

Although our species typically have lyrate-pinnatifid leaves (albeit often described as simple with a lobulate petiole), individuals of each species occasionally have some non-divided leaves. The capitulescences of our species are very large, and often comprise about 1/3 of entire plant height. Ferreyra (1944) measured the style branches in our species as 3.5-5.5 mm long, but the proximal c.
3/4 of the branches are typically connivent. Here, I give measurements of the free apices of our style branches as 0.5-1 mm long.


1. Capitula long-bilabiate+subactinomorphic, (19-)25-45-flowered; florets dimorphic, marginal floret corolla abaxial lips long-bilabiate and 3-denticulate with teeth 0.3-0.6 mm, central florets subactinomorphic. 4. O. silvatica

1. Capitula tubular-bilabiate, 10-15-flowered; florets isomorphic, corollas tubular-bilabiate with the 4 abaxial lobes 1.6-3(-4) mm.

2. Capitula 18-22 mm; phyllaries often appearing mostly white-grayish; the adaxial longer corolla lobes 5-6(-7) mm. 1. O. costaricensis

2. Capitula 22-35 mm; phyllaries often appearing mostly purplish; the adaxial longer corolla lobes 9-12 mm.

3. Peduncles and phyllaries stipitate-glandular, phyllaries with c. 15+ stipitate glandular trichomes per mm²; scattered on both mid-zones and margins. 2. O. donnell-smithii

3. Peduncles and phyllaries typically not stipitate-glandular, phyllaries infrequently with < c.10 stipitate glandular trichomes per mm² often restricted to the mid-zones or in a line bordering mid-zones. 3. O. onoseroides


Robust perennial herbs to treelets, 1-6 m; stems erect, griseous-lanuginose, sometimes heterotrichous with scattered papillae distally or patent trichomes near proximal nodes, leaves somewhat clustered along the stem. Leaves 11-50 cm, largest leaves simple and triangular-sagittate or commonly all leaves lyrate-pinnatifid with a winged petioliform base; terminal lobe 6-22 × 5-28 cm, about 1/2 of leaf length and usually at least twice as large as proximal lobes, triangular-sagittate, 3(-5)-plinerved from base, adaxial surface loosely arachnoid-pubescent, also minutely hirsutulous along veins, abaxial surface griseous-tomentose, margins irregularly sinuate-dentate; proximal lobes 2-4(-10) per side, 1-11 cm, elliptic; rachis 0.3-0.7 cm diam.; petioliform base 5-28 cm, sometimes several-lobulate basally. Capitulescence corymbiform-paniculate, 27-45+-capitulate, lateral branches (6-)12-18 cm, paucicephalous to pluricephalous, ultimate portion of branches (5-)9-13-capitulate; peduncles 0.5-4 cm; bracteoles 2-5 mm, subulate. Capitula 18-22 mm, homogamous, tubular-
bilabiate, 10-15-flowered; involucre 16-21 × 6-10 mm, turbinate to broadly so; phyllaries 4-5-seriate, often appearing mostly white-grayish, arachnoid-tomentose, mid-zone sometimes visible through indumentum but usually not green; outer phyllaries 3-6 × 0.5-1.5 mm; inner phyllaries 16-21 × 1.2-2 mm; receptacle setose, setae 0.5-0.8 mm. Florets isomorphic, tubular-bilabiate (4 + 1), homogamous, bisexual; corolla 14-18 mm, pinkish-red, mostly glabrous throughout or lobes sometimes papillose, tube and throat obviously much longer than the 4 abaxial lobes, lobes lanceolate, erect, the 4 abaxial lobes 1.6-2.5 mm, the adaxial longer lobe 5-6(-7) mm; anthers 10.5-12 mm, tails 3-4 mm; style base c. 0.6 mm diam., free apex of branches c. 0.5 mm. Cypselae 3-6 mm, sericeous; pappus 13-15 mm. *Forest margins, orillo de calle, shaded roadside banks.* Flowering Dec-Feb. CR (*Khan et al. 196, MO). (500-)800-1500 m. (Endemic.)

The holotype is numbered "*Brenes 6520 (378)," whereas a presumed isotype in NY is numbered "*Brenes 378 (6520)."


Robust perennial herbs to treelets, 0.5-4 m; stems erect, griseous-lanuginose, clustered-leaved at distal end of stem. Leaves 10-52(-81) cm, some of the larger leaves simple and triangular-sagittate to cordiform, most leaves lyrate-pinnatifid; terminal lobe 6-25(-33) × 6.5-30(-36) cm, about 1/3-1/2 of leaf length and usually at least twice as large as proximal lobes, triangular-sagittate to cordiform, 3(-5)-plinerved from base, adaxial surface arachnoid-lanuginose to loosely arachnoid-pubescent, abaxial surface griseous-tomentose, margins irregularly sinuate-dentate; proximal lobes 1-2 per side, 2.5-8(-15) cm, elliptic; rachis 0.5-0.8 cm diam., sometimes nearly unwinged; petiolariform base 4-27(-48) cm. Capitulescence corymbiform-paniculate, 9-30(-70+)-capitulate, lateral branches 5-35 cm, paucicellular to pluricellular, ultimate portion of branchlets (3-)5-13-capitulate; peduncles 0.5-5 cm, heterotrichous, griseous-lanuginose and also densely purplish stipitate-glandular with slender stipitate glandular trichomes 0.2-0.5 mm and exserted from subpressed lanuginose indumentum; bracteoles 2-4 mm, subulate, often stipitate-glandular but otherwise mostly subglabrous. Capitula 25-35 mm, homogamous, tubular-bilabiate, 10-12(-15)-flowered; involucre 22-30 × 7-15 mm, turbinate; phyllaries 5-7-seriate, decurrent onto peduncle, often appearing mostly purplish, heterotrichous, tomentellous becoming glabrate, also purplish stipitate-glandular, stipitate glandular trichomes c. 0.2+ mm, slender, erect but sometimes pressing as though appressed, c. 15+ scattered (on both mid-zone and margins) stipitate glandular trichomes per mm²; outer phyllaries 4-7 × 1-1.5 mm; inner phyllaries
22-30 × 1.2-1.8 mm; receptacle setose, setae 0.2-0.6 mm. Florets isomorphic, tubular-bilabiate (4 + 1), homogamous, bisexual; corolla 20-23 mm, red, glabrous proximally, usually papillose distally, tube and throat obviously longer than the 4 abaxial lobes, lobes lanceolate, erect, the 4 abaxial lobes 2-2.7(-4) mm, subequal or lateral(s) slightly unequal, the long adaxial internal lobe 9-10 mm; anthers 13.5-16 mm, tails 4.3-4.8 mm; style base c. 0.9 mm diam., free apex of branches 0.5-0.9 mm. Cypselae 3.5-9 mm, sericeous; pappus 14-16 mm. *Brushy hillsides, in cultivation, low forests, secondary vegetation, secondary forests.* Flowering Jan-Feb. G (*Heyde y Lux* 4527, NY); ES (*Standley* 19701, MO). 500-1100 m. (Endemic.)

*Onoseris donnell-smithii* is accepted basically as a regional stipitate-glandular segregate of *O. onoseroides*. Some material of *O. onoseroides* may have slightly stipitate-glandular phyllaries or slightly stipitate-glandular peduncles, but never both phyllaries and peduncles as consistently and as densely stipitate-glandular as in *O. donnell-smithii*.

Several typically eglandular species of *Onoseris* may occasionally be stipitate-glandular, but never so much as to seriously blur species boundaries. I therefore basically distinguish *O. donnell-smithii* and *O. onoseroides* as did Ferreyra (1944), and I use the number of stipitate glandular trichomes per mm² on the phyllaries and presence or absence of stipitate glandular trichomes on peduncles and bracteoles as useful characters. Although I defer to the species concepts and synonymy used in Ferreyra's (1944) monograph, it should be noted that Greenman (1905) used the name *Onoseris rupestris* (Benth.) Greenm. (with *Pereziopsis donnell-smithii* as a synonym) for heterotrichous material. I have not examined the type of Bentham's name (given below in synonymy of *O. onoseroides*), which has nomenclaturally priority over *O. donnell-smithii*.


Coarse perennial herbs to shrubs, (0.7-)1-3(-5) m; stems erect, griseous-lanuginose, leaves mostly closely spaced proximally. Leaves (15-)20-60(-80) cm, some leaves simple and triangular-sagittate to cordiform, most other leaves lyrate-pinnatifid; terminal lobe 10-30 × 12-30 cm, about 1/3-1/2 of leaf length and usually at least twice as large as proximal lobes, triangular-sagittate or cordiform to
broadly ovate, 3-5-plinerved from base, adaxial surface loosely arachnoid-pubescent to more commonly glabrate, abaxial surface griseous-tomentose, margins irregularly sinuate-dentate; proximal lobes 1-4 per side, 4-20 cm, elliptic to ovate, base sessile to obviously stalked with petiolule 0.5-4 cm, margins irregularly dentate to sometimes secondarily lobed with lobules to 2 cm; rachis 0.4-0.8 cm diam., sometimes nearly unwinged; petiolariform base (5-10)-30(-50) cm. Capitulescence to 1.5 m, paniculate, (15-)50-200-capitulate, lateral branches usually (10-)15-30(-40) cm, pluricephalous, ultimate portion with capitula often long-pedunculate and sometimes nutant; peduncles 0.5-5(-15) cm, griseous-lanuginose, typically not stipitate-glandular, infrequently with a few stipitate glandular trichomes; bracteoles 2-8 mm, subulate, becoming glabrate. Capitula 22-35 mm, homogamous, tubular-bilabiate, 4-11-flowered; involucre (15-)18-28 × 6-14 mm, turbinate to broadly so; phyllaries 5-8-seriate, a few sometimes slightly decurrent onto peduncle or grading into bracteoles, mostly purplish with stramineous proximal margins, glabrate to often tomentellous basally or laterally, typically not stipitate-glandular, infrequently with < c.10 stipitate glandular trichomes per mm² restricted to the mid-zone or in a line bordering mid-zone; outer phyllaries 3-7 × 1-1.6 mm; inner phyllaries (15-)18-28 × 1.2-1.8 mm; receptacle setose, setae 0.3-1 mm. Florets isomorphic, tubular-bilabiate (4 + 1), homogamous, bisexual; corolla (15-)18-25 mm, pinkish-red to orangish-red, mostly glabrous proximally, sometimes papillose distally, tube and throat much longer than the 4 abaxial lobes, lobes lanceolate, erect, the 4 abaxial lobes 1.6-3(-4) mm, the long adaxial internal lobe 9-12 mm; anthers 12-15 mm, tails 3.5-4.5 mm; style base c. 0.8 mm diam., free apex of branches 0.5-1 mm. Cypselae 5-10 mm, setose, often narrowed apically; pappus 15-18 mm. Barranco, bosque seco, cliffs, forest edge, premontane wet forests, river banks, roadsides, secondary forests, thickets, steep hillsides. Flowering Nov-May, Jul. Ch (Breedlove 23997, MO); B (Gentle 2356, NY); G (Steyermark 31283, NY); H (Molina et al. 31451, MO); ES (Montalvo 4050, MO); N (Moreno 7914, MO); CR (Grayum et al. 11204, MO); P (Brother Maurice 850, MO). 200-1600(-1800) m. (Mexico, Mesoamerica, Colombia, Venezuela.)


Robust perennial herbs to subshrubs, 0.5-2(-3) m; stems erect or subscandent, griseous-lanuginose, clustered-leafy at about mid-stem. Leaves 10-60 cm, simple and triangular-sagittate or much more commonly lyrate-pinnatisect with winged petiolariform base; terminal lobe 6-30 × 4-30 cm, about 1/3-1/2 of leaf length and usually at least thrice as large as proximal lobes, triangular-sagittate, 3-5-plinerved from base, adaxial surface loosely arachnoid-pubescent to glabrate, abaxial surface
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griseous-tomentose, margins irregularly sinuate-dentate; proximal lobes 1-6(-10) per side, 1.5-8 cm, elliptic; rachis 0.2-1.5 cm diam.; petiolariform base 4-30 cm, sometimes minutely lobulate basally. Capitulescence corymbiform, 6-21(-45)-capitulate, usually several of the lateral branches monocephalous, other branches ultimately 2-5+-capitulate; peduncles (3-)6-15(-20) cm; bracteoles 4-8 mm, subulate. Capitula 20-26(-30) mm, heterogamous, long-bilabiate+subactinomorphic, (19-)25-45-flowered; involucre 15-21(-25) × 12-22 mm, broadly turbinate to narrowly campanulate; phyllaries 4-6-seriate, arachnoid-tomentose often with green mid-zone, mid-zone sometimes glabrous or papillose (substipitate-glandular), when mid-zone glabrous the phyllaries appearing longitudinally streaked; outer phyllaries 3-5 × 0.5-1.5 mm; inner phyllaries 15-21(-25) × 2.5-3.4 mm; receptacle setose, setae c. 0.6 mm. Florets heterogamous, dimorphic. Marginal florets 12+, long-bilabiate, pistillate with well-developed staminodia; corolla 18-22 mm, c. 4 mm longer than pappus bristles, purplish-red, tube and the minute throat 6-8 mm, outer lip 12-14 × 1.5-2.5 mm, much longer than tube and throat, subglabrous and never arachnoid-pubescent abaxially, c. 6-nerved, with a 3-denticulate abaxial lip, teeth 0.3-0.6 mm, adaxial inner lip 9-11 mm, usually entire, erect with apex coiling. Central florets subactinomorphic, bisexual; corolla 15-19 mm, pinkish-red, glabrous, tube and throat obviously longer than all lobes, lobes 1.9-2.5 mm, subequal, lanceolate, erect; anthers 9.5-11 mm, tails 3-4 mm; style base c. 0.7 mm diam., free apex of branches c. 0.6 mm. Cypselae 2.5-4.5(-8) mm, sericeous-strigose; pappus 14-16 mm. Openings in forests, shaded ravines, streamsides. Flowering Dec-Mar. N (Castro 2245, MO); CR (Solis R. 533, MO); P (Sytsma & D'Arcy 3423, MO). 50-1000 m. (Mesoamerica, Colombia.)

Pittier 3312, a syntype of Onoseris silvatica, was excluded from O. silvatica by Ferreyra (1944) and redetermined as a paratype of the newly described O. costaricensis. The capitula of O. silvatica are visited by hummingbirds. Onoseris silvatica has corollas of the marginal florets and central florets homochromous (albeit those of the central sometimes paler), whereas most heterogamous species are heterochromous with central florets having yellowish corollas.

**XX. Tribus Perityleae** B.G. Baldwin

_Amauriinae_ Rydb., _Peritylinae_ Rydb.

Por J.F. Pruski.

Annual or perennial herbs to often low rupicolous shrubs; herbage often punctate-glandular or stipitate-glandular, without secretory cavities or latex. Leaves cauline, typically opposite to sometimes alternate distally, mostly petiolate; blade entire to lobed, rarely dissected, mostly chartaceous to sometimes subsucculent, venation usually trinervate. Capitulescence mostly terminal, monocephalous to openly
cymose. Capitula radiate or discoid; involucre cylindrical to hemispherical; phyllaries 8-21, subimbricate, subequal, 1-2(-3)-seriate, commonly navicular (cymbiform) or sometimes some nearly flat, subherbaceous, persistent; clinanthium flat or convex, epalette (Mesoamerica) or very rarely paleate. Ray florets 1-seriate, pistillate; corolla usually white or yellow, limb with nerves typically equally thin, adaxial surface typically finely-papillose with quadrangular epidermal cells, apex mostly 3-lobed. Disk florets bisexual or sometimes a few inner florets functionally staminate; corolla shortly 4(-5)-lobed, usually yellow, usually glandular, throats without colored resin in ducts, lobes papillose within; anthers ecaudate, filaments glabrous, thecae pale-colored, endothecium pattern polarized, appendages ovate or elliptic-ovate, usually slightly constricted at base, occasionally sessile-glandular; style short-appendiculate (Mesoamerica) or exappendiculate, base glabrous, branches thin, slightly flattened, with stigmatic surfaces 2-banded, appendage minute, much shorter than the stigmatic portions of branches, acuminated to obtuse, papillose. Cypselae isomorphic or dimorphic, often compressed or obcompressed, carbonized, walls without raphids, not finely striate; epappose or pappus of 2(-30) bristles or a short laciniate corona. Aprox. 7 genera and 85 spp. America, mostly in N. Mexico and SW. United States. 2 gen. and 2 spp. in Mesoamerica.

Our taxa (Galeana and Perityle) have epalette clinanthia and were treated within Helenieae by Bentham y Hooker (1873), Rydberg (1914), Karis y Ryding (1994), and Villarreal et al. (2008), whereas Turner y Powell (1977) placed Perityle in Senecioneae. Helenieae s. str. differ from Perityleae, however, by non-carbonized cypselae. Although treated with Heliantheae s. lat. by both Robinson (1981) and Strother (1999), by the 4-merous vs. 5-merous disk floret feature our two genera were placed in the different subtribes Hymenopappinae (where Galeana was aligned with Loxothysanus of tribe Bahieae) and Peritylinae.

Karis y Ryding (1994) retained a paraphyletic Helenieae s. str. because it was "practical" to do so, whereas Baldwin et al. (2002) segregated tribe Perityleae from Helenieae. Baldwin et al. (2002), however, treated Galeana as unassigned to tribe, whereas both of our genera were treated in an expanded Perityleae by Panero (2007-PERIT). Within the Helenioid Heliantheae, Perityleae are late-divergent and sister to Eupatorieae. Other similar Helinioid segregates include Chaenactideae and Madiaceae, which each may eventually be found in Mesoamerica, and Bahieae, which are moderately well-represented in Mesoamerica. Members of Perityleae usually stand out by their 4-merous disk corollas and compressed ciliate cypselae, with Galeana anomalous by its 5-merous disk corollas and dimorphic fruits. This treatment is based on that of Pruski (2012-Helen), whose followed the system of Panero (2007-PERIT).

Villanova anemonifolia (Kunth) Less. is known from the Andes of Antioquia, Colombia (Pruski y Funston, 2011) and should be expected in montane areas of adjacent Panama. Villanova achilleoides (Less.) Less. occurs in pine forest on Cerro Perote and Pico Orizaba (border of Puebla and Veracruz)
(Villarreal et al., 2008) and should be looked for in similar habitats of Volcan Tacana (Chiapas, Mexico and adjacent Guatemala). *Villanova* Lag. is characterized by pinnatifid leaves, 5-lobed disk corollas, and isomorphic cypselae.


1. Capitula 6-8-flowered; phyllaries 5, few-striate, striae embedded, not obviously costate; disk corollas 5-lobed; cypselae dimorphic, glabrous, epappose, ray cypselae margins becoming corky-ulate.  

   **1. Galeana**  
   1. Capitula 35-93-flowered; phyllaries 14-22(-30), bicostate proximally; disk corollas 4-lobed; cypselae isomorphic, margins exalate and white-ciliate, pappus coroniform and of 1-2 longer bristles.  

   **2. Perityle**  

   **1. Galeana** La Llave  

   *Chlamysperma* Less.

Por J.F. Pruski.

Annual thin-stemmed herbs; stems single from base but rarely simple-stemmed, erect, commonly few-opposite-branched in mid-stem region (late-season plants more densely so) becoming moderately dichotomous-branched distally with the lateral branches much-overlapping the short terminal determinate monocephalous capitulescence of central axis; herbage viscid, pubescent, often with subequal stipitate-glandular and non-glandular trichomes, also often sessile-glandular. Leaves opposite, petiolate to distal-most subsessile; blade triplinerved from base; petiole typically very narrowly winged, sometimes subclasping. Capitulescence monocephalous to open-cymose, 1-3-capitulate, appearing leafy and not held well-above subtending leaves; peduncles naked. Capitula small, radiate, 6-8-flowered; involucre obovoid to campanulate; phyllaries 5, 1-2-seriate, margins overlapping, often concave, herbaceous, appressed to reflexed past fruit, few-striate, striae embedded, not obviously costate. Ray florets 3; corolla ochroleucous, tube stipitate-glandular, limb weakly exerted from involucre, apex 3-lobed. Disk florets 3-5, outer 1-2
bisexual, the inner functionally staminate with abortive ovary; corolla funnelform to campanulate, moderately ampliate, 5-lobed, ochroleucous, tube of bisexual florets stipitate-glandular, tube of functionally staminate florets glabrous, limb sometimes sessile-glandular; anthers basally obtuse, apical appendage narrowly acute; style branches weakly recurved, apex obtuse. Cypselae dimorphic, glabrous, smooth to weakly tuberculate at maturity, epappose; rays cypselae strongly concave-obovoid, obcompressed, faces black, margins becoming corky-alate and stramineous-mottled maturing black; disks cypselae triquetrous-clavate, exalate, black or sometimes edges stramineous. \( x = 9 \). 1 sp. Mexico, Mesoamerica.

Rydberg (1914) recognized three species of *Galeana*, but these were reduced to a single species by Blake (1945), who discussed morphological variation of the species.


Herbs 10-50 cm; stems evenly-leafy, suberete to weakly sulcate-angled, greenish aging maroon, pilose-hirsute. Leaves much-reduced distally; blade \( 0.7-2.5(-3.5) \times 0.3-1.5(-2.3) \) cm, deltoid-ovate to elliptic, often subhastately lobed (distal leaves often elliptic and subentire), thin-chartaceous, surfaces sessile-glandular, also pilose-hirsute with stipitate-glandular and non-glandular trichomes, the stipitate-glandular ones mostly marginal, base subtruncate to broadly cuneate, often narrowly decurrent onto petiole to near base, margins subentire to deeply 3-5-serrate, apex acuminate to obtuse; petiole \( 0.2-0.9(-1.3) \) cm. Capitulescence only about as broad as subtending paired leaves; peduncles 2-10(-25) mm. Capitula 3-3.5 mm; involucre (1.5-)2-2.5 mm diam.; phyllaries 2.5-3 × c. 1.6 mm, elliptic-obovate, often thinly pilosulose distally, apex obtuse. Ray florets: corolla 0.6-0.9 mm, limb c. 0.5 mm, orbicular to cuneate, often broader than long. Disk florets included with involucre; corolla 1.2-1.7 mm; anthers pale yellowish; style branches c. 0.3 mm. Cypselae: ray cypselae 2-2.7 mm, body 0.9-2 mm diam., wings 0.6-1 mm diam.; disk cypselae 2.1-2.5 × 0.6-0.9 mm. \( 2n = 18 \). Flowering mostly Jun-Aug. *Disturbed habitats, canyons, fields, savannas, oak forests, pine forests, open forests, rocky slopes, near streams, scrublands,
thickets. Ch (Purpus 9157, MO); G (Heyde y Lux 3364, US); H (Williams y Molina 10125, MO); ES (Padilla 229, US); N (Oersted 113, K); CR (Grayum et al. 9112, MO). 40-2100 m. (Mexico, Mesoamerica.)

Blake (1945) noted that the protologue of *Chlamysperma arenarioides* erred in describing the disk florets as 4-lobed.

2. **Perityle** Benth.


Por J.F. Pruski.

Annual herbs to perennial subshrubs; stems leafy; herbage often viscid-glandular. Leaves opposite to sometimes distally alternate, petiolate or less commonly sessile; blade typically 3-lobed but varying from entire to finely dissected. Capitulescence monocephalous to diffusely cymose or corymbiform; peduncles short to long, few-bracteolate or naked, sometimes ampliate and fistulose distally. Capitula radiate (ours) or discoid; involucre cylindrical to hemispherical; phyllaries linear to ovate, 1-2(-3)-seriate, flat to carinate, often spreading at maturity; receptacle flat to low-convex. Ray florets (when present) mostly (5-)8-21; corolla cream-colored to yellowish, tube stipitate-glandular, limb weakly to well-exserted from involucre, apex 3-dentate. Disk florets many, bisexual; corolla tubular-funnelform to campanulate, 4-lobed, yellow to white, often stipitate-glandular; anthers 4, thecae narrowly elliptic, basally obtuse, apical appendage ovate; style branches recurved, apical appendage acuminate, papillose. Cypselae isomorphic, compressed or sometimes subcylindrical, black, ours with margins exalate and white-ciliate, faces typically setose; pappus coroniform (crown of erose or laciniate squamellae) and of 1-2 longer bristles (ours), but bristle number ranging from 0-20(-30), bristles often unequal. \( x = 17, 19 \).

Apex. 66 spp. SW. United States y N. Mexico, 1 sp. extending southeastward into Flora Area, thence disjunct with 1 sp. in Chile.

Panero (2007-PERIT) gave *Perityle* as occurring in "Central America," but this is presumably based on the erroneous protologue locality of *P. microglossa*.


1. **Perityle microglossa** Benth., *Bot. Voy. Sulphur* 119 (1845). Holotype: Mexico, Nayarit (fide Powell, 1974) [as "Realejo" i.e., Nicaragua, in the protologue], *Hinds s.n.* (photo MO! ex
Powell (1974) recognized non-typical diploid *P. microglossa* var. *saxosa* (Brandegee) A.M. Powell as restricted to NW Mexico, and characterized it by non-stipitate-glandular peduncles and ray corolla limbs 3.5-4.5 mm.

1. **Perityle microglossa** var. *microglossa*.


Annual herbs 20-75 cm; stems evenly leafy, spreading-erect to decumbent, opposite-branched mostly from above base to alternately so distally, suberete, usually greenish, puberulent to also distally densely short stipitate-glandular; herbage with stipitate-glandular trichomes, elongate non-glandular trichomes, and also generally sessile-glands (?incipient short-stipitate glandular trichomes). Leaves petiolate; blade 1.5-6(-8) × 1-5(-7) cm, typically ovate to cordiform, often palmately lobed, extremely variable in size and shape, thinly chartaceous, venation palmately 3-nerved from base, surfaces typically pilose-hirsutulous, sessile-glandular, also stipitate-glandular, infrequently glabrescent, base truncate to cordate, very narrowly attenuate, margins singly or doubly crenate to irregularly, palmately, or subb GSTately few-toothed or few-lobed, apex acute to obtuse; petiole 0.5-3(-4) cm. Capitulescence open-cymose, few-capitulate, held slightly above subtending leaves; peduncles (0.6-)1-4(-10) cm, copiously stipitate-glandular. Capitula 3.5-5(-6) mm, radiate, 35-93-flowered; involucre 4-6(-7) mm diam., globose in bud to subhemispherical or campanulate at anthesis; phyllaries 14-22(-30), 3-4.5 × 0.6-1 mm, lanceolate to oblanceolate, navicular, subimbricate, green to marginally stramineous, sometimes apex purplish in bud, bicostate proximally, apex acute to acuminate. Ray florets 5-13; corolla white to ochroleucous, tube c. 1 mm, limb 1.5-3.5 mm, oblong, exserted from the involucre, sessile-glandular abaxially. Disk florets 30-80, partly exserted from involucre; corolla 1.3-2 mm, funnelform, narrowly ampliate, yellow, tube sessile-glandular and sometimes also very shortly stipitate-glandular, limb sessile-glandular, lobes c. 0.2 mm, triangular, sparsely puberulent; anthers mostly included; style branches c. 0.6 mm. Cypselae 1.5-2 mm, oblanceolate to elliptic in outline, compressed, faces glabrous or strigillose-setose distally, margins ciliate throughout their length; pappus crown 0.2-0.5 mm, bristles 1-2, 0.5-1.2 mm, unequal, erect, fragile, few-barbellate. 2n = 68, 102. Flowering Oct-Apr(+ Jun). *Steep rocky slopes and rocky canyons*. Ch (Pruski et al. 4202, MO). 500-1500 m. (SW. United States, Mexico, Mesoamerica.)
Bibliography for Perityleae


XXI. Tribus Senecioneae Cass.

Descripción de la tribu y clave genérica por J.F. Pruski.

Annual to perennial herbs, shrubs, trees, or vines, infrequently succulent, rarely pachycaulous (in our region pachycaulous only in Pittocaulen), usually leafy stemmed, rarely ericoid shrubs (Mesoamerica), monoecious or rarely dioecious, flowering when leafy or rarely flowering when leafless (in our region only Pittocaulen flowers when leafless); stems herbaceous to woody, rarely rubbery, usually suberete and striate, infrequently angled, usually elongate and very rarely abruptly contracted or distinctly foreshortened immediately below capitulescence, pith solid to fistulose, rarely obviously resinous (in Mesoamerica only in Telanthophora); herbage sometimes purplish, (when pubescent) typically with simple trichomes or infrequently stipitate-glandular, very infrequently with branched trichomes or punctate glandular, lacking polyacetylenes. Leaves
simple to pinnatifid, rarely spinescent, alternate or rarely opposite, sessile to more commonly petiolate, rarely peltate; blade usually chartaceous, pinnate or palmate, dentations (when toothed) usually callose-tipped. Capitulescence terminal or lateral, monocephalous to more commonly cymose to paniculate, stems elongate below capitulescence (very rarely abruptly contracted or distinctly foreshortened). Capitula heterogamous (radiate or disciform) or homogamous and discoid, corollas typically homochromous, calyculate (soutended by secondary bracts) or ecalyculate; phyllaries free or sometimes slightly connivent, infrequently connate, 1(-2+)-seriate, typically subequal, initially appressed and sometimes appearing connivent, often subimbricate with outer narrower phyllaries alternating with and overlapping broader inner phyllaries, sometimes all eximbricate, not all dry and rather scarious throughout, mid-region usually green, margins especially of inner phyllaries often stramineous and broadly scarious but phyllaries never obviously scarious nor thinly papery throughout the distal portions, base typically articulated, often (especially in subtribe Tussilagininae) gibbous-carinate, typically persistent but spreading to fully deflexed post fruit; receptacle ecalyculate but sometimes cretate or squamose, smooth or sometime alveolate, flat to convex (Mesoamerica) or rarely conical. Ray florets pistillate or rarely sterile, 1(-2)-seriate; corolla usually yellow or orange, sometimes white to red or rarely blue, typically glabrous, limb with adaxial epidermal cells usually oblong and not papillose, often 4-nerved and apically 3-denticulate. Marginal florets (when capitula disciform) pistillate, 1-3+seriate; corolla usually tubular-funnelform. Disk florets bisexual or infrequently functionally staminate; corolla strictly actinomorphic or rarely slightly asymmetric with unequal divided lobes, often funnelform to narrowly campanulate, (4-)5-lobed, sometimes asymmetrically so, usually yellow or white, sometimes orange to red or rarely blue, typically glabrous, lobes usually deltate or triangular to less frequently linear-lanceolate, shorter than throat or sometimes elongate and much longer than throat, marginally nerved or often also with a median resin duct; anthers usually ecaudate to infrequently caudate, collar balusterform (dilated basally and wider than filament, basal cells often bulbous-enlarged) or cylindrical and not wider than filament (cells uniformly sized throughout), thecae bases mostly obtuse to rounded, sometimes short-aoriculate to infrequently caudate, endothelial cells with irregular thickenings on lateral walls only (tissue radial) (most of ours) or often (subtribe Tussilagininae) but frequently in Mesoamerica with irregular thickenings on polar end walls only (tissue polarized), tissue sometimes transitional, apical appendage flat, ovate to sometimes narrow-lanceolate, eglandular; pollen caveate (columellae partly separated from foot layer), usually with columellae solid (senecioid) or infrequently columellae with internal foramina (helianthoid); style typically exappendiculate, sometimes with sterile appendage (cellular or of papillae), base cylindrical to dilated, branches
usually slightly flattened (sometimes terete in cross-section) and usually smooth or nearly so for much of length abaxially, stigmatic surfaces 2-banded or continuous, usually reaching to the typically truncate or obtuse apex, branches infrequently triangular to conical or sterile long-appendiculate, usually with sweeping-papilllose subapically in an abaxial semicircle or infrequently long-papilllose apically or laterally, rarely long-comose tufted apically, rarely with a subulate vascularized vernonioid appendage, papillae (when visible) usually isomorphic to rarely obviously dimorphic, free or fused. Cypsela isomorphic within capitula, mostly columnar-cylindrical or obovoid (subterete in cross-section) to less commonly fusiform, angled, or flattened, usually (5-)8-12(-20)-costate, usually brownish and not carbonized, often with raphids, glabrous or pubescent, infrequently glandular, typically erosurate, never obviously rugulose-tuberculate abaxially, carpopodium typically annular-symmetrical; pappus of rays and disks similar, usually present to rarely squamose or rarely absent (in Mesoamerica absent only infrequently escaping *Euryops*), 1-few-seriate, usually of (few-)many elongate white, smooth to barbellate, soft very fine capillary often fragile bristles (rarely subplumose; infrequently fide Drury y Watson, 1966, fluked, i.e., subpersistent, subclavate with terminal cells subsisodiamorphic, and apices appressed or sometimes retrorse pointed). Aprox. 185 genera and 3200-3500 spp. Cosmopolitan except Antarctica.

Senecioneae are characterized mostly by their subequal uniseriate phyllaries, epaleate capitula, often ecaudate anthers, often truncate-tipped styles, and capillary pappus bristles. They are the largest tribe of Compositae and contain about 1% of all Angiosperm species (Bremer 1994; Nordenstam, 1978, 2007). Generic alignments and subtribes recognized basically follow schemes and concepts of Robinson y Brettell (1974), Bremer (1994), Nordenstam (1978, 2007), Barkley et al. (1996), Janovec y Robinson (1997), and Pruski (2012-Rob, 2012-Key). Ten of our genera have cylindrical anther collars and belong to subtribe Tussilagininae (Robinson y Brettell, 1974; Nordenstam, 1978, 2007; Jeffrey, 1992; Vincent y Getcliffe 1992; Bremer, 1994; Barkley et al., 1996; Janovec y Robinson, 1997; Pruski, 2012-Rob., 2012-Key). *Euryops* is our only genus of subtribe Othonninae, and our remaining genera have balusterform anther collars are placed in Senecioninae. The following key to genera is based on those in Robinson y Brettell (1974), Barkley et al. (1996), Janovec y Robinson (1997), and Pruski (2012-Key). Pruski (2012-Crasso) summarized literature that noted Senecioneae as characterized biochemically by their absence of most acetylenes and presence of eremophilanes and furanoeremophilanes, two types of sesquiterpene lactones not known elsewhere in Compositae. Moreover, Senecioneae are characterized further by presence of pyrrolizidine alkaloids (Pruski 2012-Crasso).
Floral microcharacters characterized subtribes recognized and have been much-used in generic circumscriptions (Robinson y Brettell, 1973, 1974; Nordenstam, 1978, 2007; Jeffrey, 1992; Vincent y Getliffe, 1992; Bremer, 1994; Barkley et al., 1996; Janovec y Robinson, 1997; Pruski, 2012-Rob, 2012-Key). Flora format stresses reliance on easily observed trichome types and floral characters, as in Drury y Watson (1965), Robinson y Brettell (1973a, 1973b, 1974); Jeffrey (1987), Jeffrey et al. (1977), Nordenstam (1978), Wetter (1983), Vincent y Getliffe (1992), and Pruski (2012-Rob). It precludes systematic study and incorporation herein of many traditional anatomical characters (e.g., leaf nodal anatomy, stems anatomy including features of the cambium and distributions of resin ducts and vessels), floral anatomy characters (e.g., ray corolla limb epidermal cellular patterns), ovary and ovule wall cellular crystal type and distributional features, pericarp epidermal cell shapes and ornamentations (except in some mature cypsela where well-manifest), and pollen characters known to be useful taxonomically (Drury, 1973a; Robinson y Brettell, 1974; Jeffrey et al., 1977; Nordenstam, 1978; Skvarla y Turner, 1966; Vincent y Getliffe, 1992; Janovec y Robinson, 1997). Style branch descriptions refer to disk floret style branches.

*Pippenalia* McVaugh and *Packera* Á. Löve et D. Löve are the only tropical Mexican genera not represented in Mesoamerica. Although *Packera bellidifolia* (Kunth) W.A. Weber et Á. Löve, *P. sanguisorbae* (DC.) C. Jeffrey, and *P. tampicana* (DC.) C. Jeffrey, occur in pinares of Volcanoes and the Sierra Madre del Sur into Veracruz and Oaxaca, none of them extend east of the Isthmus of Tehuantepec. The genus *Packera* (as well as *Robinsonecio* and *Telanthophora*) has helianthoid pollen (Skvarla y Turner, 1966), is accepted as a segregate of *Senecio*, and should be looked for in Mesoamerica. Epappose *Pippenalia* occurs along the west coast of Mexico, but is unknown in Oaxaca and is not likely to be found in Mesoamerica. I cannot match what Mociño (1993) gave as Old World *Cacalia saracenica* L. in the Cuchumatanes, and McVaugh found no corresponding material of it in MA. If a Senecioneae, Mociño's (1993) description of it as an annual with serrate lanceolate decurrent leaves brings to mind only species of *Senecio* sect. *Mulgediifolii*. *Pericallis hybrida* B. Nord. is grown ornamentally in nearby Antioquia, Colombia (Pruski y Funston, 2011: 334) and this deltate-leaved herb should looked for as an escape in Mesoamerica. Although *Othonna* L., a genus of succulent perennials with yellow-flowered capitula, is increasing in horticultural popularity, it is not known to me to escape from cultivation in Mesoamerica.

1. Anther collars cylindrical; stigmatic surfaces usually continuous (subtribe Tussilagininae).
   2. Basically acaulescent (but not caespitose) subscapose herbs, leaves mostly basal.
   3. Capitula discoid; disk corollas white or ochroleucous, lobes much longer than throat.

19. Psacalium

3. Capitula radiate, disciform, or discoid; disk corollas usually yellow, lobes usually subequal to or shorter than throat.
   4. Leaves sessile or marginally petiolate, blade oblanceolate or oblone to spatulate or obovate, secondary venation indistinct, margins never lobed.
   21. Robinsonecio

4. Leaves long-petiolate, peltate, blade orbicular to lobed, palmately veined, margins entire to lobed.

18. Psacaliopsis

2. Caulescent leafy-stemmed perennial herbs, shrubs, or trees.

5. Pachya caulous seasonally leafless shrubs.

17. Pittocaulon

5. Caulescent leafy-stemmed perennial herbs, shrubs, or trees.
   6. Corollas white or ochroleucous, deeply 5-lobed nearly to tube; endothecium polarized.

5. Digitacalia

6. Corollas usually yellow, typically shortly to moderately 5-lobed; endothecium radial to polarized.
   7. Leaves pinnatifid basically to midrib.

26. Villasenoria

7. Leaves entire to lobed, but never lobed basically to midrib.
8. Stems abruptly contracted or distinctly foreshortened immediately below capitulescence.
9. Shrubs or trees; capitula usually radiate. 25. Telanthophora
8. Stems elongate.
10. Leaves subsessile; stems with pith small, minutely chambered; capitula ecalyculate; cypselae strigose-pilose. 1. Barkleyanthus
10. Leaves petiolate; stems usually with large solid pith or stems fistulose, cortex; capitula calyculate; cypselae glabrous or rarely pubescent. 22. Roldana

1. Anther collars balusterform; stigmatic surfaces usually 2-banded (subtribes Othonninae - \textit{Euryops} and Senecioninae).
11. Phyllaries connate proximally.
12. Caulescent leafy-stemmed shrubs; leaves alternate, pinnatifid; ray corolla limbs yellow, cypselae epappose. 9. Euryops
12. Caespitose acaulescent herbs, leaves distichous, broadly linear, margins entire; ray corolla limbs white axially cypselae with a pappus of bristles. 27. Werneria
11. Phyllaries free.
13. Plants vines or lianas.
14. Leaves palmately lobed.
15. Capitula discoid; anthers caudate. 4. Delairea
14. Leaves entire to serrate or dentate.
16. Anthers cecaudate; capitula radiate; ray corollas orange to red; style apex triangular to lanceolate. 20. Pseudogynoxys
16. Anthers caudate; capitula radiate, disciform, or discoid; ray corollas (when present) usually yellow or infrequently orangish; style apex rounded or obtuse, infrequently long-comose tufted.
17. Style branches with obviously dimorphic papillae, apex densely long-comose tufted with 15-20 stiffly erect penicillate papillae about twice as long as branch diam. 15. Ortizacalia
17. Style branches with isomorphic papillae, apex not long-comose, papillae (when present) much shorter than to sometimes about as long branch diam.
18. Herbage with trichomes with thick-walled contorted appendages or trichomes variously branched; ray corollas (when present) filiform; cypselae 10-costate.

6. Dresslerothamnus

18. Herbage with trichomes simple, sometimes obliquely appendaged but appendage thin-walled; ray corollas (when present) lanceolate to elliptic-lanceolate; cypselae 5-costate.

16. Pentacalia

13. Terrestrial herbs, shrubs, or trees.

19. Shrubs to trees; anther thecae short-caudate.

13. Monticalia

19. Non-Ericoid herbs, shrubs, or trees; anther thecae obtuse to rounded not short-caudate.

21. Capitula ecalyculate; phyllaries not basally articulated.

22. Non-succulent herbs; style appendage non-vascularized, composed of fused papillae.

7. Emilia

22. Succulent herbs; style appendage partly vascularized, cellular but apex also moderately papillose

12. Kleinia

21. Capitula usually calyculate; phyllaries basally articulated.

23. Disk style branches with a subulate vascularized vernonioid appendage.

10. Gynura

23. Disk style branches without a subulate vascularized vernonioid appendage.

24. Disk style branches exappendiculate, apex usually truncate, without a central apical tuft of papillae.

23. Senecio

24. Disk style branches either appendiculate or with terminal papillae and/or isolated lateral patches of papillae.

25. Disk style branches with a caudate fused-papillae appendage that is longer than branch diam.

3. Crassocephalum

25. Disk style branches without a caudate fused-papillae appendage that is longer than branch diam.


8. Erechites


27. Plants often simple-stemmed with leaves mostly in aerial rosettes; capitulescences corymbiform-paniculate, pluricapitulate, broadly rounded to nearly flat-topped, phyllaries usually 8.

11. Jessea
27. Plants simple to few-branched, leafy without leaves in aerial rosettes; capitulescences laxly cymose, paucicapitulate; phyllaries usually 13 or more.

28. Leaf blades glabrous, margins serrate but unlobed, petioles not winged; disk style branches lacking a well-defined apical tuft of papillae; cypselae glabrous.  

2. Charadranaetes

28. Leaf blade abaxial surfaces pubescent, lobed, bases narrowly winged petiolar; disk style branches with an isolated apical tuft of papillae; cypselae usually setulose.  

24. Talamancalia

1. Barkleyanthus H. Rob. et Brettell

Por J.F. Pruski.

Leafy-stemmed shrubs; stems simple proximally, profusely branched throughout, leaves mostly clustered distally, pith small, minutely chambered, cortex without resinous ducts; herbage usually glabrous or sometimes sparsely arachnoid-puberulent in the capitulescence. Leaves simple, alternate, subsessile; blade chartaceous, 3-5-plinerved from stem or near base, margins subentire or denticulate, surfaces eglandular, usually glabrous. Capitulescence terminal, paniculate, many-capitulate, held just above leaves; peduncles minute-bracteolate, 1-2 bracteoles sometimes loosely subtending involucre. Capitula radiate, basically ecalyculate; phyllaries (5-)8, 1(-2)-seriate, free, thin chartaceous with scarios margins, pale green, 1-nerved, lateral 2-4 nerves usually indistinct; receptacle deep-alveolate (squamulose), nearly solid (indistinctly subfistulose). Ray florets pistillate; corolla yellow, limb bidenticulate. Disk florets bisexual; corolla tubular-funnelform, moderately 5-lobed, yellow, glabrous, tube and limb subequal, lobes sometimes with medial resinous nerve; anther thecae pale, ecaudate, short-auriculate, anther collar cylindrical, endothecium cell walls radially thickened; style base slightly swollen above nectary, branches with stigmatic surfaces continuous, apex truncate, papilllose. Cypselae oblong, brown, 5-striate, strigose-pilose, carpododium annular, tan; pappus of many slender stramineous scabrid capillary bristles. x = 30. 1 sp. SW Estado Unidos, Mexico, Mesoamerica.

[I don't know if part 2 will start again at page one hence at this writing I'm using "29(1)"]


Cineraria angustifolia Kunth, Senecio axillaris Klatt, Senecio salignus DC., Senecio vernus DC., Senecio xarilla Sessé et Moc.

Frequent broadly spreading shrubs (0.3-)1-3(-4); stems often lax distally, pith chambers < 0.5 mm. Leaves 3-10(-13) × 0.3-1(-1.5) cm (including narrowly winged petioliform base 1-5 mm), linear-lanceolate, acute to attenuate at both ends. Capitulescence 5-15 × 5-15 cm, branchlets 10-20 cm, often closely 7-25-capitulate, sometimes distally puberulent; peduncles 4-13(-20) mm; bracteoles c. 1.5 mm, lanceolate. Capitula 6-8(-9.5) mm; involucre 4-6 mm diam., hemispheric to campanulate-turbinate, disk florets usually well-exserted past anthesis; phyllaries 4-6(-8) × 1.5-3 mm, elliptic to obovate, glabrous except at finely papillose apex, broadly acute to rounded; receptacle with alveolate margins 0.5-0.7 mm, dentate-laciniate. Ray florets (3-)5(-8); corolla tube 3-3.5 mm, limb 4-7 × 2-3 mm, elliptic, 4(-6)-nerved. Disk florets 14-23(-30); corolla 5-7.5 mm, lobes c. 1.5(-2) mm, infrequently much longer than throat and then cut to near base of throat, recurved; anthers 1.6-2 mm; style branches c. 1 mm. Cypselae 2-3.3 mm; pappus bristles 5-6+ mm, nearly as long as disk corollas. 2n = 60. Flowering Nov-Jun. Matorral crassicaule, oak forests, pine forests, pine-oak forests, secondary vegetation, thickets. Ch (Méndez G. [aka Alush Shilom Ton] y Martínez de López 9779, MO); G (Greenman y Greenman 5967, MO); H (expected fide Williams, 1976c: 418); ES (Williams, 1976c: 418). (1300-)1500-3100 m. (SW Estados Unidos, Mexico, Mesoamerica.)

Senecio cinerarioides Kunth has similar sized leaves and capitula and should be looked for in the Flora Area. Senecio cinerarioides, as the name implies, is a cinereous shrub known from Pico Orizaba northwards, and although similar in gestalt is a true Senecio with the senecioid microfeatures of 2-banded stigmatic surfaces and balusterform filament collars.

2. Charadranetaes Janovec et H. Rob.

Por J.F. Pruski.

Glabrous or subglabrous malodorous decumbent or ascending perennial terrestrial herbs to subshrubs; stems 1-several from base, few-branched distally, leafy with leaves not in aerial rosettes, greatly decrescent. Leaves simple, alternate, petiolate; blade thinly chartaceous, venation
pinnate, margins serrate but unlobed; petiole thin, exalate, dilated but never clasping at base.

Capitulescence terminal, ascending, laxly cymose, paucicapitulate; peduncles slender, usually several linear-bracteate, bracts spreading. Capitula radiate; involucre cylindrical to narrowly campanulate, irregularly and loosely calyculate; phyllaries usually 13-14, free, margins thinly scarious; receptacle convex, solid, usually smooth. Ray florets pistillate; corolla golden-yellow or orange, limb well-exserted. Disk florets bisexual, moderately exserted from involucre; corolla narrowly funnelform, corolla yellow to golden-yellow, glabrous, tube elongate or tube (especially pre-anthesis) merely +/- subequal to limb, lobes lanceolate, subequal to throat, ascending (non-recurved), with medial resinous nerve; anthers slightly exserted, collar narrowly balusterform, slightly wider than filaments, about 1/3 as long as thecae + appendage, thecae ecaudate, base obtuse, endothecial tissue radial, apical appendage triangular, acute to obtuse apically; style short-appendiculate, base abruptly bulbous, stylopodium and free from and sitting atop the nectary, branches and distal portion of trunk exserted, branches recurved, rounded apically, indistinctly appendiculate with small smooth dome-shaped subappendage, without a caudate fused-papillae appendage that is longer than branch diam. usually subtended by semicircle of subapical-abaxial papillae, but lacking a well-defined apical tuft of papillae, stigmatic surface 2-banded or sometimes indistinctly so. Cypselae cylindrical, 8-10-nerved, glabrous, epidermal cells elongate, carpopodium prominent, annular; pappus bristles of rays and disks similar, 1-2-seriate, white, barbellate, reaching to about base of disk corolla lobes. 1 sp. Mesoamerica.

Charadranaetes is similar in habit, leaf venation, and capitulescence structure to South American Garcibarrigoa Cuatrec., but differs by non-clasping leaves, style branches lacking a well-defined apical tuft of papillae, pappus bristles fewer-seriate, and cypselae with elongate epidermal cells.


Pseudogynoxys durandii (Klatt) B.L. Turner.

Herbs to subshrubs 15-65 cm; stems sometimes purplish. Leaves longer than internodes; blade 4-11 × 0.5-3.5 cm, narrowly lanceolate or infrequently elliptic-lanceolate, usually with about 8-12 subopposite pairs of moderately arching secondary veins, base cuneate, margins usually with 10-17 apically directed teeth per side, apex acuminate to attenuate; petiole 1-4 cm. Capitulescence 1-
6-capitulate; peduncles (when pluricephalous) 2-8 cm, sometimes weakly puberulent. Capitula
10-16 mm; involucre 5-15 mm diam.; phyllaries 9-13 × 1-2 mm, lanceolate, yellow-greenish or
infrequently purplish, usually 3-striate, often puberulent apically, apex acute to acuminate;
calycular bracts usually 7-12, 7-10 × c. 1 mm, 1/2 the length to as long as the phyllaries, linear-
lanceolate, green. Ray florets 7-13 (often 8); corolla tube 6-9 mm, limb 17-23 × 2-3 mm, linear-
lanceolate, 4-nerved, 3-denticulate. Disk florets 15-52; corolla 9-15 mm, tube acrescent during
anthesis, lobes 1.6-2.4 mm; anthers 1.7-2 mm, collar c. 0.5 mm; style branches 1.4-2 mm.
Cypselae 1.5-2.5 mm, brown or sometimes nerves tan, carpopodium 0.1-0.2 mm; pappus 6-7 mm.
Flowering Jan-Aug. Rocky stream beds. CR (Almeda et al. 5791, MO). 1400-2400 m. (Endemic.)

3. Crassocephalum Moench

Por J.F. Pruski.

Annual or perennial caulescent terrestrial herbs to 1.5 m; stems erect or ascending, strict or few-
branched, uniformly leafy; herbage bearing simple trichomes. Leaves alternate, usually petiolate;
blade usually broad, chartaceous, venation pinnate, base sometimes auriculate. Capitulescence
mostly terminal, closely or openly cymose-corymbiform to infrequently monocephalous, leafy or
less commonly sparsely so. Capitula discoid (or very rarely radiate), calyculate; involucre broadly
cylindrical or urceolate (typically swollen basally at receptacle and constricted above), disk
corollas usually slightly exserted; phyllaries linear-lanceolate, free, few-raised-costate especially
basally, scarious margins narrow; calycular bracteoles unequal, linear, sometimes purplish
apically; receptacle flat. Ray florets nearly always absent. Disk florets numerous, bisexual;
corolla tubular-funnelform, ochroleucous or yellow to violet or (ours) red to reddish-orange, tube
tubular-elongate, indistinctly dilated basally, limb short, gradually very narrowly ampiate in
distal c. 1/4-1/5; anther collars narrowly balusterform, thecae bases obtuse to short-auriculate,
appendage triangular to lanceolate; style obviously but moderately appendiculate, base gradually
and slightly dilated, branches moderately elongate, spreading to recurved, stigmatic surface
proximal, 2-banded, fertile portion smooth abaxially, loosely spreading tufted-papilllose in an
abaxial semicircle immediately above stigmatic bands and immediately below the appendage,
branches thence abruptly (short-)moderate narrowly appendiculate, appendage usually caudate,
composed of fused papillae, not vascularized, differing texturally from cellular structure of
proximal portions of style branch. Cypselae narrowly cylindrical to ovoid to obovoid, 8-10-
costate, slightly constricted below the narrow annular ring, glabrous or papilllose in lines, ovary or
ovule epidermal cells with simple crystals; pappus bristles white, scabridulous, often caducous. $n = 10.24$ spp. Mostly native to Africa, now Pantropical.

This treatment is based on that of Pruski (2012-CRASS), who treated the genus as it occurs in the Americas.


Annual herbs, 0.3-1.3 m; stems striate, thinly crisped brown-puberulent to less frequently densely so; herbage pubescent with multicellular trichomes. Leaves petiolate; blade (3.5-)5-18(-25) × 1.5-8(-10) cm, elliptic to ovate or obovate in outline, simple or especially proximal leaves often lyrate-lobed, surfaces glabrous to puberulent, base obtuse to attenuate or sometimes decurrent, margins coarsely and irregularly deep-serrate, proximal lobes (when present) 1-2(-3) per margin, (1-)2-4 × (0.3-)1-1.7 cm, elliptic-oblong, usually directed laterally, terminal lobe much larger than laterals, apex acute to acuminate or less commonly obtuse; petiole 0.5-4(-5.5) cm, slender, exauriculate. Capitulescence closely corymbiform, few-several-capitulate, capitulum nutant in bud and early flower, becoming erect in fruit, leafy, not held well above cauline leaves; peduncles 0.5-5(-10) cm, naked or sometimes minutely 1-bracteolate, crisped puberulent. Capitula 10-16 mm, discoid, all florets bisexual; involucre 4-8 mm diam., truncate basally; phyllaries 13-21, 9-13 × 0.5-1.5 mm, finely 5-7-striate, equally thin throughout, not gibbous basally, apex often darkened, 2-3 adjacent phyllaries often connate at papillose apices; calycular bracteoles (6-)10-15(-21), 1.5-5(-7) mm, loosely ascending, puberulent or ciliolate. Disk florets: corolla 8-12 mm, red to reddish-orange (?rarely yellowish, tube often pale), glabrous, gradually slightly dilated proximally (subcylindrical to base), lobes 0.5-1 mm, triangular-lanceolate, ascending-erect, occasionally with thin medial resinous nerve, mamillose apically; anthers c. 1 mm, yellowish-brown, apical appendage long-lanceolate; pollen white; style gradually and slightly dilated in basal 1-1.5 mm, branches c. 1 mm, reddish or violet, appendage 0.3-0.4 mm, caudate, ≥ 1/4 branch length, c. 3+ cells wide. Cypselae 1.8-2.5 mm, slender, brownish-purplish, ribs and furrows concolorous, appressed papillose in furrows, ribs rounded; pappus bristles 8-12 mm, white, finely scabridulous, c. 2(3) cells wide. 2$n = 20, 40$. Flowering Jun-Dec. *Cafetales,*
disturbed areas, pastures, roadsides. CR (Pruski et al. 4031, MO), 900-2200 m. (Native to tropical Africa, naturalized in tropical Asia, Australia, and Pacific Islands, less frequently so in the Americas, where it seems to be absent from South America and the Lesser Antilles; United States (Florida), Mesoamerica, Hispaniola, Puerto Rico.)

4. Delairea Lem.

Senecio sect. Delairea (Lem.) Benth. et Hook. f.

Por J.F. Pruski.

Perennial herbaceous succulent vines; stems clambering, branched; herbage glabrous or nearly so, when puberulent bearing simple trichomes. Leaves cauline, simple, alternate, petiolate, often auriculate; blade palmately nerved, palmately lobed, chartaceous. Capitulescence terminal or axillary, corymbiform-paniculate, many-capitulate; peduncles slender. Capitula discoid, short-calyculate, corollas exserted; involucre cylindrical-campanulate; phyllaries 7-8, 1(-2)-seriate, free, persistent, receptacle flat to short-convex, somewhat alveolate. Disk florets bisexual; corolla yellow, narrow-campanulate, moderately long 5-lobed, tube much shorter than limb; anther collar balusteriform, thecae caudate, appendage lanceolate; style exappendiculate, branches with a 2-banded stigmatic surface, apex +/- truncate. Cypselae prismatic, 5-angled; pappus bristles subequal with corolla, fragile, capillary, many, white. $x = 10$

This treatment is based on that by Pruski (2012-Escape).


Senecio mikanioides Otto ex Walp.

Vines to 6 m. Leaves: petiole 2-10 cm, slender; blade 3-8 × 3-10 cm, (3-)5-9+-lobed, polygonal to orbicular, base cordate, lobe margins entire, sinus rounded, lobe apices acute, surfaces glabrous. Capitulescence often of few to several axillary branch apex clusters, each group 3-5 × 2-3 cm, +/- flat-topped, 10-20(-40)-capitulate; peduncles usually ≤ 10 mm, 1-3-bracteolate, bracteoles ob lanceolate, 1-2 mm. Capitula 6-9 mm; involucre 2-4 mm diam., corollas and pappus usually 1.5-2 × as long; phyllaries 3-4 mm, lanceolate, green or yellowish green with scarious margins; calyculus minute, 1-4(-5)-bracteolate, bracteoles 0.5-1.5+ mm. Disk florets 8-25; corolla c. 5 mm, tube narrow shorter than to infrequently longer than limb, limb abruptly
narrow ampliate, lobes c. 1.2 mm, ascending to recurved, infrequently with thin medial resinous nerve; anthers to c. 2 mm, tails c. 0.4 mm about as long as collar; style branches c. 1 mm, apex sometimes sparsely papillose abaxially. Cypselae c. 2 mm, glabrous; pappus bristles c. 5 mm, white, scabrid. 2n = 20. *Cultivated, sometimes naturalizing*. Ch (expect); G (expect); CR (expect). 500-2000 m. (Native of South Africa, widely cultivated in Estados Unidos, Mexico, Mesoamerica, Colombia, Venezuela, Brazil, Argentina, West Indies; Europa, Africa, Asia, Australia, New Zealand, Pacific Islands.)

Vining discoid *Delairea odorata* Lem. (syn.: *S. mikanioides* Otto ex Walp.) is a member of the paleotropical Synoid group characterized by their caudate anthers and narrowly campanulate moderately long-lobed disk corollas. *Delairea odorata* should be looked for as cultivated in Mesoamerica. Other vining Synoid genera (sensu Jeffrey, 1986) most closely resembling *S. tamoides* are Indomalayan *Cissampelopsis* (DC.) Miq. and African *Mikaniopsis* Milne-Redhead.

5. *Digitacalia* Pippen

Por J.F. Pruski.

Stiffly erect perennial leafy-stemmed caulescent herbs to 4 m; stems annual, lacking basal rosette at maturity, otherwise evenly leafy throughout, suberete to less commonly angled; herbage bearing simple trichomes. Leaves alternate, petiolate; blade usually 3-9-lobed, ours about 2/3 distance to midrib, extra-Mesoamerica sometimes more deeply so, pinnately (Flora Area) or more commonly subpalmately lobed and veined, chartaceous, lobe margins entire to serrulate. Capitulescence large, at least 30 cm tall and broad, terminal or terminating axillary branches, many capitulate, corymbiform or corymbiform-paniculate, branches subtended by bracteate leaves; peduncles minute-bracteolate. Capitula small, discoid, calyculate; involucre turbinate to narrowly campanulate; phyllaries 5-8, 1(-2)-seriate, free; calycular bracts or bracteoles (1-)3-7, usually shorter than phyllaries; receptacle +/- flat, folveolate. Ray florets absent. Disk florets bisexual; corolla salverform, white or ochroleucous, never yellow, glabrous, deeply 5-lobed nearly to tube, tube narrowly cylindrical to base, about as long as limb, throat present or absent, short when present, to c. 1 mm, lobes 3-nerved; anthers exerted, theca base obtuse, anther collar cylindrical, endothecial cell thickening polarized, apical appendage ovate; style cylindrical to base, without swollen node, branches each with a continuous stigmatic surface, but abaxially with dark-staining line, spreading to recurved, apex exappendiculate, truncate to obtuse, sometimes with lateral round-tipped papillae. Cypselae narrowly cylindrical to oblong, 8-12-costate, ribs
well-defined, glabrous or setulose when young; pappus bristles many, white, capillary, scabrid. x = 30. 5 spp. Mexico.

*Digitacalia*, a tussilaginoid genus, was described by Pippen (1968) and expanded by Turner (1990). It differs from other Mesoamerican tussilaginoid genera by its caulescent habit, and among acaulescent genera by its white deeply-lobed white corollas is most similar to *Psacalium*. *Digitacalia heteroidea* (Klatt) Pippen proves to be a species of *Roldana*.


*Caclalia chiapensis* (Hemsl.) A. Gray, *Odontotrichum chiapensis* (Hemsl.) Rydb.

Herbs to 3 m; stems striate, fistulose; herbage glabrous or nearly so. Leaves pinnately lobed to young leaves few-angulate, glabrous or abaxial face of larger veins puberulent; main stems leaves long-petiolate; blade (6-)10-15 × (4-)9-15 cm, deeply pinnately 5-lobed about 2/3 distance to midrib, , base cordate to truncate, proximal pair of lobes sometimes each with a proximal lobule, lobes elliptic-ovate, 3-7 × 1.5-4 cm, entire or subentire, apex acute to acuminate, sinuses broadly rounded, narrower than to about as broad as lobes, capitulescence leaves abruptly reduced, short-petiolate, pinnately few-angulate, ovate to rhomboidal, 2-5 × 1-3 cm, base truncate to broadly obtuse, entire or subentire, apex acute to acuminate; petiole (1-)5-7 cm. Capitulescence many-capitulate, rounded, to 30 cm, to 25 cm broad, branches small-leaved, lateral branches not overtopping central axis; peduncles slender, 5-8 mm, few-costate-sulcate, 1-4-bracteolate; bracteoles lanceolate, c. 1 mm. Capitula 5.5-7.5 mm; involucre 3-4 mm diam., narrowly campanulate; phyllaries (6-)8, 4-5 × to c. 1.5 mm, , elliptic-ovate to oblong basally subgibbous, the narrow mid-zone green, margins stramineous, about as wide as mid-zone, acute, glabrous; calycular bracteoles c. 3, linear-lanceolate, 1-1.5 mm; receptacle c. 1 mm broad. Disk florets 7-11; corolla 3.5-5 mm, tube 1.7-2.5 mm, throat indistinct, 0.3-0.5 mm, lobes lanceolate, 1.5-2 mm, spreading or recurved, nerves submarginal, rarely also with a medial resinous nerve; anthers c. 1.4 mm, theca apex abruptly appendaged, appendage elliptic-lanceolate; style branches recurved, c. 0.8 mm. Cypselae (immature) 1.2-1.4 mm, setulose; pappus 3-4 mm. *Pine-oak forests, dry slopes*. Ch (Breedlove 23342, MO). 1700-1800 m. (Endemic.)

Gray (1883), in his treatment of tussilaginoid species from Mexico, noted the uniqueness of this "singular species." The four other species of the genus differ from *D. chiapensis* by their
taller capitula and longer pappus bristles. Two of these species, D. jatrophoides (Kunth) Pippen and D. napeifolia (DC.) Pippen, occur in the Sierra San Felipe area of Oaxaca, but neither are known to occur east of the Isthmus of Tehuantepec.


Por J.F. Pruski.

Infrequent vines or lianas; stems striate; herbage (mostly leaves and phyllaries; stem indumentum is often dense with trichome arms intertwined), mostly bearing trichomes with thick-walled contorted (cap cells) appendages (as in Drury y Watson, 1965: 309, fig. 1) or trichomes that are variously branched short- to long-stalked, and cap cells multistoried, armed, and smooth (as in Robinson, 1989 t. 2b, 3b) or branched trichomes variously multiangulate (similar to those in Metcalfe y Chalk, 1979 t. 5.3k, t. 5.3m, t. 5.3; and Robinson, 1989 t. 1b), sometimes also heterotrichous with intermixed simple trichomes. Leaves simple, alternate, petiolate; blade broad, venation pinnate, margins entire. Capitulescence from distal few leaf axils, paniculate, main lateral branches unbranched in proximal half, distal branchlets bracteolate, ultimate clusters of capitula subracemose to subumbellate; bracteoles linear-lanceolate. Capitula radiate or disciform, irregularly few-calyculate, calycular bracteoles and peduncular bracteoles similar, ascending; disk florets exserted about 2-5 mm from involucre; phyllaries commonly 8(-11), 1-seriate, free, green to sometimes tinted reddish or purplish, the broader with tan-scarious margins; receptacle setose or setulose to aristate-squamulose, solid; calycular bracteoles linear-lanceolate, resembling peduncular bracteoles. Ray florets or marginal florets 5 or 8, pistillate, rarely with staminodia; corolla glabrous, actinomorphic or radiate, when radiate limb filiform, exserted, +/- yellow to sometimes golden-yellow. Disk florets 5-19, bisexual; corolla funnelform, 5-lobed, yellow, glabrous, tube elongate, gradually dilated at base, about as long as limb, thus throat shorter than tube, lobes lanceolate; anther thecae caudate, pale, tails narrow and seemingly smooth, anther collar balusterform or indistinctly so, endothecium cell wall thickenings indistinctly radial, apical appendage lanceolate to lanceolate-ovate, narrow apically or sometimes obtuse; style usually shortly triangular-subappendiculate, base gradually dilated, branches recurved becoming once-coiled, stigmatic surfaces narrowly 2-banded, apex subtruncate, usually slightly subcomose, not long-comose, papillae isomorphic, distal, lateral and/or terminal, slightly shorter than to sometimes about as long as branch diameter, free, apex acute (infrequently rounded), the abaxial-lateral papillae gradually grading into terminal papillae sometimes longer. Cypselae tardily maturing, cylindrical, finely 10-costate, glabrous, brown, carpopodium annular, tan; pappus of
many slender scabridulous capillary stramineous bristles, apex of terminal cell slightly rounded-bulbous (especially pre-anthesis) or tapered. 4 spp. Costa Rica to Colombia.

Robinson (1989) provided a synopsis of the genus, including illustrations and a discussion of branched trichome types. Robinson (1989) stated that the anther tails of *Dresslerothamnus* may be retrorse-dentate, but they appear smooth, albeit tails and thecae sometimes infected with fungal hyphae. Pruski (2012-Dress) revised the genus in South America.


1. Capitula radiate.
2. Leaves relatively short-petiolate, petioles stout, blades 7-16 × 3.5-10 cm, elliptic to ovate; herbage with pseudostellate trichomes ray florets 8; disk florets 10-15; receptacles long-setose, setae 0.5-1 mm. 1. *D. angustiradiatus*

2. Leaves relatively long-petiolate, petioles slender, blades 1.5-3 × 1-2.5 cm, ovate to suborbicular; herbage with 2(-3)-armed, T-shaped or Y-shaped trichomes ray florets 5; disk florets 5-8; receptacles aristate-squamulose, squamellae c. 0.5 mm. 4. *D. peperomioides*

1. Capitula disciform.
3. Leaf blade surfaces strongly discolorous. 2. *D. sp. b*

3. Leaf blade surfaces more or less concolorous.
4. Capitula with 5-6 bisexual disk florets. 3. *D. hammelii*

4. Capitula with c. 19 bisexual disk florets. 5. *D. schizotrichus*


Liana; stems hirsute-villous; herbage with pseudostellate brownish-red trichomes, trichome stalk and arms +/- subequal, trichomes of phyllaries often short-stalked. Leaves relatively short-petiolate; blade 7-16 × 3.5-10 cm, elliptic to ovate, subcoriaceous, lateral veins c. 4 per side, base rounded, apex obtuse to acuminate, adaxial surface sparsely hirsute-villous to more commonly subglabrous, abaxial surface hirsute-villous to sparsely so, branched trichomes to c. 1+ mm; petiole 7-15 mm, stout. Capitulescence cylindrical-paniculate, main lateral branches 7-28 cm, leafless, 10-20-capitulate, branches and branchlets brown, straight; secondary lateral branchlets
few, 2-9 cm, columnar in aspect, ultimate groups of few capitula, +/- racemose; peduncles 7-10 mm, hirsute-villous, 1(-4)-bracteolate; distal bracteoles c. 3 mm. Capitula 10-13 mm, radiate; involucre (4-)5-8 mm diam., cylindric-al to campanulate; phyllaries 8-11, 6.5-8 × 1.5-2.5 mm, strigose-villous (trichomes often short-stalked), the broader phyllaries with margins narrower than colored mid-zone; receptacle setose, setae 0.5-1 mm; calycular bracteoles 2-3(-5) mm. Ray florets 5-8; corolla tube 4.5-6 mm, limb 7-12 mm. Disk florets 10-15; corolla 7.5-9 mm, tube c. 5 mm, lobes 1-1.5(-2) mm, moderately papillose; anthers c. 2.5 mm, thecae c. 1.5 mm, tails c. 0.5 mm, smooth, filament collar c. 0.5 mm, appendage c. 0.5 mm; style branches 1.1-1.4 mm, papillae 0.1-0.25 mm, the apical often the longest. Cypselae 1-2 mm; pappus bristles 7-7.5 mm, terminal cells pointed. Flowering Feb-Apr. 

Forests. CR (Grayum 9648, MO); P (McPherson 12334, MO). 300-1300(?-1500) m. (Endemic.)

The plants with 5-rayed capitula tend to have shorter (7-8 mm) ray corolla limbs than to 8-rayed plants

2. Dresslerothamnus sp. b. Illust.: None. N.v.: None.

Climbing vines, flowering branches pendent; stems few-several branched distally, brownish-gray lanate-tomentose distally, glabrate proximally, pith solid, internodes about half as long as leaves; herbage with obliquely appendiculate trichomes with thick-walled pluricelled contorted (cap cells) appendages (as in Drury y Watson, 1965: 309, fig. 1). Leaves petiolate; blade 5-9 × 1.7-4 cm, elliptic to elliptic-ovate, subcarnose, pinnately veined, 2-4 arching secondaries per side diverging at c. 45° angles, surfaces strongly discolorous, adaxial surface glabrous, abaxial surface yellowish-brown, densely lanate-tomentose, midrib visible, secondary veins thin and obscured by indumentum, base broadly cuneate to rounded, margins entire, apex acuminate; petiole 0.7-2.5 cm. Capitulescence 10–23 × 5-10 cm, terminal, narrowly corymbiform-paniculate, axillary branchlets usually 5-8, 2-5 cm, subequal to slightly longer than subtending leaves, sometimes columnar in aspect, terminated by a subumbellate cluster of 3-7(-13) capitula; peduncles 3-9 mm, lanate-tomentose. Capitula 10-14 mm, discoid; involucre 5-6 mm diam., campanulate or narrowly so, disk florets moderately exserted (or in fruit sometimes rarely well-exserted by c. 5 mm); phyllaries ca. 8, 7.5-9.5 × 1-2 mm, lanceolate, laxly tomentose to glabrate, bases often quickly indurate; receptacular setae to c. 0.5 mm. Ray florets absent. Disk florets 15-23; corolla 9-12 mm, yellow, glabrous, tube much longer than limb, lobes 1.2-1.6 mm, shorter than to about as long as the throat; anthers 2.2-2.4 mm, collar c. 0.5 mm, tails about 1/2 as long as theca, appendage 0.3-0.4 mm, lanceolate-ovate, apex obtuse; style base gradually dilated in basal c. 0.7 mm, branches 1.6-1.9 mm, apex obtuse, stigmatic to apex, tufted-papillose with tuft triangular in outline,
abaxially papillose in distal 1/4 with papillae smaller but otherwise similar to apical papillae, composed of cellular material, laterally and apically papillose, papillae 0.1-0.2 mm, isomorphic, subequal to usually shorter than branch diam. Cypselae 1.1-1.5 mm, glabrous; pappus bristles 8-10 mm, usually reaching to about the middle of the disk corolla lobes. Flowering Feb. Forests, quebradas, volcano slopes. CR (Herrera y Schik 3830, MO). 800-1100 m. (Endemic.)

3. **Dresslerothamnus hammelii** Pruski, ined. Holotype: Panama, ined ##, MO. Illustr.: None. N.v.: None.

Suffrutex volubilis; caules glabri vel distale puberuli. Folia simplicia alterna petiolata, petiolo 0.7–1.4 cm longo, lamina 3-4 × 1.5–2 cm elliptico-ovata subcarnosa pinnatim venosa concolora glabrata vel puberula basi cuneata margine integra. Capitulescentia 1.5-3– × 2-4 cm terminalis compacta corymbosa rotunda trichomatibus complato-ramosis; pedunculi 1–6 mm longi. Capitula heterogama disciformia 9–10 mm alta; involucrum 2–3 mm diam. cylindricum; phyllaria 6-8, 6.5–7.5 × circiter 1 mm lanceolata glabra. Flosculi pistillati 5, corolla 5–6 mm longa tubulosa luteola, lobis 4–5 circiter 1 mm longis lanceolatis. Flosculi disci 5–6, corolla 6–7 mm longa infundibuliforma luteola glabra, tubo et limbo subaequalia, lobis 5 circiter 1.5 mm longis lanceolatis; antherae 2.2–2.5 longae caudatae, collum basi anguste dilatatum appendicibus apicalibus anguste circiter 1 mm longis lanceolatis; styli rami 1.2–1.5 mm longi breviter appendiculati papillae 0.1–0.2 mm longae, areis stigmaticis discretis. Cypselae 1.3–2.2 mm longae circiter 5-costatae glabrae; setae pappo 5–5.5 mm longo. Elfin forest, could forest, ridge tops. P (ined). 900-2200. (Endemic.)


Scandent vines; stems pilose, leaves mostly bracteate on flowering branches, larger stems few-leaved; herbage with brownish, 2(-3)-armed, T-shaped or Y-shaped trichomes, trichome stalk usually shorter than arms, arms infrequently minute (or broken) and entire trichome falsely resembling stipitate glands. Leaves relatively long-petiolate; blade 1.5-3 × 1-2.5 cm, ovate to suborbicular, subcarnose, lateral veins 1-2 per side, base broadly obtuse to subtruncate, apex broadly obtuse to rounded, surfaces sparsely pilosulous; petiole 6-15 mm, slender. Capitulescence pyramidal-paniculate, main lateral branches 15-25 cm, bracteate-leafy proximally, 20-30-capitulate, branches and branchlets brown, straight; secondary lateral branchlets 2-4 cm, ultimate groups of 4-8 capitula umbelliform with proximal peduncles noticeably elongate but not overtopping distal peduncles; peduncles 3-9 mm, hirsute-villous, c. 3-bracteolate; distal bracteoles c. 2 mm. Capitula 9-12 mm, typically radiate (infrequently disciform); involucre 2.5-3.5(-4) mm
diam., cylindrical, base sparsely pilosulose; phyllaries usually 8, (6.5-)7.8-5 × 1-1.6(-2.1) mm, lanceolate, glabrous for most of their length, the broader phyllaries with margins subequal in diam. (infrequently much narrower) to colored mid-zone, apex acute to acuminate; receptacle aristate-squamulose, squamellae c. 0.5 mm, bordering alveolae; calycular bracteoles c. 2 mm, linear to linear-lanceolate. Ray florets 5; corolla tube 3.5-4 mm, limb 4-7 mm, often damaged. Marginal pistillate actinomorphic florets (when present) with corolla c. 6.5 mm, lobes c. 1.5 mm. Disk florets 5-8; corolla 7.5-8 mm, tube c. 4 mm, lobes 1-1.5 mm, weakly papillose; style branch papillae 0.1-0.2 mm. Cypselae 1.2-2.5 mm; pappus bristles 5-7.5 mm, terminal cells rounded. Flowering Mar, Jul-Aug, Nov. Forests. P (McPherson 12848, MO). 1100-1400(-2200) m. (Endemic.)

The higher elevational populations are from Cerro Pate Macho, and are typically less pubescent (with the trichome arms often broken) and have disciform capitula often with five phyllaries.


Much like D. angustiradiatus in gestalt, high climbing liana; stems densely griseous-villosulous, fistulose; herbage with short-stalked multiangulate irregularly 4-6-armed trichomes, cap cell sometimes flattened. Leaves moderately petiolate; blade 3.5-9.5 × 1.5-4.5 cm, elliptic-lanceolate to elliptic, chartaceous, lateral veins 5-7 per side, third order veins visible as well, base cuneate to obtuse, apex acute, surfaces hirsute-villosous to sparsely so; petiole 7-12 mm, moderately slender. Capitulescence subcylindrical or narrow-pyramidal, main lateral branches 4-11 cm, leafless, c 20-capitulate, branches and branchlets griseous-villosulous, deflected at nodes; secondary lateral branchlets ≤ 2 cm, columnar in aspect, ultimate groups of capitula irregularly ternate or short-racemose; peduncles 1-3 mm, hirsute-villosus, 1-3-bracteolate; distal bracteoles 2.5-7 mm. Capitula (in early anthesis) 9-12 mm, disciform; involucre 3.5-4 mm diam., cylindrical-turbinate; phyllaries 7-8 × 1.5-1.8 mm, rarely a few connate to near apex, puberulent with both pseudodolabriform and simple trichomes, the broader phyllaries with margins slightly narrower than colored mid-zone; receptacle setulose, setulae 0.1-0.2 mm; calycular bracteoles 2.5-4 mm. Marginal florets 5; corolla 4.5-6.5 mm, actinomorphic, tubular-funnelform, yellow, tube 3-4 mm, lobes 5, c. 1 mm. Disk florets c. 19; corolla 6.5-7.8 mm, tube c. 3.8 mm, lobes 1-1.4 mm, weakly papillose; anther appendage narrowly lanceolate, apex obtuse; style branches 1-1.4
mm, distal papillae c. 0.1 mm, mostly lateral. Cypselae (immature) c. 1 mm; pappus bristles 6-7 mm, terminal cells pointed. Flowering Jan. *Forests*. CR (*Skutch 2502*, NY). 1000 m. (Endemic.)

This species was described in the protologue as discoid. At the time of this writing this species is known only from the type, but I suppose they are other collections languishing in herbaria sub *Pentacalia* indets.


Por J.F. Pruski.

Weak to robust, diffuse, non-succulent annual to short-lived perennial often somewhat subscapose terrestrial herbs < 1 m; stems erect to ascending or infrequently procumbent, simple to few-branched, leaves usually congested proximal-cauline or infrequently only radical, usually remotely leafy past mid-stem, usually striate, arachnoid to pilose proximally where nodes closely spaced (often in ours) to glabrous, pith solid; herbage sometimes glaucous, when pubescent with simple multicellular trichomes. Leaves simple to pinnatifid, alternate, proximal and distal leaves often dimorphic, proximal leaves typically petiolate or tapering to the base, grading to broad-based sessile and often semiamplexicaul distal leaves; blade broad, usually chartaceous, venation pinnate, surfaces often glabrous, mid-stem leaf auricles acute to rounded, margins subentire to dentate or pinnately or lyrate-lobed, terminal lobe often large. Capitulescence mostly terminal, openly cymose or laxly corymbiform, (1-)few-capitulate, held well-above cauline leaves, capitula erect; peduncles short to long, infrequently 1-2-bracteolate. Capitula discoid (ours) or in Africa rarely radiate, ecalyculate, chasmogamous or rarely cleistogamous; involucre somewhat urceolate (typically swollen basally where surrounding the receptacle and constricted above), thence narrow-cylindrical to campanulate, disk corollas included to well-exserted; phyllaries 8-13(-21), sometimes acrescent in fruit, free but often tightly connivent, separating in fruit, green with narrowly scarious margins, not basally articulated, immersed-striatulate, glabrous or villous; receptacle. Ray florets absent or rarely present. Disk florets 10-50(-100+), bisexual or inner sometimes seemingly functionally staminate; corolla tubular-funnelform, orange or red to pink or lavender, sometimes yellow, rarely white, tube moderately slender, base cylindrical to slightly dilated, about as long as to much longer than limb, lobes triangular to more commonly lanceolate, ascending to spreading, often 3-nerved; anther collar narrowly balusterform, theca bases (truncate-)broadly rounded; style very slightly dilated at base that sits above cylindrical nectary,
usually obviously appendiculate to rarely nearly exappendiculate, branches moderately elongate, slightly flattened, stigmatic surface 2-banded, reaching to near apex, fertile portion of branch smooth abaxially, appendage typically caudate and narrower but longer than branch diameter, non-vascularized, composed of fused papillae and differing texturally from cellular structure of fertile proximal portions of style branch. Cypselae cylindrical to sometimes subfusiform, usually reddish-brown, 5-angled and 10-15-costate, commonly papillose-setulose in brownish raised furrows on the angles which are closely bordered by stramineous costae or infrequently glabrous throughout, glabrous faces often 3-costate, inner florets sometimes with sterile ovaries; pappus of white(-purplish) caducous scabridulous bristles only as long as corolla tube to nearly as long as the corolla, pappus rarely absent. x = 5, ?8. Aprox. 100 spp. Mostly native to Africa, now Pantropical, 1 sp. native to the Neotropics, 3 spp. found in warm regions of New World, 2 as common weeds, and 1 escaping from cultivation.

This treatment is based on that of Pruski (2012-CRASS), who treated the genus in Central America.


1. Proximal leaves lyrate-pinnatifid; involucres narrow-cylindrical, corollas included to only slightly exserted; corollas usually pink or lavender, lobes 0.5-0.8 mm; disk floret styles indistinctly appendiculate, appendages to 0.1 mm, no longer than broad, convex.

3. E. sonchifolia

1. Proximal leaves not lyrate-pinnatifid; involucres broad-cylindrical to hemispherical, corollas moderately to well-exserted; corollas usually orange or red to pinkish-red, lobes 1. 1-2.2 mm; disk floret styles obviously appendiculate, appendages 0.2-0.3 mm, caudate.

2. Leaf margins nearly subentire; involucres campanulate, about as long as broad, corollas well-exserted; corollas bright orange to red, lobes 1.6-2.2 mm.

1. E. coccinea

2. Leaf margins usually coarsely dentate; involucres broad-cylindrical, (1-)2× as long as broad, corollas moderately exserted; corollas usually pale red or pinkish-red, lobes 1.1-1.6 mm.

2. E. fosbergii

Cacalia sagittata Willd. 1803 (nob. ex use of "excluso synonymo," i.e. excluding Hieracium javanicum Burm. f. 1768, nevertheless the Willd. name is an illeg. later homonym Cacalia sagittata Vahl 1794), Emilia flammea Cass., Emilia sagittata DC. Emilia sonchifolia var. sagittata C.B. Clarke, 

Annual herbs 0.1-0.6 m; stems sometimes several-branched from near base, leafy in proximal 1/3, rarely glabrous throughout. Leaves not lyrate-pinnatifid, somewhat subsucculent, sometimes purplish abaxially and marginally, at least crisped-pilosulose on midrib abaxially, often glabrate, margins nearly subentire (remotely to shallowly sinuate-dentate); proximal leaves (4-)6-12 × (1-)2-4 cm, often smaller than mid-stem leaves, spatulate to elliptic, winged-petiolar; mid-stem and distal leaves 3-16(-18) × 1-4(-5) cm, lanceolate or ovate to spatulate or oblong, about 3× (Jeffrey 1997) as long as wide, sessile, apex usually obtuse to rounded. Capitulescence usually 2 or 3 per plant, each 2-6-capitulate, main axis 14-30 cm, usually unbranched for most of its length; peduncles 1-3(-10) cm. Capitula 9-15 mm, 50-90-flowered; involucre 5-10 mm diam., campanulate, as long as or slightly longer than broad, corollas well-exserted by 3-5+ mm, spreading; phyllaries (10-)13, (5-)6-10 × 0.8-1.5 mm, glabrous. Disk florets usually 50-90, insect-pollinated; corolla (6-)7.5-9.5 mm, bright orange to red, distally setulose, typically glabrous proximally, tube and limb subequal, throat longer than lobes, lobes 1.6-2.2 mm, long-lanceolate; anthers c. 2.5 mm; pollen yellow; style obviously appendiculate, yellow, branches 1.5-2 mm, appendage 0.2-0.3 mm, caudate, papillae spreading. Cypselae 2-4 mm; pappus bristles 4.5-6 mm, nearly as long as corolla tube and not exserted from involucre. 2n = 10 (diploid). Flowering Jul-Aug. Cafetales, gardens, disturbed areas. G (expected fide Williams, 1976); H (Molina y Molina 26067, MO); ES (Calderon 560, MO); P (expected fide D'Arcy, 1975). 700-1300 m. (Native to Africa; cultivated widely and often escaping in United States, Mexico, Mesoamérica, Colombia, Venezuela, Guyana, Surinam, Brazil, Cuba, Hispaniola, Puerto Rico, Lesser Antilles; Europe, Asia, Australia, New Zealand, Pacific Islands.)


Emilia sonchifolia var. rosea Bello.

Annual herbs 0.15-0.5(-1) m; stems sometimes several-branched from near base, evenly leafy in proximal 1/2 or leaves infrequently mostly basal. Leaves not lyrate-pinnatifid (rarely sublyrate), chartaceous, surfaces glabrous or midrib crisped-pilosulose abaxially, margins usually coarsely dentate; basal leaves petiolate, spatulate; proximal leaves (3-)6-15(-20) × (1-)3-5(-8) cm,
often smaller than to as long as mid-stem leaves, spatulate to oblanceolate to obovate, expanded portion of blade often shorter than base, base narrowed or broadly winged, usually not broadly dilated, apex usually obtuse; mid-stem leaves (3-5)15 × 2-7 cm, about 2× as long as wide, lanceolate or ovate to oblong or obovate, base sessile and auriculate, sometimes dilated, apex usually acute; distal-most leaves often much reduced and bracteate, clasping, subentire or proximally serrate. Capitulescence 1-4(-6) per plant, main axis simple or few-branched proximally, ultimate clusters 2-5-capitulate; peduncles 1-5(-7) cm. Capitula 10-16 mm, (20-)30-60-flowered; involucre 4-8 mm diam., broad-cylindrical, (1-)2× as long as broad, corollas moderately exserted by 2-4 mm; phyllaries 8-13, (8-)10-14 × 0.7-1.4(-2) mm, 3-5-striatulate, glabrous or sometimes lingering pilose. Disk florets usually 40-50, insect-pollinated; corolla 8-11.3 mm, usually pale red or pinkish-red, not orange or yellow or in Hawaii very rarely so, tube usually slightly longer than limb, lobes 1.1-1.6 mm, lanceolate; pollen yellowish; style obviously appendiculate,ellowish, branches 1-1.5 mm, appendage c. 0.2 mm, caudate. Cypselae 3-4 mm; pappus bristles 6-7 mm, nearly as long as corolla tube and not exserted from involucre. 2n = 20 (tetraploid). Flowering year-round. 

Cultivated areas, disturbed areas, dunas costeras, forest edges, pastures, potreros, roadsides, rocky areas, strand vegetation, streamsides, wet areas. T (Ventura A. 21219, MO); Y (Tapia M. 2044, MO); C (Martinez et al. 31793-A, MO); QR (Cabrera y Cabrera 2136, MO); B (Arvigo 1987-19, NY); G (Pruski et al. 4503, MO); H (Molina et al. 31788, MO); ES (Munro et al. 2915, MO); N (Greenman y Greenman 5818, MO); CR (Pruski y Sancho 3802, MO); P (Sytsma 1752, MO). 0-1700 m. (SE Estados Unidos, Mesoamérica, Colombia, Venezuela, Guyanas, Ecuador, Peru, Bolivia, Brazil, Paraguay, Argentina, Cuba, Jamaica, Hispaniola, Puerto Rico, Virgin Islands, Lesser Antilles, Trinidad and Tobago; Taiwan, Pacific Islands.)


(nom. illeg. based on illeg. Cacalia sagittata Vahl), Senecio sonchifolius (L.) Moench., Sonchus javanicus (Burm. f.) Spreng.

Corolla lobes 0.5-1.5 mm. 2n = 10, 20. 2 vars. Native to Asia, now pantropical. Emil sonchifolia var. javanica (Burm. f.) Mattf.] is a robust annual, has involucres 6-8 mm diam, and is 25-35-flowered.


Weak annual herbs 0.1-0.5(-0.6) m; stems sometimes several-branched from near base, leafy in proximal c. 1/2. Leaves chartaceous, surfaces glabrous to thinly puberulent, usually irregularly incised to lobed; proximal leaves several, 4-12 × 1.5-5 cm, lyrate-pinnatifid, usually elliptic-lanceolate to oblanceolate or obovate in outline, tapering into a petiolar base to 4 cm, terminal triangular lobe always the largest, apically broadly acute to obtuse or sometimes rounded; stem leaves sometimes few-lyrate-pinnatifid, often lanceolate and sessile, base auriculate, margins lyrate-lobed to serrate, lateral lobes to c. 2.5 × 1.5 cm, apex narrow-acute to acuminate; distal leaves few, linear-lanceolate. Capitulescence few-branched, each branch usually 3-6-capitulate, lateral branches sometime overtopping main axis; peduncles 1-2(-4) cm. Capitula (7-)9-12 mm, 10-30-flowered, at least sometimes seemingly cleistogamous; involucre 2-4 mm diam., narrow-cylindrical, 3-4× as long as broad, corollas included to only slightly exserted to 1.5 mm; phyllaries 8, (7-)9-12(-13) × 0.5-1.3(-1.8) mm, 3-7-striatulate, sometimes lingering pilose in c. distal 2/3. Disk florets usually 15-30, seemingly often cleistogamous; corolla 7-8.5 mm, usually pink or lavender (rarely nearly white in west central Africa), not orange or yellow, tube 2-3× as long as limb, lobes 0.5-0.8 mm, triangular; pollen white; style indistinctly appendiculate, pink-lavender, branches c. 0.5 mm, appendages to 0.1 mm, no longer than broad, convex, subequal apical and lateral subapical papillae 0.05-0.1 mm. Cypselae 2.5-4 mm; pappus bristles 5.5-7 mm, nearly reaching the base of corolla lobes. 2n = 10 (diploid). Flowering year-round. Clearings, cultivated areas, disturbed areas, lawns, moist hillsides, open areas, pastures, potreros, roadsides, rocky riverbeds, strand vegetation, streamsides, wet areas. T (Hanan Alipi et al. 1191, MO); Ch (Lavin et al. 5309, data from TEX web site); B (Gentle 1455, MO); G (Greenman y Greenman 5981, MO); H (Croat y Hannon 64552, MO); ES (Rosales 2676, MO); N (Seymour y Atwood 3162, MO); CR (Folsom 8840, MO); P (Burch et al. 1409, NY). 0-1200(-1800) m. (E. Estados Unidos, Mexico, Mesoamérica, Colombia, Venezuela, Guyanas, Ecuador, Peru, ?Bolivia,
Brazil, Cuba, Jamaica, Hispaniola, Puerto Rico, Virgin Islands, Lesser Antilles, Trinidad and Tobago; África, Asia, Australia, Islas del Pacífico.)


Por J.F. Pruski.

Annual or short-lived perennial robust caulescent terrestrial herbs or subshrubs, typically with fibrous roots; stems usually 1 from base, erect, simple to few-branched, uniformly leafy but without basal leaves at anthesis (ours) or less commonly leaves crowded towards base, glabrous to pubescent, fistulose or pith sometimes chambered; herbage (when pubescent) with simple usually multicellular trichomes, less commonly merely ciliate. Leaves simple to pinnatifid, alternate, sessile to petiolate; blade chartaceous, venation pinnate, adaxial surface glabrous, abaxial surface glabrous to pilose, base decurrent or amplexicaul, margins usually irregularly dentate to variously pinnately lobed or incised. Capitulescence mostly terminal or also axillary, usually densely cymose to corymbiform-paniculate or rarely solitary, leafy, held near subtending leaves, capitula erect; peduncles about 1/2 as long as capitula to much longer than capitula, broadened apically. Capitula disciform, 20-130(-155+)-flowered, calyculate; involucre cylindrical or urceolate (typically swollen basally at receptacle and constricted above), disk corollas included to slightly exserted; phyllaries usually 13-21, linear-lanceolate, free, equally thin throughout, raised-pluricostate, not gibbous basally, green with tan scarious margins, apex sometimes reddish; calycular bracteoles unequal. Marginal florets 10-105+, 1-3-seriate, pistillate; corolla filiform-tubular, 4-5-lobed, yellow-ochroleucous sometimes greenish apically; style very indistinctly appendiculate (sect. *Goyazenses*) or ours merely indistinctly appendiculate (sect. *Erechtites*). Disk florets (3-)10-25(-50+), bisexual; corolla tubular-funnelform, usually ochroleucous at least proximally, tube much longer than short broadly funnelform limb, lobes triangular-lanceolate, erect to ascending, sometimes faintly violet, often papillose; anthers stramineous or pale brownish, collar narrowly balusterform, theca base obtuse, apical appendage ovate; style indistinctly appendiculate, base not obviously dilated, branches moderately short, flattened, spreading to recurved, short-exserted, with a 2-banded stigmatic surface reaching to near apex, branch smooth abaxially, appendage convex to low-conic, composed of connivent apical papillae usually longer than lateral papillae, appendage non-vascularized, differing texturally from cellular structure of proximal portions of style branch, without a caudate fused-papillae appendage that is longer than branch diam. Cypselae subcylindrical to subfusiform, somewhat plump, slightly tapered at both ends, 8-12(-20)-costate, ribs
and sulci usually discolored at maturity with ribs stramineous, sulci brown, often puberulent, annulus tan; pappus of white to sometimes pink-tipped caducous scabridulous bristles. $x = 20.5$ spp. Native to the New World, 2 spp. occasional in Asia and surrounding areas.

This treatment is based on that of Pruski (2012-CRASS), who treated the genus in Central America.


1. Mid-stem leaves sessile; leaf blades usually dentate to incised; calycular bracteoles ciliate to pilose; pappus bristles white; disk floret style branch appendages 0.02-0.05 mm.

   **1. E. hieraciifolius**

1. Mid-stem leaves long-petiolate; leaf blades commonly runcinate or deeply pinnatifid; calycular bracteoles usually glabrous or nearly so; pappus bristles usually pinkish distally; disk floret style branch appendages 0.05-0.1 mm. **2. E. valerianifolius**


    Erect annual herbs to 1.5(-3) m; stems striate, glabrous to pilose especially in leaf axils, mostly cauline-leaved. Leaves: basal leaves typically absent at flowering, mid-stem and distal leaves always sessile, proximal leaves sometimes with partly winged petiole; blade 3-15(-30) × (0.4-)2-4(-9) cm, lanceolate or oblanceolate to elliptic-ovate, very rarely linear-lanceolate, secondary veins often well-splayed, straight, branching from midrib at c. 45°, abaxial surface
glabrous to less commonly sparsely pilose, mid-stem and distal leaf bases usually amplexicaul to
subauriculate, proximal leaves sometimes cuneate at base, margins usually coarsely and
irregularly dentate to (usually shallowly) incised, infrequently subpinnatifid with triangular lobes
to c. 3(-4) cm, apex acute to short-acuminate; petiole (when present) of proximal leaves 0.5-2 cm,
narrowly winged distally. Capitulescence usually 10-40-capitulate, short-pedunculate or
subsessile and densely clustered, erect or spreading lateral but not obviously nutant; peduncles 5-
35(-50) mm. Capitula 9-16 mm, about 2× as long as wide, 20-85(-125)-flowered; involucre 4-8(-
d12) mm diam., typically urceolate or broad-cylindrical; phyllaries usually c. 21, 9-15(-17) × 0.5-
1.1 mm, 3-7-costate-striate, glabrous or sometimes sparsely pilose, apex sometimes short-
papillose; calycular bracteoles 5-15, 1-7 mm, linear, much shorter than phyllaries to about half as
long as phyllaries, ciliate to pilose; receptacle typically 5-10(-12) mm diam. Marginal florets 12-
60+, 2-3-seriate; corolla 7-10 mm, limb to c. 1 mm. Disk florets 8-25+; corolla 8-12 mm, tube
sometimes dilated at base post-anthesis, limb 0.8-1.5 mm, abruptly broadened, lobes 0.5-0.8 mm;
anthers mostly included, c. 1.1 mm, collar about half or more of theca length; style branches c.
0.6 mm, apical appendage 0.02-0.05 mm. Cypselae 2.3-3(-4) mm; pappus bristles 8-11 mm,
white. 2n = 40. Flowering year-round. Burned areas, clearings, cultivated areas, disturbed areas,
open hillsides, pastures, roadsides, secondary vegetation, strand vegetation, stream-sides, wet
areas. T (cited by Villaseñor, 1989); Ch (Martínez S. 8880, MO); Y (Gaumer 2394, F); C
(Matuda 3858, MO); QR (cited by Villaseñor, 1989); B (Gentle 918, MO); G (Pruski et al. 4504,
MO); H (Williams y Molina 12053, F); ES (Montalvo 3014, MO); N (Pipoly 3953, MO); CR
(Folsom 10143B, MO); P (Kuntze 1904, NY). 0-1200(-2400) m. (Canadá, Estados Unidos,
Mexico, Mesoamerica, Colombia, Venezuela, Guyanas, Ecuador, Peru, Bolivia, Brazil, Uruguay,
Paraguay, Argentina, Cuba, Jamaica, Hispaniola, Puerto Rico, Virgin Islands, Lesser Antilles,
Trinidad and Tobago; Europe, Asia, Pacific Islands.)

"*valerianaefolia.*" *Senecio valerianifolius* Link ex Spreng., *Syst. Veg.* 3: 565 (1826). Type: Not
Pruski, *Phytoneuron* 2012-Crass: t. 22B (2012-Crass). N.v.: Tzajal chi'ub, Ch; falso epasote de
altura, ES.

*Cacalia prenanthoides* Kunth, *Crassocephalum valerianifolium* (Link ex Spreng.) Less., *Erechtites
(Kunth) Greenm. et Hieron. (non DC.), *Erechtites valerianifolius* fo. *organensis* (Gardner) Belcher,

Erect annual herbs 0.3-1(-2) m; stems striate, glabrous or distally pilose-hirsute to sometimes lightly arachnoid apically, sometimes fistulose. Leaves subsessile (distal leaves) to proximal and mid-stem leaves long-petiolate; blade 5-17(-30) × 2-10(-15) cm, deeply and irregularly incised to more commonly runcinate or deeply pinnatifid to a narrowly winged rachis usually 2-5 mm diam., lanceolate to ovate-lanceolate in outline, abaxial surface glabrous or sparsely villous, base not auriculate-clasping, usually decurrent, margins (when leaves subsimple) with incisions 2+ mm (and then secondary veins closely spaced) to more commonly deeply lobed, lobes usually 2-5 × 0.5-2 cm, lanceolate to narrowly so, usually in 4-8 usually subopposite laterally directed pairs, unequal, the terminal lobe usually the longest or broadest, proximal bases of lobes decurrent onto the rachis, lobe margins subentire to serrate or rarely secondarily lobed, sinuses subequal to lobes to often broader than lobes, apex acuminate; petiole 0.5-5 cm, usually narrowly winged distally. Capitulescence usually of several somewhat dense rounded clusters of several to many capitula, slightly held above subtending leaves but somewhat leafy, the distal several stem nodes typically each with a cluster terminating a spreading lateral branch to 10 cm, lateral branches about as long as subtending stem leaf; peduncles 5-15(-25) mm. Capitula 9-14 mm, about 3× long as wide, 20-50-flowered; involucre 2-5 mm diam., cylindrical to narrow-cylindrical, subtruncate basally at the puberulent c. 2 mm diam. disk; phyllaries c. 13, 8-11 × 0.5-0.9 mm, finely 5-7+-striate, glabrous or nearly so; calycular bracteoles 5-8, 2-4 mm, subulate, loosely ascending, usually glabrous or nearly so, infrequently lingering arachnoid-crisped-puberulent, marginally subentire. Marginal florets 1(-2)-seriate; corolla c. 7 mm. Disk florets usually more numerous than marginal florets, often indistinctly bisexual with anthers included; corolla 8-9 mm, lobes sometimes tinged pink or violet; style sometimes exserted with branch bifurcation visible, branches 0.6-0.8 mm, apical appendage 0.05-0.1 mm. Cypselae 2.5-3.6 mm; pappus bristles 8-10 mm, usually pinkish distally, infrequently white throughout. 2n = 40.


Por J.F. Pruski.

Perennial caulescent leafy-stemmed herbs to shrubs, rarely annual herbs; herbage when pubescent with simple trichomes. Leaves alternate, simple to variously lobed or pinnatisect, sessile. Capitulescence terminal or axillary, usually monocephalous to openly subcymose. Capitula radiate or rarely discoid; involucre ecalyculate; phyllaries connate proximally, not basally
articulated. Ray florets pistillate; corolla yellow. Disk florets bisexual or rarely functionally staminate; corolla funnelform, shortly 5-lobed, yellow; anther collar balusterform, thecae bases ecaudate; style branch apex truncate to obtuse, papilllose, stigmatic surfaces 2-banded. Cypselae ellipsoidal, striate or smooth, glabrous or pubescent; pappus bristles caducous or sometimes absent. $x = 10$. Aprox. 100 spp. Native to Africa, a few species are in cultivation, persisting or sometimes escaping.

This treatment is based on that by Pruski (2012-Escape in press).


Shrubs 0.5-2 m, subglabrous with non-glandular trichomes in leaf axils. Leaves 3-9 × 1-2.5 cm, pinnatifid, oblanceolate to oblong, lobes usually 7-10 per side, usually 1-1.5 cm, lanceolate, the distal ones directed forward, sinuses wider than lobes, apex mucronulate. Capitulescence monocephalous; peduncles 5-15 cm, ebracteate. Capitula e. 10 mm; involucre campanulate; phyllaries 5-8 × 2-3 mm, triangular-lanceolate, connate to mid-phyllary. Ray florets c. 13; corolla limb 15-25 mm. Cypselae epappose. Flowering Feb. *Cultivated, persisting or sometimes escaping*. G (Pruski y Ortiz 4269, MO). 1500-2500 m. (Native to South African; widely cultivated in warm regions of the world.)

It is possibly that our plants are of hybrid origin.


*Seneçio* sect. *Gynura* (Cass.) Baill.

Por J.F. Pruski.

Perennial typically caulescent (infrequently rosulate) terrestrial herbs, infrequently vining or rarely subshrubs, roots sometimes tuberous; stems erect to les commonly climbing or procumbent, strict or few-branched, typically uniformly leafy in proximal half or sometimes leaves in basal rosette, sometimes subsucculent distally, glabrous or more commonly pubescent; herbage (when pubescent) with simple patent trichomes. Leaves simple to pinnatifid, alternate, sessile or petiolate; blade chartaceous to sometimes subsucculent, venation pinnate, margins usually serrate. Capitulescence typically terminal, commonly openly corymbiform and few-several-capitulate to infrequently monoecephalous, usually held (ours) erect well above leaves. Capitula discoid, calyculate, many-numerous-flowered; involucre cylindrical to campanulate,
base not swollen, disk corollas usually well-exserted; phyllaries 8-13, elliptic-lanceolate, free, often strongly raised 3-costate basally, margin scarious to broadly so; calycular bracteoles unequal, linear. Ray florets absent. Disk florets bisexual; corolla tubular-funnelform, yellow or orange to less commonly reddish to purplish especially post-anthesis, tube elongate, abruptly and conspicuously dilated at thickened base (Backer 1939: 450), limb narrowly but obviously and abruptly ampliate, lobes triangular to lanceolate, sometimes papilloso apically; anther collars balusterform to less commonly only narrowly so (Davies 1981), theca base obtuse to rounded or slightly auriculate, apical appendage ovate to lanceolate; pollen senecioioid without internal foramina (Davies 1981); style gradually but obviously appendiculate, base abruptly and conspicuously bulbous, branches elongate, symmetrically subulate, ascending at anthesis (later spreading), well-exserted, stigmatic surface proximal, 2-banded (Belcher 1955: 457), continuing to base of sterile appendage, fertile portion of branch smooth abaxially, appendage subulate, about as long as or longer than fertile portion of branch, very gradually narrowed distally, continuous texturally with fertile portions of branch, appendage cellular and vascularized (Belcher 1955, 1956, 1988), externally papilloso (vernonioid fide Cassini 1825: 392) throughout. Cypselae prismatic-cylindrical, brown, 8-10-costate, glabrous or furrows puberulent, truncate apically, annulus and carpodium tan, ovary or ovule epidermal cells with drusiform crystals; pappus of white (ours) to yellowish scabridulous often persistent bristles. \( x = 10.44-45 \) spp. Paleotropical, 2 spp. in the Americas.

This treatment is based on that of Pruski (2012-CRASS), who treated the genus in Central America.


N.v.: hoja tornasol, G; ala de ángel, H; tornasol, túnica de nazareno, CR.


Coarse robust subsucculent herbs 0.4-1(-2+) m, without tubers and instead becoming hard at the base; stems few-several-branched, striate, densely villous-hirsute, trichomes to 1 mm; herbage with multicellular articulated purplish trichomes. Leaves petiolate or distal leaves sessile, usually auriculate but auricles readily caducous; blade 5-10(-15) × 2.5-6.5(-9) cm, usually ovate or sometimes obovate to slightly lyrate, surfaces scabrous to densely crisped-pubescent, trichomes
0.5-0.7 mm, base cuneate to obtuse or sometimes decurrent onto petiole, much less commonly proximal-most cordate, proximal lobes (when present) 1(-2) per margin, 0.5-1(-4) mm, directed laterally, lateral veins 7-10 per side, margins moderately irregularly serrate, teeth to c. 3 mm, apex acute to acuminate; petiole 1-4(-8) cm, usually auriculate at least when young.

Capitulescence terminal, open-corymbiform, 2-10-capitulate, branches often 10-20 cm and broadly spreading; peduncles 2-10 cm, sometimes flexuous, sometimes minutely few-bracteolate, purplish crisped-hirsute. Capitula 12-18 mm, discoid, malodorous; involucre 6-10 mm diam., campanulate; phyllaries (10-)12-13, 6-11 × 1.5-2.5 mm, prominently 3-costate proximally, crisped-hirsute in central zone; calycular bracteoles 6-12, 3-5(-6) mm, loosely arranged. Disk florets 30-45+, often spreading laterally 3-6 mm from involucre; corolla 9-14(-16) mm, orange-yellow, glabrous, tube longer than limb, dilated and sometimes indurate in basal 1-1.5 mm, limb 3-4 mm, lobes 1-1.5 mm, triangular-lanceolate, lacking central resin duct; anthers 2-2.5 mm, yellow, collar (short-)elongate, subcylindrical (narrowly balusterform) to distinctly balusterform, apical appendage 0.5-0.7 mm, lanceolate; style base abruptly globose in basal c. 0.3 mm, branches 3-4 mm, orange-yellow, appendage c. 2 mm. Cypselae 2-4 mm, glabrous, cells of immature cypselae sometimes bulbous-papillose; pappus bristles 10-12 mm, about as long as corolla, dirty white, c. 3-5 cells wide, somewhat fragile. 2n = 20. Flowering Dec-Jan, Apr. G (Williams, 1976: 397); H (Molina, 1975: 114; Nelson Sutherland, 2008: 175); ES (Rodriguez 176, MO); CR (Tonduz 18054, MO). 600-1100 m. (Native to Java and Sumatra; cultivated and occasionally escaping pantropically; United States [Florida], Mexico, Mesoamerica, Colombia, Brazil.)

Pruski (2012-Crass) excluded from the species much material formerly referred to it in both horticulture and in the neotropical literature. For example, cultivated Rueda et al. 18346 (MO) from Nicaragua was referred by Pruski (2012-Crass) to the cultivar Gymnura 'purple passion,' Although Gymnura 'purple passion' is reported as naturalized in the Americas only in Florida (Pruski, 2012-Crass), it should nevertheless be looked for as an escape in Mesoamerica.


Senecio sect. Multinervii Greenm.

Por J.F. Pruski y B. Nordenstam.

Shrubby perennial terrestrial herbs to small trees, often simple-stemmed or at least sparingly branched, leaves mostly in aerial rosettes; stems erect, broad, leaves often clustered distally with leaves often much longer than distal internodes, often sulcate-striate, sometimes leaves somewhat
remote and distal nodes deflected, pith large and solid or sometimes fistulose; herbage bearing simple trichomes. Leaves simple or pinnately incised-lobed near base, alternate, subsessile to petiolate, usually semi-clasping the stem; blade chartaceous, venation closely pinnate, veins usually 70-85°, margins usually serrate at least distally, teeth blunt-callose tipped, apex obtuse to often narrow. Capitulescence terminal, erect to ascending, corymbose-paniculate, pluricapitulate, broadly rounded to nearly flat-topped, ultimate clusters usually densely hemispherical-rounded; peduncles usually puberulent. Capitula radiate, irregularly and loosely calyculate in 1-2 series; involucre cylindrical to campanulate; phyllaries usually 8, much shorter than disk florets, free, often striatulate to striate, margins thinly scarious; receptacle solid, denticulate or squamulose; calycular bracteoles linear or narrowly linear-lanceolate. Ray florets 3-8, pistillate; corolla yellow or orangish, glabrous, limb exserted, usually 4-7-nerved, apex 3-denticulate. Disk florets 5-18, bisexual, greatly exserted at anthesis; corolla narrowly funnelform, yellow to golden-yellow or sometimes orangish, glabrous, tube elongate, longer than limb, limb distinct but narrowly ampliate, lobes triangular-lanceolate (in one species) to more commonly lanceolate, shorter than to much longer than throat, each usually with laterals and a medial resinous nerve, without a caudate fused-papillae appendage that is longer than branch diam.; anthers often merely slightly exserted when corolla lobes elongate, collar balusterform, thecae ecaudate, bases rounded, endothecial tissue radial or transitional, apical appendage oblong, often with resinous midrib; style with dilated basal node, branches rounded apically, with subapical lateral papillae and an isolated apical tuft of papillae, papillae often longer than branch diam., stigmatic surface 2-banded. Cypsela cylindrical, 8-costate, glabrous or occasionally setulose, carpochondium indistinct; pappus bristles of rays and disks similar, 3-4-seriate, white, barbellate, about as long as disk corolla tube and phyllaries. \( x = 50 \). 4 spp. Costa Rica and Panama.

**Jessea** contains four species, all known at least in part from Costa Rica. *Jessea gunillae* is known only from the type, whereas *J. cooperi* and *J. megaphylla* are widespread occurring from near Monteverde into northern Panama. Although Jeffrey (1992) placed three species of the then undescribed *Jessea* into West Indian *Jacmaia* B. Nord., Robinson y Cuatrecasas (1994) noted that *Jacmaia* differs by caudate (vs. ecaudate) anthers. Nordenstam noted that hybridization occurs in *Jessea* and indeed specimens are often intermediate between the three core species. Consequently, many determinations and elevational records in Tropicos are erroneous.

1. Capitulescence branches scabrid to hirtellous; cypselae glabrous or setulose.
   2. Cypselae setulose; ray florets 5-8, corolla limbs 9-13 mm; phyllaries 8; leaf blades often lobed proximally.  
      1. J. cooperi
   2. Cypselae glabrous; ray florets 2-3, corolla limbs 6-7 mm; phyllaries 5-7; leaf blades not lobed.
      2. J. gunillae

1. Capitulescence branches arachnoid-tomentose to glabrate; cypselae glabrous.
   3. Leaves usually subsessile, blades usually not lobed, petiolar bases 0.4-1+ cm diam, typically broad, usually winged to base; disk corolla lobes subequal to throat.
      3. J. megaphylla
   3. Leaves petiolate, blades often lobed basally, petioles 0.1-0.2 cm diam., thin, exalate; disk corolla lobes usually shorter than throat.
      4. J. multivenia


Jacmaia cooperi (Greenm.) C. Jeffrey.

Shrubby perennial herb to shrubs 1-4 m, often simple-stemmed; stems scabrous to hirtellous distally, becoming glabrate proximally. Leaves usually subsessile with an elongate typically winged petiolar base; blade 10-42 × (5-)10-27 cm, lanceolate to obovate or subpandurate, often few-lyrate lobed proximally, surfaces puberulent or villosulous especially on veins abaxially to more commonly glabrate, base attenuate to nearly truncate, decurrent, basal lobes 1-10 cm, triangular to lanceolate, margins irregularly serrate or dentate, teeth usually 1-3+ mm, apex usually acute; petiolar base 5-15 cm, amplexicaul, typically winged. Capitulescence to 30 × 25 cm, bracteate, branches scabrous to hirtellous, bracteate leaves 7-20 cm, lanceolate to elliptic-lanceolate, subsessile; peduncles mostly 3-9 mm, hirtellous, often bracteolate. Capitula 12-18 mm; involucre 4-6 mm diam., broadly cylindrical; phyllaries 8, 8-11 mm, lanceolate, glabrous, apex fimbriolate or penicillate-tipped; calycular bracteoles few, 1-3 mm. Ray florets 5-8; corolla tube 6-8 mm, limb 9-13 × 1-2 mm, lanceolate. Disk florets 10-18; corolla 11-15 mm, deeply 5-lobed, tube longer than limb, lobes 2.5-4 mm, longer to much longer than throat, lanceolate; anthers c. 3 mm. Cypselae 1.5-2.5 mm, setulose or much less commonly so merely thinly setulose post dehiscence; pappus bristles 6-8 mm. Flowering Year-Round. Cloud forests, disturbed areas, forest edges, mixed forests, montane forests, páramos, riversides, roadsides, secondary thickets,
steep slopes, volcano slopes. CR (Skutch 3700, NY); P (Maurice 864, MO). (600-)1000-3000. (Endemic.)


Erect shrubs c. 3 m; stems scabrid to hirtellous distally, becoming glabrate proximally. Leaves subsessile to short-petiolate; blade 15-22 × 4-6 cm, lanceolate, not lobed, surfaces puberulent to more commonly glabrate, base cuneate to attenuate, somewhat decurrent, margins closely denticulate to dentate, teeth usually 0.3-1.2 mm, apex acuminate; petiolar base 2-4 cm, semiamplexicaule, narrowly winged. Capitulescence to 25 × 20 cm, bracteate, branches scabrid to hirtellous, bracts 1-4 cm, lanceolate, sub sessile; peduncles mostly 2-5 mm, often bracteolate. Capitula c. 10 mm; involucre c. 5 mm diam., broadly cylindrical-campanulate; phyllaries 5-7, 7-9 mm, lanceolate, glabrous; calycular bracteoles 2-5 mm. Ray florets 2-3; corolla tube c. 5 mm, limb 6-7 × c. 1.5 mm. Disk florets 5-8; corolla 8-10 mm, deeply 5-lobed, tube usually longer than limb, lobes 2-2.5 mm, subequal to or longer than throat, lanceolate; anthers c. 2.5 mm; style branches to 2.5 mm. Cypselae 1.5-2 mm, glabrous; pappus bristles 5-7 mm. Flowering Mar. *Cloud forest.* CR (*Nordenstam 9154*, US). 2000-2100 m (Endemic.)


*Jacmaia megaphylla* (Greenm.) C. Jeffrey.

Shrubby perennial herb to shrubs 1-5 m; stems straight or infrequently deflected at distal nodes, arachnoid-tomentose especially in leaf axils to glabrate. Leaves sub sessile; blade usually 10-50 × 2-20 cm, oblanceolate to elliptic, usually not lobed, surfaces arachnoid-tomentose to soon glabrate except often not so on midrib, base cuneate to attenuate, typically decurrent onto petiolar base, margins regularly to more commonly irregularly serrate to dentate, teeth usually 0.5-4 mm, apex acute or acuminate; petiolar base about 1/4-1/3 of leaf length, 0.4-1+ cm diam, typically broad, usually winged to base. Capitulescence usually to 20 × 25 cm, branches arachnoid-tomentose to glabrate, leafy bracteate at nodes, bracts usually 3-5 cm, lanceolate, palmately veined; peduncles mostly 2-10 mm, often bracteolate. Capitula 9-13 mm; involucre 3.5-4.5 mm diam., cylindrical-campanulate; phyllaries 8, usually 6-7 mm, lanceolate to elliptic ovate, glabrous with fimbriate apex; calycular bracteoles mostly 3-4 mm. Ray florets usually 5; corolla tube 4-6 mm, limb 5-9 × 1-1.8 mm, lanceolate to elliptic-lanceolate. Disk florets 9-16;

*Jacmaia multivenia* (Benth.) C. Jeffrey.

Erect shrubs or small trees 1-5 m; stems arachnoid-tomentose to glabrate. Leaves petiolate; blade usually 10-30 × 4-13 cm, lanceolate to ovate, often lobed basally, margins regularly to more commonly irregularly sharp-serrate to sometimes proximally pinnately incised 1/4-1/2 distance to midrib or few-lyrate lobed, teeth usually 1-4 mm, surfaces glabrous or subglabrous, base attenuate to obtuse, apex acute to attenuate; petiole 1-10 × 0.1-0.2 cm, thin, exalate, sometimes abruptly dilated and auriculate at base. Capitulescence to 25 × 28 cm, branches arachnoid-tomentose to glabrate, leafy bracteate at nodes, bracts 1-6 × 0.7-3 cm, ovate, palmately veined; peduncles mostly 2-7 mm, often bracteolate. Capitula 10-13 mm; involucre 4-5 mm diam., campanulate; phyllaries 5-8, 5-8(-9) mm, lanceolate to elliptic ovate, glabrous; calycular bracteoles mostly 2-5(-6) mm. Ray florets usually 5; corolla tube 4.5-5 mm, limb 6-7(-8) × 1.3-2 mm, lanceolate to elliptic-lanceolate. Disk florets 9-16; corolla usually 10.5-14.5 mm, shallowly 5-lobed, tube usually longer than limb or pre-anthesis subequal to limb, lobes 1-1.5 mm, usually shorter than throat, triangular-lanceolate; anthers 2-2.4 mm, more or less included. Cypselae 1-1.5 mm, glabrous; pappus bristles 5-8 mm. Flowering (Oct-)Nov-Jun(-Aug). *Cloud forests, forest edges, mixed forests, montane forests, páramos, riversides, roadsides*. CR (*Davidse y Pohl 1577*, MO). 900-3500 m. (Endemic.)

12. **Kleinia** Mill.


Por J.F. Pruski.
Succulent perennial terrestrial herbs to shrubs; herbage when pubescent with simple trichomes. Leaves usually developed, alternate, simple. Capitulescence terminal, usually paucicapitulate. Capitula discoid; involucre calyculate or (ours) sometimes ecalyculate; phyllaries free, not basally articulated. Ray florets absent. Disk florets bisexual; corolla funnelform, 5-lobed, yellow to purple or red, sometimes white; anther collar long-balusterform, thecae bases ecaudate; style branch apex triangular (ours) to long-acuminate, and partly vascularized, cellular but apex also moderately papillose, stigmatic surfaces 2-banded. Cypselae oblong, striate, glabrous (ours) or sometimes pubescent, ovary or ovule epidermal cells with drusiform crystals; pappus of many subequal white barbellate bristles, about as long as involucre. Aprox. 40 spp. Native to Africa, 20+ spp. in cultivation.

This treatment is based on that by Pruski (2012-Escape).


1. **Kleinia sp. 1.** Illustr.: none. N.v.: none.

Herbs to c 0.5 m, subglabrous. Leaves 1-5-5 × 0.8-3 cm, oblong to obovate. Capitulescence c. 4-capitulate, held well above leaves; peduncles 2-7 cm, few-bracteolate. Capitula c. 25 mm, ecalyculate; involucre c. 10 mm diam., cylindrical-campanulate, ecalyculate; phyllaries c. 8, 15-17 mm. Disk florets 20-30; corolla 20-25 mm, orange. Cypselae c. 5 mm, glabrous; pappus bristles 15-20 mm. Flowering Feb. *Cultivated, perhaps escaping*. ES (Montalvo 6228, MO). 800-900 m. (Native to Africa; cultivated elsewhere.)

Our plants have triangular (vs. long-acuminate) style branch appendages, but otherwise are similar to *Kleinia abyssinica* (A. Rich.) A. Berger. Our plants were labeled as though naturalized, which is possible as the genus reproduces easily from cuttings.

13. **Monticalia** C. Jeffrey


Erect to sometimes prostrate terrestrial ericoid subshrubs to trees; stems branched with leaves typically closely inserted, often ribbed-angled; herbage (when pubescent) usually with simple trichomes, trichomes rarely complanate-squammose. Leaves simple, alternate or much less commonly opposite; blade chartaceous to subcoriaceous, venation typically pinnate, generally eglandular, margins usually entire or when serrate the serrations regular. Capitulescence terminal, generally corymbiform to corymbiform-paniculate, generally flat-topped to rounded. Capitula
radiate or discoid, calyculate; involucre 1(-2)-seriate; phyllaries free, at least some with margins usually scarious; receptacle flat. Ray florets (when present), pistillate, uniseriate; corolla usually yellow, tube commonly shorter than limb. Disk florets bisexual; corolla shortly 5-lobed, usually yellow, tube usually dilated basally; anthers short-caudate, filament collar balusterform; style basically exappendiculate, branch apices truncate to rounded, apex weakly papillose, stigmatic surfaces 2-banded. Cypsela 5-angled; carpopodium distinct; pappus of many elongate white scabridulous fragile bristles (or infrequently fluked and somewhat persistent) bristles usually about as long as disk corollas. $x = 10, 20, 40$. Aprox. 70 spp. Southern Central America and (mostly Andean) South America.

_Monticalia_, diagnosed by its woody habit, is a segregate of _Pentacalia_, itself a segregate of _Senecio_ (Pruski 2012-Mont). This treatment is based on that for Central American species by Pruski (2012-Mont), who reports _Monticalia_ only in the Talamanca mountains. Neither species treated here was reported in Panama by Barkley (1975). Nordenstam (2007) keyed _Monticalia_ only as having radiate capitula, but our two species are discoid.


1. Leaf blades concolorous, surfaces glabrous; pappus bristles 3-4 mm, fluked.

2. _M. firmipes_

1. Leaf blades discolorous, tomentose abaxially; pappus bristles scabridulous

2. Capitula discoid; phyllaries 8-10, usually ovate.

1. _M. andicola_

2. Capitula radiate; phyllaries 12-14, lanceolate.

3. _M. sp. 1_


_Pentacalia andicola_ (Turcz.) Cuatrec.

Shrubs 1.5-3 m; stems moderately alternate-branched, leafy usually in distal 10-30 cm, glabrous to lingering tomentose distally. Leaves 2–6 × 0.8–2 cm, short-petiolate; blade elliptic-lanceolate to elliptic, midrib sometimes slightly impressed, secondary veins slightly visible, 4-8 per side, surfaces discolorous, adaxial surface glabrous or glabrate, abaxial surface white-gray tomentose, midrib sometimes glabrate or tomentulose, bases rounded to subcordate, margins
entire, revolute, apex obtuse, mucronate. Capitulescence to 15 × 14 cm, not exserted from subtending leaves, usually 7-25-capitulate; peduncles usually 5-15 mm, usually arachnoid-tomentose, bracteolate, bracteoles few, usually 4-6 mm, lanceolate to oblanceolate. Capitula 5-8 mm, discoid; involucre usually 5-7 mm diam., campanulate; phyllaries 8-10, 4.5-6.5 mm, 1(-2)-seriate, glabrous or loosely arachnoid-tomentose, outer ones narrowly ovate with acute apex, inner ones ovate or obovate with acute to obtuse apex; calycular bracteoles usually 3-5 mm. Ray florets absent. Disk florets 25-50, weakly exserted; corolla 4-6 mm, yellow to sometimes ochroleucous, lobes 0.7-1.2 mm, triangular-lanceolate. Cypselae 1-1.5 mm; pappus bristles 4-5.5 mm, scabridulous. 2n = 40. Flowering Aug-Sep, Jan-Mar. Elfin forests, páramos, wet meadows. CR (Pruski et al. 3886, MO); P (Davidse et al. 25302, MO). (2500-)3000-3600 m. (Mesoamerica, Colombia, Venezuela, Ecuador, Peru.)


Pentacalia firmipes (Greenm.) Cuatrec.

Rounded shrubs 1-3 m; stems much branched, usually 5-10 clustered-fasciculate branchlets at ends of branches, leafy usually in distal 5-25 cm, petiole bases usually persistent, glabrous or nearly so. Leaves 1-3.5 × 0.3-0.8 cm wide, subsessile or short-petiolate; blade lanceolate or oblanceolate to infrequently elliptic, midrib usually slightly impressed, secondary veins usually indistinct, surfaces concolorous, glabrous, base cuneate to obtuse, margins entire, often finely ciliolate, apex apiculate. Capitulescence usually 2-5 cm diam., not exserted from subtending leaves, usually 15-30+-capitulate; peduncles 1-3 mm, often loosely arachnoid, bracteolate, bracteoles few, 1-2 mm, lanceolate. Capitula 4-6 mm, discoid; involucre usually 3-4 mm diam., campanulate; phyllaries usually 8, 3-4 mm, ovate, 1-seriate, glabrous, apex obtuse; calycular bracteoles usually 2-3 mm. Ray florets absent. Disk florets 12-20, well exserted; corolla 3.5-4.5 mm, light yellow to ochroleucous, lobes to c. 0.5 mm, triangular. Cypselae c. 1 mm; pappus bristles 3-4 mm, fluked. Flowering Nov-Apr(-Jul), Sep. Bogs, elfin forests, moist cloud forest, páramos, scrub-forests, wet meadows. CR (Pruski et al. 3876, MO); P (Weston 10188, MO). 2600-3700 m. (Endemic.)

Monticalia firmipes is diagnosed by its fluked pappus bristles, but otherwise is very similar to the generitype (M. pulchella (Kunth) C. Jeffrey) and to M. trichopus (Benth.) C. Jeffrey, the later differing from most Monticalias by stems with complanate squamose trichomes.

Robust shrubs to small trees 1-3(-5) m; stems ascending to erect, branches few, elongate, ribbed-striate, densely white-arachnoid-tomentose, evenly leafy distally and but never with leaves clustered distally in aerial rosettes, leaf base persistent. Leaves simple, alternate, petiolate or distal-most leaves sometimes subsessile; blade 6-19 × 1-6 cm, usually lanceolate or elliptic-lanceolate, rarely linear-lanceolate, stiffly chartaceous, venation pinnate with 5-10 main secondaries per side, tertiary reticulum occasionally prominent, surfaces discolorous, adaxial surface green, smooth to often rugulose, midrib appressed tomentulose, surface otherwise sparsely arachnoid to more commonly glabrous, abaxial surface densely white-floccose-tomentose, base cuneate to obtuse, margins subentire to denticulate, often slightly revolute, apex narrowly acute to acuminate; petiole (0-)1-2.5 cm. Capitulescence 5-20 cm diam., densely corymbiform-paniculate, many-numerous-capitulate, rounded on top with lateral branchlets not overtopping central axis; peduncles 0.3-1.1 cm, loosely lanate, several-bracteolate, bracteoles usually 2-5 mm, abruptly smaller than distal-most stem leaves, linear, loosely lanate to sometimes glabrate. Capitula 7-9 mm, radiate, (?20-)27-33-flowered, very loosely few-calyculate; involucre 3.5-5 mm diam., broadly cylindrical, loosely arachnoid basally; phyllaries 12-14, 5.5-6 × 0.8-1.1 mm, lanceolate, sometimes nerves resinous, apex sometimes subcuculate; calycular bracteoles 2-3 mm, linear-subulate; receptacle alveolate. Ray florets 6-8, short-exserted; corolla pale yellow, glabrous, tube 3.5-4.2 mm, limb (2.5-)3.6-4.2 × 1.2-1.5 mm, oblong, 4-nerved, in early fruiting plants limb often destroyed but tube intact. Disk florets (?13-)21-25; corolla 4.5-6.5 mm, funnelform, yellow, glabrous, tube c. 2.5 mm, dilated basally, limb 10-nerved, lobes c. 0.7 mm, much shorter than throat, triangular, 3-nerved; anthers c. 2 mm, balusterform, filament collar c. 0.5 mm, basal cells slightly enlarged, tails of thecae about 1/3 as long as collar, appendage lanceolate; style base moderately dilated, branches c. 1 mm, abaxially papillose in c. distal 1/3, apex convex; nectary low-cylindrical, c. 0.2 mm. Cypselae 1.2-2 mm, fine-papillose; pappus bristles 4.5-6 mm, scabridulous. Flowering (Oct-)Dec-Jul. Bosque abierto subtropical, brushy rocky slopes, cloud forest, infrequently in disturbed areas, dry open slopes, pine forests, pine-oak forests, secondary vegetation, thickets. CR (Smith 12500, F). 600-2200 m. (Endemic.)

14. Nelsonianthus H. Rob. et Brettell

Por J.F. Pruski.
Epiphytic leafy-stemmed vines; stems few-branched, leaves mostly clustered distally as aerial subrosettes, abruptly contracted immediately below capitulescence, fistulose or with a cambered pith, cortex without resinous ducts; herbage mostly glabrous or glabrate, trichomes (when present) simple. Leaves simple, alternate, long-petiolate; blade thick-chartaceous, venation pinnate, surfaces eglandular. Capitulescence with axis abruptly contracted, terminal leafless convex panicle. Capitula discoid (ours) or radiate, irregularly few-calyculate; phyllaries 8, 1-seriate, free, thin chartaceous with scarious margins, pale green to purplish, thinly 3-nerved; receptacle, +/- solid, arista-squamulose; calycular bracteoles linear-lanceolate, resembling peduncular bracteoles, ascending. Ray florets (when present) 5, pistillate; corolla limb 2-3 x c. 1 mm, elliptic, yellow. Disk florets 9-20, bisexual; corolla narrow-funnelform, moderately 5-lobed, yellow, glabrous, throat shorter than limb; anther thecae pale, sagittate (auricles c. 1/5 as long as collar), anther collar cylindrical, endothecium cell wall thickenings polarized, apical appendage narrowly lanceolate, narrower than thecae; style branches ascending, smooth, stigmatic surfaces continuous or except narrowly-cleft at very base, apex obtuse. Cypselae cylindrical, brown, costate, glabrous, carpododium annular, tan; pappus of many slender sometimes fragile stramineous scabrid capillary bristles, apex slightly tapered. 2 spp. S. Mexico, Mesoamerica.

In their generic description, Robinson y Brettell (1973:53-54) stressed that the stem cortex lacks resinous ducts.


*Senecio armentalis* L.O. Williams.

Subsucculent epiphytes; stems 0.5-1.5 m, spreading, leafy distally or sometimes leafless at anthesis. Leaves: petiole 1.5-2.5(-3.5) cm; blade 4-10(-11.5) x 2-6(-7) cm, elliptic-lanceolate to ovate, lateral veins in proximal half of blade, 2-3 per side, base obtuse to rounded, margins subentire to callose-denticulate, apex acute or acuminate, surfaces glabrous or infrequently sparsely arachnoid. Capitulescence 5-12 cm diam., 7-21-capitulate, 1-3-branched in proximal 3/4, branches glabrous to arachnoid-villosulous; peduncles 5-15 mm, 1-3-bracteolate, brownish-red, arachnoid-villosulous; distal bracteoles 2-4 mm. Capitula 11-14 mm; involucre 3-7 mm diam., cylindrical-turbinate becoming narrowly campanulate post anthesis, base glabrous or sometimes arachnoid-villosulous, florets included or exserted to c. 3 mm; phyllaries 9-12 x 1.5-2 mm, glabrous at least for most of their lengths; receptacular squamellae 0.2-0.8 mm. Ray florets absent. Disk florets 9-12; corolla 10-11 mm, lobes 1.5-2 mm; anthers c. 3.5 mm; style branches
1.7-2.5 mm. Cypselae 2-4 mm, c. 10-costate; pappus bristles c. 8 mm, reaching only to base of corolla lobes. Flowering Nov-Feb. *Epiphytic on oaks in open montane cloud forests*. Ch (Matuda 739, MO); G (Williams 41747 et al., MO). 2400-4000 m. (Endemic.)

15. *Ortizacalia* Pruski

Por J.F. Pruski.

Scandent to climbing subglabrous lianas; stems leafy distally, puberulent distally, glabrous proximally, pith solid; herbage (when pubescent) with contorted-curled obliquely appendaged trichomes with thick-walled seemingly unicellular appendage (as in Jeffrey, 1987: 207, fig. 3a). Leaves simple, alternate, petiolate; blade oblanceolate to oblong, subcarnose, venation pinnate, margins entire, surfaces glabrous, eglandular; petiole slender, exalate. Capitulescence rounded corymbiform-paniculate, terminal, much longer than subtending leaves, proximal and mid-capitulescence branches typically subtended by subsessile leafy bracts, distal branchlets few-bracteolate, thinly crisped-puberulent, ultimate clusters of capitula rounded; peduncles thinly crisped-puberulent, 1-few-bracteolate. Capitura short-radiate, usually 12-21-flowered; involucre cylindrical, irregularly and loosely calyculate; phyllaries 8, 1-seriate, free, mostly glabrous but apex usually puberulent; receptacle flat crestate, solid. Ray florets pistillate; corolla yellow to orange, glabrous, limb slightly exserted, lanceolate to elliptic-lanceolate, 4-nerved, apex 3-denticulate. Disk florets bisexual, longer than involucre; corolla funnelform or narrow-campanulate, 5-lobed, yellow, glabrous, tube and limb subequal or tube acrescent during anthesis and slightly longer, limb distinct, moderately ampliate, lobes triangular-lanceolate, shorter than throat, apex papilllose; anther collar balusterform, thecae bases caudate, endothecial tissue transitional, apical appendage ovate, nearly as broad as thecae (as in Jeffery, 1987: 207, fig. 5d), apex rounded (Pruski, 2011-Ort: 2, fig. 1A); style base bulbous, branches with obviously dimorphic papillae, distal half abaxially densely papillose, subapically long-papillose, apex densely long-comose tufted with 15-20 stiffly erect penicillate papillae about twice as long as branch diam. (Pruski, 2011-Ort: 3, fig. 2), stigmatic surface 2-banded. Cypselae tardily maturing, subcylindrical, c. 5-ribbed, glabrous, carpopodium rimmed distally; pappus of rays and disks similar, 1-seriate, of many white barbellate bristles reaching to near disk corolla lobe base. 1 sp. Costa Rica.


Liana climbing 1.6-5+ m; stems straight to slightly curved distally. Leaves: blade 4-9 × 1-2.5 cm, secondary veins usually 3-4, thin, straight, at c. 45° to midrib, third order veins indistinct, adaxially subnitidous, base cuneate to attenuate, margins sometime slightly revolute, apex usually obtuse to rounded; petiole 0.8-2.5 cm. Capitulescence 8-25 × 6-18 cm, 30-100+ capitulate, proximal and mid-capitulescence leafy bracts 2-3 × 0.4-1 cm, narrowly oblanceolate, glabrous, distal branchlet bracteoles 0.5-1 cm, lanceolate, sessile, subglabrous to thinly puberulent; peduncles 4-15 mm, bracteoles 1-2 mm, linear-lanceolate, sessile. Capitula 10-12 mm; involucre 3.5-5(-6) mm diam.; phyllaries 6-7.5 × 0.8-1.3 mm, lanceolate, inner ones with narrowly scarious margins narrower than green midzone. Ray florets (0-)2-5; corolla tube 4-5.5 mm, limb 5-8 × 0.8-1.2 mm, subequal to or slightly longer than tube. Disk florets 10-16; corolla 8-9.5 mm, lobes c. 1.5 mm, shorter than throat; anthers c. 2.5 mm; style branches 1.3-1.7 mm, apical coma papillae 15-20, 0.4-0.5 mm. Cypselae (immature) 1.3-2 mm, glabrous; pappus bristles 7.5-8.5 mm.

Flowering Feb-Apr. **Montane forests.** CR (*Haber y Zuchowski 9847*, MO). 1300-1900 m. (Endemic.)

16. **Pentacalia** Cass.


Por J.F. Pruski.

Scandent to climbing woody vines, sometimes with long pendent flowering branches; stems subterete, pubescent or glabrous, leaves mostly in distal half but often not greatly decrescent, distal internodes often shorter than leaves; herbage when pubescent with simple trichomes, sometimes obliquely appendaged but appendage thin-walled. Leaves simple, alternate or rarely opposite, petiolate or rarely sessile; blade generally elliptic to ovate, sometimes oblanceolate or obovate, subcarnose to less commonly coriaceous, venation typically pinnate, margins usually entire or when serrate the serrations regular, generally eglandular. Capitulescence terminal (on main axis or on elongated branches much longer than main stem leaves) or less commonly axillary on branches shorter than subtending leaves, generally corymbiform-paniculate, generally pyramidal or flat-topped, mush less commonly cylindrical, not usually leafy with specialized large primary bracts. Capitula radiate, discoid, or disciform, usually (5-)11-64-flowered, erect, subsessile or more commonly pedunculate; involucre cylindrical to campanulate, 1-seriate,
sometimes calyculate with usually small subglabrous bracteoles; phyllaries commonly 5-13, free, rarely strongly connivent to near apex, often with narrowly scarious ones alternating with broadly scarious-margined ones, slightly to moderately spreading in fruit; receptacle flat, epealeate, often shortly cristate. Ray florets (when present) usually (1-)4-14, pistillate, corolla sometimes quickly deciduous; corolla commonly yellow, glabrous, tube commonly shorter than limb, limb weakly to moderately exerted, usually lanceolate to elliptic-lanceolate. Marginal florets (disciform; when present) pistillate, usually 1-8; corolla tubular-funnelform; shortly symmetrically 3-5-lobed, flattened radiating limb absent, or very rarely corollas pseudobilabiate and florets with staminodia. Disk florets usually (4-)7-50, bisexual; corolla usually funnelform and often much-elongated at maturity, commonly yellow, glabrous, tube usually dilated at maturity, lobes longer than wide, sometimes with a medial resin duct; anthers stramineous, filament collar balusterform (swollen), thecae caudate (not rounded), tails usually shorter than collar, apical appendage oblong; style branches with paired stigmatic lines, with isomorphic papillae, apices truncate or obtuse, not long-comose, smooth to slightly papillose, papillae (when present) much shorter than branch diam. Cypselae indistinctly 5-angled at maturity, usually 8-10-ribbed, glabrous or rarely long-pilose near base; carpodium annular and broader than cypsela base, with a narrow distal rim; pappus bristles of rays and disks similar, many, 1(-2)-seriate, white to stramineous (rarely pinkish), scabridulous to barbellate, about as long as the disk corollas, apex usually evenly narrowed. $n = 20, 40, 45-51$. Aprox. 200 spp. Neotropics.

**Pentacalia** is a segregate of *Senecio*, differing by its vining habit and caudate anthers. The ray florets and pistillate marginal florets sometimes have corollas not much longer than the phyllaries or that are deciduous: such material is often mistaken as being discoid. The group has been treated by Greenman (1950), Pruski (2012-Pent), Robinson y Cuatrecasas (1978, 1993) and Williams (1984).

Barkley (1990) provisionally assigned two Chiapan collections to *Pentacalia venturae* (T.M. Barkley) C. Jeffrey, a taxon which he compared to *P. magistri*, *P. morazensis*, *P. parasitica*, and *P. phorodendroides*. Here, these collections from Chiapas are referred to *P. epidendra*, but because I have not seen the type material from Veracruz of the very similar *P. venturae*, it is placed adjacent to, rather than in synonymy of *P. epidendra*.

1. Capitula obviously calyculate with white-lanate-tomentose elliptic to obovate calycular bracts about half as long as involucre.  

1. P. calyculata

1. Capitula ecalyculate or when calyculate with subglabrous bracteoles shorter than half the length of involucre.

2. Capitulescences of mostly axillary branchlets shorter than to slightly longer than the subtending leaves; several capitula per branch with some phyllaries connate to near apex.

8. P. phorodendroides

2. Capitulescences terminal or when mostly axillary the branches much longer than the subtending leaves; phyllaries typically free (sometimes connate in P. candelariae and P. morazensis).

3. Capitula disciform or sometimes discoid.

4. Leaf blades chartaceous, 2° veins spreading from midrib at about 75-80°, 3° venation visible and usually forming reticulum with areolae ≤ 1 mm diam., margins usually denticulate or dentate; disk corollas white; pappus bristles 2-seriate.

7. P. phanerandra

4. Leaf blades subcarnose, 2° veins spreading from midrib at about 45-60°, 3° venation usually not visible, when visible usually forming very to extremely loose reticulum with areolae 2-5+ mm diam., margins entire; disk corollas usually yellow or pale yellow, pappus bristles 1(-2)-seriate.

5. Phyllaries 4.3-6 mm; capitula, 8-14-flowered; ultimate clusters of capitula usually subfasciculate; herbage (when pubescent) with crisped trichomes.

2. P. candelariae

5. Phyllaries (5-)6-8.5 mm; capitula (15-)19-23-flowered; ultimate capitula usually open (well-spaced); herbage glabrous or subglabrous.

6. P. parasitica

3. Capitula usually radiate.

6. Capitula broadly campanulate.

7. Peduncles moderately puberulent; leaf blades 6-14 cm, secondary veins moderately prominent; disk corollas lobes 1-1.5 mm long, usually shorter than throats.

3. P. epidendra

7. Peduncles sparsely puberulent; leaf blades 4-7(-8) cm, secondary mostly immersed; disk corollas lobes 1.5-2 mm long, about as long as throat.

5. P. morazensis

6. Capitula cylindrical to narrowly campanulate or turbinate-campanulate.
8. Capitulescences mostly on lateral branches longer than subtending leaves; phyllaries 5.

4. **P. matagalpensis**

8. Capitulescences mostly terminal; phyllaries 5-8.

9. Capitulescences leafy-bracteate with specialized large elliptic to ovate primary bracts.

10. **P. tonduzii**

9. Capitulescences not leafy-bracteate, without specialized large primary bracts.

10. Stems puberulent to glabrate; phyllaries 8; disk corolla lobes 1.5-2 mm, about as long as throat; pappus bristles usually reaching to about the middle of the disk corolla lobes.

9. **P. streptothamna**

10. Stems glabrous; phyllaries 5(-8); disk corolla lobes shorter than throat; pappus bristles at maturity usually reaching to only about base of the disk corolla lobes.

11. **P. wilburii**

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Woody vines to 10 m; stems closely arachnoid-tomentose to quickly puberulent or glabrate, pith solid. Leaves petiolate; blade 2.5-6 × 1.3-4 cm, elliptic to ovate, subcarnose, pinnately veined, usually with 2-5 pairs of partly immersed secondaries per side diverging at c. 45° angles, tertiary venation indistinct, surfaces glabrous or midrib adaxially arachnoid-puberulent, base cuneate to sometimes obtuse, margins entire, apex acute to sometimes obtuse; petiole 1-2 cm. Capitulescence terminal, broadly corymbose-paniculate, moderately dense, without specialized large primary bracts, few-bracteolate, ultimate clusters with capitula not fasciculate, bracteoles to 10 mm, lanceolate; peduncles 1-7 mm, arachnoid-puberulent, often 1-2-bracteolate, bracteoles usually arachnoid-pubescent or white-lanate-tomentose. Capitula 8-11 mm, radiate, 8-12-flowered, obviously calyculate; involucre 3-4 mm diam., narrowly campanulate, slightly shorter than disk florets or in fruits disks sometimes exserted 3-4 mm; phyllaries 5-6(-7) × 1.2-2.5 mm, broadly lanceolate to ovate, sparsely arachnoid-puberulent to glabrate, apex acute to obtuse, often fimbriate-papilllose; calycular bracts 2-3(-4), 3-4.5 mm long, usually about half as long as involucre, elliptic to obovate, completely covered with dense white-lanate-tomentose indumentum. Ray florets 2-5; ray corolla yellow, glabrous, limb 3-4 mm long, slightly shorter than tube, elliptic-lanceolate. Disk florets 6-7; corolla 5.5-7 mm, narrowly funnelform, yellow, glabrous, lobes c. 1.5 mm, triangular-lanceolate, slightly shorter to about as long as throat.
Cypselae 1-2 mm, glabrous; pappus bristles 4-6 mm, usually reaching to about the middle of the disk corolla lobes. Flowering (Sept.+Nov-Feb. *Montane forest, borders of pastures*. CR *(Jimenez 2649, MO)*. 2000-3100(?-3300). (Endemic.)


Climbing vines; stems densely crisped-pubescent or villosulous to subglabrous, larger stems sometimes narrowly fistulose; herbage (when pubescent) with crisped trichomes. Leaves petiolate; blade 6-9 × 2-4.5 cm, lanceolate to elliptic or less commonly elliptic-ovate, subcarnose, thinly pinate-veined with 3-6 visible 2° veins per side spreading from midrib at about 45-60° to venation indistinctly pinnate with 2° veins sometimes immersed, 3° venation immersed or slightly visible and forming a very loose reticulum with areolae 2-5+ mm diam., surfaces sparsely crisped-puberulent to glabrous, base cuneate to obtuse or less commonly rounded, margins entire, apex acute to attenuate; petiole 0.5-2 cm. Capitulescence mostly terminal, sometimes on axillary branches that are often about 1.5 × as long as the often large subtending leaves of main stem, pluricapitulate, pyramidal corymbiform-paniculate, each branchlet subtended by a linear-lanceolate bracteole 2-4 mm, branches and branchlets usually crisped-puberulent or villosulous, ultimate clusters with 3-7 capitula usually subfasciculate and subsessile; peduncles 0-2(-6) mm, crisped-puberulent or villosulous, sometimes few-bracteolate, bracteoles 1-2 mm, usually much shorter than 1/2 as long as the phyllaries, lanceolate to elliptic. Capitula 6-8 mm, disciform, 8-14-flowered; involucre c. 3 mm diam., broadly cylindrical, disk florets only slightly exserted to well-exserted, phyllaries usually 8, 4.3-6 × c. 1.1 mm, lanceolate to lanceolate-ovate, typically free or rarely a few connate to near apex, glabrous or sparsely crisped-puberulent, apex usually acute, sometimes ciliate-fimbriolate. Ray florets absent. Marginal florets 1-3, noticeably smaller than disk florets, corolla sometimes quickly deciduous; corolla 4-4.5 mm, usually yellow or pale yellow, lobes 1-1.2 mm. Disk florets 7-11; corolla 4.8-5.6 mm, usually yellow or pale yellow, glabrous, lobes 1.3-1.6 mm, about as long as or longer than throat, faint medial nerve sometimes visible. Cypselae 1-2 mm, glabrous; pappus bristles 4-5.3 mm, mostly 1-seriate, usually reaching to about the middle of the disk corolla lobes. Flowering Feb-May. *Cloud forest, forests margins, premontane wet forests, streamsides, trail sides*. CR *(Wilbur 14351, MO)*; P *(Churchill et al. 4573, MO)*. 800-2000 m. (Endemic.)

Woody vines; stems moderately araneose-puberulent, often fistulous. Leaves petiolate; blade 6-14 × 4.5-9 cm, ovate, subcarnose, pinnately veined with 4-8 moderately prominent secondaries per side diverging at c. 55° angles, surfaces glabrous or often sparsely puberulent abaxially, base broadly cuneate to obtuse, margins entire, apex acute; petiole 1.5-3 cm. Capitulescence corymbiform-paniculate, terminal or on spreading axillary branches longer than subtending leaves, main branches without specialized large primary bracts; peduncles 5-15 mm, moderately araneose-puberulent, often indistinctly bracteolate. Capitula 9-13 mm, radiate, few-calyculate; involucre 4-9 mm diam., broadly campanulate, disk florets well-exserted; phyllaries 8, 4.5-8 mm, narrowly oblong to ovate, usually puberulent; calycular bracteoles few, to c. 2.5 mm. Ray florets c. 5; corolla yellow, glabrous, limb 5-6 × 1-1.5 mm, about as long as tube, oblanceolate, 4-nerved. Disk florets 15-25; corolla 7-8 mm, funnelform, yellow, glabrous, lobes 1-1.5 mm, usually shorter than throat. Cypselae 1-2 mm, glabrous; pappus bristles usually 5-7 mm, reaching to about the middle of the disk corolla lobes. Flowering Jan-Mar. *Evergreen cloud forest, oak forests*. Ch (Breedlove 49771, MO); G (Steyermark 42889, MO). 2000-2700 m. (Endemic.)

Barkley (1990) provisionally assigned two Chiapan collections to *Pentacalia venturae* (T.M. Barkley) C. Jeffrey, a taxon which he compared to *P. magistri*, *P. morazensis*, *P. parasitica*, and *P. phorodendroides*. Here, these collections from Chiapas are referred to *P. epidendra*, but because I have not seen the type material from Veracruz of the very similar *P. venturae*, it is placed adjacent to, rather than in synonymy of *P. epidendra*.


Climbing vines; stems much-branched, pale brown, hispidulous distally to subglabrous, internodes often elongate, at least some trichomes obliquely appendaged. Leaves petiolate; blade 2.5-6 × 1-2.3 cm, elliptic, subcarnose, thinly pinnately veined, usually with 2-4 visible secondary veins per side diverging at c. 45° angles, surfaces glabrous, base cuneate, margins entire, apex acuminate; petiole 0.5-1 cm. Capitulescence mostly on axillary branches (position typically apparent on herbarium specimens) mostly 10-20 cm, each pyramidal and moderately longer than subtending leaf, ultimate capitula often closely spaced; peduncles 1-4 mm, crisped-hirsutulous, usually 1-4-bracteolate or capitula 1-2-calyculate, peduncular or calycular bracteoles 1-1.5(-2) mm, sessile, elliptic-ovate, chartaceous. Capitula 6.5-8.5 mm, indistinctly short-radiate, 5-7-
flowered; involucre 2-2.5 mm diam., cylindrical, moderately shorter than florets; phyllaries 5, 5-6 × 1-1.5 mm, lanceolate to elliptic-lanceolate, glabrous, apex acute to obtuse. Ray florets 1-2; corolla ochroleucous, glabrous, tube 3-4 mm, limb 2-2.5 × c. 0.5 mm, shorter than tube, elliptic-lanceolate. Disk florets 4-5; corolla c. 6 mm, ochroleucous, glabrous, lobes 1.5-2.5 mm, lanceolate, about as long as or longer than the throat; style branch distally abaxially and marginally short-papillose, papillae to c. 0.1 mm. Cypselae 1-2 mm, glabrous; pappus bristles c. 5 mm. Flowering Feb-Mar. Cloud forests, elfin forests, secondary forests. N (Pipoly 6076, MO). (900-)1100-1500 m. (Endemic.)


Climbing vines, 1-3+ m; stems glabrous, often fistulous. Leaves petiolate; blade 4-7(-8) × (1.5-)2-3 cm, elliptic-lanceolate to sometimes ovate, subcarnose, pinnately thin-veined, 4-5 mostly immersed secondary veins per side diverging at c. 45° angles, surfaces glabrous, base broadly cuneate to obtuse, margins entire, apex acuminate to acute; petiole 1-1.5 cm. Capitulescence corymbiform-paniculate, terminal or on spreading axillary branches longer than subtending leaves; peduncles 5-15 mm, glabrous or sparsely crisped-puberulent, often 1-3-bracteolate, bracteoles 3-5 mm, sessile, linear-lanceolate, thin-chartaceous. Capitula 10-14 mm, radiate to (on abnormal substrates) rarely seemingly disciform; involucre 5-8 mm diam., broadly campanulate, disk florets well-exserted; phyllaries 8-13, 6-7 × 2-3 mm, linear-lanceolate to oblong, glabrous except at the ciliate-fimbriate apex, some phyllaries partly connate, apex acute to obtuse; calycular bracts c. 3 mm, slightly spreading. Ray florets 5-8; corolla yellow, glabrous, tube 3-3.5 mm, limb 4-7 × 1-2.5 mm, elliptic to oblong, rarely deeply bilobed to near tube with lobules 1-2 mm and thus capitula seemingly disciform. Disk florets 17-30; corolla 5.5-6.5 mm, yellow, glabrous, lobes 1.5-2 mm, about as long as throat. Cypselae (immature) 1-1.8 mm, glabrous; pappus bristles 7-8 mm, usually reaching to about the middle of the disk corolla lobes, pre-anthesis often fluked with apex clavellate. Flowering (Nov+)Jan-Mar(-Apr). Cloud forest, dry slopes, secondary shrubby vegetation, wet forests, sometimes on granite ridges. Ch (Breedlove y Smith 31764, MO); H (Williams 17423, EAP); ES (Martinez 874, MO); N (Stevens et al. 32812, MO). 2000-2600(-2800) m. (Endemic.)
Robinson y Cuatrecasas (1978) recognized as distinct *Pentacalia morazensis* by clavellate pappus bristles and *P. magistri* by apically narrowed pappus bristles, whereas Williams (1984) treated *P. magistri* in synonymy of *P. morazensis*. Examination of pappus bristles apices suggest that in this species bristles apex shape is developmentally influenced, with the clavellate condition basically manifest only pre-anthesis. Thus the synonymy used by Williams (1984) is followed here.

Barkley (1990) provisionally referred *Breedlove 31764* to *Pentacalia venturae* (T.M. Barkley) C. Jeffrey, a plastic capitulate species originally described as radiate, but which sometime has marginal florets with staminodia and pseudobilabiate corollas. I find *Breedlove 31764* to have typical radiate capitula and thus this collection fits comfortably within *P. morazensis* as circumscribed here.


*Cacalia parasitica* (Hemsl.) Sch. Bip. ex A. Gray.

Climbing vines; herbage glabrous or subglabrous. Leaves petiolate; blade 4-9 × 1.4-2.5 cm, elliptic-ovate to ovate, subcarnose, thinly pinnate-veined with 2-4 visible secondary veins per side spreading from midrib at about 45-60°, to venation indistinctly pinnate with 2° veins usually immersed, 3° venation usually not visible, when visible 3° venation forming a extremely loose reticulum with areolae c. 5+ mm diam., surfaces glabrous, base cuneate to obtuse, margins entire, apex acuminate to attenuate; petiole 0.4-1.2 cm. Capitulescence to 20+ × 15+ cm, mostly terminal, pluricapitulate, pyramidsymmetric-paniculate, ultimate 2-4 capitula usually open or well-spaced (sometimes closely spaced); peduncles 0-4(-5) mm, puberulent or subglabrous, sometimes weakly 1-2-bracteolate or capitula 1-2-subcalyculate, bracteoles c. 1-1.5 mm, sessile, lanceolate, chartaceous. Capitula 7.5-9.5 mm, disciform (?sometimes discoid), (15-)19-23-flowered; involucre 2.5-4 mm diam., broadly cylindrical, disk florets usually only slightly exserted to infrequently well-exserted to c. 5 mm; phyllaries usually 8, (5-)6-8.5 × 1-1.5 mm, lanceolate to elliptic-lanceolate, typically free, glabrous or rarely apex ciliate-fimbriate, apex acute to obtuse. Ray florets absent. Marginal florets usually (4-)5, often associated with an individual phyllary and not much exserted from it; corolla 5-6 mm, yellow, lobes c. 1 mm. Disk florets (11)14-18; corolla 6-7.5 mm, yellow, glabrous, lobes 1-1.5 mm, usually shorter than to about as long as throat. Cypselae 1-2 mm, glabrous; pappus bristles 5-7 mm, 1(-2)-seriate, usually
reaching to about the middle of the disk corolla lobes. Flowering in Mexico Oct-Apr. *Atlantic slope forests, bosques mesofilo, oak forests.* Ch (Redonda-Martínez y Villaseñor-Ríos, 2011: 18); G (Contreras 9451, MO). 1000-2300 m. (S. Mexico, Mesoamerica.)

Material of *Pentacalia parasitica* from Oaxaca usually has involucres much shorter than the disk florets as typical of *P. guerrerensis*, but otherwise the Oaxacan material seems to match *P. parasitica.* Torres y Martínez 4831 (MO) from Oaxaca, on the western foot of Cerro Baul within a few kms of the border with Chiapas, appears to be a short involucral disciform form of *P. parasitica*. Some collections from Guatemala and Chiapas formerly referred to *P. parasitica* have axillary capitulescences and are now referred to *P. phorodendroides*. Barkley (1975) referred material from Panama to *P. parasitica*, but Robinson y Cuatrecasas (1978) excluded this species from Panama.


Sprawling shrub to climbing vines 1-5 m; stems much-branched, pluristriate, hirsutulous-puberulent at least in axils to sometimes subglabrous. Leaves petiolate; blade 2.5-8 × 1-2.8 cm, lanceolate to elliptic, chartaceous to stiffly so, pinnately veined, 2° veins not immersed, 6-13 per side, spreading from midrib at about 75-80°, 3° venation visible and forming reticulum, surfaces glabrous, base cuneate to obtuse, margins usually denticulate or dentate with 10-17 teeth per side or less frequently subentire, apex usually acute to acuminate; petiole 0.5-1.4 cm. Capitulescence terminally corymbiform-paniculate on the many elongate (10-25 cm) distal axillary laterally spreading branches, branches much longer than subtending leaves, ultimate capitula 3-10 in 1-2 cm diam. clusters; peduncles 2-5 mm, crisped-puberulent, often 1-2-bracteolate; bracteoles c. 1 mm, sessile, elliptic-lanceolate, thin-chartaceous. Capitula 5-7 mm, disciform or sometimes discoid; involucre usually c. 2(-2.5) mm diam., shorter than florets, broadly cylindrical, usually loosely 2-5-calyculate, calycular bracteoles 1-3 mm, elliptic-lanceolate; phyllaries 8, 3.8-4.2 × 0.8-1.2 mm, linear-lanceolate, typically free, often 3-costate proximally, glabrous or apex sometimes fimbrillate, base often gibbous, usually narrow-margined, apex acute to obtuse. Ray florets absent. Marginal florets (0-)1-2; corolla 4-5-lobed. Disk florets 10-12; corolla 3.5-4.5 mm, white, glabrous, lobes 1.2-1.7 mm, usually much longer than the throat, often recurved; anthers usually well-exserted, sometimes pale violet; styles often directed outward, margins distally papillose, apex sometimes also papillose. Cypselae 1-1.5 mm, glabrous, pappus bristles 3-3.5 mm, 2-seriate with some bristles distinctly inserted within outer series. Flowering Jan-May(-Jul).
Cloud forests, elfin forests, montane rain forests, shrub páramos, secondary forests, thickets, volcano slopes. CR (Greenman y Greenman 5392, MO); P (Klitgaard et al. 835, MO). 1300-3300 m. (Endemic.)

Greenman (1950) and Robinson y Cuatrecasas (1978) cite Pentacalia phanerandra has a Costa Rican endemic. The typical form is very similar to South American P. arborea (Kunth) H. Rob. et Cuatrec., which Diaz y Cuatrecasas (1999) give as having capitula strictly homogamous-discoid and with longer calycular bracts. Entire lanceolate leaves plants are referred provisionally to P. phanerandra, and although they have more consistently disciform capitula, field studies are desired to determine variation and importance of this capitular feature.


Pentacalia horickii H. Rob.

Large climbing vines; stems subglabrous, internodes much shorter than leaves. Leaves petiolate; blade 4.5-10 × 1-4 cm, lanceolate to elliptic or oblong, subcarbose, indistinctly pinnately veined, surfaces glabrous, base narrowly cuneate, margins entire, apex acuminate or attenuate to infrequently obtuse; petiole 0.7-1.5 cm. Capitulescence pluricapitulate, cylindrical, of mostly axillary (position readily apparent on herbarium specimens) branchlets terminated by corymbiform or corymbiform-paniculate loose clusters from the distal 5-10+ nodes, each cluster 3.5-10 cm and shorter than to slightly longer than subtending leaf; peduncles 1.5-13 mm, puberulent, often 1-3-bracteolate, bracteoles 1-2 mm, sessile, lanceolate, chartaceous. Capitula 7.5-9.5 mm, obscurely short-radiate or somewhat indistinctly disciform (sometimes both conditions on single individuals); involucre 2-3.5 mm diam., narrowly campanulate, disk florets well-exserted, sometimes loosely few-calyculate; phyllaries 5-8, 4-6 × 1.2-2.5 mm, lanceolate to ovate, glabrous, apex acuminate to obtuse, several capitula per branch with some phyllaries connate to near apex. Marginal florets 2-3, either zygomorphic and radiate or actinomorphic and narrowly tubular; corolla yellow, glabrous, tube (3-)4-5 mm, longer than limb, limb 1-2 × c. 0.5 mm and zygomorphic or 1-2.5 mm and actinomorphically 3-5-lobed, when zygomorphic sometimes loosely enclosing style trunk. Disk florets 8-15; corolla 6-7 mm, yellow, glabrous, lobes (1-)1.5-2.2 mm, about as long as throat; style branch distal abaxial surface and margins short-papillose, papillae to c. 0.1 mm, shorter than branch diam. Cypselae 1.4-2.4 mm, glabrous; pappus bristles 5-6.5 mm, usually reaching to about the middle of the disk corolla lobes.
Flowering Dec-Feb. *Cloud forests, Pacific slope montane rain forests, volcano slopes.* Ch (Breedlove y Thorne 31042, MO); G (Standley 85080, MO). 1100-2800 m. (Endemic.)

*Pentacalia phorodendroides* is occasionally cultivated and was described by Williams (1975) as "discoid." The paratypes *Standley 85080* from San Martin Chile Verde and *Matuda 5461* from Chiapas were cited by Williams (1975), respectively, as "58080" and "15461". *Matuda 5461* is from an elevation of 2585 meters, but was cited by Williams as from "258" m. *Pentacalia phorodendroides* is similar to *P. parasitica*, which occurs in Atlantic slope forests and which has phyllaries about as long as the disk florets.


Woody vines to 15 m; stems puberulent to glabrate. Leaves petiolate; blade (2.5-)4-7 × 1.5-2.5(-3.5) cm, elliptic to ovate or oblanceolate, chartaceous to subcarnose, pinnately veined, with 3-5 mostly immersed secondaries per side diverging at c. 45° angles, tertiary venation somewhat distinct, surfaces glabrous, base cuneate to attenuate, margins entire, apex acuminate to obtuse; petiole 0.5-1(-2) cm. Capitulescence terminal, corymbose-paniculate, not leafy-bracteate, without specialized large primary bracts, moderately dense, larger branchlets subtended by a thin-chartaceous lanceolate to ovate bracteole 5-20 mm; peduncles 2-20 mm, few-bracteolate, crisped puberulent, bracteoles 2-4 mm, linear-lanceolate, often spreading. Capitula (6-)7-10 mm, radiate; involucres 3-5 mm diam., narrowly campanulate, disk florets slightly to moderately exserted; phyllaries 8, 5-6.5(-7) mm, lanceolate, glabrous with apex usually ciliate-fimbriate; calycular bracteoles 2-3 mm, lanceolate to elliptic. Ray florets 2-5; corolla yellow, glabrous, tube c. 3.5 mm, limb 2.5-5 × 1-1.5 mm, oblanceolate-elliptic, 4-nerved. Disk florets 8-10; corolla (4.5-)5.5-7 mm, narrowly funnelform, yellow, glabrous, lobes 1.5-2 mm, about as long as throat; style branch papillae to c. 0.15 mm. Cypsela 1-2 mm, glabrous or subglabrous; pappus bristles 5-6 mm, usually reaching to about the middle of the disk corolla lobes. Flowering Feb-Jul. *Riverside forests, montane forest, oak forests.* N (Dillon et al., 2001: 356); CR (Skutch 3440, MO); P (van derWerff y Herrera 7103. MO). 500-2600 m. (Endemic.)

Scrambling vines; stems puberulent with trichomes oblique-appendiculate, pith sometimes narrowly fistulous. Main stem leaves petiolate; blade 6-19 × 3.5-9.5 cm, ovate, chartaceous, pinnately veined with 3-5 partly to mostly immersed secondaries per side diverging at c.50° angles, surfaces glabrous or subglabrous, base cuneate, margins entire, apex acuminate to acute; petiole 1-2.5 cm. Capitulescence openly corymbiform on axillary branches moderately longer than subtending leaves, moderately paucicapitulate, leafy-bracteate with specialized large elliptic to ovate primary bracts to c. 4 cm; peduncles 10-30 mm, paucibracteolate, puberulent. Capitula 9-10 mm, radiate; involucr 5-7 mm diam., turbinate-campanulate, disk florets slightly to moderately exserted; phyllaries 8, 6-8 mm, lanceolate, glabrous with apex ciliate-fimbriate. Ray florets c. 5(-8); corolla yellow, glabrous, tube 3.7-5 mm, limb 3.7-5 mm, oblanceolate to oblong. Disk florets 12-16; corolla 7.2-8 mm, narrowly funnelform, yellow, glabrous, lobes 1.5-2 mm, about as long as throat; anthers 2-2.2 mm; style branch papillae to c. 0.1 mm. Cypselae (immature) c.1 mm, glabrous; pappus bristles 4-5.5 mm, reaching only to about the base of the disk corolla lobes. Flowering May. Forest. CR (Morales 6205, MO). 1500-2200 m. (Endemic.)


Woody vines; stems glabrous, sometimes with indurate ivory-white cells distally. Leaves petiolate; blade 3-6.5 × 1.5-3.3 cm, elliptic to obovate, carnose, pinnately veined, with 2-3 fully immersed weakly visible secondaries per side diverging at c. 45° angles, without visible tertiary venation, surfaces glabrous, base cuneate to somewhat attenuate, margins entire, apex acute; petiole 1-1.7 cm. Capitulescence terminal, corymbose-paniculate, not leafy-bracteate, without specialized large primary bracts, moderately dense, larger branchlets subtended by a thin-chartaceous linear-oblancoate bracteole to 10 mm; peduncles 3-10 mm, few-bracteolate, crisped puberulent, trichomes oblique-flagelliform, bracteoles 3-4 mm, linear. Capitula 8-10 mm, radiate; involucr 3-4 mm diam., cylindrical to narrowly campanulate, disk florets slightly exserted; phyllaries 5(-8), 5-7 × 1-2 mm, linear-lanceolate to oblong, glabrous with apex ciliate-fimbriate; calycular bracteoles 3-4 mm, linear. Ray florets 2-3; corolla yellow, glabrous, tube c. 3.5 mm, limb 3.5-4 × c. 1.5 mm, elliptic, 3-6-nerved. Disk florets 5-8(-11); corolla 7-8 mm, narrowly funnelform, yellow, glabrous, lobes 1.3-1.7 mm, shorter than throat; anthers 2.5-3 mm; style branch papillae to c. 0.1 mm. Cypselae 1.5-2 mm, glabrous; pappus bristles 4-6 mm, at maturity usually reaching to only about base of the disk corolla lobes. Flowering Jan-Mar. Montane forest, oak forests. CR (Alfar 1582, MO); P (Klitgaard et al. 734, MO). 1900-3100 m. (Endemic.)
17. **Pittocaulon** H. Rob. et Brettell

Por J.F. Pruski.

Erect pachycaulous soft-subsucculent leafy-stemmed but seasonally leafless shrubs or trees 1-5 m, usually flowering when leafless; stems simple proximally becoming few-several-branched distally, glabrous to pubescent distally, leaves clustered distally, leaf scars often prominent, distal nodes shorter than leaves, cortex with resinous ducts often visible, pith chambered. Leaves usually palmately lobed, alternate, petiolate; blade usually ovate, chartaceous to subcarnose, venation palmate, marginal lobes deltate to triangular, margins usually smooth, apex acuminate to obtuse. Capitulescence terminal, axis abruptly foreshortened, the corymbiform-umbelliform clusters developing at the tip of 1-year old branches, followed by a cluster of new leaves; peduncles bracteolate. Capitula radiate, ecalyculate (sometimes extra-Mesoamerica few-subcalyculate); involucre cylindrical to broadly campanulate; phyllaries usually (5-)8-21, imbricate, margins thinly to broadly scarious; receptacle solid to somewhat fistulose, smooth to somewhat alveolate. Ray florets usually 5-13, pistillate; corolla yellow, limb exserted, apex 3-denticulate. Disk florets 6-70+, bisexual, slightly longer than involucre; corolla funnelform, yellow, glabrous, shortly 5-lobed, lobes deltate to triangular; anther collar cylindrical, thecae bases obtuse, endothecial tissue radial; style base slightly dilated, node stipitate above nectary, branches spreading to recurved, usually obtuse apically, minutely papillae, stigmatic surface continuous. Cypselae cylindrical, ribbed, glabrous, carpopodium indistinct to distinct; pappus bristles of rays and disks similar, 1-few-seriate, white, barbellate, reaching to near apex of disk corolla lobes. n = 30. 5 spp. Mexico, Central America.

*Pittocaulon* was segregated from *Senecio* by Robinson y Brettell (1973a) based on its tussilaginoid microcharacters and its pachycaulous habit, similar to that of eupatorioid *Pachythamnus* R.M. King et H. Rob. Robinson y Brettell (1973a) and Clark (2000) noted that the Central American materials may be recognized by their flat leaf scars and few-flowered capitula.


**Senecio morelensis** Miranda, *Senecio praecox* var. *morelensis* (Miranda) McVaugh.

Shrubs or trees to 5 m; stems leafy post-anthesis, glabrous to nearly canescent, leaf scars flat, flush with stem. Leaves: blade 5-10 × 3-11 cm, elliptic-ovate to broadly ovate, finely reticulate, base rounded to subcordate, margins obscurely dentate to shallowly 3-9-lobed, apex acuminate to acute, surfaces arachnoid-tomentose to more commonly glabrate; petiole 5-10 cm, base completely deciduous. Capitulescence 5-10 cm diam., 15-30+-capitulate, subpeduncular stalks usually 1-2 cm diam; peduncles 3-10 mm, bracteoles 0.3-1 mm, lanceolate. Capitula 10-15 mm; involucre 3-5 mm diam., cylindrical; phyllaries (5 or)8, 7-10(-12) × 1-2.5 mm, lanceolate or elliptic-lanceolate, often c. 3-striate, inner ones with scarious margins to c. 0.5 mm+ diam., as wide or wider than green midzone. Ray florets 3-5; corolla limb 8-15 × 2-4 mm, longer than tube, lanceolate to elliptic, 4-nerved. Disk florets 6-8(-10); corolla 8-11 mm, lobes 1-2 mm; anthers 3-4.5 mm; style basal node c. 0.4 mm, branches 1.5-2 mm. Cypselae 2.5-4 mm, glabrous; pappus bristles 7-10 mm. 2 vars. C. Mexico to Guatemala.

**Pittocaulon velatum** is very similar to the common and widespread *P. praecox* (Cav.) H. Rob. et Brettell, which differs by capitula with 15-18 disk florets.


Shrubs or small trees to 3 m; stems glabrous or nearly so distally. Leaves: blade elliptic-ovate, margins obscurely dentate. Ray florets (3-)5; corolla limb apex acute. Flowering (Nov-)Feb-Apr. Deciduous forest, rocky areas, volcano slopes. Ch (Breedlove 51027, CAS); G (Véliz y Morales MV15699, MO). 900-1600 m. (Endemic.)

18. **Psacaliopsis** H. Rob. et Brettell

*Senecio* sect. *Psacaliopsides* (H. Rob. et Brettell) L.O. Williams

Por J.F. Pruski.

Perennial basically acaulescent (but not caespitose) subscapose erect herbs, leaves mostly basal; caudex base densely lanate; herbage bearing simple trichomes. Leaves alternate, long-petiolate, peltate; blade chartaceous to subcoriaceous, palmately veined, margins entire to lobed; petiole base often vaginate, pilose. Capitulescence scapose, monoecephalous to few-capitulate and few-branched; peduncles naked or infrequently 1-leaved, apex often bracteolate. Capitula radiate or
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discoid, 25-60-flowered, often subcalyculate; involucre broad; phyllaries 15-20, subequal, 1-2-seriate, free; receptacle epealeate. Rays (when present) pistillate; corolla limb yellow, long-exserted. Disk florets bisexual; corolla yellow to purplish, shortly 5-lobed, tube elongate, cylindrical, not dilated basally, throat faintly 10-nerved, lobes deltate-triangular, 3-nerved; anther thecae with endothecial cell wall thickenings radial, filament collars cylindrical; style branches slightly flattened, each with single continuous stigmatic surface to apex or nearly so, exappendiculate. Cypselae striate to ribbed, base substipitate, carpopodium regular, inconspicuous; pappus persistent, of many white capillary bristles. $x = 30$. Aprox. 6 spp. Approx. 5 spp. Mexican endemics, 1 sp. endemic to Guatemala.


1. Capitulescence open cymose-paniculate, 3-12-capitulate, capitula erect; capitula radiate, 31-45-flowered; involucre 8-13 mm diam.; phyllaries 1-3 mm diam., sparsely stipitate-glandular.

1. P. pinetorum

1. Capitulescence monocephalous, capitula nutant; capitula discoid, 50-60-flowered; involucre 20-25 mm diam.; phyllaries 3-5 mm diam., sparsely villous to glabrous, eglandular.

2. P. pudica


Perennial scapose herbs 20-50 cm from woody lanate caudex; stems often purplish, heterotrichous, stipitate-glandular and pilose-hirsute. Leaves cauline-basal, centrally to eccentrically peltate; blade 4-12 cm diam., orbicular to shalllowly 7-11-lobed ≤ 1/4 to midrib, chartaceous, adaxially glabrous or infrequently sparsely stipitate-glandular, abaxially glabrate to densely stipitate-glandular, lobes broadly triangular, lobe apex obtuse to rounded; petioles 5-19 cm. Capitulescence open cymose-paniculate, 3-12-capitulate, non-leafy, central axis 25-45 cm, stipitate-glandular, capitula erect; peduncles 1.5-6 cm, 1-few-bracteolate, bracteoles 1-2 mm, linear. Capitula 10-15 mm, radiate, 31-45-flowered; involucre 8-13 mm diam., campanulate; phyllaries 8-13, 8-11 × 1-3 mm, sparsely stipitate-glandular; calycular bracteoles few, 2-7 × 0.5-1 mm. Ray florets c. 8; corolla glabrous, tube 4-7 mm, limb 20-20 × 2-3 mm, 5-7-nerved. Disk
florets 23-37; corolla 9-10.5 mm, funnelform, glabrous, tube usually slightly shorter than limb, lobes 1-2 mm; style branches 2-3 mm. Cypselae 1.5-3 mm, cylindrical-fusiform, 5-7-ribbed, glabrous; pappus bristles 5-10 mm. Flowering Feb, Aug. Pine-oak forests, cloud forests. H (Molina 22122, F); ES (Villacorta 1037, MO). 1800-3500 m. (México, Mesoamerica.)


*Pericalia pudica* (Standl. et Steyerm.) Cuatrec., *Senecio nubivagus* L.O. Williams.

Simple-stemmed erect, scapose, perennial herbs, 18-32 cm tall, rhizome fibrous-rooted, caudex short, lanate. Leaves few, mostly radical, rarely on scape, simple, alternate, long-petiolate; blade 3.5-6 cm, orbicular to star-shaped, centrally peltate, undulate to shallowly c. 7-lobed, lobes broadly triangular, 5-12 mm, lobe apex broadly obtuse to rounded, with apiculum c. 0.1 mm, lobe margins also often with apiculum c. 0.1 mm, abaxial surface glabrous, abaxial surface sparsely villous-floccose; cauline leaves 0-1, smaller and more deeply lobed than radical leaves, eccentric-peltate; petiole (5-)10-15 cm, slender, villous to glabrous. Capitulescence monoecephalous, long-pedunculate, 1 per caudex, capitula nutant; peduncles 18-32 cm, abruptly ampliate distally, few-bracteolate, densely villous-tomentose distally, subglabrous proximally, broad distal part c. 7 × c. 10 mm, obconic-turbinate; bracteoles lanceolate distally to hastiform or palmatifid proximally, 6-15 mm. Capitula 10-12 mm, discoid, 50-60-flowered, ecalyculate to subcalyculate; involucre 20-25 mm diam. (pressed), broadly campanulate to hemispherical, arising from the broadened part of peduncles; phyllaries 10-12, 10-12 mm × 3-5 mm, the inner ones broader then the outer, elliptic-ovate, 2-seriate, purplish or the inner ones less so, few-nerved, subreticulate, sparsely villous to glabrous, eglandular, acute or obtuse. Disk florets not exserted from involucre; corolla purplish at least distally, 5-lobed, funnelform, 7.5-8.5 mm, glabrous, tube c. 2.3 mm, lobes 1.1-1.8 mm, triangular-lanceolate; anthers c. 2 mm, occupying < 1/2 throat length, base obtuse to rounded, apical appendage c. 0.4 mm, narrowly lanceolate; style trunk cylindrical to base or slightly narrowed at the low-cylindrical nectary, branches c. 2 mm, somewhat recurved, long-papillose (when hydrated), papillae nearly as long as diam. of branches, apex obtuse. Cypselae 3-3.5 mm, broadly fusiform, c. 10-nerved, glabrous, base c. 0.5 mm, narrow; pappus bristles 6-7 mm, scabridulous. Flowering Jul-Sep. *Alpine meadows, Juniperus chaparral.* G (Cobar 1348, MO). 3400-3800 m. (Endemic.)
This species is endemic to the Cuchumatanes. The protologue describes the leaves as often abaxially glandular, but I see no glandular-trichomes. Perhaps the description refers to internal secretory cavities. Williams (1976) describes the capitula as calyculate, but the occasional loose association of a single bracteole with the capitulum is not consistent, and is described here as subcalyculate.


Por J.F. Pruski.

Perennial basically acaulescent (but not caespitose) subcapose herbs to 3 m, leaves mostly basal, thick fleshy roots, tubers infrequently present; stems single or clustered, erect, finely striate to sometimes costate, mostly remotely large-leafy basally and proximally-cauline, distal-cauline leaves few, bracteate, caudex usually densely lanate, distal portions pubescent to unevenly glabrate; herbage usually bearing simple non-glandular trichomes. Leaves alternate, petiolate or distal bracteate leaves sessile; palmatilobed or pinnatisect to pinnatifid, chartaceous to subcoriaceous, venation pinnate or palmate, surfaces glabrous to sparsely-densely pubescent or rarely densely matted-pubescent; petiole marginal or leaves peltate. Capitulescence corymbiform or corymbiform-paniculate, capitula few to many, branches typically subtended by vaginate bracteate leaves, often pubescent, stipitate-glandular or eglandular. Capitula discoid, 5-40(-80)-flowered, subcalyculate or calyculate; involucre cylindrical to campanulate; phyllaries 5-8(-17); calycular bracts 1-3(-5), as long as the phyllaries or shorter; receptacle epaleate. Ray florets absent. Disk florets bisexual; corolla campanulate to salverform, white or ochroleucous (ours) to very rarely yellow, deeply 5-lobed, glabrous, tube narrowly cylindrical but dilated basally, throat minute, lobes much longer than throat, ascending or spreading, linear-lanceolate to elliptic, usually 3-nerved; anther collars cylindrical, theca bases sagittate, endothecial cell wall thickenings radial, apical appendage ovate; style base often dilated, branches short and slightly flattened to longer and subfiliform, each with single continuous stigmatic surface to apex or nearly so, spreading to recurved, glabrous to finely papillose subapically, apex truncate or obtuse to narrow. Cypselae ellipsoid to obovoid or pyriform, subcompressed when immature, 10-20-striate to 10-20-costate, glabrous or pubescent, carpopodium inconspicuous; pappus bristles present or rarely absent. $x = 25, 30$. Aprox. 42 spp. Mostly Mexican, 1 sp. extending into S.W. Estados Unidos, 2 spp. endemic to Guatemala.
Gray (1883) treated the perennial subscapose Mexican herbs with discoid capitula and white long-lobed corollas as *Cacalia* L., then untypified and now rejected (ICBN, 2006). Gray (1883) was the first to synonymize *Odontotrichum* and *Mesoneuris*. Rydberg (1924b) and Pippen (1968) recognized each *Odontotrichum* and *Psacalium*, *Psacalium* differing by its peltate leaves. Robinson et Brettell (1973zz) reduced *Odontotrichum* to synonymy of *Psacalium*.


1. Basal leaves with marginal petioles, blades 2-3-pinnatisect; phyllaries per capitulum ≥ 8.
   1. *P. cirsiiifolium*

1. Basal leaves (when known) peltate, shallowly to moderately lobed; phyllaries per capitulum 5.
   2. Phyllaries stipitate-glandular; florets 5-9 per capitulum.
   2. *P. guatemalense*
   2. Phyllaries eglandular; florets 5-6 per capitulum.
   3. Capitula 15-17 mm; phyllaries 10-11 mm, hirsutulous; corolla 11-12 mm, tube 7-8 mm; pappus bristles about as long as corolla tube.
   3. *P. pinetorum*
   3. Capitula 11-13 mm; phyllaries 8-10 mm, puberulent to glabrous; corolla 7-9 mm, tube 4-5 mm; pappus bristles much longer than corolla tube.


Herbs to 1.5 m; stems c. 4 mm diam. at base of capitulescence, eglandular, sparsely to moderately arachnoid-pubescent to tomentellous, trichomes c. 0.5 mm, usually crisped; pith solid. Basal and mid-stem leaves 2-5, long-petiolate with petiole marginal; blade 18-15 × 14-22 cm, 2-3-pinnatisect, elliptic to ovate in outline, adaxial surface glabrous to sparsely pubescent, abaxial surface densely matted-pubescent, rachis 0.2-0.8 cm diam., primary lobes in 7-10 pairs (+ terminal lobe), 8-12 cm, opposite or becoming alternate distally, decurrent onto rachis, secondary lobes in 2-6 pairs (+ terminal lobe), 1-3.5 × 0.1-0.9 cm, lanceolate, opposite or becoming
alternate distally, lobe apex acute to acuminate, primary and secondary sinuses as broad as toroader than lobes and lobules; petiole 8-17 cm, sometimes narrowly and irregularly subwinged
to base. Distal cauline leaves few, 2-12 × 1-7 cm, gradually decrescent, sessile, 1-2-pinnatifid or
distal most merely lacerate-pinnatifolobed, elliptic to ovate, finely-reticulate, surfaces glabrous,
base broad sometimes subclasping, apex acuminate to attenuate. Capitulescence 20-30 × 10-20
cm, 10-40(-50)-capitulate, open, more or less flat on top with lateral branches often overtopping
central axis, lateral branches usually 2 or 3 per stem, 5-20 cm, each subtended a by bracteate leaf;
peduncles 1-6 cm, slender, densely crisped-pubescent, bracteoles 0-few, c. 5+ mm, linear.
Capitula 9-13 mm; involucre 8-13 mm diam., campanulate; phyllaries (8-)11-13(-15), (4-)5-7(-9)
× 2-3 mm, lanceolate-ovate, sparsely arachnoid in bud to mostly glabrous when mature, apex
sometimes papillose; calycular bracteoles 3-5, to c. 10 mm, linear. Disk florets 20-30(-40);
corolla 7-8(-8.5) mm, salverform, glabrous, tube 3-3.5 mm, throat minute, lobes 4-4.5(-5) mm;
anthers 2.5-3 mm; style branches 1-1.5 mm. Cypselae 3-6 × to c. 3 mm, obovoid to pyriform,
glabrous or less frequently setulose, margins slightly but abruptly ampliate as annual ring bearing
pappus; pappus bristles c. 30, 3-3.5 mm, about as long as corolla tube, fragile to caducous.
Flowering Aug-Sep. 2n = 60. Pine-oak forests, grassy slopes, rocky slopes. Ch (Ghiesbrecht 805,
MO). 900-2800 m. (SW Mexico.)

This taxon was recognized as Odontotrichum cirsifolium by both Rydberg (1924b) and
Pippen (1968).

Guatemala, Steyermark 32823 (F!). Illus.: no se encontró. N.v.: none.

Infrequent stout viscid herbs to 1.2 m; stems unbranched until capitulescence, 8-9 mm diam. at
base of capitulescence, homotrichous, moderately short-stipitate-glandular, stipitate-glands 0.1-
0.2 mm, fistulous at least distally, caudex base unknown. Leaves: basal and lowest cauline leaves
unknown; midstem leaves few, non-bracteate, sessile, 25-27 × 10-18 cm, oblong to obovate,
shallow-pinnately and unequally c. 9-lobed, chartaceous, base cordate-amplexicaul, lobes 3-10 ×
3-7 cm, ovate, adaxial surface indistinctly heterotrichous, puberulent and also sparsely short-
stipitate-glandular, non-glandular trichomes to c. 0.6 mm, abaxial surface loosely lanate,
trichomes patent, crisped, underlain by dense matted-pubescent, margins undulate to lobulate,
lobe apices obtuse, sinuses rounded, much narrower than the closely spaced lobes; distal cauline
leaves 3-6 × c. 1.5 cm, bracteolate, oblanceolate, subtending capitulescence branches.
Capitulescence 30-45 × c. 25 cm, corymbiform-paniculate, subpyramidal, many-capitulate,
terminal on main axis and on strongly ascending lateral proximally naked branches 15-30 cm, densely short-stipitate-glandular throughout, individual panicles 8-10 × 6-8 cm, terminal, ovate, bracteolate, bracteoles linear, nearly as long as associated branch or branchlets; peduncles 0.2-0.4 cm, 1-2-bracteolate; bracteoles 4-5 mm, linear. Capitula 9-14 mm, ecalyculate or subcalyculate; involucre 3.5-6 mm diam., cylindrical to turbinate; phyllaries 5, 7.5-9.5 × 1.5-2.5 mm, lanceolate, short-stipitate-glandular, outer ones sometimes violet distally. Disk florets 5-9; corolla 8.6-10 mm, salverform, glabrous, tube 4.5-5.5 mm, throat minute, c. 0.3 mm, lobes 3.8-4.2 mm, recurved, often faintly 3-nerved; anthers 3-3.2 mm, collar c. 0.4 mm, cylindrical, apical appendage lanceolate; style dilated in basal 0.5 mm, branches c. 1.5 mm. Cypselae 4-5.7 mm, obconic with apical constriction below the broader annulus, light brown, c. 16-costate, glabrous; pappus bristles c. 5 mm, subequal, about as long as corolla tube. Flowering Dec. Pine forest.

(Steyermark 32823, F). 2000-2200 m. (Endemic.)


Infrequent herbs to 1 m; stems unbranched until capitulescence, 6-7 mm diam. at base of capitulescence, obviously heterotrichous, sparsely to moderately villous-hirsutulous to villosulous, trichomes usually 0.2-0.4 mm, also short-stipitate-glandular, stipitate-glands usually 0.1(-0.2) mm, viscid, caudex base lanate. Leaves eglandular; basal and proximal cauline leaves c. 2, peltate; blade 10-18.5 cm, suborbicular, chartaceous, venation palmate, palmately 7-8 moderate-lobed, lobes 2.5-7 × 1.5-4 cm, elliptic-lanceolate to obovate, adaxial surface villous to sparsely so on larger veins, areoles to sparsely villous to glabrous, abaxial surface densely matted-pubescent, margins undulate to denticulate, lobe apices obtuse, sinuses rounded, much narrower than the closely spaced lobes; petiole 13-25 cm. Distal cauline leaves few, 4-10 × 1-8 cm, bracteate, not peltate, pubescence as on basal and proximal cauline leaves, palmately 7-lobed and broadly winged-petiolate grading to oblanceolate and sessile. Capitulescence 30-50 × c. 10 cm, corymbiform-paniculate, subcylindrical, many-capitulate, terminal on main axis and on 1-3 lateral branches, branches 7-10 cm, strict, strongly ascending, subtended by narrow bracteate leaf, bearing 1-4 few-capitulate rounded clusters 2-3 cm broad on branchlets 2-5 cm, branches and branchlets not overtopping central axis, moderately to densely hirsutulous and short-stipitate-glandular, bracteole; peduncles 0.5-1.5 cm, moderately to densely hirsutulous and short-stipitate-glandular, few-bracteolate; bracteoles 5-9 mm, linear, hirsutulous, eglandular. Capitula
15-17 mm; involucre 4.5-6 mm diam., cylindrical; phyllaries 5, 10-11 × 2-3 mm, lanceolate to broadly so, hirsutulous, eglandular. Disk florets 5; corolla 11-12 mm, salverform, glabrous, tube 7-8 mm, throat minute, c. 0.2 mm, lobes c. 3.8 mm, typically 3-nerved; anthers c. 3.3 mm, collar c. 0.3 mm, subcylindrical, gradually broadening distally; style dilated in basal 2 mm, branches c. 1 mm. Cypselae (2.5-)5-6 mm, obconic, 10+-costate, glabrous, apical annulus, c. 0.2 mm; pappus bristles 6-8 mm, unequal, about as long as corolla tube. Flowering Jan. Pine forest, mixed woods, open slopes and ravines. G (Williams et al. 22856, F). 2600-3200 m. (Endemic.)

Williams (1976) reports this as known from two collections, although I have seen only the type. Williams (1976) described the phyllaries as "7-8 mm" and as "glandular-puberulent" but those of the holotype are longer and eglandular. The species was not treated in the monograph of Psacalium by Pippen, although treated as Psacalium by Cuatrecasas (1955).


Psacalium pippenianum L.O. Williams.

Herbs 1-2 m; stems unbranched until capitulescence, 5-7 mm diam. at base of capitulescence, villous-hirsutulous to villosulous. Basal and proximal cauline leaves usually 2-4, peltate; blade 16-50(-60) cm, suborbicular, chartaceous, venation palmate, adaxial surface hirtellous to villosulous, abaxial surface villous, margins palmately 7-9-lobed 1/4-1/2 distance to petiole, lobes 3-10 × 3-8 cm, ovate to cuneate, secondarily 3-lobed, sinuses rounded, much narrower than the closely spaced lobes, margins otherwise undulate to denticulate, apices usually obtuse; petiole 20-35 cm. Distal cauleine bracteate leaves 1-4, 8-17 cm, not peltate, palmately lobed and broadly winged-petiolate grading to ob lanceolate or obovate and sessile, pubescence as on basal and proximal cauleine leaves. Capitulescence 20-40 × 7-30 cm, corymbiform-paniculate, lateral branches 1-3, to 20+ cm, strongly ascending, subtended by narrow bracteate leaf, villosulous-hirsutulous, sometimes also short-stipitate-glandular; peduncles 0.3-1 cm, villosulous-hirsutulous, bracteoles 1-4, 2-5 mm. Capitula 11-13 mm, subcalyculate; involucre 3-5 mm diam., cylindrical; phyllaries 5, 8-10 × 2-3.4 mm, lanceolate to elliptic-ovate, pluristriatulate, puberulent to glabrous, eglandular. Disk florets 5-6; corolla 6.5-9 mm, salverform, glabrous, tube 3.5-5 mm, throat minute, lobes 3-4 mm, often 3-nerved; style branches 1-1.5 mm. Cypselae 3.5- × 1-1.5 mm, obconic, 10+-costate, glabrous; pappus bristles 6.5-7.5 mm, much longer than corolla tube.
Flowering Sep-Nov. Cloud forests, pine-oak forest, pine forest. Ch (Breedlove y Strother 46287, MO). 900-3000 m. (Mexico.)

20. **Pseudogynoxys** (Greenm.) Cabrera


Por J.F. Pruski.

Erect to scandent or sprawling, suffrutescent vines; stems pluristriate, usually puberulent, internodes generally shorter than leaves, straight or rarely deflected at the nodes, pith often fistulose; herbage (when pubescent) with trichomes simple. Leaves simple, alternate, petiolate; blade lanceolate to ovate or cordiform, chartaceous or subcarnose, venation subpalmate (with some secondary veins not parallel to others) to pinnate (with secondary all more or less parallel), veins often arching toward apex, surfaces glabrous to subtomentose, margins subentire to coarsely dentate, rarely lobed (one South American species), apex acute to acuminate or sometimes attenuate. Capitulescence terminal or less commonly axillary, usually open and few-several capitulate, often long-pedunculate. Capitula radiate, many-flowered, calyculate; involucre 1-seriate, cylindric to broadly campanulate or hemispherical; phyllaries linear-lanceolate to lanceolate or rarely ovate, free or rarely some strongly connivent to near apex, mostly green; receptacle flat, usually squamulose. Ray florets pistillate; corolla orange to red, showy, limb oblanceolate to oblong (linear in bud). Disk florets bisexual, often moderately exserted from involucre; corolla long-tubular-funnelform, sometimes slightly zygomorphic, yellow to orangish-yellow, glabrous, limb narrowly ampliate, tube much longer than limb, lobes unequal or subequal, about as long as throat, lanceolate, often with evident medial resinous nerve; anther collar balusterform, thecae bases ecaudate, obtuse or short-auriculate, apical appendage lanceolate, slightly narrower at base than theca; style base abruptly bulbous, trunk often exserted distally, branches with paired stigmatic lines, the apices triangular to triangular-lanceolate, papillose, papillae shorter than branch diam. Cypselae cylindrical, c. 10-costate, setulose-puberulent, carpopodium annular; pappus of rays and disks similar, 3(-5)-seriate, of many subequal white barbellate bristles, about as long as involucre. 14 spp. Neotropics.

Species of _Pseudogynoxys_ were traditionally described with _Gynoxys_ Cass., a shrubby Andean genus of subtribe Tussilagininae characterized by opposite bicolor leaves. Greenman (1901) and most subsequent authors, however, aligned the species of _Pseudogynoxys_ with subtribe Senecioninae as _Senecio_ sect. _Convoluloidei_ as circumscribed as in Robinson y Cuatrecasas (1977) and Pruski (1996, 1997, 2012-Crasso). The implicit reduction by Turner (1991, 1996) of
Charadranaetes, Garcibarrigoa Cuatrec., and Talamancalia to synonymy of Pseudogynoxys is not followed here. Robinson y Cuatrecasas (1977) noted that the floral characters of Pseudogynoxys are constant, and species are distinguished mostly by leaf, capitulescence, and capitular characters as in the keys in Robinson y Cuatrecasas (1977) and Pruski (1996). Common names from the literature (e.g., Nelson, 2008) cannot be applied with certainty to individual species as misdeterminations are frequent in the genus.


1. Phyllaries, c. 8, sometimes connate to near apex.  
3. P. fragrans

1. Phyllaries 13-37, free.

2. Involucre 15-25(-30) mm diam.; phyllaries 10-15 mm, apices long-attenuate to caudate; ray florets with corollas dark orange to red; disk florets 100-150+.

2. P. cumingii

2. Involucre 5-16 mm diam.; phyllaries 4-8 mm, apices acute to acuminate; ray florets with corollas orange; disk florets usually 25-60.

3. Calycular bracteoles subglabrous to sparsely puberulent, eximbricate, apex straight; phyllaries glabrous or subglabrous; peduncles obviously broadened and obconic below involucre as a subreceptacle.

1. P. chenopodioides

3. Calycular bracteoles crisped puberulent to densely villosulous, usually subimbricate and subsquarrose; phyllaries subglabrous to more commonly at least sparsely crisped puberulent; peduncles usually only very slightly broadened below involucre as a short subreceptacle.

4. P. haenkei


Vines 1-5 m; stems trailing to climbing, glabrous or sometimes puberulent distally. Leaves: blade 2-9 × 0.5-5.5 cm, lanceolate to lanceolate-ovate, thin chartaceous or subcarnose, venation
arching-pinnate from above base, usually 2-3 pairs of larger secondary veins per side proximally, tertiary venation indistinct, surfaces usually glabrous, base broadly cuneate or obtuse to rounded or truncate, margins coarsely and remotely serrate or sometimes subentire, teeth usually 5-10 per side, apex acute to attenuate; petiole 0.7-2(-3) cm. Capitulescence terminal, subcymose-corymbiform, usually 3-13-capitulate; peduncles (2-)3-9 cm, obviously broadened and obconic below involucr as a subreceptacle where calycular bracteoles attach, sparsely puberulent or sometimes glabrous. Capitula usually 10-15 mm; involucre usually 8-15 mm diam., campanulate; phyllaries (13-)21, 3.5-6 × 1-1.5 mm, nearly subequal to exterior subreceptacle, lanceolate, free, apex acute to acuminate, glabrous or subglabrous; calycular bracteoles 2-10 × 0.3-0.4 mm, usually shorter than phyllaries, linear, loosely spirally inserted, eximbricate, usually ascending to spreading, apex straight, sometimes blackened, subglabrous to sparsely puberulent, margins often ciliolate; receptacle 10-15 mm diam., glabrous to puberulent, external subreceptacle nearly as long as phyllaries. Ray florets 15-24; corolla orange, limb 12-20+ × 2-4 mm, lanceolate to elliptic-lanceolate. Disk florets c. 60; corolla 7-10 mm, lobes 1.5-2.5 mm; style branch appendage 0.5-0.7 mm, triangular-lanceolate. Cypselae 1.5-2.5 mm; pappus 5-8 mm, usually reaching to near base of disk corolla lobes. Flowering year-round. Mangrove forests, roadsides, secondary vegetation, selva baja, selva mediana, selva perennifolia, thickets. T (Peréz et al., 2005: 85); Ch (Breedlove, 1986: 54); Y (Darwin 2443, MO); C (Cabrera y Cabrera 15333, MO); QR (Cabrera et al. 8335, MO); B (Arnason y Lambert 17649, NY); G (Contreras 9532, MO); H (Nelson et al. 3590, MO); ES (Lara 2172, MO); N (Guzmán y Castre 69, MO). 0-1000 m. (S. Estados Unidos [escaping from cultivation along the Gulf Coast], Mexico, Mesoamerica, Colombia, Venezuela, Guyana, Surinam, Greater Antilles, Virgin Islands; widely cultivated and sometimes escaping elsewhere in South America and in the Paleotropics.)

_Pseudogynoxys chenopodioides Senecio kermesinus_, known for more than half a century as _Senecio confusus_, was circumscribed broadly by Barkley (1975), Clewell (1975), Williams (1976, 1984), and Dillon et al. (2001), who treated it as the only species in Mexico and Central America. Most determinations, distributions, and elevational ranges in the Mesoamerican literature under the name _P. chenopodioides_ refer instead to other species, especially to _P. haenkei._


Vines 1-6 m; stems climbing or rarely prostrate, puberulent to densely pubescent distally. Leaves: blade mostly 4-16 × 2-8.5 cm, lanceolate to ovate, chartaceous, venation arching-pinnate, usually 4-6 pairs of larger secondary veins per side, tertiary venation reticulate, base usually obtuse to truncate, surfaces puberulent, margins crenulate to serrate or doubly serrate, teeth often 10-22 per side, apex acuminate to attenuate; petiole 0.5-3 cm. Capitulescence terminal, mostly subcymose, 1-3(-5)-capitulate; peduncles (2-)3-12 cm, usually stout but very slightly broadened below involucre as a short subreceptacle, usually crisped puberulent. Capitula 15-20 mm; involucre 15-25(-30) mm diam., campanulate to hemispherical; phyllaries usually 21-37, 10-15 × 1-1.5 mm, linear-lanceolate, much longer than exterior subreceptacle, adjacent phyllaries free, usually puberulent, apex long-attenuate to caudate, reddish; calycular bracteoles 15-25+, 5-10 × c. 1 mm, usually shorter than phyllaries, usually lanceolate, moderately densely inserted, subimbricate, usually spreading, puberulent but usually less so than subreceptacle; receptacle 6-10 mm diam., external subreceptacle much shorter than phyllaries, usually densely crisped puberulent. Ray florets 21-34; corolla dark orange to red, limb 15-20 × 3-4 mm, usually lanceolate to elliptic-lanceolate. Disk florets 100-150+; corolla 10-13 mm, lobes 2-3 mm; style branch appendage 0.7-1 mm, triangular to triangular-lanceolate. Cypselae 2-4 mm; pappus 8-10 mm, usually reaching to near base of disk corolla lobes. Flowering (Nov-)Jan-Jun, Sep. *Bosques seco tropical, forest edges, gallery forests, lava flows, roadsides, secondary vegetation, streamssides, thickets.* Ch (Croat 47483, MO); G (Greenman y Greenman 5837, MO); ES (Berendsohn y Araniva de González, 1989: 290-10); N (Friedrichsthal 986, NY); CR (Hoffmann 497, GH); P (Allen 1624, MO). 0-1500(-1800) m. (Mexico, Mesoamerica, Colombia, ?Venezuela)

*Pseudogynoxys cumingii* was treated as a synonym of *P. chenopodioides* by Barkley (1975), but was circumscribed by Standley (1938) as done here, albeit under the name *Senecio hoffmannii*. Although typified by material from Nicaragua, *P. cumingii* was not mentioned in Dillon et al. (2001). Pruski (1996) reported the species to be in cultivation in the southern United States. These showy plants occur principally on the Pacific watershed.

Senecio skinneri Hemsl.

Vines 3+ m; stems climbing, roots tuberous; herbage glabrous or subglabrous. Leaves: blade 3.5-9 × 1.5-5.5 cm, lanceolate to ovate, subcarnose, venation arching-pinnate, secondary venation not prominent, base cuneate to rounded, margins entire, sometimes undulate, apex acute to acuminate; petiole 1.4-3.5 cm. Capitulescence terminal, subcymose, 5-6-capitulate; peduncles 3-4.8 cm, very slightly broadened below involucre as a short subreceptacle. Capitula 18-22 mm; involucre 10-13 mm diam., cylindrical-campanulate; phyllaries c. 8, 10-13 × 2-5 mm, lanceolate to ovate, much longer than exterior subreceptacle, free or adjacent phyllaries sometimes connate to near apex, apex acute to acuminate; calycular bracteoles 4-6, c. 5 × 0.5 mm, much shorter than phyllaries, linear, very loosely inserted, eximbricate; receptacle 5-7 mm diam., external subreceptacle much shorter than phyllaries. Ray florets 5-7; corolla orange, limb 13-19 × c. 0.8 mm, linear. Disk florets 16-17; corolla 10-12 mm, lobes 1-1.5 mm. Cypselae 1.5-3 mm; pappus 8-10 mm, usually reaching only to near base of disk corolla limb. Habitat unknown. G (Skinner s.n., K). Elev. unknown. (Endemic.)

Although known only from the cultivated holotype, Pseudogynoxys fragrans is provisionally accepted based on its seemingly unique phyllary characters. The characters of entire cuneate-based leaves and narrow ray corolla limbs, although characteristic, occur elsewhere in species from Mesoamerica.


Vines 2-6+ m; stems climbing to sometimes trailing, usually puberulent to densely pubescent distally, often glabrate proximally. Leaves: blade mostly 4-12 × 1-8 cm, lanceolate to ovate, chartaceous, venation arching-pinnate, usually 3-4 pairs of larger secondary veins per side in proximal half, tertiary venation reticulate, surfaces puberulent, base usually obtuse to truncate or sometimes subcordate, margins crenulate or finely serrate to less commonly remotely serrate or entire, teeth often 10-20 per side, apex acuminate to attenuate; petiole 1-4 cm. Capitulescence terminal, subcymose to more commonly corymbiform-paniculate, (4-)7-35-capitulate; peduncles 1-2(-4) cm, usually only very slightly broadened below involucre as a short subreceptacle, less
commonly subreceptacle broadened, densely crisped puberulent to densely villosulous. Capitula 8-15(-20) mm; involucre 5-9(-13) mm diam., cylindrical to infrequently campanulate; phyllaries usually 13-21, 5-8 × c. 1 mm, lanceolate, subequal to much longer than exterior subreceptacle, adjacent phyllaries free, apex acute to acuminate, subglabrous to more commonly at least sparsely crisped puberulent; calycular bracteoles 10-15, 3-4(-5) × c. 0.5 mm, much shorter than phyllaries, usually lanceolate, moderately densely inserted, usually subimbricate, usually subsquarrose, crisped puberulent to densely villosulous; receptacle 2-5(-8) mm diam., external subreceptacle usually much shorter than phyllaries, usually crisped puberulent to villosulous. Ray florets usually 8-15; corolla orange, limb 6-17 × 2-4 mm, usually lanceolate to elliptic-lanceolate, very infrequently linear. Disk florets usually 25-50(-60); corolla 7.5-11 mm, lobes 1.5-2.5 mm; style branch appendage 0.5-0.6(-0.7) mm, triangular to triangular-lanceolate. Cypselae 1.5-3 mm; pappus 5.5-8 mm, usually reaching only to near base of disk corolla limb. Flowering year-round. 

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Pseudogynoxys haenkei is the most common Mesoamerican species of the genus, but was treated by Williams (1976, 1984) and Dillon et al. (2001) in synonymy of *P. chenopodioides*. By vegetative features the type of synonymous *Senecio rothschuhianus* Greenm. superficially resembles *P. fragrans*, but it matches *P. haenkei* in capitular features.

21. **Robinsonecio** T.M. Barkley et Janovec

Por J.F. Pruski.

Small subscapose perennial rosulate herbs, caudex thick, root fibrous; scapes 1(-2) per plant, basally copiously floccose to lanate, sometimes glabrate distally, rosette prominent, cauline leaves remote and reduced; herbage lanate to glabrate, eglandular. Leaves sessile of marginally petiolar; blade oblanceolate or oblong to spatulate or obovate, never lobed, margins entire to remotely denticulate. Rosette leaves spirally alternate; blade secondary venation indistinct, base gradually attenuate onto narrowly winged petiolar base that is dilated near caudex, margins entire to remotely denticulate, sometimes revolute, surfaces often discolored. Cauline leaves sessile, margins entire. Capitulescence erect or ascending, laxly cymose, 1-6-capitulate. Capitula radiate, irregularly and loosely calyculate; involucre campanulate; phyllaries 13-20, imbricate, arachnoid
or villous at least proximally, often glabrate distally, margins of inner phyllaries sometimes broadly scarious; receptacle solid. Ray florets pistillate; corolla yellow or golden-yellow, limb well-exserted. Disk florets bisexual, slightly exserted from involucre; corolla narrowly funnelform, yellow, glabrous, tube and limb subequal, lobes triangular-lanceolate to lanceolate, ascending to sometimes slightly spreading, with or without a medial resinous nerve; anthers mostly included, collar cylindrical, equal in diameter to filaments, endothecial tissue typically radial, apical appendage triangular, acute apically; style base slightly dilated and sitting atop the basal nectary rather than immersed within nectary, branches weakly exserted, slightly recurved, apex obtuse to truncate, papillose in a subapical-abaxial semicircle below apex, stigmatic surface continuous. Cypselae cylindrical, 10-nerved, base gradually narrowed, carpopodium prominent; pappus bristles of rays and disks similar, white, barbellate, about as long as the disk corollas. \( x = 30 \). 2 spp. Mexico, Mesoamerica.

This treatment is based on that in Pruski (2012-ROB). Barkley y Janovec (1996) gave the endothecium of *R. gerberifolius* as polarized, but Pruski (2012-ROB) found that more typically it has a radial endothecial pattern. Barkley y Janovec (1996) mentioned that *Senecio cuchumatanensis* is likely a species of *Robinsonecio*, but this species excluded to *Senecio* by Pruski (2012-ROB), who showed it to have seneciod microcharacters.


Herbs 15-33 cm, scapes usually 1-3-leaved. Rosette leaves long-petiolariform; blade 2-15 × 0.7-2.5(-3.5) cm, narrowly oblanceolate or oblong to spatulate or obovate, subcoriaceous, midrib sometimes impressed adaxially, apex acute to less commonly obtuse, slightly to obviously discolorous, adaxial surface gray-green to green, sometimes nitidous, arachnoid-floccose to glabrate, abaxial surface grayish-white, tomentose to lanate; petiolar base 1-8 cm. Cauline leaves 1-3; blade 2-7 cm, lanceolate or infrequently oblanceolate, semiamplexicaule. Capitulescence scape 14-31.2 cm, striate or few-angled, densely floccose or lanate to sometimes arachnoid or glabrate in patches; peduncles (when pluricephalous) 1-8(-10) cm. Capitula 10-18 mm; involucre 10-15 mm diam., loosely arachnoid-floccose in bud; phyllaries c. 13, 8-13 × 2-3.5 mm, elliptic-
lanceolate to narrowly ovate, greenish-yellow, pluristriate, arachnoid proximally and glabrate distally, apex acute, sometimes purplish; calycular bracteoles 1-5(-7), 7-12 × 0.7-1.1 mm, about 3/4 as long as the phyllaries, linear-lanceolate, green; receptacle convex, foveolate. Ray florets usually 13(11-15); corolla tube 5-6 mm, limb 11-15 × 3-4 mm, elliptic-lanceolate, 4-9-nerved, 3-denticulate, apical teeth 0.1-0.3 mm. Disk florets 35-65; corolla 8-10 mm, lobes 1-1.6 mm, typically with a medial resinous nerve; anthers 2.5-3 mm, thecae bases obtuse, not caudate, endothelial tissue radial, connate zone between anthers usual with cells thickened at poles; style branches 1.2-1.5 mm. Cypselae 3-4 mm, brown, glabrous to pilose, trichomes to 0.5+ mm; pappus 6.5-8.5 mm. 2n = 60. Flowering Aug, Dec. Rocky subalpine zone. G (Steyermark 50178, MO). 3300-3700 m. (S. Mexico, Guatemala.)

22. Roldana La Llave


Por J.F. Pruski y A.M. Funston

Perennial caulescent ( ours) leafy-stemmed non-pachycaulous herbs, shrubs, or small trees, usually leafy-stemmed and leafy when flowering with stems elongate immediately below capitulescence (rarely subcaulescent herbs, rarely subpachycaulous seasonally deciduous flowering when leafless subforeshortened-stemmed shrubs); stems erect to ascending, simple-stemmed or branching only distally, leaves clustered to distally evenly distributed, subterete or rarely angled, sometimes linear-maculate, usually slender with large solid pith or stems fistulose, cortex without resinous ducts (rarely subresinous); herbage usually various pubescent or sometimes glabrous, trichomes simple, sometimes stipitate-glandular with cap cell only slightly bulbous. Leaves simple to pinnatifid, alternate, petiolate, petiole marginal or leaves infrequently centric-peltate, very rarely sessile; blade various, sometimes pinnatifid, usually stiffly chartaceous, typically more or less ovate to round and 5-13 lobed, lobe apices acute to rounded, sinus depth typically about half way to midrib but ranging from subentire to deeply incised but in ours never incised basically to midrib, venation palmate to sometimes pinnate, adaxial surface typically glabrescent, abaxial surface glabrate to densely lanate-tomentose or canescent, margins usually finely denticulate on and between lobes, infrequently subentire between serrations or lobes. Capitulescence typically corymbiform-paniculate, infrequently open-cymose, often leafy-bracteate; peduncles typically with bracts or bracteoles filiform to obovate. Capitula radiate to less frequently disciform or discoid, usually paucicalyculate (rarely ecalyculate), corollas
homochromous; involucre cylindrical to campanulate; phyllaries mostly 5-13, usually ovate or outer sometimes lanceolate; often gibbous-carinate basally, typically glabrous or stipitate-pubescent, sometimes arachnoid or tomentose; calycular bracteoles usually (0-)1-5, usually 1-3 mm, usually linear; receptacle surface alveolate and ridged. Ray florets (0-)3-5(-8); corolla usually yellow (but ranging from ochroleucous to orange), glabrous or infrequently pubescent, limb moderately exserted, 4-nerved. Disk florets 6-30(-90+), bisexual; corolla sometimes slightly zygomorphic, funnelform to narrowly campanulate, typically shortly 5-lobed, yellow, usually yellow, glabrous or infrequently pubescent, lobes typically much shorter than throat; anthers collar cylindrical, thecae ecaudate, base rounded or short-auriculate, endothecial tissue semipolarized, apical appendage ovate-lanceolate; style exappendiculate, base cylindrical or dilated, free from nectary, branches each with a continuous stigmatic surface reaching to apex, apex obtuse to conical, not papillose-tufted. Cypselae glabrous or rarely pubescent, cylindrical, (5 or)10-costate, eglandular or rarely glandular, ovary or ovule epidermal cells usually with drusiform and simple crystals, carpododium sometimes enlarged; pappus of numerous white capillary bristles, several-seriate. Aprox. 53 spp. Few United States, most Mexican, about a dozen in Central America, mostly in cloud forests or pine-oak forests; one sp. commonly cultivated pantropically.

Species of *Roldana* were historically treated in *Senecio* (e.g., Hemsley, 1881; Williams, 1975, 1976), but the genus was resurrected by Robinson y Brettell (1974) and aligned with those now placed into subtribe Tussilagininae. Among Central American Tussilagininae, *Roldana* by sometimes peltate leaves and short disk corolla lobes is similar to *Psacaliopsis*, which differs by basically acaulescent subscapose habit. Keys to species have been provided by Greenman (1926), Gibson (1969), Robinson y Brettell (1974), Turner (2005), Funston (2008), and (Pruski 2012-Rold). This treatment is adapted from that of Pruski (2012-Rold).

I presume that the report by García-Pérez (2001) of *R. angulifolia* (DC.) H. Rob. et Brettell in Chiapas is in reference to material I would determine as or near *R. gilgii*. *Roldana lineolata* (DC.) H. Rob. et Brettell (is similar *R. schaffneri* and) has been reported in Miahuatlan, Oaxaca, has possibly been misapplied to Mesoamerica (e.g., Ramirez y Hernandez 374 on the CAS web site), but nevertheless should be looked for in Chiapas. *Roldana eriophylla* and *R. schaffneri* are treated here following Robinson y Brettell (1974), but were noted as atypical by Robinson y Brettell (1974), Turner (2005), and Pruski (2012-Crasso, 2012-Rold). With limited conviction I refer *R. schaffneri* to *Roldana* and southern Central American collections to this species, rather than to *Telanthophora grandifolia*. *Roldana lobata* was reported by Funston (2008) in Guatemala from budding material only; verification of it there awaits collection of fertile material. This budding
Guatemalan material was referred (along with the future type of *Senecio quezalticus*) to *R. aschenborniana* by Gibson (1969). *Roldana quezaltica*, recognized by Williams (1975, 1976), is treated in synonymy of *R. aschenborniana* following Funston (2008). Central American material called *R. oaxacana* by Turner (2005) and *R. petasitis var. petasitis* by Funston (2008), is recognized here as *R. petasioides* as in Clewell (1975), Robinson (1975), and Williams (1976, 1984). *Roldana petasisitis* is excluded from Central America.

The type of *Jungia guatemalensis* Standl. y Steyerm. (= *Jungia ferruginea* L. f.) was originally misidentified as a *Roldana*. Indeed, by palmate-lobed leaves and subequal, 1(-2)-seriate phyllaries, *Jungia* (tribe Nassauvieae) is superficially similar to *Roldana*, but differs in tribal characters.


1. Subpachycaulous subforeshortened-stemmed shrubs or trees usually seasonally deciduous flowering when leafless; disk corolla lobes longer than throat; cortex sometimes subresinous.

5. **R. eriophylla**

1. Non-pachycaulous elongate-stemmed herbs, shrubs, or trees flowering when leafy; stems elongate; disk corolla lobes subequal to or shorter than throat; cortex without resin ducts.


3. Leaf blade venation pinnate to subpinnate.

4. Leaf surfaces slightly discolorous, abaxial surfaces persistently tomentulose to pubescent; capitulescence not held well above stem leaves; disk florets only slightly exserted from involucre.

2. **R. aschenborniana**

4. Leaf surfaces obviously discolorous, abaxial surfaces usually densely lanate-tomentose; capitulescence held above stem leaves; disk florets moderately exserted from involucre.

3. **R. barba-johannis**

3. Leaf blade venation palmate to triplinerved.
5. Capitulescences loosely corymbiform-paniculate; capitula 9-18 mm.

6. Capitula radiate; herbage indistinctly stipitate-glandular, trichomes 0.5-1 mm; leaves with petiole marginally attached; phyllaries 2-3.5 mm diam.

   6. R. gilgii

6. Capitula disciform; peduncles and phyllaries with indumentum mostly of dense stipitate-glands, stipitate glands 0.1-0.2 mm; leaves eccentrically peltate below capitulescences; phyllaries 1-2 mm diam.

   8. R. heterogama

5. Capitulescences with ultimate clusters moderately dense; capitula 7-13 mm.

7. Leaf blades suborbicular to reniform, venation palmate; stems densely lanate-tomentose, pith solid; abaxial leaf blade surfaces densely and persistently lanate-tomentose.

   10. R. lanicaulis

7. Leaf blades rhomboidal to ovate, venation triplinerved; stems densely floccose-tomentose to glabrate in patches, fistulose; abaxial leaf blade surfaces arachnoid-pubescent to floccose-tomentulose.

   11. R. lobata

2. Phyllaries 5-8.

8. Leaf blade venation pinnate; phyllaries 5(-6).

   15. R. schaffneri

8. Leaf blade venation palmate to triplinerved; phyllaries usually (5-)8.

9. Capitulescence branches and peduncles sparsely arachnoid-puberulent to glabrate, trichomes always non-glandular; phyllaries glabrous.

   10. Stems usually quadrangular-hexagonal; leaf blades triplinerved; capitulescences leafy-bracteate; phyllaries 8; Guatemala and Chiapas.

   1. R. acutangula

   10. Stems subterete; leaf blades palmately 5-11-veined; capitulescences not leafy-bracteate; phyllaries 5(-6); Costa Rica.

   14. R. scandens

9. Capitulescence branches, peduncles, or phyllary pubescence at least in part of stipitate-glands (or granular-papillose trichomes) or phyllaries usually sparsely hirsutulous with indistinctly stipitate-glands.

   11. Capitula discoid or disciform.

   12. Capitula discoid; phyllaries 4-6.5 mm, usually obviously stipitate-glandular; disk corollas glabrous; leaf blade margins shallowly 5-9-lobed.

   4. R. cristobalensis
12. Capitula disciform; phyllaries 10-13 mm, usually sparsely hirsutulous; disk corolla tubes puberulent; leaf blade margins (5-)7-13-lobed about 1/2 way to midrib base.  

7. R. greenmanii

11 Capitula radiate.

13. Leaf blade abaxial surfaces glabrous throughout or sometimes puberulent-hirsutulous on veins basally.  

9. R. jurgensenii

13. Leaf blade abaxial surfaces hirtellous, loosely arachnoid-puberulent, or floccose-tomentose.

14. Leaf blade abaxial surfaces floccose-tomentose; capitula 10-15 mm; phyllaries 6.5-9 mm.  

13. R. petasioides

14. Leaf blade abaxial surfaces hirtellous or loosely arachnoid-puberulent; capitula 7-10 mm; phyllaries 4-6.5 mm.

15 Leaf margins moderately lobed; disk floret corollas glabrous.  

12. R. oaxacana

15. Leaf margins shallowly lobed; disk floret corolla tubes papillose-puberulent.  

16. R. tonii


Senecio acutagulus (Bertol.) Hemsl.

Robust shrubby perennial herbs 1-2.5(?-4) m; stems straight or rarely deflected, usually quadrangular-hexagonal with costa on angles larger than the striae on each face, very loosely arachnoid-puberulent to glabrate; herbage (when pubescent) with non-glandular trichomes. Leaves with petiole marginally attached; blade 6-23 × 5-17 cm, ovate to suborbicular, venation 3-5-palmate from very base or sometimes in larger leaves from near base, usually with a distal pair of larger secondary veins also strongly ascending, adaxial surface puberulent-papillose to glabrate, abaxial surface hirtellous on veins and sometimes in areolae to glabrate, base cordate to sometimes merely truncate, moderately 5-7-palmatilobed, lobes usually 1-3 cm, triangular, apex acute; petiole 4-12(-18) cm. Capitulescence corymbiform-paniculate to thyrsoid-paniculate, usually leafy-bracteate at base, branches and peduncles sparsely arachnoid-puberulent to glabrate, trichomes always non-glandular, leafy bracts petiolate; peduncles 2-10 mm. Capitula 9-11 mm,
radiate; involucre 2-3 mm diam., cylindrical-turbinate; phyllaries 8, 6-8 × 1.4 mm, glabrous. Ray florets (2-)3-5; corolla yellow, tube glabrous, limb 5-7 mm. Disk florets 5-9; corolla 7-8.5 mm, glabrous, lobes 2-2.5 mm. Cypselae 1.5-2 mm, glabrous or sparsely setulose; pappus bristles 5.5-7 mm. 2n = 60. Flowering Nov-Mar. Cloud forests, montane forest, thickets, volcano slopes. Ch (Shilom Ton 553, MO); G (Standley 58735, MO). (1200-)1500-3300 m. (Endemic.)


Roldana quezaltica (L.O. Williams) H. Rob., Senecio quezalticus L.O. Williams.

Shrubs 1.5-3 m; stems sometimes deflected at the distal nodes, leaves only slightly descrescent, flocose-tomentose to glabrate proximally, pith solid; herbage (when pubescent) with non-glandular trichomes, not stipitate-glandular. Leaves with petiole marginally attached; blade 5-11(-15) × 4-10(-11.5) cm, ovate to orbicular, venation typically subpinnate or pinnate, basal portion of midrib often prominent abaxially, surfaces slightly discolorous, adaxial surface glabrate or veins sparsely hirtellous, abaxial surface persistently tomentulose to pubescent, shallowly 5-9-lobulate, lobules 0.4-1 cm, broadly triangular, base rounded to subcordate; petiole 4-6(-9) cm. Capitulescence moderately dense-corymbiform, leafy and not held well above full-sized stem leaves, bracteoles 2-5 mm; peduncles 5-10 mm, arachnoid-pubescent. Capitula 6-9 mm, radiate; involucre 3-4 mm diam., cylindrical-turbinate, disk florets only slightly exserted; phyllaries 11-13, 5-7 × c. 1 mm, glabrous or very base arachnoid-pubescent. Ray florets 6-8; corolla yellow, glabrous, limb 5-7 mm. Disk florets 10-15; corolla 5.5-7 mm, glabrous, lobes to 1 mm. Cypselae c. 2 mm, glabrous; pappus bristles 5-6.5 mm. 2n = 60. Flowering Jan-Apr. Cloud forests, montane forest. Ch (cited by García-Pérez, 2001: 938); G (Standley 84286, MO). (2000-)2400-3000 m. (Mexico, Mesoamerica.)

Greenman (1926) gave 8 as the number of phyllaries, which is the technical character of the otherwise similar R. albonervia (Greenm.) H. Rob. et. Brettell. Gibson (1969) gives the leaf venation as sometimes palmate, but at least as the species is manifest in Mesoamerica the venation is subpinnate or pinnate (Williams, 1975). Williams (1975, 1976) recognized R. quezaltica, but Funston (2008) treated it in synonymy of typically more densely pubescent-leaved R. aschenborniana. Turner (2005) listed R. hirsuticaulis (Greenm.) Funston in synonymy, but this
Mexican species was recognized by Funston (2008) and was provisionally recognized as distinct by Pruski (2012-Rold).


Simple-stemmed to few-branched subshrubs to small trees 1-3(-5) m, caudex woody; stems sometimes deflected at the distal nodes, reddish brown, leaves usually moderately descrecent, lanate-tomentose distally. Leaves with petiole marginally attached; blade 7-15 × 5-11 cm, elliptic-lanceolate to orbicular, subcoriaceous, venation pinnate to subpinnate with 2-4 main secondary veins per side, surfaces obviously discolorous, adaxial surface glabrous or veins pubescent, abaxial surface usually densely lanate-tomentose or rarely weakly tomentose, base rounded to subcordate, margins subentire or denticulate to sinuous or 5-9-lobulate, lobules low-triangular; petiole 2-9 cm, tomentose. Capitulescence thyrsoid-paniculate, held above stem leaves, branches tomentose, bracts 3-5 mm, linear; peduncles 2-10 mm, bracteoles 0-2, 1-2 mm, linear. Capitula 8-11 mm, radiate or rarely discoid; involucre c. 3 mm, campanulate, disk florets moderately exserted; phyllaries 10-13, 4-5 × 0.8-1.5 mm, arachnoid-tomentose to glabrate, apex usually purplish. Ray florets (0-)5-9; corolla yellow, glabrous, limb (1-)4-6 mm. Disk florets 10-18; corolla 6-8.5 mm, glabrous, lobes 1.1-1.5 mm. Cypselae 1-2 mm, c. 5-costate, glandular, otherwise glabrous; pappus bristles 6-8 mm. 2n = 60. Flowering Nov-Apr. Oak forests, pine-oak forests, secondary forests, rocky slopes. Ch (*Ton 8066*, MO); G (*Pruski y Ortiz 4266*, MO); H (*House 1199*, MO). 2000-3300(-3700) m. (Mexico, Mesoamerica.)


Fragrant shrubs 1-2.5 m; stems straight or deflected at distal nodes, sometimes raised-lenticellate, hirsutulous to hispidulous; herbage mostly non-glandular proximally or mostly stipitate-glandular throughout or only distally. Leaves with petioles basically marginal or very slightly excentrically subpeltate and attached within 2-5 mm of blade base; blade usually 7-20 ×
7-23 cm, suborbicular or reniform, venation triplinerved or palmate, base cordate to sometimes truncate, margins shallowly 5-9-lobed, lobes 1-2.5(-3.5) cm, deltate to broadly triangular, apex obtuse to broadly acute, adaxial surface hirsutulous or hirtellous to glabrate, abaxial surface sparsely hirsute-hispidulous; petiole 5-15 cm. Capitulescence corymbiform-paniculate, leafy bracteate, branches and peduncles stipitate-glandular or sometimes heterotrichous with scattered non-glandular trichomes, bracteate leaves usually 3-8 cm, stipitate-glandular, sessile or proximal-most winged petiolariform; peduncles 3-12 mm. Capitula 9-11.5 mm, discoid; involucre 3-4 mm diam., turbinate; phyllaries 8, 4-6.5 × 1.2-2 mm, obviously stipitate-glandular, trichomes sometimes also non-glandular, rarely mostly non-glandular; calycular bracteoles rarely nearly as long as phyllaries. Ray florets absent. Disk florets 8-16; corolla 5.5-7 mm, campanulate, glabrous, tube sometimes elongate and longer than limb, lobes 1-1.5 mm. Cypselae 1.5-3 mm, glabrous; pappus bristles 5-6 mm. 2n = 60. Flowering Nov-Mar. Montane cloud forests, pine-oak forests, roadsides, streamsides. Ch (Pruski et al. 4212, MO); G (Tuerckheim II 678, NY). 1000-2400 m. (Mexico [Oaxaca], Mesoamerica.)

Roldana cristobalensis was treated by Turner (2005) in synonymy of R. oaxacana and by Funston (2008) as a variety of extra-Mesoamerican R. petasitis, but was recognized at the specific rank by Gibson (1969), Robinson y Brettell (1974), Williams (1976), and Pruski (2012-Rold).


Pittocaulon calzadanum B.L. Turner.

Seasonally deciduous subpachycaulous subforeshortened-stemmed shrubs or trees 1-5 m, flowering when leafless, cortex sometimes subresinous; stems straight, slightly foreshortened immediately below capitulescence, usually 2-3-branched just below the foreshortened apex, new growth floccose-tomentose, sparsely arachnoid-puberulent to glabrate proximally, pith seemingly solid; herbage with non-glandular trichomes only. Leaves with petiole marginally attached; blade 4-12 × 2-7.5 cm, ovate to rhomboidal, venation pinnate, surfaces gray-tomentose or occasionally adaxial surface loosely arachnoid-tomentose, base rounded to cordate, margins 5-11- lobed, lobes 0.5-2 cm, deltate to triangular, margins subentire between lobes, apex acute to obtuse; petiole 2.5-4(-6) cm. Capitulescence thyrsoid-paniculate, not leafy-bracteate, lateral branchlets usually 3-7, 4-6 cm, nearly at right angles to central axis, ultimate capitula closely rounded-clustered on these naked branchlets; peduncles 3-9 mm, floccose-tomentose. Capitula 10-12 mm, discoid; involucre
3-4.5 mm diam., cylindrical-turbinate; phyllaries 8, 6-8 × 1.2-2.5 mm, carinate, dark-carinate basally, arachnoid-tomentose basally, eglandular, glabrous in distal 2/3. Ray florets absent. Disk florets 8-12; corolla 7-9 mm, white to yellow, glabrous, lobes 2-4 mm, longer than or sometimes subequal to throat. Cypselae 2-4 mm, 10-12-striate, glabrous; pappus bristles 6-7.5 mm.

Flowering Mar-Apr. Rocky forests, selva baja caducifolia. Ch (Purpus 277, MO); G (Steyermark 50784, MO). 700-1600 m. (S. Mexico, Mesoamerica.)

Turner (1995) described plants of this taxon as Pittocaulon calzadanum and stated that it has cortical resin ducts. Subsequently, Turner (2005) reduced P. calzadanum to synonymy of R. eriophylla. Indeed, Greenman (1926) had earlier treated this taxon within Senecio sect. Palmatinervii. Roldana eriophylla was noted by Pruski (2012-Crass, 2012-Rold) as the only seasonally deciduous subpachycaulous subresinous subforeshortened-stemmed species in Roldana (i.e., Greenman's Senecio sect. Palmatinervii), thus mixing characters of the normally distinctive genera Digitacalia, Pittocaulon, and Telanthophora. Sterile off-season leafy collections are similar to R. aschenborniana, but differ by their leaf margins subentire between lobes.


Shrubby robust perennial herbs to shrubs 1.5-4 m; stems remotely leafy distally, reddish lanate-tomentose; herbage with patent indistinctly stipitate-glandular trichomes 0.5-1 mm. Leaves with petiole marginally attached; blade 8-22 × 12-30 cm, suborbicular to reniform, subcoriaceous, venation palmate, surfaces slightly discolored, adaxial surface pilose-hirsute, abaxial surface moderately to densely pilose-hirsute, 9-13+- lobulate, lobules 1.5-3 cm, deltate to triangular; petiole 10-20 cm. Capitulescence loosely corymbiform-paniculate, leafy bracts only subtending larger branches, branchlets reddish lanate-tomentose, bracteoles 4-5 mm, linear; peduncles mostly (5-)10-25 mm, stout, reddish lanate-tomentose, bracteoles 2-6, 2-4 mm, linear. Capitula 12-18 mm, radiate; involucre 7-12 mm diam., campanulate; phyllaries 11-13, 10-13 × 2-3.5 mm, oblong, reddish lanate-tomentose or the inner ones only narrow-medially so and laterally smooth and pluristriatulate. Ray florets 8-9(-10); corolla yellow, glabrous, limb 5-8 mm. Disk florets 25-35; corolla 8-10 mm, glabrous, lobes 2-2.5 mm, lanceolate, about as long as throat. Cypselae 3-4 mm, glabrous; pappus bristles 7-9 mm. Flowering Jan-Mar. Montane rain forests, pine-oak.
forests, thickets, volcano slopes. Ch (Breedlove 24411, MO); G (Skutch 2131, MO). (1400-)1900-2700(-3000) m. (Endemic.)

By herbage with long trichomes and large capitula, R. gilgii is similar to the widespread R. angulifolia (DC.) H. Rob. et Brettell. Roldana angulifolia, which has southeastern-most stations on Pico Orizaba and Sierra San Felipe, should be looked for in Mesoamerica, and differs by an ebracteate capitulescence and discoid capitula with 8 phyllaries. Roldana angulifolia was reported in Chiapas by García-Pérez (2001), but that report is presumably in reference to material I would determine as or near R. gilgii.


Senecio greenmanii (H. Rob. et Brettell) L.O. Williams.

Shrubby perennial herbs to trees 1-5(-7) m; stems hirsute, pithy; herbage with patent multicelled crisped to elongate trichomes 0.3-2 mm and distally in capitulescence usually indistinctly stipitate-glandular. Mid-stem leaves usually with petioles basically marginal, very slightly excentrically subpeltate in the infrequently collected proximal leaves; blade usually 8-20(-30) × 10-25(-35) cm, suborbicular or reniform, venation palmate or triplinerved, base cordate, (5-)7-13-lobed about 1/2 way to midrib base, lobes 1-9 × 1-3 cm, obovate, surfaces concolorous, adaxial surface sparsely puberulent to glabrous, abaxial surface sparsely to moderately hirsutulous or hirsute; petiole 10-25 cm. Distal leaves usually 6-10 cm, obovate to subpandurate, venation sometimes subpinnate, winged-petiolariform. Capitulescence corymbiform-paniculate to thyrsoid-paniculate, leafy-bracteate, branches and peduncles usually indistinctly stipitate-glandular, bracteate leaves usually 1-4 cm; peduncles 5-20(-30) mm, moderately to densely hirsutulous or hirsute. Capitula 11-15 mm, disciform; involucre 4-6 mm diam., cylindrical-turbinate to narrowly campanulate; phyllaries 8, 10-13 × 1-2 mm, lanceolate, usually sparsely hirsutulous(-subglabrous) with indistinctly stipitate-glands; calycular bracteoles 3-5 mm, shorter than to half as long as phyllaries, usually moderately hirsutulous with stipitate-glands. Marginal florets 4-9, pistillate; corolla 7-9 mm, tubular-funnelform, 4-5-lobed. Disk florets 12-18; corolla 9-11 mm, tube longer than limb, puberulent, lobes 1-2 mm. Cypselae 2-3 mm, glabrous; pappus bristles 6-8 mm, reaching to corolla throat base. Flowering Feb-May. Cloud forests, montane forests, volcano slopes. Ch (Hampshire et al. 494, NY); G (Steyermark 36745, F). (1400-)1800-2500 m. (Mexico, Mesoamerica.)
Some specimens have broad corymbiform-paniculate capitulescences with narrowly campanulate involucres, others have narrow thyrsoid-paniculate capitulescences with cylindrical-turbinate involucres, but all are referred provisionally to *R. greenmanii*. Funston (2008) described the disk corollas as glabrous, but Robinson y Brettell (1974), Williams (1976), and Pruski 2012-Rold) noted that the disk corolla tubes were puberulent. This taxon was treated by Gibson (1969) as *Senecio heterogamous* under the unpublished varietal epithet "megaphyllus."


*Cacalia calotricha* S.F. Blake, *Senecio heterogamus* (Benth.) Hemsl., *Senecio heterogamus* var. *kellermannii* Greenm.

Shrubby perennial herbs (0.4-)1-4 m, caudex woody; stems pubescent distally to glabrate proximally; herbage heterotrichous, capitulescence herbage mostly stipitate-glandular, stipitate glands 0.1-0.2 mm, proximal herbage and leaves mostly with patent simple brownish trichomes 0.5-1 mm. Leaves eccentrically peltate below capitulescence, sometimes winged petiolar and subclasping within capitulescence; blade usually 6-35 × 6-35 cm, suborbicular or reniform, stiffly chartaceous, venation palmate to triplinerved in distal leaves, 5-9(-13)-lobed, lobes 1-5 cm, triangular, surfaces concolorous, indumentum usually homotrichous of elongate simple trichomes, adaxial surface sparsely pilose-hirsute to glabrate, abaxial surface moderately or densely pilose-hirsute to glabrate; petiole 4-17 cm, usually 1-10 cm from margins. Distal leaves usually 3-10 cm, bracteate, lanceolate and winged-petiolar to suborbicular and petiolate. Capitulescence somewhat loosely corymbiform-paniculate, terminal or axillary, branchlets heterotrichous, bracts usually 15-25 × 4-8 mm, obovate to ob lanceolate; peduncles mostly (5-)10-25 mm, obviously and densely stipitate-glandular, stipitate glands 0.1-0.2 mm, sometimes heterotrichous with some non-glandular trichomes, bracteoles mostly 4-5 mm. Capitula 9-15 mm, disciform; involucre 7-11 mm diam., turbinate-campanulate; phyllaries 10-13, 7-10 × 1-2 mm, lanceolate, indumentum mostly homotrichous of dense stipitate-glands, occasionally villous-hirsute; calycular bracteoles 3-5 mm, shorter than to half as long as phyllaries, usually stipitate-glandular. Marginal florets 2-7, pistillate; corolla 6-7 mm, tubular-funnelform, 4-5-lobed, lobes often shorter than throat. Disk florets 20-30; corolla 7-8 mm, glabrous, lobes 1.2-2 mm. Cypselae 1-2.5 mm, glabrous; pappus bristles 5-7.5 mm. Flowering Sep-May. *Cloud forests, montane*.
Cloud forests, pine-oak forests, subparamo forests, thickets, volcano slopes. Ch (Breedlove 50039, MO); G (Heyde y Lux 3390, MO); CR (Pruski et al. 3909, MO); P (Klitgaard et al. 792, MO). (1400-2500-4100 m. (Mexico [Oaxaca], Mesoamerica.)

*Roldana heterogama* is a common Central American species distinguished by eccentrically peltate leaves. The species was listed as occurring in Honduras by Clewell (1975), but subsequently was not listed for Honduras by Williams (1984) or Pruski (2012-Rold). Some material referred to *R. heterogama* by Gibson (1969) was described subsequently as *R. greenmanii* (Robinson y Brettell, 1974).


**Roldana breedlovei** H. Rob. et Brettell.

Shrubs 1.5-4(-5) m; stems straight or deflected at distal nodes, often conspicuously raised-lenticellate, puberulent to glabrate, sometimes fistulose; new growth herbage especially in the capitulescence predominantly stipitate-glandular, also sparsely pubescent with longer non-glandular trichomes. Leaves with petiole essentially marginally attached or in proximal leaves slightly subpeltate; blade 8-15 × 9-16 cm, ovate to suborbicular, mostly thin-chartaceous, 3-7-subpalmately nerved, adaxial surface puberulent-papillose to glabrate, abaxial surfaces glabrous throughout or sometimes puberulent-hirsutulous on veins basally, base truncate to cordate, moderately 5-7-palmatilobed, lobes usually 1.5-3.5 cm, triangular to less commonly broadly triangular, lobe margins entire to remotely denticate, lacking (except in the type of *R. breedlovei*) a tendency for secondary lobes on the major lobes, apex acute to obtuse, pointed and not rounded; petiole 4-15 cm. Capitulescence usually thyrsoid-paniculate, leafy bracted, leafy bracts 1.5-7(-9) cm, lanceolate to ovate or palmatilobed, sessile or winged petiolariform; peduncles 3-12 mm, moderately to more commonly densely stipitate-glandular, sometimes also with sparse elongate non-glandular trichomes. Capitula 9-12 mm, radiate; involucre 2-3.5 mm diam., cylindrical-turbinate; phyllaries 8, 5-9 × 1.2-1.8 mm, stipitate-glandular or granular-papillose to less commonly glabrous. Ray florets (4-)5; corolla yellow, glabrous, limb 6-9 mm. Disk florets 7-11; corolla 6-8 mm, glabrous, lobes 1-1.5 mm. Cypselae 2-4 mm, glabrous; pappus bristles 5.5-7 mm. 2n = 60. Flowering Dec-Mar(-Apr).
forests, thickets, volcano slopes. Ch (Breedlove 9228, NY); G (Standley 84415, MO); H (House 1183, MO); ES (Gibson, 1969: 119). 1000-3000(-3500) m. (Mexico [Oaxaca], Mesoamerica.)

Although the protologue of Senecio jurgensenii (Hemsley, 1881) gave "lobis rotundatis vel subacutis," the leaf lobes are triangular to less commonly broadly so. They are never broadly rounded as often found in those of R. oaxacana and R. petasitis. The type of R. breedlovei H. Rob. et Brettell (Breedlove 9228) has glabrous phyllaries (Robinson y Brettell, 1974). However, variation is seen in the phyllary pubescence feature and Breedlove 9228 was cited as S. jurgensenii earlier by Gibson (1969), who is followed. Williams (1976), Turner (2005), Funston (2008), and Pruski (2012-Rold) each treated R. breedlovei as a synonym of R. jurgensenii.


Shrubs 2-4(-6) m; stems densely lanate-tomentose, pith solid; herbage with non-glandular trichomes only. Leaves with petiole marginally attached; blade 15-30 × 13-25 cm, suborbicular to reniform, venation palmate, mostly c. 7-nerved, surfaces obviously discolorous, adaxial surface sparsely arachnoid-pubescent to glabrate, abaxial surface densely and persistently lanate-tomentose, base cordate, margins shallowly 9-15-lobulate, lobules 0.3-1 cm, sinuose; petiole 8-18 cm, arachnoid-tomentose to densely lanate-tomentose. Capitulescence corymbiform-paniculate, main axis usually 30-45 cm, not leafy bracteate (or at least not so as represented on herbarium specimens), ultimate clusters moderately dense, bracteoles 1-2 mm; peduncles 1-4 mm, arachnoid-pubescent. Capitula 7-9 mm, radiate; involucre c. 3 mm diam., cylindrical; phyllaries 10-13, 4-5 × c. 1 mm, glabrous or very base arachnoid-pubescent, eglandular. Ray florets 4-6; corolla yellow, glabrous, limb 3.5-4.5 mm. Disk florets 8-15; corolla 5-6.5 mm, glabrous, lobes 1-1.5 mm. Cypselae 1-1.5 mm, glabrous; pappus bristles 4.5-6 mm, reaching to proximal portion of corolla lobes. Flowering Nov-Feb. Montane cloud forests, pine-oak forests. Ch (Nelson 3771, MO); G (Steyermark 49830, MO). 2000-3000 m. (S. Mexico, Mesoamerica.)

Funston (2008) gave the leaves as adaxially glandular-pubescent, but Greenman (1926) keyed this following his "in no sense glandular" lead and similarly Pruski (2012-Rold) gave them as non-glandular.
11. Roldana lobata


Senecio jaliscanus S. Watson, Senecio roldana DC., Senecio rotundifolius Sessé non Stokes non Lapeyr. nec Hook., Senecio schumannianus S. Schauer.

Perennial herbs to shrubs 1-2(-4) m, mostly simple-stemmed, caudex woody; stems stiffly erect and not obviously deflected at the distal nodes, leaves gradually but greatly descrescent, densely floccose-tomentose at least distally to glabrate in patches, fistulose but capitulescence branchlets solid; herbage with non-glandular trichomes only. Leaves with petiole marginally attached; blade 7-20(-25) × 6-15(-20) cm, rhomboidal to ovate, stiffly chartaceous, distal leaves with venation triplinerved from just above base, larger proximal leaves with subpinnate venation, finely reticulate, surfaces usually obviously discolorous, adaxial surface sparsely arachnoid-hirtellous to soon glabrate, abaxial surface arachnoid-pubescent to floccose-tomentulose, base truncate to cordate, shallowly and sinuously 5-9-lobed, proximal lobes often the largest, lobes 0.3-2(-3) cm, sinuose to sometimes triangular, apex obtuse to rounded; petiole 7-17 cm, arachnoid-pubescent to floccose-tomentulose. Capitulescence thyrsoid-paniculate, leafy bracteate and held well above full-sized stem leaves, bracteate leaves mostly 3-6(-10) cm, much smaller than stem leaves, ultimate clusters moderately dense; peduncles (1-)3-10 mm, arachnoid-pubescent. Capitula 9-13 mm, radiate or infrequently discoid or disciform; involucre 3-5 mm diam., turbinate-campanulate, disk florets moderately to well-exserted; phyllaries 10-13, 4-6 × 1-1.8 mm, less than half as long as florets, purplish, eglandular, usually densely floccose-tomentose in proximal 3/4 and apex glabrate; calyculate bracteoles sometimes half as long as phyllaries. Ray florets (0-)2-6(-8); corolla yellow to yellow-orange, tube slightly setulose distally, limb 2-6 mm. Disk florets 12-20; corolla 6-8 mm, tube slightly setulose distally, lobes 1-1.6 mm. Cypselae 1.5-2.5 mm, glabrous; pappus bristles 5-7.5 mm. Budding Nov. Montane forests. G (Standley 77351, MO). 700-1700 m. (Mexico, Mesoamerica.)

Gibson (1969) gave as sometimes 8 the number of phyllaries in R. lobata. The single known Guatemalan specimen is in bud and was determined by Jesse Greenman (en schedule MO) as Senecio roldana. Subsequently this sheet was referred (along with the future type of Senecio quezalticus) to R. aschenborniana by Gibson (1969). Williams (1975, 1976, sub Senecio) called this Guatemalan material R. quezaltica and did not report R. lobata in Guatemala, whereas Funston (2008) called this material R. lobata. Although only budding, Standley 77351 matches R. lobata by leaves gradually but greatly descrescent, distal leaf venation triplinerved from just above base, proximally loosely floccose-tomentose immature phyllaries, and capitulescences
leafy bracteate and held well above full-sized stem leaves (Pruski, 2012-Rold). Verification of this species in Mesoamerica, however, awaits collection there of flowering material.


* Roldana chiapensis
* Roldana hederoides (Greenm.) H. Rob. et. Brettell,

Shrubs 1-3 m; stems nearly straight to slightly deflected at distal nodes, sometimes slightly lenticellate, hirtellous or hirsutulous, mostly stipitate-glandular distally, infrequently fistulose; new growth herbage especially in the capitulescence predominantly hirtellous-stipitate-glandular. Leaves with petioles basically marginal or very slightly excentrically subpeltate and attached within 2-5 mm of blade base; blade usually 4-11(-12) × 5-13(-15) cm, suborbicular, venation triplinerved or subpalmate, adaxial surface hirsutulous or hirtellous to glabrate, abaxial surface sparsely hirtellous, base cordate to truncate, margins moderately 5-7-lobed, lobes 1.5-3 cm, triangular or sometimes broadly triangular, lobe margins entire to remotely denticulate, apex acute to sometimes obtuse; petiole 2-9(-10.5) cm. Capitulescence corymbiform-paniculate to thyrsoid-paniculate, usually obviously leafy bracteate, branches and peduncles stipitate-glandular, bracteate leaves usually 2-6 cm, hirtellous-stipitate-glandular, sessile or subsessile; peduncles 5-13 mm. Capitula 7-9(-10) mm, radiate; involucre 4-6 mm diam., turbinate-campanulate, disk florets well-exserted at anthesis; phyllaries 8, 4-6 × 1.5-2.2 mm, ovate or outer sometimes elliptic-lanceolate, stipitate-glandular; calycular bracteoles 0-2. Ray florets (4-)5; corolla yellow, glabrous, limb 3-5 mm. Disk florets 8-13; corolla 5.5-7 mm, glabrous, throat longer than lobes, lobes 1-1.5 mm. Cypselae 1-2 mm, glabrous; pappus bristles 4-6 mm. 2n = 60. Flowering Dec-Jan. *Montane forests*. Ch (Breedlove 31499, MO). Aprox. 1600 m. (Mexico [Oaxaca], Mesoamerica.)

Turner (2005) broadly defined *R. oaxacana* as ranging from Veracruz to Nicaragua, but Pruski (2012-Rold) by short phyllaries circumscribed more narrowly the species as Mexican, more or less matching the concepts of Gibson (1969) and Redonda-Martínez y Villaseñor-Ríos (2011). Turner (2005) treated *R. cordovensis* (Hemsl.) H. Rob. in synonymy of *R. oaxacana*, but peltate-leaved *R. cordovensis* was recognized as distinct by Robinson y Brettell (1974) and Funston (2008). *Roldana chiapensis* (described by Robinson y Brettell, 1974) was treated by Williams


Shrubs 1-3(-4) m; stems nearly straight to slightly deflected at distal nodes, sometimes slightly lenticellate, submentose to hirtellous, mostly stipitate-glandular distally, sometimes fistulose; new growth herbage in the capitulescence stipitate-glandular and hirsute with non-glandular trichomes. Leaves with petioles marginal; blade usually 6-22 × 7-24 cm, ovate to suborbicular, venation palmate, adaxial surface granular-hirtellous to subglabrate, abaxial surface floccose-tomentose, base cordate to sometimes truncate, margins moderately 7-11-lobed, lobes 1-3 cm, deltate to broad-triangular, lobe margins entire to remotely denticulate, apex acute to obtuse; petiole 4-17 cm. Capitulescence corymbiform-paniculate, leafy bracteate, branches and peduncles stipitate-glandular, bracteate leaves usually 2-6 cm, hirtellous-stipitate-glandular, sessile or subsessile; peduncles 8-20 mm. Capitula 10-15 mm, radiate; involucre 3.5-6 mm diam., turbinate to campanulate, disk florets moderately exserted at anthesis; phyllaries 8, 6.5-9 × 1.2-2 mm, elliptic-lanceolate, stipitate-glandular, trichomes c. 0.1 mm, pale-colored; calycular bracteoles 0-3. Ray florets usually 5; corolla yellow, glabrous, limb 6-10 mm. Disk florets 9-14; corolla 8-10 mm, glabrous, lobes 1.5-2 mm. Cypselae 2-3.5 mm, glabrous; pappus bristles 6-8 mm. Flowering Dec-Apr(Jun). *Montane forests and pine-oak forests*. G (Pruski y Ortiz 4288, MO); H (Standley 56152, MO); ES (Calderon 468, MO); N (Moreno 23521, MO). 900-2600(-3200) m. (Endemic.)

Pruski (2012-Rold) following tradition (Greenman, 1904, 1926; Robinson y Brettell, 1974; Williams, 1975, 1976) recognized *Roldana cristobalensis*, *R. oaxacana*, *R. petasioides*, and extra-Mesoamerican *R. petasitis* (Sims) DC. as distinct. However, Gibson (1969) and Turner (2005) recognized only three of the four as species, and Funston (2008) basically treated each of the four within *R. petasitis* at the varietal rank. Pruski (2012-Rold) circumscribed *R. petasioides* in the same sense that Gibson (1969) circumscribed it sub *Senecio petasitis* Sims. Gibson (1969) gave the type of *Senecio petasitis* as with doubt from Mexico and circumscribed the taxon as otherwise occurring in cultivation and in the wild from only Guatemala southeast to Nicaragua. Robinson (1975), Williams (1975, 1976), and Pruski (2012-Rold), however, thought Gibson misapplied to
Central American plants the name *R. petasitis*, and instead they treated *R. petasitis* as the purple-haired plant in cultivation, as extra-Mesoamerican, and as an earlier name for synonymous *S. sartorii*.

The name having priority as applied to abaxially floccose-tomentose-leaved non-cultivated Central American plants is *R. petasioides*, as used by Clewell (1975), Robinson (1975), Williams (1975, 1976, 1984), and Pruski (2012-Rold). *Roldana petasioides* and *R. petasitis* as circumscribed by Pruski (2012-Rold) basically match, respectively, *R. oaxacana* and *R. petasitis* of Turner (2005) and *R. petasitis* var. *petasitis* and *R. petasitis* var. *sartorii* of Funston (2008). In addition to leaf differences, the Central American plants have phyllary trichomes pale-colored and disk florets moderately exserted at anthesis, whereas the phyllaries of Mexican *R. petasitis* have purple-articulated trichomes 0.2-0.5 mm (Gibson, 1969), and the disk florets are only weakly exserted at anthesis (Williams, 1975).


Shrubs 1-5 m; stems sparsely arachnoid-puberulent to quickly glabrate; herbage (when pubescent) with non-glandular trichomes. Leaves with petiole marginally attached; blade 4-10 × 5-14 cm, orbicular to reniform, palmately 5-11-veined, surfaces quickly glabrate, shallow-palmately 5-11-lobulate, lobules 0.3-0.8 cm, sinuous to low-broad-triangular; petiole 4-8.5 cm. Capitulescence broadly corymbiform-paniculate, not leafy-bracteate, branches and peduncles sparsely appressed arachnoid-puberulent to glabrate, trichomes always non-glandular; peduncles 3-10 mm. Capitula 8-9 mm, radiate; involucre 2-3 mm diam., cylindrical-turbinate; phyllaries 5(-6), 5-7 × c. 1 mm, glabrous. Ray florets c. 2; corolla yellow, glabrous, limb 6-7 mm. Disk florets c. 5; corolla 7-8 mm, glabrous, lobes 2-3 mm, about as long as throat. Cypselae c. 2 mm, glabrous; pappus bristles 6.5-7.5 mm. Flowering Aug-Sep, Jan. *Upper montane oak forests. CR (Davidse 24716, MO). 2700-3300 m. (Endemic.)*


Soft shrubs to small trees 1-3.5(-6) m; stems ascending-erect, usually straight or infrequently
slightly deflected at the distal nodes, leafy distally, usually closely arachnoid-tomentulose distally to unevenly glabrate proximally. Leaves with petiole marginally attached; blade 5-22 × 2-12 cm, oblanceolate to elliptic to ovate or obovate, stiff-chartaceous to subcoriaceous, venation pinnate, usually with 5-7 secondary veins per side spreading from midrib at about 45°, surfaces concolorous, adaxial surface glabrous, abaxial surface weakly arachnoid-pubescent to glabrate, base usually cuneate to sometimes broadly rounded or truncate, margins subentire to denticulate, unlobed to shallowly few-lobed, lobes usually 1-2 cm, sinuous to low-triangular, acute to obtuse, blade apex acute; petiole 2-8 cm, glabrate or axil tufted-arachnoid. Capitulescence corymbose-paniculate, branchlets arachnoid-floccose, main branches not obviously leafy bracteate, branchlet bracteoles c. 2 mm, linear; peduncles 2-5 mm, arachnoid-pubescent or glabrate, bracteoles minute. Capitula 7-10 mm, radiate; involucre 2-2.5 mm diam., cylindrical, disk florets well-exserted; phyllaries 5(-6), 4.5-6(-7) × 1-1.8 mm, weakly arachnoid-pubescent to glabrate, apex often obtuse to rounded; calycular bracteoles minute. Ray florets 1-3; corolla yellow, glabrous, limb usually 3-4 × mm. Disk florets 3-6; corolla 6.5-8 mm, glabrous, lobes 1-2 mm, sometimes nearly as long as the throat. Cypsela 2-3 mm, glabrous; pappus bristles 5-6 mm. Flowering Jan-Jul. Cloud forests, montane forests, pine-oak forests, thickets. Ch (Breedlove 24959, MO); G (Heyde y Lux 4520, NY); H (Evans 1239, MO); ES (Carlson 780, MO); N (Williams y Williams 24679, F). (600-)1000-2400 m. (Mexico, Mesoamerica.)

_Roldana schaffneri_, placed by Greenman (1901) in _Senecio_ sect. _Terminales_ in part because of its pinnate leaf venation, was not included in the revision of _S._ sect. _Palmatinervii_ by Gibson (1969). _Roldana schaffneri_ was mentioned by Robinson y Brettell (1974), Turner (2005), and Pruski (2012-Rold) as atypical. The Hemsley, Coulter, and Greenman names were placed in synonymy by Williams (1975). The species has variable leaf forms and generally seems to grade from unlobed lanceolate leaf forms in northern Mesoamerica to populations with lobed ovate leaves (e.g., _Senecio orogenes_) often in, but not restricted to, southern Mesoamerica (Robinson, 1975; Pruski 2012-Rold). Unlobed lanceolate-leaved individuals of _R. schaffneri_ are often confused with _Telanthophora grandifolia_, which like _R. schaffneri_, Greenman (1901) also treated as _Senecio_ sect. _Terminales_. Similarly, _R. schaffneri_ and _T. grandifolia_ were each placed by Williams (1976) into _Senecio_ sect. _Fruticosi_ (syn. _Senecio_ sect. _Terminales_). Lobed-leaved forms of _R. schaffneri_, by exserted disk corollas with lobes sometimes as long as the throat, also are confused with species of _Digitacalia_, which differs by usually ochroleucous corollas and polarized endothelial tissue.

Mexican _Roldana lineolata_ (DC.) H. Rob. et Brettell occurs in nearby Oaxaca and should be looked for in Mesoamerica. It may be differentiated from the otherwise similar _R. schaffneri_ by 8
(vs. usually 5) phyllaries and its generally larger capitula with c. 5 (vs. 1-3) ray florets and 9-13 (vs. 3-6) disk florets (Pruski 2012-Rold).


Shrubs 1.5-2 m; stems several-costate, non maculate, usually heterotrichous with non-glandular arachnoid-tomentum much longer than and more or less obscuring the underlying short stipitate-glands. Leaves with petiole marginally attached; blade mostly 8-13 × 8-14.5 cm, ovate to suborbicular, mostly thin-chartaceous, palmately c. 5-veined, reticulations often slightly raised adaxially, adaxial surface hirtellous to glabrate, abaxial surface loosely arachnoid-puberulent, base truncate to subcordate, margins shallowly 7-11-lobulate, lobules sinuose or broadly triangular, lobule margins entire to remotely denticulate, lobe margins irregularly denticulate to irregularly serrulate, apex pointed and not rounded; petiole 2-6 cm. Capitulescence broadly corymbiform from distal nodes, usually leafy-bracteate, branches and peduncles heterotrachious with arachnoid tomentum longer than and more or less obscuring the underlying short stipitate-glands; peduncles 4-10 mm. Capitula 8-10 mm, radiate; involucre 3-3.5 mm diam., cylindrical-turbinate; phyllaries 8, 5-6.5 × 1.1-1.8 mm, loosely arachnoid-tomentellous and short stipitate-glandular. Ray florets 3-5; corolla yellow, tube papillose-puberulent, limb 3-6- mm. Disk florets 8-10; corolla 7-8 mm, tube papillose-puberulent, lobes 1-1.5 mm. Cypselae c. 1.5 mm, glabrous; pappus bristles 5-6 mm. Flowering Nov-Dec. *Pine-oak forests*. Ch (*Breedlove 23034, MO*). 2400-2800 m. (Endemic.)


23. *Senecio* L.

Por J.F. Pruski.
Annual or perennial terrestrial herbs to sometimes shrubs or rarely trees; stems with basal and/or cauline; herbage glabrous or when pubescent with simple trichomes. Leaves simple to pinnatifid, alternate, petiolate (especially proximal leaves) to sessile, sometimes clasping; blade filiform to ovate, rarely orbicular, usually chartaceous to stiffly so, venation pinnate or less commonly subpalmate. Capitulescence mostly terminal, cymose or corymbiform to paniculate, rarely monoecephalous, capitula erect or sometimes nutant; peduncles mostly slender and bracteolate, bracteoles sometimes grading into calycular bracteoles. Capitula radiate or discoid or sometimes disciform, calyculate; involucre cylindrical to hemispherical, disk florets (ours) usually only slightly to sometimes moderately exserted; phyllaries 5-21(-34), 1(-2)-seriate, free, usually green in mid-region with margins scarious or stramineous, appressed with margins overlapping, persistent but usually reflexed post-fruit; receptacle epaleate sometimes alveolate, often fistulose. Ray florets (when present) (1-)5-21(-34), pistillate; corolla usually yellow, limb mostly 4-nerved, apex often 3-denticulate. Disk florets (3-)5-80+, bisexual; corolla usually yellow, usually tubular-funnelform to narrowly campanulate, usually shortly 5-lobed, tube often dilated basally, tube and limb subequal or limb longer, lobes usually deltate to short-triangular; anthers with filament collar balusteriform, thecae base usually shortly obtuse-auriculate, endothecial tissue radial (with irregularly thickened lateral cell walls and appearing as bead-like vertical strands); style exappendiculate, often with dilated basal node held above nectary, branches each with a 2-banded stigmatic surface reaching to near apex, apex usually truncate to sometimes broadly obtuse, without central apical tuft of papillae, often with subapical laterally spreading round-tipped short sweeping papillae in an abaxial semicircle. Cypselae cylindrical, 5-10-striate-costate, glabrous to pubescent; pappus of rays and disks similar, of many white-stramineous scabridulous (smooth-barbellate, infrequently fluked) mostly capillary bristles. Aprox. 1000-1200 spp. Cosmopolitan except Antarctica.

As recognized here, Senecio is largely characterized by calyculate capitula, exappendiculate apically truncate 2-banded styles, anthers with basally ecaudate thecae, and balusteriform anther collars (Robinson y Brettell, 1974; Jeffrey, 1992; Nordenstam, 1978, 2007; Vincent y Getliffe, 1992; Bremer, 1994; Barkley et al., 1996; Janovec y Robinson, 1997; Pruski, 2012-Rob; 2012-Sen, 2012-Key). In earlier works (e.g., Bentham y Hooker, 1873; Hemsley, 1881; Williams, 1976), however, Senecio was treated typically in the broad sense (e.g., Bentham y Hooker, 1873, recognized 28 sections of which several are now recognized as genera), and including both Tussilaginoid and Senecioid subtribal elements. More recently, several genera (e.g., Dresslerothamnus, Jessea, Monticalia, Ortizacalia, Pentacalia, Psacalium, Roldana, Talamancalia, Telanthophora) have been segregated from it and were recognized widely as
distinct (Robinson y Brettell, 1974; Jeffrey, 1992; Nordenstam, 1978, 2007; Bremer, 1994; Barkley et al., 1996; Janovec y Robinson, 1997; Pruski, 2012-Rob; 2012-Sen, 2012-Key). Nordenstam (1978), Wetter (1983), Vincent y Getliffe (1992), and Pruski (2012-Rob), illustrated some of the microcharacters that define Senecio and that were used as the basis of segregate many genera from it. Infragenera recognized are mostly those in Greenman (1901, 1902), Williams (1976), Cuatrecasas (1982), Villaseñor (1991), and Barkley et al. (1996). This treatment is adapted from that of Pruski (2012-Sen).

Two alpine species of Senecio sect. Mulgediifolii, roseus Sch. Bip. [= Cacalia runcinata Kunth] and S. runcinatus Less. are each others closest congener, moderately frequent on Pico Orizaba to Ciudad de Mexico (Villaseñor 1991), and should be looked for as disjunct on volcanoes east of the Isthmus of Tehuantepec (e.g. Volcán Tacaná). Several other species of pyrrolizidine alkaloid containing Senecio sect. Mulgediifolii [e.g., S. bracteatus Klatt, S. conzattii Greenm., S. polypodoides (Greene) T. Durand et B.D. Jacks.] occur in Oaxaca (Villaseñor 1991), and should be looked for east of the Isthmus of Tehuantepec. It seems likely that undiscovered species of South America-centered Senecio sect. Culcitioides Cuatree. exist in the páramos of Costa Rica and Panama.

Senecio bicolor (Willd.) Viv. (as Senecio cineraria DC. in Standley, 1938: 1514 and Nelson Sutherland, 2008: 193; n.v. Dusty Miller) is a dissected-gray-leaved perennial herb occasionally cultivated in Mesoamerica, but rarely flowers and is not known as an escape. Curio rowleyanus (H. Jacobsen) P.V. Heath (as Senecio rowleyanus H. Jacobsen in Barkley et al. 2006, 20: 545; n.v.: string-of-beads) is grown in urban areas of Mesoamerica. It is commonly used in tropical regions as a delicate ground cover or as a hanging-basket plant. Curio rowleyanus is characterized by its succulent herbage of prostrate mat-forming stems with evenly spaced orbicular-globose leaves and by white discoid capitula; it easily escapes and it should be watched for in Mesoamerica.

1. Vines
2. Vines; leaf blades palmately veined
   2. Leaf blades 3(-7)-palmately lobed, carnose; capitula with disk florets slightly exserted; involucres 7-12 mm diam., campanulate-turbinate; ray florets 8; disk florets 40-60, corollas 6.2-7.5 mm.
   9. S. sp. 1M
2. Leaf blades 5-9 palmately lobed, chartaceous; capitula with disk florets well-exserted; involucres 3-4 mm diam., cylindrical; ray florets 5; disk florets 10-13, corollas 11-14 mm.
   14. S. tamoides

1. Annual or perennial herbs to sometimes small subshrubs.
3. Capitula usually discoid (infrequently short-radiate in S. godmanii).
4. Annual herbs; cypselae appressed-setose to sparsely puberulent. [Senecio sect. Senecio] 15. S. vulgaris
4. Perennial herbs; cypselae glabrous. [Senecio sect. Mulgediifolii]
5. Basal and most cauline leaves runcinate; capitula commonly subnutant at anthesis; phyllaries mostly rosaceous; disk corollas of at least outer florets purplish to less commonly ochroleucous.
   1. S. callosus
   13. S. rhyacophilus
5. Basal and most cauline leaves simple with at least blade usually unlobed; capitula erect; phyllaries green with small (c. 0.2 mm) rosaceous tip, disk corollas at least in bud yellowish or greenish to with age often purplish.
7. Moderately delicate herbs; leaves chartaceous to thinly so, adaxial surface smooth; basal leaves commonly attenuate apically; basal and proximal-cauline leaf blades often hastate at base.  

5. **S. doratophyllus**

7. Stout herbs or rarely subshrubs; leaves stiffly chartaceous to subcoriaceous, adaxial surface rugulose, basal leaves commonly acute to obtuse apically; basal and proximal-stem leaf blades obtuse to cordate at base, rarely hastate.  

6. **S. godmanii**

3. Capitula radiate.  

8. Leaves deeply and coarsely pectinate-laciniate pinnatifid. 3. **S. costaricensis**

8. Leaf blade margins entire to doubly serrate-dentate or doubly serrate.  

4. **S. cuchumatanensis**


5. **S. chirripoensis**


10. Leaf blades broad-lanceolate to ovate or obovate, 1.8-17 cm wide, margins serrate to serrate-dentate.  

11. Leaf blade surfaces discolorous, abaxial surfaces white-gray tomentose; ray florets c. 13.  

11. **S. oerstedianus**

11. Leaf blade surfaces usually concolorous, abaxial surfaces glabrate to sparsely arachnoid (rarely tomentulose); ray florets usually 7-8.  

12. Capitulescences terminal, open and laxly corymbiform; capitula 11-13 mm; phyllaries 19-23, 7.5-9 mm.  

12. **S. chirripoensis**  

12. Capitulescences tightly corymbiform-paniculate; capitula 6.5-9 mm; phyllaries usually 13, 4.5-6 mm.  

10. **S. multidentatus**

10. Leaves typically linear-lanceolate or linear-oblanceolate to lanceolate or oblanceolate (infrequently elliptic-lanceolate to elliptic-oblanceolate), 0.2-1(-2.5) cm wide, margins entire to denticulate.  

13. Basal leaves present at anthesis, leaves abruptly descrescent distally.  

14. Rhizomatous herbs; ray corolla limbs 3.5-5 mm wide, oblong; disk florets 112-129.  

14. **S hansweberi**

14. Stoloniferous herbs; ray corolla limbs 3-3.5 mm wide, oblanceolate; disk florets 54-66.  

8. **S. kuhbieri**

13. Basal leaves absent at anthesis, leaves gradually descrescent distally.  

15. Perennial caulescent herbs; cypselae glabrous.  

15. Typically small caulescent woody-based subshrubs; cypselae strongly papillose.  

16. **S. warszewiczii**

*Senecio coulteri* Greenm., *Senecio decorus* Greenm., *Senecio eximius* Hemsl.

Perennial herbs 0.35-1.5(-1.8) m; stems erect, branched only distally, striate, often purplish, glabrous to crisped hirsutulous or tomentulose, fistulose. Leaves basal (usually withered at anthesis) and cauline, ascending, chartaceous, venation pinnate, adaxial surface smooth, usually glabrous, abaxial surface occasionally purplish, arachnoid-tomentulose to glabrate, trichomes usually (seemingly) patent-based and flagellate-appressed apically, at least distal margins irregularly dentate; basal leaves few, subrosulate, clasping or at least frequently dilated basally; basal and proximal-stem leaves (10-)15-35(-45) × 2.5-15(-20) cm (including petiole), typically runcinate-pinnatifid, petiolate, margins usually 2-4 lobed and incised more than half way or sometimes almost to midrib, the terminal lobe the largest (to c. 10 cm), commonly acuminate(acute) apically, petiole 2-20 × 0.4-1 cm, winged or interrupted winged to wingless; mid-stem and distal cauline leaves 6-20(-30) × 1.5-6(-14) cm, sessile and auriculate, runcinate-lyrate to distal ones simple and lanceolate, terminal lobe (when present) sometimes as narrow as or narrower than lateral lobes, apex attenuate. Capitulescence corymbiform-paniculate, 20-80+ capitulate, basically leafless, lateral branches subtended by bracteate leaf 2-6; peduncles 0.5-2 cm, usually 1-2-bracteolate, crisped-hirsutulous, often purplish, bracteoles c. 3 mm, linear-lanceolate, often rosaceous at least distally, subglabrous. Capitula 9-15 mm, discoid, loosely few-calyculate, commonly subnubent at anthesis; involucre (4-)5-8 mm diam., campanulate, disk florets exerted 2-3 mm; phyllaries 12-13, 7-11 × (0.8-)1-1.5 mm, linear-lanceolate, mostly rosaceous or sometimes base green, usually glabrous; calycular bracteoles 2-4 mm, linear-lanceolate, glabrous; receptacle alveolate. Ray florets absent. Disk florets 18-30(-40); corolla 7-11 mm, narrowly funnelform, purplish to less commonly ochroleucous, glabrous proximally, tube 3.5-4 mm, throat often slightly longer than tube, lobes 5, 0.6-1.1 mm, deltoate to short-triangular, glandular-papillose; anthers 2-3 mm; style base abruptly dilated, branches 1-1.5 mm. Cypselae 1.5-4 mm, terete, striate, glabrous; pappus bristles 6-9 mm, fragile. 2n = 40(80). Flowering Nov-Feb(-April). *Bosques mesófilo de Montaña, coniferous forest, coniferous-oak forest, (usually north-facing) volcano slopes. Ch* (Breedlove 29355, MO); G (Donnell Smith 2361, NY). 2700-4000 m. (C. y S. Mexico, Mesoamerica.)
By its frequently purplish phyllaries and corollas, this species was placed in *Senecio* sect. *Mulgediifolii* by Greenman (1901, 1902) and Villaseñor (1991). *Senecio callosus* is much more frequently encountered north of Mesoamerica (where it is known from Cerro San Felipe northwestwards and often compared to *S. runcinata* Less.), but occasionally is locally common in Mesoamerica. *Senecio iodanthus* Greenm. was treated by McVaugh (1984) as a synonym of *S. callosus*, but was recognized as distinct by Villaseñor (1991).


Large-leaved decumbent to ascending simple-stemmed short-lived perennial caulescent herbs 0.5-1 m; stems moderately leafy except at base, striate, glabrous or sometimes sparsely appressed puberulent, internodes to about half as long as leaves, pith solid. Leaves alternate, sessile to petiolate, chartaceous, venation pinnate, margins doubly serrate, surfaces concolorous, sparsely arachnoid to glabrescent; proximal and midstem leaves with narrow petiole or winged subpetiolar base, blade (or expanded portion of leaf) 10-15 × 4-8 cm, ovate to triangular, base cordate to truncate, apex acute to acuminate, petiole to 8 cm or subpetiolar base to 6 cm × 1.5 cm; distal leaves 9-13 × 1-2.5 cm, lanceolate to linear-lanceolate, sessile, base amplexicaul and margins sometimes shortly decurrent onto stem as narrow wings to 2 cm, apex attenuate. Capitulescence open and laxly corymbiform, held above the leaves, more or less flat-topped with lateral branchlets nearly as long as central axis, few-headed; peduncles 1-4 cm, slender, glabrous or nearly so, few-bracteolate; bracteoles 1-5 mm, lanceolate-subulate. Capitula 11-13 mm, 52-58-flowered, radiate; involucre 6-7 mm diam., campanulate; phyllaries 19-23, 7.5-9 × 1-1.2 mm, linear-lanceolate, apex sparsely brownish-setulose; calycular bracteoles 4-8, 3-4 mm, linear-subulate. Ray florets 7-8; corolla c. 13 mm, yellow, glabrous, limb c. 3 mm wide. Disk florets 45-50; corolla c. 8 mm, narrowly funnelform, yellow, glabrous, tube c. 3 mm, lobes c. 0.5 mm, short-triangular, apex sparsely papillose; anthers c. 2 mm, appendage narrowly oblong; style branches truncate. Cypselae (immature) 1.2-1.4 mm, glabrous; pappus bristles 6-7 mm. Along rocky stream in oak forests. CR (Burger 8324, MO). 3000-3200 m. (Endémica.)


Erect caulescent simple-stemmed herbs 1-2 m; stems moderately leafy from mid-stem to apex, striate, fistulose, internodes about half as long as to sometime nearly as long as leaves; herbage
subglabrous to younger parts often shortly pubescent with curved antrorse trichomes. Leaves alternate, sessile to often narrowly winged-subpetiolate, deeply and coarsely pectinate-laciniate pinnatifid with 10-20 usually opposite lateral lobes; blade 5-25 × 1-12 cm, elliptic to ovate in outline, chartaceous, venation pinnate, base amplexicaul, rachis very narrowly winged proximally to 1-2 cm wide distally, apex acuminate, sinuses broadly rounded and usually 1-1.5 × as wide as lobes, lobes lanceolate, apex obtuse, lobe margins sinuous-dentate, sometimes short-pubescent adaxially. Capitulescence to c. 22 × c. 26 cm, corymbiform-paniculate and held above the progressively smaller leaves, more or less flat-topped with lateral branches nearly overtopping central axis, many-headed; peduncles 0.5-1.5 cm, slender, usually shortly pubescent, usually 1-3-bracteolate; bracteoles 1-2 mm, lanceolate-subulate. Capitula 5-7 mm, radiate, 17-25-flowered; involucre 3-4 mm diam., narrowly campanulate; phyllaries c. 12, 4-5 × c. 0.8 mm, lanceolate, the narrow mid-zone green. margins broad, stramineous, gradually acuminate, glabrous to sparsely setulose apically; calycular bracteoles 2-6, 0.5-2 mm, linear-subulate; receptacle flat, c. 1.5 mm broad. Ray florets pistillate, 5-8; corolla yellow, glabrous, tube 2.5-3.3 mm, limb 4.5-5.5 × 1.3-2 mm, oblong, 4-nerved. Disk florets bisexual, 12-20; corolla 4-5 mm, funnelform, yellow, glabrous, tube 2-2.2 mm, slightly shorter than to about as long as limb, lobes 0.5-0.8 mm, lanceolate; anthers apically exserted, to c. 1.5 mm, theca apex gradually appendaged, appendage ovate; style branches c. 0.5 mm. Cypselae 1.2-1.4 mm, 6-9-costate, glabrous; pappus bristles 4-4.5 mm. 2

Disturbed areas, open bog-like areas, open pine forests, open shrub páramos, orillas de caminos, sabanas, steep slopes, thickets, volcano slopes. CR (Pruski et al. 3826, MO). 2400-3400 m. (Endémica.)


Scapose or subscapose perennial herbs 0.15-0.33 m, caudex thick, root fibrous, scapes 1(-3) per plant, basally densely floccose, remotely bracteate or sometimes 1-2-leaved, basal leaves 3-10, crowded at apex of caudex. Rosette leaves spirally alternate, long-petiolate; blade 1-3.5 × 1-2.5 cm, oblong to broadly ovate, chartaceous, venation pinnate, the 3-6 main secondaries per side often impressed adaxially, adaxial green, lingering arachnoid to glabrate, abaxial surface purplish or grayish, arachnoid-floccose to loosely so, base obtuse to rounded or less commonly cuneate, abruptly attenuate onto narrowly winged petiole, margins remotely few-serrulate, often revolute, apex obtuse to rounded; petiole 1-4.5 cm. Cauline leaves sessile; blade 2-4 × 0.4-0.8 cm, oblanceolate, base clasping, margins entire. Capitulescence 1-2(-3)-capitulate, scape 14-32 cm,
striate or few-angled, sometimes 1-2-bracteate, bract 1-2 cm, lanceolate. Capitula 9-12 mm, radiate; involucre c. 8 mm diam., campanulate, densely arachnoid-floccose in bud, disk florets slightly exserted; phyllaries c. 21, 7-9 × 0.8-1.2 mm, linear-lanceolate, 1-nerved, glabrous proximally, margins narrowly scarious, apex acuminate, arachnoid; calycular bracteoles few, 3-5 mm, lanceolate. Ray florets 9-13; corolla yellow, tube 4-6 mm, limb 10-14 × 1.5-2.5 mm, lanceolate, 4-7-nerved, apical teeth 0.3-1 mm. Disk florets 40-50; corolla 5.5-6.5(-8) mm, narrowly funnelform, yellow, glabrous, tube and limb subequal, lobes 0.7-1.1 mm, triangular, without a medial resinous nerve, spreading to reflexed; anthers 2-2.2 mm, mostly included, collar moderately balusterform, thecae bases slightly caudate, endothecial tissue radial, apical appendage ovate, obtuse to rounded apically; style base swollen, branches c. 0.7 mm, weakly exserted. Cypselae c. 2 mm, setulose; pappus bristles 5-6(-7) mm, fragile. Flowering Aug. Rocky subalpine zone. G (Steyermark 50117, MO). 3300-3700 m. (Endémica.)

Barkley y Janovec (1996) suggested that S. cuchumatanensis may be a species of tussilaginoid Robinsonecio, but Pruski (2012-Rob) illustrated the senecioid microcharacters used here to retain taxonomically this species in Senecio.


Moderately delicate perennial herbs 0.4-1.8 m; stems erect to rarely clambering, branched only distally, striate-costate, sometimes purplish, glabrous or sparsely arachnoid, fistulose. Leaves basal (often withered at anthesis) and cauline, simple with at least blade usually unlobed, ascending, chartaceous to thinly so, venation pinnate, adaxial surface smooth, glabrous, abaxial surface arachnoid-tomentulose to glabrous, trichomes usually (seemingly) patent-based and flagellate-appressed apically, margins commonly irregularly or doubly sharp-serrate; basal leaves few; basal and proximal-stem leaves long-petiolate, leaf (including petiole) 12-40(-60) × (1-)2-10(-12) cm, oblong to obovate, base obtuse or cordate to more commonly hastate, commonly acute to at least basal ones commonly attenuate apically, petiole 5-23(-30) × 0.3-1 cm, winged, irregularly serrate to crenulate, petiole sometimes longer than blade; mid-stem and distal cauline leaves 7-20 × 1-6 cm, triangular-ob lanceolate to lanceolate or very narrowly so, usually sessile and auriculate to sometimes very narrowly and elongate petiolar, margins typically few-lobed, ultimate lobe typically hastate, apex attenuate. Capitulescence corymbiform-paniculate to less frequently corymbiform, (4-)20-60-capitulate, mostly leafless, capitula erect; peduncles 0.04-
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015(-0.35) cm, (0-)few-bracteolate, sparsely arachnoid; bracteoles 2-5(-7) mm, linear to linear-lanceolate, rosaceous-tipped, subglabrous. Capitula 8-12 mm, discoid (?very rarely radiate), loosely few-calyculate, capitula erect at anthesis; involucre 3-6 mm diam., cylindrical to narrowly campanulate, disk florets exserted 2-4 mm; phyllaries (8-)13, 5.5-9 × (0.5-)1-1.5 mm, linear-lanceolate, green with small (c. 0.2 mm) rosaceous tip, glabrous to rarely very sparsely arachnoid; calycular bracteoles 1.5-2.5 mm, linear, glabrous; receptacle alveolate. Disk florets 12-25(-30); corolla (6.5-)7.5-9 mm, funnelform, greenish-yellow (at least in bud) or with age often purplish, glabrous, tube 3-3.7 mm, tube and throat subequal, lobes 5, 0.6-1 mm, deltate to short-triangular; anthers 2-2.5 mm; style base abruptly dilated, branches 1-1.5 mm. Cypselae 1.5-3.5(-4) mm, terete, striate, glabrous; pappus bristles 6-8 mm, fragile. 2n = 40. Flowering Jul-Feb(-May).

Plants growing singly (Villaseñor, 1991) in open areas of bosques mesófilo de montaña, cloud forests, coniferous forests, volcano slopes. Ch (Villaseñor y Martinez 1097, MO); G (Steyermark 49881, MO); H (Daniel y Araque 9870, MO). (1800-)2100-3800 m. (Endemic.)

I have not reexamined the type of Senecio alatipes Greenm. for this project, but it does not have leaves with the more prominent reticulations nor rugulose adaxial surfaces as in the similar S. godmanii. Thus, S. alatipes Greenm. seems likely to be a synonym of S. doratophyllus, as given by Villaseñor (1991). Blake (1926) cited the Cacalia cuspidata as a taxonomic synonym of S. godmanii, whereas Villaseñor (1991) gave it as a synonym of S. doratophyllus. Senecio guatimalensis was proposed as a nom. nov. for Cacalia cuspidata (the epithet of which is preoccupied in Senecio) and has nomenclatural priority over S. godmanii. For nomenclatural stability and because types of all names involved were not seen, Cacalia cuspidata was listed as a possible synonym of S. doratophyllus by Pruski (2-012-Sen), whose is followed here.

In Guatemala, especially in the Cuchumatanes, relatively large-capitulate plants with narrow petiolar-based elongate leaves are occasional. They are referred to S. doratophyllus as in Villaseñor (1991). Williams (1975) characterized Steyermark 34098 (F) as radiate, and Villaseñor (1991) included this sheet in his exsiccate of S. doratophyllus. I have not examined this sheet, which may be a rare radiate individual of S. doratophyllus.


Stout perennial herbs or rarely subshrubs, (0.5-)1-1.7 m; stems robust, erect, branched only distally, striate-costate, fistulose, sparsely arachnoid. Leaves basal (often withered at anthesis) and cauline, simple with at least blade usually unlobed, stiffly chartaceous to subcoriaceous,
venation pinnate, adaxial surface rugulose, glabrous, or infrequently sparsely arachnoid, abaxial surface sparsely arachnoid to glabrous, margins irregularly to doubly serrate, less commonly incised, teeth or incisions 1-3(-20) mm; basal leaves few; basal and proximal-stem leaves winged-petiolate, leaf (including petiole) 15-38(-60) × 6-15(-18) cm, oblong to obovate, base obtuse to cordate or rarely hastate, slightly subamplexicaul, commonly acute to obtuse apically, petiole 5-18 × 0.7-1.5(-6) cm, usually uniformly narrowly (to c. 1.5 cm diam.) winged and entire or infrequently irregularly broadly (c. 6 cm diam.) incised and winged; mid-stem and subdistal cauline leaves usually 5-15 × 1-5 cm, lanceolate to oblanceolate, sessile and auriculate, apex acuminate. Capitulescence corymbiform-paniculate, many-numerous-capitulate, mostly leafless, capitula erect; peduncles 0.1-0.8(-2.5) cm, (0-)few-bracteolate, crisped-hirsutulous-tomentulose; bracteoles 2-4(-5) mm, linear-lanceolate or proximal-most elliptic-lanceolate, rosaceous-tipped, subglabrous. Capitula 9-10(-13) mm, discoid or infrequently short-radiate, loosely few-calyculate, capitula erect at anthesis; involucre 3-5 mm diam., narrowly campanulate, disk florets exserted 3-4 mm; phyllaries 13, 6.5-8.5 × 0.7-1.3 mm, linear-lanceolate, green with small (c. 0.2 mm) rosaceous tip, glabrous; calycular bracteoles 1.5-3.5 mm, linear-lanceolate, glabrous; receptacle alveolate or when past fruit sometimes smooth. Ray florets typically absent, infrequently present and 2-5 per capitulum, 7-9 mm, yellow, glabrous to sparsely long-papillose, staminodia not seen, tube 2.5-3 mm, limb dentate to deeply 3-lobed and seemingly subteratological. Disk florets 16-20; corolla (6-)7-9 mm, funnelform, yellow, glabrous or lobes sparsely papillose, tube c. 3 mm, tube and throat subequal, 5(10)-veined, lobes 5, 0.8-1 mm, short-triangular; anthers 2-2.5 mm, endothelial tissue radial, filament collar c. 0.4 mm, apical appendage 0.3-0.4 mm, narrow-lanceolate; style base gradually dilated, branches c 1.1 mm; nectary very reduced. Cypsela 1.5-3.2 mm, terete, striate, glabrous; pappus bristles 6-8.5 mm, fragile. Flowering June-Apr. Dense colonies (Villaseñor, 1991) in cloud forests, forested slopes, Quercus forests, rocky outcrops, volcano slopes. Ch (Matuda 2891, MO); G (Williams y Molina 15310, MO). (2000-)2200-3800 m. (Endemic.)

The occasionally radiate-capitulate *S. godmanii* was included in synonymy of *S. doratophyllus* by Williams (1976), but resurrected by Villaseñor (1991).


Perennial caulescent simple-stemmed subrosulate rhizomatous herbs 0.2-0.6 m; rhizome 1-few-stemmed; stems erect, moderately leafy, basal leaves present at anthesis, leaves abruptly descrescent distally, brittle, purplish to purplish-green, striate, sparsely arachnoid, distal
internodes about half as long as leaves. Leaves ascending, alternate, sessile or basal ones sometimes with a narrowed subpetiolar base, stiffly chartaceous, venation pinnate, surfaces discolorous, adaxial surface green, glabrous or distal leaves sparsely arachnoid, abaxial surface white-lanate but with a raised purplish-green glabrous midrib, subpetiolar base 4-8 cm, margins entire, revolute, apex acute to attenuate; basal leaves several, progressively fewer and more well-spaced distally; basal and proximal leaves 9-20 × 0.4-1 cm, linear-oblanceolate, base long attenuate; mid-stem and distal leaves 2-9 × 0.2-0.7 cm, lanceolate, base dilated, subamplexicaul. Capitulescence 3-13 cm broad, open, corymbose, more or less flat-topped with lateral branchlets nearly as long as central axis, 3-7(-15)-headed; peduncles 1.5-7.5 cm, greenish-yellow, stiff, sparsely arachnoid, several-bracteolate; bracteoles 6-14 mm, lanceolate-subulate, subglabrous to sparsely arachnoid. Capitula 14-18 mm, radiate, 125-142-flowered; involucre 9-12 mm diam., campanulate; phyllaries c. 21, 8.5-10 × 1.5-2 mm, elliptic-lanceolate, the green mid-zone broad and about 2 × as wide as either narrow-stramineous margin, apex acute, ciliolate; calycular bracteoles c. 8, 5-6 mm, linear-lanceolate; receptacle convex, 4-6 mm broad. Ray florets 13; corolla 13.5-18 mm, yellow, glabrous, tube 3.5-5 mm, limb 10-13 × 3.5-5 mm, oblong, 4-6-nerved. Disk florets 112-129; corolla 6.8-9 mm, funnelform, yellow, glabrous or nearly so, tube 3-4.5 mm, about as long as limb, lobes 0.7-1.2 mm, triangular-lanceolate, sometimes with a faint medial resinous nerve; anthers 2-2.5 mm, theca apex gradually appendaged, appendage ovate; style branches c. 1.5 mm. Cypselae (2.5-)4-4.5 mm, pale, c. 10-costate, glabrous; pappus bristles 6-8 mm. Boggy páramos. CR (Pruski et al. 3912, MO). 3400-3700 m. (Endémica.)
Cuatrecasas (1982) placed *S. hansweberi* into *Senecio* sect. *Culcitioides* Cuatrec., where it is very similar to Andean *S. comosus* Sch. Bip.

Perennial caulescent (subrosulate) stoloniferous herbs ≤ 0.5 m; stolons few, shorter than plant height, arachnoid-lanate; stems ascending to erect, sparsely to moderately leafy, basal leaves present at anthesis, leaves abruptly descrecent distally purplish, striate, arachnoid-lanate, distal internodes about as long as leaves. Leaves ascending to spreading, alternate, stiffly chartaceous, venation pinnate, surfaces discolorous, adaxial surface green, glabrous or stem leaves sparsely arachnoid, abaxial surface white-lanate but with a raised glabrous midrib, margins denticulate, subrevolute, apex acute; basal leaves 2-6, long-petiolate, oblong-lanceolate, blade 5-9 × 0.5-1 cm, petiole 5-10 cm; stem leaves usually 5 or 6, 1.5-8 × 0.2-0.8 cm, lanceolate, base dilated, subamplexicaul. Capitulescence 3.5-6 cm broad, open, corymbiform or much less commonly
monocephalous, more or less flat-topped with lateral branchlets about as long as to slightly
topping central axis, (1-)3-4(-9)-headed; peduncles 2.5-5 cm, sparsely arachnoid, several-
bracteolate; bracteoles 2-6 mm, abruptly smaller than distal-most stem leaves, linear-subulate,
subglabrous to sparsely arachnoid. Capitula c. 13 mm, radiate, 66-80-flowered; involucre 7-9 mm
diam., campanulate; phyllaries c. 21, 9.5-10 × 1-1.8 mm, lanceolate, apex obtuse, ciliolate;
calycular bracteoles 7-9, 4-5 mm, linear-subulate; receptacle 3-4 mm diam., convex. Ray florets
12-14; corolla 18-21 mm, yellow, glabrous, tube c. 5 mm, limb 13-16 × 3-3.5 mm, oblongate.
Disk florets 54-66; corolla 8.5-9 mm, funnelform, glabrous or nearly so, yellow, tube c. 4 mm,
lobes c. 1 mm, triangular-lanceolate; anthers c. 2.5 mm, appendage oblong; style branches 1.5-1.8
mm. Cypselae (immature) 2.8-3 mm, glabrous; pappus bristles 7-8 mm. Rocky ridges, shrubby
thickets in páramos. CR (Weston 12351, US). 3400-3600 m. (Endémica.)

The rare *S. kuhbieri* is closely related to the sympatric *S. hansweberi*, which appears to differ
by being strictly rhizomatous and by having larger capitula with longer bracteoles.

9. *Senecio* sp. 1M

Perennial herbaceous vines mostly 1-3 m; stems climbing or scandent, striate; herbage
glabrous or nearly so. Leaves cauline, simple, alternate, petiolate; blade 3-7 × 3-7 cm, deltoid-
hastate, 3(-7)-palmately lobed, carnos, 3(-7)-palmately veined, surfaces concolorous, glabrous,
lobes basal, usually only 2, large and acuminate like the central one, lobes sometimes each with a
proximal secondary lobe, very infrequently with a more distal smaller lobe as well, base cordate
to hastate, lobe margins entire, lobe and blade apices acute or acuminate; petiole 1.5-3 cm, at
nearly right angles to blade, exauriculate, uniformly slender throughout. Capitulescence terminal
or axillary, monocephalous or openly corymbiform and 2-3-capitulate; peduncles 4-15 cm, 2-5-
bracteolate, sometimes puberulent; bracteoles 2-10 mm, subapical, oblongate. Capitula c. 10
mm, radiate, long-calyculate, disk florets slightly exserted; involucre 7-12 mm diam.,
campanulate-turbinate; phyllaries 12-13, 9-10 × 1-1.5 mm, narrowly oblongate, green or with
scarious margins, glabrous; calyculus obvious, c. 10-bracteate; calyicular bracts 8-10 mm, about
as long as involucre, ascending-spreading, narrowly elliptic, sometimes ciliate; receptacle
epaleate. Ray florets 8; corolla pale yellow, glabrous, tube 4.5-5.5 mm, limb 10.5-14 × 2-3 mm,
oblong, 9-11-nerved, somewhat thickener than most other species (perhaps due to its native
Mediterranean habit). Disk florets bisexual, 40-60; corolla 6.2-7.5 mm, narrow-funnelform,
yellow, shortly 5-lobed, glabrous, tube 2-2.5 mm, shorter than limb, slightly dilated basally, limb
very narrowly ampliate, lobes c. 1.1 mm, triangular, usually 3-nerved; anthers c. 3 mm, short-
sagittate, collar c. 0.5 mm, noticeably balusterform, endothelial cell thickenings radial, apical
appendage triangular-ovate; style base 0.3-0.4 mm, abruptly enlarged, bulbous or barrel-shaped, branches c. 1.5 mm, slender, spreading-recurved, stigmatic surface narrowly 2-banded, stigmatic surfaces continuing to the apex, apex truncate, laterally papillose, abaxial surface sometimes slightly papillose distally. Cypselae c. 2(-4.5) mm, cylindrical, brown, ribbed, glabrous; pappus bristles c. 6 mm, about as long as disk corollas, capillary, weakly scabridulous, white, bases connate at least when dried (perhaps from resinous excretion rather than ontogenetically).

Flowering July. Escaping from cultivation. ES (Villacorta M. RV-00585, MO). 800 m. Possibly native or Africa.


Syntype: Mexico, Veracruz, Linden 1126 (imagen en Internet ex K!). Illust.: none. N.v.: none.

Perennial caulescent herbs 0.4-0.6 m; stems erect, few-branched, leafy or rarely rosulate, striate, tomentulose to glabrate. Leaves sessile or basal leaves (when present) petiolate; blade 20-30(-40) × 1.8-6(-15) cm, oblong or narrowly obovate to infrequently runcinate, chartaceous, venation pinnate, surfaces usually concolorous, adaxial surface tomentulose to glabrous, abaxial surface glabrate(-tomentulose), base (of distal leaves) auriculate, semiamplexicaule, margins usually finely and regularly serrate-dentate to sometimes doubly serrate-dentate, 30+ teeth per side, apex acute to acuminare; petiole of basal leaves 15-30 cm. Capitulescence tightly corymbiform-paniculate, flat-topped; peduncles 0.4-2 cm, tomentulose, bracteolate. Capitula 6.5-9 mm, radiate; involucres 5-9 mm diam., campanulate or sometimes cylindrical; phyllaries usually 13, 4.5-6 mm, glabrous to tomentulose, apex acuminare, often laciniate; calycular bracteoles 3-6 mm, 2-3 mm, linear. Ray florets usually 8; corolla limb usually 5-9 mm. Disk florets c. 45; corolla 5-7 mm. Cypselae 2-3 mm; pappus bristles 4-6 mm. Habitat unknown. ?Ch (Breedlove, 1986: 54). (Mexico.)

Breedlove (1986) reported six collections from Chiapas as Senecio multidentatus "vel. aff." Of these six collections I have examined only Ton 510 (NY), which proves to be S. godmanii. The identification of Ton 510 as S. godmanii raises the possibility that the five other collections cited by Breedlove as similar to S. multidentatus are instead S. godmanii or perhaps another species in sect. Mulgediifolii. Furthermore, Turner (2012) does not cite S. multidentatus in Chiapas.

Nevertheless, S. multidentatus is treated here based on strength of the Breedlove literature report and upon disjunctions of other taxa (e.g. Robinsonecio gerberifolius) from Volcán Orizaba to Mesoamerica. Senecio multidentatus is circumscribed here as in García-Pérez (2001) and Turner (2012), who did not treat S. multidentatus var. huachucanus (A. Gray) T.M. Barkley as conspecific.

_Senecio mirus_ Klatt.

Robust perennial caulescent herbs 0.3-1.5 m; stems erect, 1-few from thick woody caudex, mostly simple, striate, arachnoid-tomentose, leaves evenly distributed, internodes shorter than leaves. Basal and proximal stem leaves long-petiolate; blade usually 10-30 × 6-17 cm, elliptic-lanceolate to ovate, thick-chartaceous, venation pinnate, with 20+ laterally spreading closely spaced secondary veins per side, surfaces discolorous, adaxial surface sparsely arachnoid in patches to glabrate, abaxial surface white-gray tomentose, base cuneate to cordate, margins densely serrate-dentate, apex acute to rounded; petiole usually 8-25 cm, densely arachnoid-tomentose. Mid-stem and distal leaves sessile and bracteate; blade 5-15 × 2-5 cm, broad-lanceolate, surfaces discolorous, abaxial surface white-gray tomentose, base dilated and subclasping, margins serrate-dentate, apex acuminate to caudate. Capitulescence 7-30 cm diam., corymbiform-paniculate, ultimate clusters moderately dense; peduncles mostly 2-6 cm, arachnoid-tomentose, bracteolate, bracteoles 3-10 mm, linear, spreading. Capitula 10-15 mm, radiate; involucre 5-9 mm diam., (cylindrical-)campanulate; phyllaries (13-)21, 6-10 mm, thickly 2-3-costate, subglabrate but minutely erose-tipped, inner ones with scarious margins, apex acute to acuminate; calycular bracteoles several, half as long as to subequal to phyllaries, linear, unevenly arachnoid-tomentose. Ray florets c. 13; corolla yellow, limb 7-10 × 3-4 mm, elliptic, usually 4-6-nerved. Disk florets (20-)50-100; corolla 7-9.5 mm, tube and limb subequal, lobes c. 1 mm. Cypselae 2-3 mm, glabrous; pappus bristles 6-9 mm, in fruit usually slightly exserted from involucre. Flowering Year-round. Cloud forests, disturbed areas, forested slopes, matorral alpino, meadows, oak forest, open moist forests, páramos, volcano slopes, volcano summits, wet thickets. Ch (Matuda 2869, MO); G (Steyermark 35520, MO); CR (Pruski et al. 3901, MO); P (Pittier 3094, US). (2000-)2500-4000(-4600) m. (Endemic.)


Perennial caulescent herbs 0.3-1 m; stems erect, 1-few from base, each simple or branched, stems ascending to erect, moderately and evenly leafy, basal leaves absent at anthesis, leaves gradually descrescent distally, striate, arachnoid-pubescent to arachnoid-tomentose. Leaves subsessile; blade 3-10 × 0.3-0.8 cm, linear-lanceolate to narrowly oblanceolate, chartaceous,
venation pinnate, secondary veins few, indistinctly and remotely arching, adaxial surface arachnoid-tomentulose to glabrous, abaxial surface arachnoid-tomentulose to arachnoid-tomentose, base usually attenuate and narrowly winged-petiolate, dilated and auriculate, margins remotely denticulate, revolute, apex acuminate to attenuate. Capitulescence corymbiform, 4-20+-capitulate, flat-topped; peduncles 1-2 cm, arachnoid-tomentulose, few-bracteolate. Capitula 7-10 mm, radiate; involucre cylindrical-campanulate; phyllaries 13(-21), 6-8 mm, usually glabrous, apex acute to acuminate, often darkened; calycular bracteoles 5-8, 3-4.5 mm, linear, arachnoid-tomentose proximally. Ray florets usually 8; corolla limb usually 5-7 mm. Disk florets c. 30+; corolla 5.5-7 mm. Cypselae 2-3 mm, glabrous; pappus bristles 4-6 mm. *Oak forests, pine forests, volcano slopes.* Ch (Breedlove, 1986: 54). 2200-2800 m. (Mexico.)


Lectotype (designated by Williams, 1976): Guatemala, *Hyde y Lux 4502* (GH, photo en MO!).

Illustr.: no se encontró. N.v.: none.

Perennial rhizomatous herbs 1-1.5 m; stems single, erect, branched only distally, striate, fistulose, subglabrous proximally to sparsely puberulent distally. Leaves basal and cauline, (1-)2-bipinnatisect, ascending, thin-chartaceous, venation pinnate, both surfaces glabrous or subglabrous; basal leaves 12-31 × 2.5-8 cm, oblong in outline, subrosulate, very narrowly winged-petiolare, runcinate-bipinnatisect to very near midrib, base indistinctly subamplexicaul, margins usually with 5-10 primary lobes per side, rachis very narrowly winged throughout, usually 2-5 mm diam., lobes unequal and irregular, primary lobes 2-5 cm, oblong, sinus about 2 × as broad as primary lobes, secondary lobes usually 2-4 per primary lobe margin, usually 2-10 mm, triangular-lanceolate, terminal lobe about same size as the lateral lobes; mid-stem and subdistal cauline leaves gradually smaller, lanceolate to oblong-lanceolate, pinnatifid, sessile, semiamplexicaul, base 1.5-2.5 cm diam., lobes fewer and shorter than in basal leaves; distal cauline leaves 4-7 cm, linear-lanceolate in outline, subbracteate, once-pinnatifid. Capitulescence loosely corymbiform, 10-20-capitulate, nearly leafless; peduncles 1-3 cm, few-bracteolate, crisped-puberulent, one bracteole usually basal-axillary, bracteoles 3-6 mm, linear-lanceolate, glabrous. Capitula 12-15 mm, discoid, loosely few-calyculate, commonly subtunant at anthesis; involucre 4-6 mm diam., narrowly campanulate, disk florets slightly exserted (2-3 mm); phyllaries 11-13(-14), 9-11 × 0.7-1.3 mm, linear-lanceolate, rosaceous, glabrous with setulose apex; calycular bracteoles 2-4(-5) mm, linear-lanceolate, glabrous. Ray florets absent. Disk florets (16-)20-25; corolla 7-9(-10) mm, narrowly campanulate, rosaceous or those of the inner florets sometimes ochroleucous, glabrous or lobes sparsely papillose, tube and throat subequal,
lobes 5, 0.7-1 mm, deltate to short-triangular; anthers 2.5-3(-3.5) mm, apical appendage 0.5-0.6 mm, narrow-lanceolate, filament collar c. 0.6 mm; style branches 1.3-1.5 mm. Cypselae 2-3 mm, terete, striate, glabrous; pappus bristles 7-8(-9) mm, fragile. Flowering Nov-Apr. *Wet montane forest, ?streamsides*. G (Skutch 1699, MO). 2400-2700(-3000) m. (Endemic.)

Although Breedlove (1986) cited Breedlove 10890 and Breedlove 28194 from Chiapas as *S. rhyacophilus* "vel aff.," the species is here excluded from Mexico. Both collections cited by Breedlove are now determined as *S. doratophyllus*. Recent collections distributed to MO as *S. rhyacophilus* prove instead to be *S. callosus*.


Perennial herbaceous subsucculent vines 1-2 m; stems climbing or scandent, branched, twining, striate to angled; herbage glabrous or nearly so. Leaves cauline, simple, alternate, long-petiolate; blade 3-7(-9) × 3-7(-11) cm, deltoid-hastate to broadly ovate, shallowly and unequally 5-9 palmately lobed, chartaceous, 3(-7) palmately veined, surfaces concolorous, glabrous or sometimes puberulent abaxially, base cordate to hastate or truncate, lobe or teeth margins entire, lobes 5-15 mm, triangular, lobe or teeth apices acute to acuminate, sinus rounded; petiole 1-4(-6) cm, straight, exauriculate, uniformly slender throughout, sometimes puberulent, about as long as blade or nearly so. Capitulescence 5-6 × 9-12 cm, terminal or axillary, corymbiform-paniculate, fasciculate, 10-15+-capitulate, open, flat on top, axis short, few-branched well below mid-point, ultimate clusters subumbelliform; peduncles 0.7-1.6(-2.5) cm, slender, few bracteolate; bracteoles sometimes papillose. Capitula 9-20 mm, in fruit half as long as in flower, radiate, short-calyculate; involucre 3-4 mm diam., cylindrical, disk florets well-exserted, but ray and disk pappus much shorter and only slightly exserted; phyllaries 8, 5-6(-9) × 1.2-1.5 mm, broadly lanceolate, green or yellowish green with scarious margins, apex triangular, acute, purplish, papillose; calyculus minute, 2-5-bracteolate; calycular bracteoles 1-1.5 mm, linear-lanceolate, sometimes papillose; receptacle flat to short-convex, epaleate. Ray florets 5, style well exserted; corolla yellow or less commonly yellow-orange, glabrous, tube 4.5-6 mm, limb 10-12 × 2.5-4 mm, oblong, 4(-5)-nerved. Disk florets bisexual, 10-13; corolla 11-14 mm, narrow-funnelform, yellow or less commonly yellow-orange, shortly 5-lobed, glabrous, tube 2+ times shorter than limb, slightly dilated basally where it is thicker and becomes somewhat indurate, limb very narrowly ampliate, 5-10-nerved, lobes c. 1 mm, triangular, often with a thinner central nerve in addition to the 2 thicker laterals; anthers 2.3-2.8 mm, short-sagittate, collar 1-2 mm, narrowly
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balusterform, apical appendage ovate; style cylindrical or nearly so to base, base c. 0.5 mm, bulbous-celled, lighter in color than distal style trunk, branches 1.5-2 mm, recurved, stigmatic surface indistinctly narrowly 2-banded, stigmatic surfaces continuing to the apex, abaxially smooth, apex obtuse, extreme apex ephemeral-papillose. Cypselae (2.7-)3.5-4.5 mm, cylindrical-prismatic, brown, c. 8-nerved, glabrous, carpododium narrowly annular, stramineous; pappus bristles 4.5-5.5 mm, about 2× shorter than corollas, capillary, weakly scabridulous or merely fluked, white. Occasionally cultivated, sometimes persisting, infrequently escaping. G (Pruski 4510, MO). 800-1500 m. (Native of South Africa, cultivated pantropically and as an annual in temperate zones.)


Annual tap-rooted herbs 0.1-0.4(-0.6) cm; stems erect, sparsely-moderately leafy throughout, subsucculent, simple to few alternate-branched, lateral branches often overtopping central axis; herbage glabrous to loosely arachnoid pubescent. Leaves alternate, sessile or proximal ones narrowly winged-subpetiolate, shallowly to deeply coarsely pinnatilobed with 4-8 usually opposite lateral lobes; blade 2-8(-11) × 0.5-3.5 cm, oblanceolate to obovate in outline, chartaceous, venation pinnate, base attenuate, distal leaves subamplexicaule, apex obtuse. Capitulescence corymbiform, ultimate clusters rounded, 1-4 cm and broad, few-headed, capitula erect at anthesis; peduncles 0.05-0.15(-0.2) cm, slender, usually loosely arachnoid pubescent, few-bracteolate; bracteoles 1-2 mm, lanceolate-subulate, distal half black. Capitula 5-8 mm, discoid, 50-70-flowered; involucre (2-)3-4 mm diam., broadly cylindrical (pressing campanulate); phyllaries 18-23, 4-7 × 0.5-0.7 mm, linear-lanceolate, mostly glabrous, mid-zone green, margins broad, stramineous, apex typically black, apical c. 1 mm triangular, acuminate to attenuate, often setulose; calycular bracteoles 5-11(-15), 1-2.5 mm, linear-subulate, distal half black; receptacle to c. 4 mm diam., narrowly fusiform, sometimes deeply alveolate. Ray florets absent. Disk florets bisexual (sometimes outer series seemingly pistillate by included anthers and the capitula thereby seemingly disciform); corolla 4-6 mm, (4-)5-lobed, narrowly funnelform, yellow, glabrous, tube 2.5-4 mm, usually about 1.5 × as long as limb, lobes 0.2-0.4 mm, deltate; anthers c. 0.7 mm, included, theca apex abruptly appendaged, appendage lanceolate; style branches c. 0.5 mm. Cypselae 2-2.5 mm, broadly c. 10-costate, ribs rounded, appressed-setose to sparsely puberulent; pappus bristles 4-5 mm, about as long as the corolla, rarely fluked. 2n = 40. Disturbed areas, open pine forests, volcano slopes. Ch (Breedlove 51817, CAS); G (Pruski y Ortiz 4280, MO); CR
Senecio warszewiczii

A. Braun et Bouché, Index Sem. (Berlin) 1851: 13 (1851).

The species, the generitype and native to Eurasia, was not cited for Costa Rica by Standley (1938) or for Guatemala by Williams (1976).

16. Senecio warszewiczii

A. Braun et Bouché, Index Sem. (Berlin) 1851: 13 (1851).

Holotype: Cultivated in Berlin from seed collected in Guatemala by Warszewicz (B, photo en MO!). Illustr.: no se encontró. N.v.: Margarita de monte, G.

Typically small caulescent woody-based subshrubs (sometimes flowering as perennial caulescent herbs), 0.3-1(-1.5) m, few-branched basally and then again in capitulescence; stems ascending to erect, moderately to densely leafy from near base to apex, basal leaves absent at anthesis, leaves gradually descrescent distally, leafy stunted shoots often also proliferous in the axils, ribbed-sulcate, white-arachnoid-lanate. Leaves simple, alternate, sessile or proximal leaves sometimes narrowly winged-petiolate, dilated basally to abruptly so, auriculate-clasping; blade 3-8(-15) × 0.3-1(-2.5) cm, linear-lanceolate or linear-oblongate to infrequently elliptic-lanceolate or elliptic-oblongate, stiffly chartaceous, venation pinnate with secondary veins usually mostly obscured, surfaces slightly to obviously discolorous, adaxial surface grayish-green to infrequently green, sparsely arachnoid to sometimes densely arachnoid or infrequently glabrate, abaxial surface densely white-floccose-tomentose, base cuneate to more commonly auriculate, margins subentire to denticulate, sometimes slightly revolute, apex acute to acuminate; petiole 0(-2) cm.

Capitulescence 5-15 cm diam., somewhat openly corymbiform to corymbiform-paniculate, nearly flat-topped with lateral branchlets often almost overtopping central axis; peduncles 0.5-2(-3) cm, loosely lanate, few-bracteolate; bracteoles c. 5 mm, abruptly smaller than distal-most stem leaves; linear, loosely lanate to glabrate. Capitula 9-12 mm, radiate, usually several-calyculate; involucre usually 5-8 mm diam., campanulate; phyllaries 13-21, 6.5-9 × 0.8-1.2 mm, linear-lanceolate, arachnoid basally to nearly glabrous throughout, apex acute to acuminate; petiole 0(-2) cm.

Disk florets (30-)45-61, slightly exserted from involucre; corolla 6-8 mm, funnelform, yellow, glabrous, tube and throat subequal or throat slightly longer, lobes 0.7-1 mm, triangular-lanceolate; anthers 2-3 mm; style base dilated, branches 1-1.3 mm, apex truncate, papillose. Cypselae 2.5-3.7 mm, strongly papillose; pappus
bristles 5.5-6.5 mm, fragile. Flowering Nov-Mar, Jun, Aug. *Alpine slopes, coniferous forests, elfin forest, oak forests, pine forests, roadside thickets, open rocky hillsides, streamsides, volcano slopes*. Ch (*Matuda 2876, MO*); G (*Pruski y Ortiz 4262, MO*). (1600-)2000-4100 m. (Endemic.)

*Senecio warszewiczii* is accepted provisionally as distinct from the similar to extra-Flora Area *S. calcarius* Kunth (syn. *S. mairetianus* DC.), which differs by leaves less obviously auriculate and by larger capitula with usually 21 lanate phyllaries and 13 ray florets with corolla limbs 12-17 mm. Plants of *S. warszewiczii* occurring at elevations below 3000 meters often have broader leaves than do the more frequently encountered higher elevational (3000-4100 m) narrow-leaved populations.

I presume the report by García-Pérez (2001) of *S. mairetianus* DC. in Chiapas is in reference to material I would determine as *S. warszewiczii*.

24. **Talamancalia** H. Rob. et Cuatrec.

Por J.F. Pruski.

Perennial terrestrial herbs to subshrubs to 2 m; stems erect to spreading, simple to few-Branches, lanate to glabrate, leafy with leaves not in aerial rosettes, leaves decrescent and usually remotely bracteate distally, nodes often very slightly deflected proximally, usually elongate distally, pith solid or partly fistulose. Leaves often lyrate-pinnatifid but sometimes unlobed, alternate, narrowly winged petiolar to a dilated-subclasping base; blade lanceolate to ovate in outline, chartaceous to stiffly so, venation closely arching-pinnate, abaxial surfaces pubescent, margins usually serrate at least in distal half. Capitulecence terminal, erect to ascending, laxly cymose, paucicapitulate; ultimate clusters broadly rounded to somewhat flat-topped. Capitula radiate, irregularly and loosely calyculate in 2-3 series; involucre campanulate to broadly campanulate; phyllaries 12-19, free, margins thinly scarious; receptacle solid, usually smooth; calycular bracts linear-lanceolate to ovate. Ray florets (0-)8-15, pistillate; corolla yellow or orange, glabrous, limb exserted, apex 3-denticulate. Disk florets 20-90, bisexual, somewhat exserted from involucre; corolla narrowly funnelform, corolla yellow to light orange, glabrous, tube cylindrical, subequal to longer than limb, lobes about the same length to longer than throats, lanceolate, ascending to somewhat spreading (non-recurved), usually with lateral and a medial resinous nerve; anthers often exserted, collar balusterform, thecae bases obtuse to rounded, not caudate, endothelial tissue radial, non-polliniferous connate zone between anthers usual with cells thickened at poles, apical appendage distinct, often with resinous midrib; style base slightly dilated, branches rounded apically, with subapical lateral papillae and an isolated apical tuft of papillae, papillae
shorter than to subequal to style branch diam., without a caudate fused-papillae appendage that is longer than branch diam., stigmatic surface 2-banded. Cypselae cylindrical, 10-nerved, usually setulose, epidermal cells short-quadrangular, carpopodium indistinct; pappus bristles of rays and disks similar, 3-4-seriate, white, barbellate, reaching to about base of disk corolla lobes. 4 sp. Central America, Ecuador, Peru.

Robinson y Cuatrecasas (1994) described senecioid *Talamancalia* from Costa Rica and Panama, stressing taxonomically its style branch features and lanceolate corolla lobes. *Talamancalia* was expanded to include a third species (from Ecuador) by Nordenstam y Pruski (1995), and the range of the genus was expanded into Peru by Beltrán y Pruski (2000). The essential generic microcharacters (balusterform anther collars, stylar papillae, lanceolate disk corolla lobes with a medial resinous nerve) were illustrated by Beltrán y Pruski (2000: 15, fig. 1).


1. Capitula 9-14 mm; calycular bracts 5-10 × c. 1 mm, linear-lanceolate to lanceolate, not covering involucres; ray corolla limbs 9-12 × 2-3 mm, 4-8-nerved; disk florets 20-35.


2. *T. westonii*


*Pseudogynoxys boquetensis* (Standl.) B.L. Turner.

Perennial herbs to subshrubs 0.3-2 m; stems leafy proximally, simple-stemmed or few-branched, sometimes purplish, lanate-villous or arachnoid to glabrate, proximal and mid-stem internodes shorter than leaves. Leaves: blade 6-13 × 2.5-6.5 cm, commonly lyrate-lobate, lanceolate to ovate in outline, usually with about 6-13 larger secondary veins per side, veins sometimes purplish, adaxial surface green, loosely pilose with flagelliform trichomes to sometimes glabrate, abaxial surface usually grayish-white, lanate-villous or infrequently loosely arachnoid, proximally with 2-4 lobes per side, lobes mostly 0.5-2 cm, dome-shaped to triangular, moderately spaced with sinus between lobes about as broad as lobes, in smaller plants blade
sometimes proximally cuneate and unlobed, margins denticulate or serrate to doubly so, apex acute to acuminate, typically discolorous; petiolar base (1-)2-8 cm. Capitulescence (3-)5-15 cm diam., usually on a few-bracteate stalk held 15-35 cm above distal-most leaves, usually (1-)3-21-capitulate, of 1-5 few-several-capitulate clusters, bracts usually 1-3(-4) cm, linear or lanceolate to sometimes weakly lyrate; peduncles usually 1-2.5 cm, weakly puberulent to glabrate. Capitula 9-14 mm; involucre 7-10 mm diam., campanulate; phyllaries 12-19, 7-9 × 1-1.5(-2) mm, lanceolate, greenish-yellow to sometimes purplish, 3-5-striate, often erose or fimbriate apically, apex acute to acuminate; calycular bracts usually 6-11, 5-10 × c. 1 mm, about 1/2 the length to slightly longer than phyllaries, linear-lanceolate to lanceolate, not covering involucre, green to sometimes purplish, 1-nerved, spreading to reflexed, setose to glabrate; receptacle alveolate. Ray florets usually 8 or very rarely seemingly absent; corolla orange, tube 3.8-6 mm, limb 9-12 × 2-3 mm, elliptic-lanceolate, 4-8-nerved. Disk florets 20-35; corolla 7-9 mm, light orange, tube and limb subequal, lobes 2-3 mm, longer than throat, somewhat spreading, often with a medial resinous nerve; anthers 2.5-3 mm, collar c. 0.5 mm, apical appendage 0.4-0.6 mm, narrow-lanceolate; style branches 1.5-2 mm, lateral and apical papillae 0.05-0.1 mm, shorter than style branch diam. Cypselae 2-3 mm, brownish; pappus bristles 5-7 mm. Flowering Nov-Apr. Marshes, rocky stream beds, savannas, volcano slopes. CR (Solano y Kriebel 780, INB); P (Terry 1299, MO). 1000-3000 m. (Endemic.)


Pseudogynoxys westonii (H. Rob. et Cuatrec.) B.L. Turner.

Subshrubs c. 0.3 m; stems 2-3-branched from base, seeming leafy mostly mid-stem, white-lanate, proximal internodes 0.5-1 cm, much shorter than leaves. Leaves: blade 5-5.3 × 1.7-2.5 cm, pinnatilobed, elliptic-lanceolate in outline, usually with about 8-10 larger secondary veins per side, surfaces discolorous, adaxial surface grayish-green, loosely arachnoid with flagelliform trichomes, abaxial surface densely white-tomentose, proximally commonly lyrate-lobulate with 3-5 lobes per side, lobes mostly 0.5-1 cm, closely spaced with sinus between lobes narrower than lobes, margins irregularly serrate, apex acuminate; petiolar base c. 1 cm. Capitulescence 4-5 cm diam., main axis 4-5 cm, held slightly above distal-most leaves, thinly lanuginose, bearing 2 clusters each 2-4-capitulate, branches with subfoliar bracts 2.5-3.5 × c. 1.5 cm, ovate, sessile; peduncles 0.5-1 cm. Capitula 20-23 mm; involucre 9-14 mm diam. broadly campanulate; phyllaries c. 13, 10-11 × 1.2 mm, lanceolate, surface usually thinly lanuginose, apex acuminate;
calycular bracts usually 7, 10-12 × 7-9 mm, about as long as phyllaries, broadly ovate to oblong-ovate, covering involucre, thinly lanuginose. Ray florets c. 15; corolla orange, tube c. 9 mm, limb c. 19 × 5-6 mm, elliptic-lanceolate, 10-15-nerved. Disk florets 80-90; corolla 18-20 mm, light orange, usually tube 12-13 mm, longer than limb, lobes c. 4 mm, longer than throat; anthers (including apical appendage) c. 4.2 mm, collar c. 0.5 mm, apical appendage c. 0.7 mm, lanceolate. Cypsela c. 3 mm; pappus bristles c. 7 mm. Flowering Feb. Páramo. CR (Weston 12373, US). 3100 m. (Endemic.)

25. Telanthophora H. Rob. et Brettell

Senecio sect. Terminales Greenm.

Por B.L. Clark y J.F. Pruski.

Erect caulescent leafy-stemmed simple-stemmed or few-branched shrubs or trees; stems sometimes subpachycaulous, with aerial rosettes of distally clustered leaves, distinctly foreshortened immediately below capitulescence, pith solid or rarely chambered, cortex (of stems 0.5-1+ cm diam.) often with obvious resin ducts; herbage (when pubescent) with simple trichomes. Leaves alternate, simple, petiolate; blade venation pinnate or sometimes indistinct, margins sometimes lobed, but never basically to midrib. Capitulescence terminal, subumbellate to corymbiform or corymbiform-paniculate, axis distinctly foreshortened, pith; peduncles bracteolate. Capitula radiate or discoid (in Mesoamerica only in T. cobanensis), inconspicuously calyculate; involucre cylindrical to narrowly campanulate; phyllaries 4-9, lanceolate, free, inner ones with scarious margins; calycular bracteoles few, linear; receptacle flat, epaleate, solid to sometimes fistulose. Ray florets 0-11, pistillate; corolla limb yellow, 3-denticulate. Disk florets 2-11, bisexual, usually slightly exserted; corolla gradually to abruptly ampliate, moderately 5-lobed but never nearly to tube, yellow, lobes sometimes longer than throat; anther collars cylindrical, thecae bases sagittate, endothecial cell wall thickenings usually radial; style branch apices truncate to conical, stigmatic surface continuous. Cypsela cylindrical, glabrous; pappus of rays and disks similar, of many white barbellate bristles. x = 30. Aprox. 9 spp. Mexico, Central America.

Species of Telanthophora were historically treated in Senecio (e.g., Hemsley, 1881; Williams, 1975, 1976), but the genus was described as new by Robinson y Brettell (1974). By microfeatures Robinson y Brettell (1974) placed it into subtribe Tussilagininae, and Pruski (2012-Tel, 2012-Key) keyed it other genera of this subtribe. Williams (1975, 1976) treated both Senecio cobanensis var. sublaciniatus and S. molinae as synonyms of S. cobanensis, but each T.
cobanensis, *T. molinae*, and *T. sublaciniatus* are recognized here. The present treatment differs from that of Clark (2000) by treating *T. cobanensis* and *T. grandifolia* without infrataxa and by recognizing *T. molinae*. The report by Berendsohn y Araniva de González (1989: 290-12) of *T. andrieuxii* (DC.) H. Rob. et Brettell and *T. cobanensis* in El Salvador is presumably in reference to materials that I would determine as other species. This treatment is adapted from that of Pruski (2012-Tel).


1. Phyllaries c. 8; capitula radiate.

2. Leaf blade surfaces discolorous, abaxial surfaces densely arachnoid-tomentose throughout or sometimes glabrate in patches, never completely glabrate.

5. *T. sp. 1*

2. Leaf blade surfaces discolorous, abaxial surface loosely arachnoid-pubescent to glabrate.

3. Petioles 2-4 cm; leaf blade venation indistinctly pinnate, margins usually entire or denticulate.

1. *T. bartlettii*

3. Petioles 4-18 cm; leaf blade venation clearly pinnate, 13-50 × 7-30 cm, commonly shallowly to deeply pinnatilobed.

3. *T. grandifolia*

1. Phyllaries c. 5; capitula radiate or discoid.

4. Ray florets 0; leaf blade with secondary veins immersed and usually indistinct.

2. *T. cobanensis*

4. Ray florets 1-2; leaf blades with pinnate venation.

5. Leaf margins sublacinate; disk floret corolla lobes much longer or subequal to throat; peduncles arachnoid pubescent

6. *T. sublaciniata*

5. Leaf margins entire to remotely serrate; disk corolla lobes longer than or subequal to throat; peduncles pubescent in axils, otherwise glabrous.

6. Leaf blade base attenuate to narrowly cuneate.

6. Leaf blade base cuneate to sometimes nearly obtuse.

7. *T. uspantanensis*


*Senecio montidorsensis* L.O. Williams.
Simple-stemmed shrubs to 3 m; stems tomentose to irregularly glabrate. Leaves: blade 10-20 × 2.5-7 cm, oblanceolate to ovate, subcarnose, venation indistinctly pinnate, adaxial surface glabrate, abaxial surface puberulent on midrib, base cuneate, margins entire or denticulate, less commonly very shallowly 3-4-sublobate, apex acute; petiole 2-4 cm, pubescent in axil. Capitulescence 8-20 cm diam.; peduncle axils pubescent. Capitula 9-11 mm, short-radiate; involucre 3.5-5 mm diam.; phyllaries 8, 6-8 mm, glabrous; calycular bracteoles c. 3 mm, pubescent. Ray florets (3-)4-5(-6); corolla limb (2-)3-4 mm. Disk florets 6-9; corolla 7-8 mm, lobes c. 2 mm. Cypselae 2-3 mm; pappus bristles 4.5-6 mm. Flowering Mar. Scrub forests, Pine-Oak forests. B (Davidse y Brant 32108, MO). 300-1000 m. (Endemic.)


Telanthophora cobanensis var. molinae (H. Rob. et Brettell) B.L. Clark, Telanthophora molinae H. Rob. et Brettell.

Branched shrubs or trees 1-7 m; stems glabrous or subglabrous. Leaves: blade 7-25 × 2-4.5 cm, oblanceolate to infrequently obovate, subcarnose, secondary leaf veins immersed and usually indistinct, adaxial surface glabrous, abaxial surface glabrous or sometimes midrib puberulent, base attenuate to infrequently cuneate, margins entire, apex attenuate or acuminate to infrequently obtuse; petiole 1-7 cm. Capitulescence mostly 10-20 cm diam., not held well above subtending leaves; peduncle axils white-tomentose, bracteoles c. 2 mm, glabrous. Capitula 6-9(-10) mm, discoid; involucre 2-3 mm diam.; phyllaries 5, 5-8(-9) mm, glabrous; calycular bracteoles c. 1 mm, glabrous. Ray florets absent. Disk florets (4-)5-6; corolla 4-6 mm, lobes 1-3 mm, longer than or subequal to throat. Cypselae 2-3 mm; pappus bristles 4-6 mm. Flowering (Dec-)Feb-May. Cloud forests, forested slopes, pine forests, pine-oak forests, stream sides. Ch (Matuda 16257, MO); G (Tuerckheim II 1656, MO); H (Molina y Molina 25563, MO); N (Stevens et al. 32838, MO). 1300-2600 m. (S. México, Mesoamérica.)

The citation by Balick et al. (2000) of Telanthophora cobanensis in Belize is presumably in reference to specimens that I would determine as T. bartlettii.

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Internet ex HAL!). Illustr.: Carrière, Rev. Hort. 62: 492 sub Senecio ghiesbreghtii (1980). N.v. Jol tuluk’ vomal, Ch; estrello, mano de león, G; tapatamal, H.


Simple-stemmed or branched shrubs or trees to 10+ m; stems pubescent to floccose-tomentose distally to irregularly glabrate. Leaves: blade 13-50 × 7-30 cm, elliptic to ovate, chartaceous, venation clearly pinnate with 8-15+ secondary veins per side spreading from midrib at about 60-80°, adaxial surface usually glabrate, abaxial surface loosely arachnoid-pubescent to glabrate, base oblique-cuneate to cordate, margins subentire to more commonly shallowly to deeply pinnatifoliated, lobes mostly 2-7 per side, 1-15 cm and sometimes incised to near midrib, apex acuminate to obtuse; petiole 4-18 cm. Capitulescence usually 10-30+ cm; peduncle axils pubescent. Capitula 7-13 mm, short-radiate(very rarely discoid); involucre 3-5 mm diam.; phyllaries usually 8, 4-7 mm, glabrous or sometimes pubescent; calycular bracteoles c. 1 mm. Ray florets (0-)1-6; corolla limb usually 3-6 mm. Disk florets 4-11; corolla 4-7 mm, lobes usually 1.5-2.5 mm. Cypselae 1-3 mm; pappus bristles 4-7 mm. 2n = 60. Flowering Nov-Aug. *Forests, montane forest, pine-oak forests, streamsides, secondary vegetation, thickets, volcano slopes*. Ch (Breedlove 49924, MO); G (Skutch 2081, MO); H (Daniel y Molina 9535, MO); ES (Standley 21487, US); N (Davidse et al. 30417, MO); CR (Tonduz 11663, NY); P (Woodson et al. 905, MO). 500-2500 m. (Mexico, Mesoamerica; occasionally cultivated in temperate greenhouses and out-of-doors in tropical regions.)


*Telanthophora cobanensis* var. *molinae* (H. Rob. et Brettell) B.L. Clark.

Branched shrubs to 4 m; stems few-branched, hirsute distally. Leaves: blade 10-25 × 2-3.5 cm, narrowly oblanceolate, venation pinnate with 4-7+ secondary veins per side spreading from midrib at about 45-60°, reticulate in dried specimens, surfaces glabrous, base attenuate to narrowly cuneate, margins remotely serrate, apex acute to acuminate; petiole 3-3.5 mm. Capitulescence 10-13 cm diam., not held well above subtending leaves; peduncles 2-5 mm, glabrous. Capitula 6.5-8 mm, radiate; involucre c. 3 mm diam.; phyllaries 5, 6-7.5 mm, glabrous;
calycular bracteoles c. 1 mm. Ray florets 1-2; corolla limb 5-6 mm. Disk florets c. 3; corolla 5.5-7 mm, lobes 1.5-3 mm, longer than to shorter than throat. Cypselae 1-2 mm; pappus bristles c. 5 mm. Flowering Dec-Feb. Cloud forests. G (Williams et al. 26080, US); H (Molina y Molina 25563, MO). 1800-2500 m. (Endemic.)

This species seems intermediate between Roldana schaffneri and Telanthophora sublaciniatus, each having pauciradiate capitula with 5 phyllaries variously shorter than to nearly as long as disk florets and often having long disk corolla lobes. The differences are fine and the generic stem character distinctions are by no means always clear in herbarium material. I feel confident only that, by radiate capitula, T. molinae is out of place within T. cobanensis, where it was placed by Clark (2000).

5. Telanthophora sp. 1. Illstr.: none. N.v.: none.

Pachycaulous shrubs 3-7 m; stems floccose-tomentose distally to irregularly subglabrate. Leaves: blade 10-22 × 4-10 cm, elliptic-ovate, stiffly chartaceous, venation pinnate with 10-12 secondary veins per side spreading from midrib at about 60-80°, surfaces obviously discolorous, adaxial surface green, sparsely arachnoid-tomentose along veins to glabrate, abaxial surface white-gray, densely and persistently arachnoid-tomentose throughout or sometimes glabrate in patches, never completely glabrate, base cuneate to obtuse, margins subentire to remotely and shallowly sinuoso-lobulate, lobules 0.2-0.5 cm, apex acuminate to obtuse; petiole 3-8 cm. Capitulescence 6-15 cm diam., branches and peduncles tomentulose, bracteoles 3-5 mm, linear-lanceolate. Capitula 6.5-8 mm, short-radiate; involucre 3-4 mm diam., campanulate; phyllaries c. 8, 4-5.5 mm, tomentulose on midzone or only so basally; calycular bracteoles 1-2 mm, linear-lanceolate. Ray florets 2-3; corolla limb c. 3+ mm, weakly exserted, 5-6-nerved. Disk florets 7-10; corolla c. 5 mm, tube shorter than limb, lobes 1.5-2 mm, about as long as throat, long-lanceolate, with median resin duct. Cypselae (immature) 1-1.5 mm; pappus bristles c. 5 mm. Flowering Mar, Jul, Sep, Nov. Near cafetales, low montane forests. G (Steyermark 49510, F). 1100-1800 m. (Endemic.)


Shrubs or small trees 2-6 m; stems with distal 10 cm closely arachnoid-pubescent to tufted arachnoid-tomentose in axils, proximally glabrate. Leaves: blade 6-17 × 1-3.5 cm, lanceolate to elliptic-lanceolate, venation pinnate, 4-6 strongly forward-directed thin main secondaries per side
diverging from midrib at about 30°, surfaces glabrous or glabrate, base narrowly cuneate, margins
sublaciniate, teeth-lobes 2-6(-10) mm, remote, apex acute; petiole 2.5-5.5 mm, pubescent in axil.
Capitulescence to c. 10 cm diam.; peduncles arachnoid pubescent, bracteoles 1-2 mm, linear.
Capitula 8-11 mm, short-radiate; involucre 3-4 mm diam.; phyllaries 5, 4.5-6 mm, inner ones
with scariosus margins wider than green midzone, apex acute to broadly obtuse, arachnoid-
puberulent to glabrate; calycular bracteoles c. 1 mm. Ray florets 1; corolla limb 4-5 mm. Disk
florets 3-4, well-exserted; corolla 5.5-7 mm, sometimes slightly asymmetric, lobes 2.5-3 mm,
subequal to unequal, much longer or subequal to throat. Cypselae c. 2 mm; pappus bristles 5-7
mm. Secondary vegetation, wet forests, pine forests. G (Steyermark 46994, MO); ES (Villacorta
1600-2200 m. (Endemic.))

7. Telanthophora uspantanensis (J.M. Coult.) H. Rob. et Brettell, Phytologia 27: 428

Senecio uspantanensis (J.M. Coult.) Greenm.

Shrubs or trees 2-7.5 m; stems villosulous in axils to glabrate. Leaves: blade (8-)15-33 × (2-
)3-9.5 cm, narrowly elliptic to oblong, subcarnose, venation pinnate, adaxial surface glabrous,
abaxial surface glabrous or sometimes midrib puberulent, base cuneate to sometimes nearly
obtuse, margins entire or subentire, apex acute to acuminate; petiole 6-11 cm. Capitulescence
mostly 10-25 cm diam., not held well above subtending leaves; peduncles pubescent in axils,
otherwise glabrous, bracteoles 1-3 mm, glabrous to puberulent. Capitula 7-9 mm, radiate;
involucre 2.5-3.5 mm diam.; phyllaries 4-5, 6-8 mm, glabrous; calycular bracteoles 0.5-1 mm,
glabrous. Ray florets 1-2 ; corolla limb 5-5.5 mm. Disk florets 2-3, slightly exserted at anthesis;
corolla 5-7 mm, lobes 2-3 mm, longer than or subequal to throat. Cypselae 1.5-2 mm; pappus
bristles 4-5 mm. Cloud forests, montane forests. Ch (Matuda 1941, MO); G (Steyermark 46943,
MO). 1300-2800 m. (S. México, Mesoamerica.)

J. D. Smith 1598, a syntype of Senecio ghiesbreghtii var. uspantanensis J.M. Coult., is the
type of Senecio serraquitchesiens.

26. Villasenoria B.L. Clark

Por J.F. Pruski.

Caulescent leafy-stemmed simple-stemmed perennial herbs to shrubs, leaves clustered distally;
stems glabrous or sometimes hirsute, pith solid. Leaves pinnatifid basically to midrib, alternate,
petiolate; blade chartaceous, leaflets usually in 4(-6) pairs, margins subentire to denticulate, surfaces eglandular. Capitulescence terminal, elongate, held well above distal-most stem leaves, main axis not conspicuously foreshortened basally, corymbiform-paniculate, branched only in distal 1/2-1/4 and usually bearing a loose cluster of 5-15 capitula, individual terminal clusters often broadly rounded, main axis and lateral branches minutely few-bracteolate, sparsely puberulent. Capitula radiate, (14-)18-28-flowered, irregularly and loosely calyculate; involucre usually cylindrical; receptacle flat, somewhat alveolate; phyllaries usually 8, lanceolate, glabrous. Ray florets pistillate; corolla yellow, limb moderately-exserted. Disk florets bisexual, slightly exserted from involucre; corolla narrowly funnelform, shortly 5-lobed, yellow, glabrous, tube slightly shorter than limb, lobes triangular-lanceolate, ascending to spreading, typically with a medial resinous nerve; anthers included, collar cylindrical, thecae bases cordate, endothelial tissue radial, apical appendage elliptic-lanceolate, apex acute; style base cylindrical, branches slightly exserted, slightly recurved, stigmatic surface continuous (sometimes appearing weakly cleft), apex truncate to obtuse, minutely papillose. Cypselae cylindrical, 10-nerved, glabrous but at maturity papillose-roughened; pappus bristles of rays and disks similar, many, white, barbellate, about as long as the disk corollas. 1 sp. S. Mexico.


**Telanthophora orcuttii** (Greenm.) H. Rob. et Brettell.

Perennial herbs to shrubs 1-3 m; stems erect. Leaves (including petiole) 10-30(-70) × 10-25(-40) cm, obovate in outline, leaflets 4-17 × 1-6 cm, elliptic-lanceolate to ovate or obovate, directed laterally or the larger terminal pair directed somewhat forward, leaflet venation arching pinnate with 3-4 main secondaries per side, distal leaflets usually with base proximally decurrent onto midrib, proximal leaflets usually very shortly petiolulate, apices acute to attenuate, adaxial surface glabrous to sparsely puberulent, abaxial surface sparsely pubescent; petiole 2-13 cm. Capitulescence often 15-25 cm diam., lateral branches usually diverging from main axis at 45-60°; peduncles usually 10-20 mm. Capitula 10-14 mm; involucre c. 4(-5) mm diam., slightly shorter than disk florets; phyllaries 9-12 × 1-2.5 mm, apex usually acute to acuminate; calycal bracteoles 0-4, 1-2 mm, linear. Ray florets 2-5; corolla tube c. 7 mm, limb 7-10 × c. 3(-4) mm, elliptic-lanceolate, usually 4-nerved, apex obtuse to rounded, 3-denticulate. Disk florets (12-)16-23; corolla 8-10(-14) mm, lobes 0.8-1.2 mm; anthers 2.5-3 mm; style branches 2.3-2.5 mm.
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Cypselae 2.5-4 mm, brown; pappus 7.5-10 mm. Flowering November. *Limestone outcrops.* Ch (Clark, 1996: 633). 1200-1300 m. (S. Mexico.)

27. **Werneria** Kunth

Por J.F. Pruski.

Perennial terrestrial herbs, solitary or clumped; rhizome thick. Leaves basal or crowded proximally on the very short scape, sessile, margins entire, surfaces glabrous. Capitulescence monocephalous, capitulum sessile or pedunculate. Capitula radiate, ecalyculate; involucre campanulate or hemispheric; phyllaries connate proximally, usually for at least 1/2 their length. Ray florets pistillate; corolla limb exerted, at least adaxially white or infrequently yellow. Disk florets bisexual; corolla white or yellow; anthers sagittate, filament collar balusterform; style branches short, each with a 2-banded stigmatic surface, apex obtuse, papillose. Cypselae oblong, brown, costate, glabrous; pappus of many slender stramineous scabrid capillary bristles. Aprox. 25-30 spp. Andean, 1 sp. also Mesoamerican.


Locally frequent caespitose acaulescent (ours) herbs, plants occurring solitary; caudex 1.5-2 cm diam., densely stramineous-lanate, leaf bases persistent. Leaves 4-13(-30) × (0.2-)0.6-1(-3) cm, broadly linear, distichous, subcoriaceous, indistinctly 1-nerved, base dilated and clasping, apex obtuse to rounded. Capitulescence of a sessile (ours) capitulum, rarely on peduncle to 15 cm. Capitula (excluding rays) 2-2.5 cm diam.; phyllaries 15-28, c. 15(-30) × 3-4 mm, linear-lanceolate, proximal 1/3-1/2 connate, margins scarious to apex, glabrous except at papillose apex. Ray florets c. 21 (15-35); corolla tube to c. 9 mm, limb 10-25(-45) × 3-5 mm, 6-13-nerved, white adaxially, often violet abaxially, apex obtuse, 3-denticulate. Disk florets (50-)100-200; corolla 6-11 mm, narrowly funnelform, yellow, tube and throat subequal, lobes 1-1.5 mm; anthers 3-3.5 mm, appendage ovate; style branches c. 1.2 mm. Cypselae 2-4 mm; pappus bristles 9-11 mm. Flowering Nov, Jan-Mar, May. *Alpine meadows, páramo, volcano slopes.* Ch (Breedlove 24279,
MO); G (Pruski y Ortiz 4283, MO); CR (Kappelle y Horn, 2005: 417); P (Weston 10164, MO). 2700-4300 m. (Mexico [Chiapas], Mesoamerica, Colombia, Ecuador, Peru, Bolivia.)

*Werneria nubigena* is circumscribed as including in synonymy pedunculate individuals named as *W. stuebelii*, thus following the generic monograph by Rockhausen (1939).

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XXII. Tribus Tageteae Cass.

Por J.F. Pruski.

Annual or perennial herbs to sometimes shrubs or rarely small trees; herbage often obviously streaked
with strong-scented internal pellucid secretory cavities filled with volatile essential oils. Leaves alternate or
opposite, unlobed to bipinnatisect, filiform to ovate. Capitulescence terminal, monocephalous to
corymbiform and obviously pedunculate or infrequently glomerate with subsessile capitula. Capitula radiate or infrequently discoid, corollas homochromous; involucre cylindrical to hemispherical, sometimes calyculate; phyllaries free to completely connate, subequal or sometimes moderately graduate, 1-2(-5)-seriate; clinanthium flat or convex, epaneate. Ray florets usually present, usually 5, 8, or 13, 1-seriate, pistillate; corolla usually yellow or orange, limb distally typically with a senecioid adaxial epidermal cellular pattern (cells oblong-tabular with a convex outer surface with cuticle minutely and transversely rugulose-striped). Disk florets (1-)5-70(-150+), bisexual; corolla usually symmetrically and shortly 5-lobed to infrequently asymmetrically lobed, usually yellow or orange, glabrous to indistinctly setose or glandular; anthers ecaudate, filaments glabrous, thecae pale, base truncate to weak-sagittate, endothecium pattern typically polarized, apical appendage usually lance-ovate, often sclerified, usually eglandular; style base glabrous, branches somewhat flattened, with stigmatic surfaces 2-banded, usually not confluent apically, apex truncate and exappendiculate to or sometimes tapering and appendiculate. Cypsela isomorphic, mostly prismatic to cylindrical, black to sometimes brown, carbonized, walls without raphids, usually finely striatulate (interruptions in the carbonized layer) between angles and costae, usually 5-10-strate-costate, carpododium often well-developed, apex truncate; pappus typically of few-many usually persistent 1-seriate bristles or (sometimes dissected) scales, sometimes unequal with bristles and scales in various combinations, sometimes coroniform, rarely absent. Aprox. 32 gen., 270 spp. Mostly SW United States and Mexico; 8 gen., 33 spp. in Mesoamérica.

Tageteae were recognized by Rydberg (1914), Strother (1977), Turner (1996), Villarreal (2003), and Panero (2007), but our genera were treated in either subtribes Flaveriinae, Pectidinae, or Tagetinae as either tribes Heliantheae (Robinson, 1981) or Helenieae (Bentham y Hooker, 1873; Karis y Ryding, 1994). Rydberg (1914) and Strother (1977), however, each excluded Flaveria from Tageteae.

Adenophyllum and Comaclinium were treated as synonyms of Dyssodia by Turner (1996). Several species of Flaveria and Pectis are noteworthy by their C-4 photosynthesis and by having concentric mesophyll-sheath cells closely surrounding the closely-spaced leaf vascular bundles (Kranz anatomy).

Thymophylla tenuifolia (Cass.) Rydb. and Thymophylla tenuiloba (DC.) Small should be looked for in Mesoamerica. Each maybe be expected as natives to southern Mexico, as well as throughout Mesoamerica as escapes from cultivation.

1. Leaves and phyllaries not pellucid-glandular.

4. Flaveria

1. Leaves and/or phyllaries pellucid-glandular.

2. Leaves simple and sessile; ray florets equal in number to phyllaries and each borne at base of a closely subtending phyllary.

6. Pectis

2. Leaves usually not all simple and sessile; ray florets none or not equal in number to phyllaries, each ray not closely associated with an individual phyllary.

3. All phyllaries free to base or nearly so.

4. Involucre ecalyculate; phyllaries uniseriate; capitula discoid; pappus of 25-50+ free bristles.

7. Porophyllum

4. Involucre calyculate; phyllaries 2-seriate; capitula radiate or infrequently discoid; pappus of 15-20 free scales, all dissected into 5-10 bristles.

5. Leaves simple or rarely trifoliate, pellucid-glandular in lines between secondary veins; disk corolla lobes lanceolate; clinanthium long-scaly or long-setose, scales or setae as long as or longer than cypselae.

2. Comaclinium

5. Leaves pinnatifid to pinnatisect into 5-15 lobes, pellucid glands scattered or submarginal; disk corolla lobes deltate; clinanthium glabrous or short-setose, setae typically shorter than cypselae.

3. Dyssodia

3. At least inner phyllaries connate from 1/3 to more than half of their length.

6. Pappus usually of 10 or fewer scales, sometimes scales erose; involucre ecalyculate.

8. Tagetes

6. Pappus of (8-)15-20 scales, at least some scales dissected into 3-10 bristles; involucre often calyculate.

7. Leaves pinnate or pinnatifid; phyllaries 12-20, at least the inner weakly connate 1/3-2/3 of their length.

1. Adenophyllum

7. Leaves simple; phyllaries 5-13, connate to near apex.

5. Gymnolaena

1. Adenophyllum Pers.

Dyssodia sect. Adenophyllum (Pers.) O. Hoffm.

Por J.L. Strother.

Annual herbs, perennial herbs, or shrubs; leaves and phyllaries pellucid-glandular. Leaves opposite or alternate, petiolate, pinnate or pinnatifid, pellucid glands marginal and subterminal in lobe-tips, often associated with bases of lobes, base, rachis, and teeth usually setose-bristly. Capitulescence terminal, mostly monocephalous. Capitula radiate or less
commonly discoid; involucre 8-25 mm, turbinate to hemispherical; phyllaries (8-)12-20(-30), 2-seriate, at least the inner weakly connate in proximal 1/3-2/3, the outer series sometimes free nearly to base, pellucid-glandular; calyculus of (0-)12-22 bracteoles, often seta-tipped. Ray florets (0-)8-16, not equal in number to phyllaries, each ray not closely associated with an individual phyllary; corolla yellow to scarlet. Disk florets 30-60. Cypselae obpyramidal; pappus of (8-)15-20 squamellae, variously muticous, aristate, or at least some dissected into 3-11 bristles. 10 spp. SW. United States, Mexico, Central America, West Indies.


1. Sprawling shrubs; leaves pinnate, leaflets 3-7(-11), ovate to lanceolate; calyculus of linear to subulate bracteoles.

   **1. A. appendiculatum**

1. Coarse annuals; leaves pinnatifid into 7-13 linear to obovate lobes; calyculus of pectinate-setaceous bracteoles.

   2. Capitula discoid; pappus squamellae all dissected into 5-10 bristles.

   **2a. A. porophyllum** var. *porophyllum*

   2. Capitula inconspicuously radiate; outer pappus of muticous, erose scales.

   **2b. A. porophyllum** var. *radiatum*


Sprawling shrubs to 2 m. Leaves mostly opposite, pinnatifid, leaflets 3-7(-11), 1.5-4.5 × 0.7-1.5 cm, ovate to lanceolate, glabrous, serrate, tips usually lance-subulate, subtended by pellucid glands. Capitula: involucre 12-18 mm; phyllaries c. 20, lance-linear, connate c. 1/2 their length, most with 1-5 pellucid glands; calyculus of 12-20 linear to subulate, gland-bearing bracteoles. Ray florets 8-16; corolla orange to red. Disk florets 40-60; corolla 12-13 mm. Cypselae 4-6 mm, sparsely pubescent; pappus 9-11 mm, of 10-15 subequal squamellae, each dissected into 5-9 bristles. 2n = 26. *Wooded slopes, ravines, roadsides.*

Ch (*Breedlove 46461*, CAS). 300-1200 m. (S. Mexico.)

This species was treated as a synonym of *Dyssodia aurantia* (L.) B.L. Rob. by Turner (1996).

*Dyssodia porophyllum* (Cav.) Cav.

Coarse annual herbs to 1(-2) m. Leaves 2-7 cm, becoming alternate, pinnatifid into 7-13 linear to obovate lobes, pellucid-glandular, marginal lobes toothed or divided, teeth with setae 7-12 mm. Capitula discoid or inconspicuously radiate; involucre 5-12 mm; phyllaries 12-18, lanceolate, connate c. 2/3 their length, each keeled and with a pellucid gland; calyculus of 6-18 pectinate-setaceous gland-bearing bracteoles. Ray florets 0 or c. 13. Disk florets 30-60; corolla 6-9 mm. Cypselae 4-5.5 mm; pappus of c. 20 squamellae, all dissected into bristles or the outer muticous. \(2n = 26\). Ruderal, fields, roadsides. 200-1900 m. (C. Mexico to Nicaragua, Cuba.)


Capitula discoid. Ray florets 0. Pappus squamellae all dissected into 5-10 bristles. \(2n = 26\). G (Standley 57947, MO). 1500-1900 m. (Jalisco to Oaxaca, Mesoamerica.)


Capitula inconspicuously radiate. Ray florets c. 13; corolla red-orange, limb c. 3 mm. Outer pappus of muticous, erose scales. T (Cowan, 1983: 24 sub *Dyssodia porophyllum* var. radiata); Ch (Breedlove 55452, CAS); Y (Gaumer 304, BM); G (White 5244, F); H (Standley 22449, GH); N (Williams 23766, F). 200-1900 m. (Mexico [Veracruz], Mesoamerica, Cuba.)

2. **Comaclinium** Scheidw. et Planch.

Por J. L. Strother.

Perennial herbs; leaves and phyllaries pellucid-glandular. Leaves opposite, becoming alternate, simple or rarely trifoliolate, sessile or petiolate, pellucid-glandular in lines
between secondary veins. Capitulescences terminal, monocephalous. Capitula radiate; involucre campanulate, 12-15 mm; phyllaries 10-16, 2-seriate, free to base or nearly so, streaked with linear or elliptic pellucid glands; calyculus of 3-12 bracteoles; receptacle long-scaly or long-setose, scales or setae as long as or longer than cypselae. Ray florets 10-15, not equal in number to phyllaries, each ray not closely associated with an individual phyllary; corolla orange. Disk florets c. 50+; corolla lobes lanceolate. Cypselae obpyramidal, pubescent; pappus of c. 20 free scales, the outer shorter, all dissected into 5-10 bristles. 1 sp.


*Dyssodia montana* (Benth.) A. Gray.

Herbs mostly 0.3-1 m. Leaves 4-10 cm, ovate to lanceolate, often with 2-6 setaceous lobules at base. Capitulescence: peduncles 10-25 mm. Capitula: phyllaries oblong to elliptic. Ray florets: corolla limb 10-15 mm. Disk florets: corolla 9-12 mm. Cypselae c. 3 mm; pappus to c. 10 mm. 2n = 26. *Open to brushy slopes and banks, streamsides*. Ch (Breedlove 47674, CAS); G (Standley 74897, US); H (Williams et al. 43008, US); ES (Standley 19299, US); CR (Almeda 2395, OS); P (Pittier 5079, US). 100-1900 m. (Endemic.)

3. *Dyssodia* Cav.

Por J. L. Strother.

Annual or perennial herbs; leaves and phyllaries pellucid-glandular. Leaves opposite, becoming alternate, petiolate; blade pinnatifid to pinnatisect into (3-)5-15(-17) lobes, pellucid glands scattered or submarginal. Capitulescence terminal, monocephalous or less commonly glomerulate. Capitula radiate or infrequently discoid; involucre 5-10 mm, cylindrical to turbinate; phyllaries 4-16, 2-seriate, free to base or nearly so, pellucid-glandular; calyculus of 1-9 bracteoles; receptacle glabrous or short-setose, setae typically shorter than cypselae. Ray florets 0-8, not equal in number to phyllaries, each ray not
closely associated with an individual phyllary; corolla yellow to orange. Disk florets 12-50; corolla lobes deltate. Cypselae obconic to obpyramidal; pappus of 15-20 free scales, all dissected into 5-10 bristles.

1. Capitulescence glomerulate; ray corolla limbs 6-9 mm.  
1. D. decipiens

1. Capitulescence monocephalous or of loose subsessile clusters; ray corolla limbs 1.5-3 mm.
2. D. papposa


Annual or short-lived perennial herbs to 0.5 m. Leaves to 5.5 cm, pinnatifid into 5-15 linear-cuneate to oblanceolate lobes. Capitulescence glomerulate, composed of a central discoid capitulum surrounded by 5-7 peripherally radiate capitula. Capitula: involucre 5-8 mm, turbinate to angular; phyllaries 5, broadly obovate; calyculus of 1-5 bracteoles. Ray florets 0-2; corolla limb 6-9 mm. Disk florets 14-30; corolla 3-4 mm. Cypselae 2.5-4 mm, obpyramidal; pappus of c. 20 squamellae, each dissected into 5-10 bristles. 2n = 26. Open places, mixed forests, sometimes ruderal. Ch (Breedlove 46420, CAS); G (Kellerman 4400, OS). 600-2300 m. (S. Mexico, Mesoamerica.)


Boebera papposa (Vent.) Rydb.

Annual herbs to 0.7 m. Leaves 1.5-5 cm, pinnatisect into 11-15 linear to lanceolate lobes. Capitulescence monochasial or of loose subsessile clusters. Capitula: involucre 6-10 mm, turbinate to campanulate; phyllaries 6-12, ovate to oblanceolate, each bearing 1-7 pellucid glands; calyculus of 4-9 bracteoles. Ray florets 3-8, inconspicuous; corolla limb 1.5-2.5 mm. Disk florets 12-50; corolla c. 3 mm. Cypselae c. 3 mm, obpyramidal; pappus of c. 20 unequal squamellae, each dissected into 5-10 bristles. 2n = 26. Ruderal. Ch (Breedlove 47074, CAS); G (Williams 41152, US). 1100-2700 m. (Canada, United States, Mexico, Mesoamerica, Bolivia, Argentina.)

Annual or perennial usually glabrous herbs to subshrubs to 2 m, less commonly trees to 4 m; stems erect or decumbent, branching distally or throughout, opposite-branched or as often pseudo-dichotomous by overtopping; herbage usually somewhat succulent, leaves and phyllaries not pellucid-glandular. Leaves simple, opposite, sessile or narrowed to a petiolariform base to 2 cm; blade linear to oblong-ovate, chartaceous, often triplinerved, surfaces glabrous or sometimes short-pubescent, margins entire to serrate, apex acute to attenuate, infrequently obtuse. Capitulescence corymbiform, of several somewhat compact several-capitulate tight-clusters and flat-topped or of axillary sessile glomerules; peduncles usually very short. Capitula radiate or discoid, radiate and discoid capitula often in same cluster with radiate capitula peripheral and discoid capitula central; involucre 0.5-2 mm diam., cylindrical or turbinate, often subtended by 1-few peduncular bracteoles; phyllaries 2-5(-9), persistent, stramineous, subequal, 1-2-seriate, lanceolate to ovate, sometimes cymbiform, apex acute to less commonly rounded, receptacles small, convex. Ray florets 0-1(-2), pistillate; corolla yellow or whitish, limb inconspicuous and not much exserted from involucre, oblong to ovate. Disk florets 1-15; corolla 2-4 mm, funnelform to campanulate, 5-lobed, yellow, sometimes papillose or stipitate-glandular to setose, tube sometimes appearing as long as throat, throat often ampliate only well above tube, lobes deltate, finely papillose; anthers stramineous, collar narrow; style base very slightly enlarged, branch apex truncate-papillose. Cypselae narrowly obconic, usually epappose, black, slightly compressed, c. 10-nerved, glabrous; pappus (present in 2 species) of few basally connate squamellae. $x = 18$. 21 spp. Largely American but with one species endemic to Australia and with 2 species weedy in the Old World; mostly in the S. Estados Unidos and México, 2 species in Flora Area, 3 spp. in South America; England, África, Asia, Australia, and Hawaii.

*Flaveria bidentis* includes as a synonym the generitype, and was used traditionally (Johnson, 1903) as a yellow dye and a vermifuge. It is an annual herb with a terminal capitulescence and capitula with 3 phyllaries, occurs on Hispaniola, the Lesser Antilles, gulf coastal Estados Unidos, and should be looked for in the Yucatán Peninsula.

*Flaveria* is a rare example of a Compositae having radiate capitula without disk florets, albeit these peripheral capitula occur in basically syncephalous capitulescences.
Flaveria is also noteworthy (Powell, 1978) because several species have Kranz anatomy typical of C4 photosynthesis, and as to be expected several species of Flaveria are found in alkaline or saline areas. Sartwellia is similar superficially to species of Flaveria with corymbiform capitulescences, but differs by having 3-5 ray florets per capitula and an aristate pappus.


1. Capitulescence terminal, of corymbiform-paniculate clusters; phyllaries 5(or 6); capitula usually 5-8-flowered.  
   1. F. linearis
   1. Capitulescence axillary, sessile, glomerulate; phyllaries usually 2; capitula usually 1(-2)flowered.  
   2. F. trinervia

Illustr.: Godfrey y Wooten, Aquat. Wetland Pl. S.E. U.S. Dicot. 807, t. 723 (1981). N.v.: Cardo santo, k'aan lool xiw, k'anlotxiw, kan lol xiw, kanlol xiu, xk'aan lool xiw, xk'anlolvxiw, Y; k'aan lool xiw, k'anlotxiw, kan lol xiw, kanlol xiu, xk'aan lool xiw, xk'anloxiw, QR.


Shrubby fibrous-rooted perennial herbs 30-90 cm; stems branched basally, erect, nodes about as long as associated leaves or distal nodes longer, subterete, mostly glabrous. Leaves sessile or subsessile; blade 3-8(-12) × 0.1-0.4(-1) cm, linear-lanceolate or rarely elliptic-lanceolate, attenuate basally, margins subentire, apex acute to acuminate. Capitulescence terminal, corymbiform-paniculate, flat-topped, many-capitulate, exserted from subtending leaves, distal branches sometimes puberulent, capitula subsessile to short-pedunculate in several many-capitulate clusters; peduncles to c. 0.5 mm, sometimes puberulent. Capitula radiate or sometimes discoid, usually 5-8-flowered; involucre 0.9-1.5 mm diam., more or less cylindrical, often subtended by 1 or 2
bracteoles, bracteoles 1-2.5 mm, linear; phyllaries 5(-6), 3-4.5 mm, oblanceolate, subimbricate, often stiffly persistent. Ray florets (0-)1; corolla 3-3.5 mm, longer than the cypsela, tube c. 1.5 mm, sometimes sparsely setose, limb to c. 2 mm, oblong, yellow. Disk florets usually 5-7; corolla c. 2.7 mm, funnelform-campanulate, tube and throat often setose, tube c. 1 mm, throat 1.3 mm, lobes c. 0.4 mm. Cypselae 1.2-1.8 mm, linear, epappose. 2n = 36. Edges of salt marshes, dunes, roadsides, beaches, salty flats, shrub island margins next to lagoons, edges of mangrove vegetation. Y (Gaumer et al. 1147, MO); C (Cabrera y Cabrera 13366, MO); QR (Lewis 6860, MO); B (Balick et al. 1989, NY). 0-5 m. (Estados Unidos [Florida], Bahamas, Mesoamérica, Cuba.)

Plants matching those described as Flaveria linearis var. latifolia are uncommon, but occur in Mesoamérica as well as peninsular Florida.


Shrubby tap-rooted annual herbs 0.2-1(-1.5) m; stems erect, subterete to angled, glabrous or rarely puberulent, nodes often longer than associated leaves. Leaves with a petiolariform base 1-2 cm, or distal ones sessile; blade 2-6(-10) × 0.5-2(-3) cm, oblanceolate to elliptic-ovoblate, bases attenuate or those of distal leaves little narrowed, often ciliate, margins serrulate, apex acute. Capitulescence axillary, sessile, glomerulate and nearly syncephalous, many-capitulate but glomerules simulating a single many-flowered capitulum, subspherical, 1-1.5 cm diam., subtended by reduced leaves, glomerule axis (a false receptacle) stiffly setose with erect to spreading setae 1-2 mm. Capitula radiate or discoid, usually 1-flowered; involucre 0.7-1 mm diam., more or less cylindrical; phyllaries usually 2, 3.8-4.5 mm, oblanceolate, eximbricate, tightly conduplicate around edges of mature cypselae and deciduous with them. Ray floret (0-)1; corolla c. 1.5 mm, shorter than the cypsela, tube papillose, limb 0.5-1 mm, ovate, pale yellow or whitish. Disk floret (when present) 1; corolla 2-2.5 mm, campanulate, tube 0.5-1.4 mm, basally papillose, throat 0.5-0.8 mm, lobes c. 1 mm. Cypselae 2-2.6 mm, epappose. 2n = 36. Dunes, sandy beaches, secondary areas, roadsides. Ch (Breedlove y
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Strother 46452, MO); Y (Gaumer et al. 23404, MO); C (King 6855, MO); QR (Darwin 2389, MO); B (Balick 2149, NY). 5-300(-1200) m. S. Estados Unidos, Mesoamérica, Venezuela, Ecuador, Perú, Brasil, Cuba, Jamaica, Puerto Rico, Lesser Antilles; introduced in Asia, África, Hawaii.

*Flaveria trinervia*, native to the Americas, is weedy in parts of the Old World. The Mesoamerican collections, except for the few collections from Chiapas, occur below 300 m elevation. The capitula of *Flaveria trinervia* are usually 1-flowered, thus either radiate or discoid. The species is not known from the Caribbean coast of Guatemala, although it was treated by Williams (1976).

I follow the tradition established by Willdenow (1803), and followed subsequently by Persoon (1807), Cassini (1825), Candolle (1836), Mohr (1901), Johnson (1903), and Powell (1978), and take Sprengel's *Brotera contrayerba* as based on a different type than *Milleria contrayerba* Cav. Each Sprengel (1801), Willdenow (1803), Persoon (1807), Cassini (1825), and Candolle (1836) treated these two species in two different genera, albeit now treated as congeneric. Cassini (1825) commented that the reuse of the epithet "contrayerba" by Sprengel (1801) was "impropre et fondé sur une erreur de synonymie," albeit Cassini's proposed replacement name *Brotera sprengelii* for *B. contrayerba* is itself nomenclaturally superfluous. In following traditional usage of taking these names as heterotypic, we should note (as did Willdenow etc.) that the descriptions and illustrations of each are of different plants: *M. contrayerba*, with a terminal capitulescence, being a synonym of South American centered *F. bidentis*, whereas *B. contrayerba*, characterized by an axillary capitulescence, is a synonym of *F. trinervia*.

5. **Gymnolaena** (DC.) Rydb.

*Syssodia* sect. *Gymnolaena* DC.

Por J.L. Strother.

Shrubs to 3 m; leaves and phyllaries pellucid-glandular. Leaves mostly opposite, simple, subsessile or short-petiolate, ovate to lanceolate, serrate, glabrous or puberulent, pellucid-glandular. Capitulescence terminal, monocephalous or in corymbiform clusters. Capitula radiate; involucre 1-2 cm, cylindrical; phyllaries 5-13, uniseriate, connate to near apex, dotted or streaked with pellucid glands; calyculus of 0-3 bracteoles. Ray florets 5-13, not equal in number to phyllaries, each ray not closely associated with an individual phyllary; corolla yellow to red. Disk florets 10-40+. Cypselae obpyramidal to clavate, pubescent;
pappus of 15-20 squamellae, each deeply dissected into 5-10 unequal bristles. 3 spp. S.
Mexico. 1 sp in Mesoamerica.


Shrubs. Leaves 10-15 cm, lanceolate, attenuate, with 2-4 subulate lobes at base.

Capitulescence: peduncles (2-)8-14 cm. Capitula: involucre 17-20 × 8-10 mm; phyllaries c. 13. Ray florets 8-12; corolla limb 7-8 mm, red-orange. Disk florets 30-40; corolla c. 9 mm.

Cypselae c. 6 mm, clavate; pappus squamellae dissected into 7-10 bristles 9-11 mm. 2


6. *Pectis* L.


Por J.F. Pruski.

Scented annual or unscented perennial low herbs; stems procumbent to erect, usually subterete when perennials to usually hexagonal when annuals, usually leafy throughout, often densely branched, sometimes pseudodichotomously branched with lateral stems greatly overtopping with often withered central axis, glabrous to puberulent; leaves or phyllaries pellucid-glandular. Leaves simple and sessile, opposite, linear to narrowly elliptic, chartaceous, sometimes stiff, 1-veined, surfaces variously punctate with large embedded oil glands, midrib sometimes puberulent abaxially, otherwise typically glabrous, base typically subperfoliate and sheathing, margins ciliate with (0-)3-10 pairs of long bristles from near apex proximally to commonly only proximally, bristles sometimes longer than blade width, otherwise usually entire. Capitulescence usually terminal, 1-several-capitulate, corymbiform; peduncles short to elongate, usually slender, infrequently dilated distally, often bracteolate; bracteoles usually alternate. Capitula shortly to inconspicuously radiate; involucre cylindrical or turbinate to sometimes campanulate, spreading with age, ecalyculate; phyllaries (3)4-8(-12), linear to oblong, usually free or sometimes conuate at base, subimbricate, subequal, 1(-2)-seriate,
conduplicate-involute, at least at base and equal in number to and bearing ray florets, base usually glibbous, sometimes carinate, laterally finely costate, with pectinate glands, glands usually elliptic or linear, otherwise glabrous to infrequently puberulent; receptacle flat or convex. Ray florets pistillate, equal in number to phyllaries and each borne at base of a closely subtending phyllary; corolla yellow or tinged with red, glabrous or tube weakly puberulent, limb short-ascending to moderately exerted, apex emarginate to rarely 3-denticulate; style branches elongate, linear-lanceolate. Disk florets few to many; corolla actinomorphic and 5-lobed, or zygomorphic with one lobe much more deeply cut than and opposing the others (often described in floras as bilabiate), typically yellow, glabrous or tube puberulent; anthers stramineous, base obtuse, included; style trunk papillose, branches short, elliptic-ovate, papillose, with weakly paired stigmatic lines. Cypselae elongate, narrowly cylindrical, often as long as or longer than disk corollas or pappus bristles, black, usually strigillose; pappus various, of few to several, scabrid or infrequently smooth awns, basally dilated aristate scales, or slender bristles, as long as or longer than the disk corollas or of a low crown of squamellae only or interspersed with the bristles, sometimes coroniform, stramineous or sometimes purplish. Estados Unidos, México, Central America, tropical and subtropical Suramérica, West Indies; c. 85 species, 43 spp in México, mostly neotropical.

The useful treatments by Gray (1883), Fernald (1897), Rydberg (1916), and Urban (1907), have been important for tracing name usages historically (Fernald, for example, gives many "usage synonyms"), as well as for checking synonymies. Recent floras by Keil (1996), Strother (1999), and Keil (2001), however, are the basis of my species concepts, although infrataxes have often not been recognized by me. Most of the chromosome numbers given below are derived from Keil (1977) and Keil (1996).

Although the genus is easily recognized by its narrow ciliate leaves, free subequal phyllaries, and elongate cypselae, Gray (1883) stated it "seems incapable of division" into infragenera. Nevertheless, each Gray (1883) and Fernald (1897) recognized three infragenera largely defined by pappus characters, yet Fernald acknowledged "these groups are not constant in their characters." The pappus variation is reflected in the generic synonymy that includes two generic names each proposed by Cassini (Chthonia and Cryptopetalon) and Lessing (Loretea and Pectidium), each of the four segregated from Pectis because of pappus morphologies. Fernald (1897) alludes to some taxonomic difficulties by noting that slender pappus bristles in some species "may become ... dilated below" (thus resembling aristate scales), in several species may be "entirely obsolete,"
and that "in many cases plants originally perennial with a suffruticose base may develop as annuals."

In the present treatment, specimens most difficult to assign to species are damaged-regrowth annuals and the southern-most small-capitulate coroniform individuals usually assigned to either *P. uniaristata* or *P. bonplandiana*. For example, the South American plants called *P. swartziana* by Pruski (1997, with the synonym *P. venezuelensis*) seem possibly conspecific with those called *P. uniaristata var. holostemma* by Keil (2001), but not matching Mexican *P. uniaristata var. holostemma* of Keil (1996). Because true *P. swartziana* is a pappose Cuban plant matching Mexican-typified pappose *P. bonplandiana*, the more southerly small-capitulate coroniform plants of Pruski (1997a), Keil (2001) may be misnamed and worthy of recognition as a current synonym (either *P. cyrilii* 1954, *P. panamensis* 1911, or *P. venezuelensis* 1953). In spite of these difficulties, I defer species concept judgment, and attempt to use the concepts of Keil (1996) and Keil (2001).


1. Prostrate perennial herbs rooting at the nodes; involucre 9-12 mm.

1. Erect to prostrate annual to perennial herbs never rooting at the nodes; involucres ≤ 8m.

2. Capitula sessile; prostrate (to ascending) annual herbs.

8. *P. prostrata*

2. Capitula pedunculate; erect to prostrate annual or perennial herbs.

3. Perennials with suberete stems; peduncles 1-9 cm.

4. Phyllaries glabrous; ray florets and phyllaries 5 per capitulum; disk florets 7-15 per capitulum; ray floret pappus of 0-5 scales, disks florets pappus of 3-12 scales.

3. *P. capillipes*
4. Phyllaries usually puberulent; ray florets and phyllaries 7-13 per capitulum; disk florets ≥ 20 per capitulum; rays epappose or pappus squamulose or of few bristles, disk floret pappus of 20-40 bristles.

9. **P. saturejoides**

3 Annual or biennial herbs with subhexagonal stems; peduncles ≤ 4 cm.

5. Involucre 1.8-2.3 mm.

2. **P. brachycephala**

5. Involucre ≥ 2.5 mm.

6. Most disk corollas lobes with a gland; pappus typically of 1-5, stout smooth awns, sometimes horizontally refracted; pairs of leaf bristles (0-)1-2.

2. **P. linifolia**

6. Disk corollas lobes without pellucid glands; pappus of scabrid scales or bristles spreading but never horizontally refracted, sometimes reduced and squamulose-coroniform; pairs of leaf bristles usually 3-10.

7. Ray florets 5-8(-11).

1. **P. bonplandiana**

7. Ray florets 5.

8. Pappus of 2-20 aristae, bristles, or scales ≥ 2-5 mm.

9. Pappus of 3-20 slender bristles; peduncles 0.5-1.5(-2.5) 2 cm.

4. **P. elongata**

9. Pappus of 2-6 broad-based scales; peduncles 2-4 cm.

5. **P. linearis**

8. Pappus of 1-5(-10) bristles ≤ 2.2 mm or coroniform.

10. Immature phyllaries obtuse; ray florets 5-8(-11); disk florets 6-15(-22); pappus of 1-6(-10) bristles or coroniform.

1. **P. bonplandiana**

10. Phyllaries always acute to acuminate; ray florets 5; disk florets usually 3-7; pappus of 1 bristle or coroniform.

10. **P. uniaristata**


Holotipo: México, Queretaro, *Humboldt y Bonpland s.n.* (P-HBK). Illustr.: none. N.v.: Culantrillo, G.

Erect to spreading or sometimes prostrate scented annual to biennial herbs 5-40 cm; stems several pseudodichotomously branched, subhexagonal, glabrous. Leaves 10-20(-40) × 1.5-3(-5) mm, linear to more commonly elliptic-lanceolate or falcate, glabrous, broad-based, margins sometimes scabrous, apex acute to obtuse, short-mucronulate, glands scattered. Capitulescence diffuse, corymbiform, held slightly above subtending leaves; peduncles 0.5-2(-3.5) cm, glabrous, minutely 1-3(-6)-bracteolate; bracteoles 1-2 mm, filiform, slightly spreading. Capitula 4.5-5.5 mm, pedunculate, inconspicuously radiate, corollas weakly exserted from involucre; involucre 3.5-4.5 × 1-2 mm, turbinate to narrowly campanulate; phyllaries 5-8(-11), 0.5-1 mm diam., linear-lanceolate to oblanceolate, often strongly conduplicate (though only thinly carinate) especially when dried, apex obtuse when immature, becoming acute to acuminate at anthesis, glands few, linear-elliptic. Ray florets 5-8(-11); corolla yellow becoming purplish, limb 1-2 × to c. 0.6 mm, elliptic-ovate to spatulate, 3-5-nerved. Disk florets 6-15(-22), infrequently outside of Mesoamerica 4 or 5; corolla 1.5-2 mm, cylindrical, 1 lobe longer than others, lobes without pellucid glands. Cypselae (1.8-)2.5-3 mm, strigillose; pappus minutely fimbriate squamulose-coroniform to c. 0.5 mm, or also with 1-6(-10) bristles 1-2(-2.2) mm, spreading but never horizontally refracted, bristles often brown. 2n = 48. Beaches, entre pastos, grasslands, hillsides, lawns, margins of thickets, marshes, matorral, orilla de camino, pastures, savannas, secondary vegetation, strand vegetation. T (Ventura A. 20933, MO); Ch (E. Ventura V. y E. López 2348, MO); ?Y (reported by Strother, 1999, but not by Keil, 1996); B (Schipp 673, MO); G (Contreras 7804, MO); N (Nee y Miller 27556, MO); CR (Morales y Rodríguez 5729, MO); P (Duke 603, MO). 0-400(-900) m. (México, Mesoamérica, Colombia, Venezuela, Cuba, Jamaica, Hispaniola.)

Urban (1907) and Pruski (1997a) listed the species as occurring south to Bolivia but those reports are based on misdeterminations made in the early 1900s on Herzog collections. Similarly, each Williams (1976) and Strother (1999) cited this species as occurring in El Salvador, but these citations are presumably based on misdeterminations, as has been all material from El Salvador seen by me. Panamanian materials with > 5 rays/capitulum are generally referred here, but this distinction seems arbitrary. Panamanian and South American populations are usually smaller-capitulate, have c. 5 disk florets per capitulum, and are squamulose-coroniform (thus recalling *P. uniaristata*), whereas Mexican populations often have broader leaves, 10+ disk florets per capitulum, and 4-6(-10) pappus bristles. These differences may be important at the species level. The
Fernald (1897) report of *P. swartziana* in Panamá is presumably in reference to the present species or to *P. uniaristata.*


*Pectis minutiflora* D.J. Keil.

Erect tap-rooted annual herbs to 15 cm; stems several dichotomous-trichotomously branched, spreading, subhexagonal, glabrous. Leaves 5-15(-25) × 1-2.5 mm, linear to linear-oblanceolate, glabrous, margins proximally with 1-2 pairs of bristles c. 1 mm, apex acute, mucronulate, glands in 1 line per side immediately adjacent to margin, infrequently scattered. Capitulescence diffuse, corymbiform, held slightly above subtending leaves; peduncles 0.8-1.5(-2) cm, filiform, glabrous, minutely 2-3(-6)-bracteolate; bracteoles c. 1 mm, filiform, slightly spreading. Capitula 2-2.5 mm, pedunculate, inconspicuously radiate, corollas weakly exserted from involucre; involucre 1.8-2.3 × 1-1.5 mm, broadly turbinate to campanulate; phyllaries 5(-7), 0.8-1.3 mm diam., ovate to obovate, thinly carinate except apically, apex obtuse, glands few, linear-elliptic, immediately adjacent to midnerve. Ray florets 5(-7); corolla 1-1.5(-1.8) mm, yellow, limb to c. 0.7 × to c. 0.3 mm, elliptic-ovate, faintly 3-nerved. Disk florets 12-29; corolla 1-1.2 mm, funnelform, 4-lobed, lobes subequal. Cypselae 1.2-1.5 mm, glabrous or sparsely strigilllose; pappus absent or minutely squamulose-corniform, to c. 0.2 mm. *Pacific coastal plains.* Ch (Purpus 9162, MO). 0-100 m. (Mexico [Oaxaca], Mesoamerica, Venezuela, Aruba.)

This is the smallest flowered species of *Pectis,* was recognized by Strother (1999) as *Pectis minutiflora,* but was reduced to synonymy by Keil (1996).


*Pectis erecta* Fernald.

Unscented perennial herbs with woody rhizome 5-30 cm; stems erect or ascending to sometimes decumbent, few-dichotomous branched throughout, branches often elongate-spreading, glabrous to finely hirsutulous, subterete (but sometimes slightly angled-ridged distally), internodes slightly shorter than leaves to much shorter distally. Leaves 10-50 × 1-3 mm, linear-lanceolate, midrib somewhat prominent, glands round, in 1-2 lines per
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side, surfaces otherwise glabrous to very finely hirsutulous, margins thickened, sometime revolute, apex acuminate, long-mucronate. Capitulescence of few axillary capitula per plant, each borne near apex of lateral branchlets, typically well-exserted from subtending leaves; peduncles 1-7 cm, glabrous, minutely 2-6-bracteolate; bracteoles 2-3 mm, subulate, ascending. Capitula 6-8 mm, pedunculate, short-radiate, corollas moderately exserted from involucre; involucre 4-6.5 × 3-4.5 mm, narrowly turbinate; phyllaries 5, 1.5-2 mm diam., oblong, thinly carinate except distally, apex acute to obtuse, glabrous, glands inconspicuous. Ray florets 5; corolla yellow or purplish when young, tube 1.5-3 mm, limb 2-6 × to c. 1 mm, oblong, faintly 3-5-nerved, margins often involute. Disk florets 7-15; corolla 3.5-5 mm, yellow to lobes sometimes purplish, lobes to c. 2 mm, unequal, one longer than others; style sometimes well-exserted. Cypselae 2-3 mm, strigillose; pappus sometimes purplish, of unequal aristate, scabrid scales and often of basal squamellae 1-2 mm, the ray pappus of 0-5 scales 3-4 mm, the disk pappus of 3-12 scales 2-5 mm. 2n = 24. *Brushy hillsides, grassy slopes, wet pastures, matorrales secos, pinares, roadsides, saline flats, savannas, secondary vegetation. G (Vélez y Pérez 13285, MO); H (Molina R. y Molina 25783, MO); ES (Monterrosa 596, MO); N (Baker 2556, F); ?P (Hemsley, 1881-1882, and Gray, 1883, cited Seemann s.n., GH + K, sub *P. diffusa*). 0-1400 m. (Endemic.)*

Among Mesoamerican species, *Pectis capillipes* is most similar to annual *P. linearis*, but differs by its thick-margined leaves and often pappus including squamellae. The Mexican perennial *P. diffusa* Hook. et Arn. is very similar but differs by longer ray corolla limbs and longer disk corolla lobes. The specimens from Nicaragua cited by Hemsley are presumably *P. capillipes*, whereas the sole specimen from Panamá cited by Hemsley (1881-1882) and Gray (1883) as *P. diffusa* needs verification.


Frequent erect slender scented annual or biennial herbs to 0.5(-1) m; stems usually simple below capitulescence, then few-trichotomous(-dichotomous) branched, often
reddish, subhexagonal, glabrous or scabrous on angles or at nodes, internodes (at least proximal ones) often longer than leaves. Leaves 10-40(-60) × 1-4 mm, linear-lanceolate, glands round, scattered, surfaces otherwise glabrous to sometimes scabrous, apex acute to obtuse, mucronate or aristate. Capitulescence diffuse, thyrsoid-paniculate, usually comprising top half of plant, each secondary branch with terminal cluster corymbiform, often flat-topped with third-order branches as long as secondary axis, held within or weakly exserted from subtending leaves; peduncles 0.5-1.5(-2.5) cm, glabrous, minutely 2-3-bracteolate; bracteoles 1-1.5 mm, subulate, ascending. Capitula 5-6.5 mm, pedunculate, inconspicuously radiate; involucre 4.5-5.5 × 1.3 mm, cylindrical to narrowly campanulate; phyllaries 5, 0.5-1 mm diam., narrowly lanceolate, thinly carinate except distally, apex acute to acuminate, glands few, elliptic, otherwise glabrous. Ray florets 5; corolla yellow, limb 2-4 mm, linear-lanceolate, faintly 3-5-nerved. Disk florets 5-9; corolla 2-4 mm, 4.5-lobed, 1 lobe more deeply cut than others, lobes without pellucid glands. Cypselae 2-2.5 mm, strigillose; pappus of 3-20 slender bristles 2-5 mm, spreading but never horizontally refracted. 2n = 24. Disturbed areas, dry hillsides, gravel bars, meadows, open woodland, open rocky hillsides, pastures, pine-oak forests, roadsides, sandy areas, savannas, scrub-forests, streamsides. Ch (cited by Keil, 1996, but not by Strother, 1999); ?Y (Villaseñor 1989: 82); ?QR (Villaseñor 1989: 82); G (Standley 76187, MO); H (Standley 27600, MO); ES (Calderón 125, MO); N (Baker 2137, US); CR (Williams et al. 26392, F); P (Allen 1018, MO). 0-1000(-1500) m. (México, Mesoamérica, Colombia, Venezuela, Guayanas, Ecuador, Brasil, Cuba, Jamaica, Hispaniola, Puerto Rico, Lesser Antilles.)

This is our most common species of Pectis. Infraspecies have often been recognized within Pectis elongata (e.g., Keil, 1996; Keil, 2001; Pruski, 1997a), but two of these are treated here in synonymy, whereas P. elongata var. fasciculiflora (DC.) D.J. Keil, the third and final non-typical variety, is recognized here as the species P. fasciculiflora. Although, cited by Villaseñor (1989) as occurring in Yucatan and Quintana Roo, the distributions there were neither verified by me, nor cited in Keil (1996).

Erect scented annual herbs to 25 cm; stems 7-50 cm, spreading, several-dichotomous(-trichotomous) branched, often reddish, subhexagonal, glabrous or very finely puberulent, internodes slightly longer than to much shorter than leaves. Leaves 10-20(-30) × 1-2 mm, linear-lanceolate, glands round, in 1 line per side, surfaces otherwise glabrous to very finely puberulent, apex acute, mucronate. Capitulescence diffuse, of few capitula per plant, each borne near apex of lateral branchlets, typically well-exserted from subtending leaves; peduncles 2-4 cm, glabrous, minutely 3-4-bracteolate; bracteoles 1-2 mm, subulate, ascending. Capitula 5-7 mm, pedunculate, inconspicuously radiate; involucre 4-5.5 × 2-3 mm, narrowly turbinate; phyllaries 5, c. 1 mm diam., narrowly lanceolate, thinly carinate except distally, apex acuminate, glands few, linear, otherwise glabrous. Ray florets 5; corolla 2.5-3 mm, yellow or sometimes pinkish, limb 1-1.5 × c. 0.4 mm, linear-lanceolate, 3-nerved. Disk florets 5-9; corolla 2-3 mm, lobes slightly unequal, without pellucid glands. Cypselae 2-2.5 mm, strigillose; pappus of 2 (rays) to 6 (disks) subequal aristate, scabrid broad-based scales 2-3 mm, spreading but never horizontally refracted, squamellae absent. 2n = 24. Savannas and pastures. Y (Schott 666, F); ?C (Chan 2306 reported as P. schottii by Sosa et al., 1985). 0-300 m. México, Mesoamérica, Venezuela, Jamaica, Puerto Rico, Virgin Islands, Lesser Antilles, Curacao.)

Pectis schottii is typified by material from Yucatán, and was reduced here to synonymy by Keil 91996). The report by Rydberg (1916) of Pectis febrifuga (a synonym of annual P. linearis) in Costa Rica (repeated unverified by Adams, 1972, and Standley, 1938) is possibly in reference to plants with a pappus partly of squamellae (as keyed by Rydberg, 1916) that I would determine as the perennial P. capillipes. Howard (1989) cited the Mairet holotipo of P. capillaris in G-DC as lectotype, but although from the same locality this choice is perhaps in conflict with the La Llave protologue that cited a Pineda collection. The G-DC sheet is only a possible type of the La Llave name.

Pectidium punctatum (Jacq.) Less., Pectis linifolia var. hirtella S.F. Blake, Pectis linifolia var. marginalis Fernald, Pectis punctata Jacq., Tetracanthus linearifolius A. Rich., Verbesina linifolia L.

Erect slender unscented annual herbs to 1 m; stems few-several pseudodichotomously-branched distally, these lateral branches ascending and greatly overtopping the usually withered central axis/capitulum, often purplish, internodes (at least proximal ones) typically longer than leaves, glabrous to angles finely puberulent. Leaves 10-65 × 1-4.5(-8) mm, linear to linear-lanceolate, glands round, scattered or in 1-2 line per side, glabrous to finely hirtellous on abaxial surface of midrib and on margins, margins proximally usually with (0-)1-2 (Flora Area) pairs of bristles 1-2 mm, rarely to 3 pairs to 7 mm, apex acute. Capitulescence diffuse, pseudodichasial, corymbiform, well-exserted from subtending leaves; peduncles 1-3 cm, glabrous, minutely 1-5-bracteolate, sometimes bracteole only at subtending node; bracteoles c. 1 mm, subulate, ascending to spreading. Capitula 5-8(-9) mm, pedunculate, inconspicuously radiate; involucre 4.5-7.5 × 1-2 mm, cylindrical; phyllaries 5, c. 0.6 mm diam., linear-lanceolate, sometimes purplish, usually glabrous, apex usually obtuse, sometimes ciliolate, glands to c. 1 mm, linear or becoming elliptic distally, obvious. Ray florets 5; corolla 2-3 mm, yellow sometimes drying purplish, tube 1-2 mm, limb c. 1(-2.5) × 0.2-0.3 mm, oblong, faintly 2-3-nerved, margins sometimes involute, apex sometimes 3-denticulate, often 1-2 punctate-glandular. Disk florets 1-4(-6); corolla 2-3(-4) mm, yellow but typically drying purplish, lobes subequal, most with a single round gland apically. Cypselae fertile (Flora Area) or sometimes disks sterile, 3-7 mm, occasionally nearly as long as involucre, strigillose; pappus of 1-5, stout, purplish, sometimes horizontally refracted, smooth awns 2-3 mm, rarely disks (in extra-FM material) solely squamulose. 2n = 24. Thickets, roadsides, rocky slopes, sea shores, stone walls. Y (Gaumer 979, MO); QR (cited by Villaseñor, 1989); G (Standley 73633, US); P (D'Arcy 10218, MO). 0-500 m. (SW. Estados Unidos, México, Mesoamérica, Colombia, Venezuela, Ecuador, Perú, Bolivia, Cuba, Jamaica, Hispaniola, Puerto Rico, Virgin Islands, Lesser Antilles, Bahamas, Galapagos, Hawaii.)

This species was revised by Keil (1978), but Pectis linifolia var. hirtella S.F. Blake, recognized by Keil (1978), is reduced to synonymy, and P. linifolia is treated here without recognition of infraspecies. The species was not treated by Keil (1975), and was first reported in Panamá by Keil (1981).

Semisucculent prostrate unscented perennial herbs rooting at the nodes; stems to 1(-5+) m, sometimes ascending to 10 cm, throughout, glabrous or puberulent proximal from nodal subperfoliation. Leaves (5-)20-40 × 1-5(-8) mm, linear to elliptical or oblanceolate, glands round, marginal or sometimes scattered, sometimes glaucous, otherwise glabrous, margins sometimes serrulate, apex obtuse to acute, mucronate. Capitulescence monocephalous on lateral branchlets, generally slightly exserted from subtending leaves; peduncles 1-6 cm, 1-4-bracteolate; bracteoles to c. 5 mm, subulate, opposite or ascending or appressed. Capitula to c. 15 mm, short- radiate, ray corollas sometimes well-exserted from involucre; involucre 9-13 × 7-10, narrowly campanulate; phyllaries 5-8(-9), 2-4 mm diam., lanceolate to obovate, 1-2-seriate, apex acute to obtuse, ciliate, glands linear in lines to inconspicuous, otherwise glabrous. Ray florets 5-8(-9); corolla yellow, tube 2-3.5 mm, limb 6-9 mm. Disk florets 15-50+; corolla 5.5-7.5 mm, lobes unequal (4+1), the longer one c. 3 mm, linear, the shorter ones 0.5-1 mm. Cypselae 6-8 mm, clavate, glabrous or sparsely setulose distally; pappus of 10-20 unequal moderately broad, scabrid bristles 1-7 mm, sometimes with few tiny squamellae. 2n = 72. *Pacific Ocean beaches, dunes, strand vegetation.* Ch (Davidse et al. 30107, MO); G (expected fide Williams, 1976); H (Molina R. 23283, MO); ES (M.A. Renderos 132, MO); N (Levy 384, K); CR (Pittier 7342, GH); P (Dwyer 2520, MO). 0-10 m. (México, Mesoamérica, Colombia, Ecuador, Perú.)


Frequent unscented prostrate (to ascending) annual herbs; stems 1-30 cm, simple or spreading to basally much-branched and forming mats, leafy throughout and most
densely so apically where nodes are generally very much shorter than leaves, proximal internodes often longer than leaves, puberulent, trichomes often in lines from nodal subperfoliation. Leaves 10-35 × 1.5-5 mm, linear to oblanceolate, submucronate, glands round, scattered, margins sometimes scabrous, marginal bristles sometimes from near apex to base, 1-3(-4) mm, apex acute or obtuse. Capitulescence of sessile or subsessile axillary, single or congested, capitula, not exserted from subtending leaves; peduncles 0-1 mm. Capitula to c. 8 mm, inconspicuously radiate; involucre 4.5-7.5 × c. 3 mm, cylindrical to narrowly campanulate, often dehiscing together with enclosed cypselae; phyllaries 5, 1-2 mm diam., oblong to obovate, carinate proximally, apex acute to more commonly obtuse or truncate, glands few, mostly apical, otherwise glabrous to puberulent. Ray florets 5; corolla yellow, tube c. 1 mm, limb 1.5-2 mm. Disk florets (3- )5-10(-17); corolla 2-2.5 mm, one lobe slightly longer than others. Cypselae 2.5-4.5 mm; pappus 1.5-2.5 mm, of 2-5 lanceolate, scabrid scales. 2n = 24. Beaches, lake edges, open rocky areas, orillas de potreros, roadsides, savannas, selva baja caducifolia pertubada, streamsides, thickets. T (Fernández N. y Guadarrama-Zamudio 1489, MO); Ch (Breedlove 51994, MO); Y (Gaumer 778, MO); C (cited by Villaseñor, 1989 and Keil, 1996); B (Schipp 831, MO); G (Pruski et al. 4520, MO); H (Molina R. y Molina 34245, MO); ES (Montalvo et al. 6323, MO); N (Seymour 2846, MO); CR (Poveda et al. 3823, MO); P (D'Arcy y D'Arcy 6102, MO). 0-1500 m. (S. Estados Unidos, México, Mesoamérica, Colombia, Venezuela, Ecuador, Cuba, Jamaica, Puerto Rico, Bahamas.)


Diffuse unscented perennial herbs 10-30 cm, from woody caudex; stems erect to spreading and decumbent, simple to commonly much-branched from the base, subterete, shortly puberulent to canescent-tomentose. Leaves 10-30 × 1.5-4 mm, linear to narrowly elliptical, subglabrous to densely canescent-hirsutulous on both surfaces, marginal bristles sometimes from mid-blade to base, sometimes revolute, apex acute to acuminate, long-mucronate, mucro to 2+ mm. Capitulescence of few solitary capitula each long-pedunculate from distal nodes; peduncles 3-9 cm, bracteolate; bracteoles 2-4 mm,
subulate, ascending. Capitula 6.5-8.5 mm, pedunculate, short-radiate, ray corolla limbs well-exserted from involucre; involucre 6-7 × 6-10 mm, campanulate; phyllaries often tinted purplish, 7-13, 6-7 × 1-2 mm, linear to oblanceolate, 1-2-seriate, apex acute to obtuse, slightly carinate from base, sometimes ciliate especially outer series, usually puberulent. Ray florets 7-13; corolla yellow, tube 2-3 mm, limb 5-9 mm, narrowly elliptic, 5-nerved. Disk florets 20-40(-60); corolla 4-6 mm, narrowly funnelform, lobes 1.7 mm, one c. twice as long as others; style branches short-ovate, c. 0.3 mm. Cypselae black, 3-4 mm, setulose-strigillose; rays epappose or pappus squamulose or of few bristles; disk floret pappus 3.5-6 mm, of 20-40 scabrid bristles, sometimes reddish. 2n = 24. Beaches, brushy hillsides, fields, grassy slopes, limestone ridges, orilla de la quebrada, pastizal, pond margins, roadsides, sand dunes, savannas, selva baja caducifolia pertubada. T (Matuda 3515, MO); Ch (Davidse et al. 20548, MO); G (Heyde y Lux 3401, F); H (Standley 28197, MO); N (Baker 2133, GH); CR (Oersted 204, C). 0-900(-1700) m. (México, Mesoamérica.)

*Pectis auricularis* (DC.) Sch. Bip. was given by Rydberg (1916) as a synonym of *P. saturejoides*, but is, fide Keil (1996), a synonym of *P. canescens* Kunth.


The species contains three varities (Keil, 1996), two in extra-Flora Area México, one of these disjunction into Mato Grosso, Brasil, and the following variety in Flora Area.


*Pectis cyrilii* Cuatrec., *Pectis dichotoma* Klatt.

Erect or ascending scented annual herbs 5-50 cm; stems several, spreading, pseudodichotomously-trichotomously branched, subhexagonal, glabrous to scabrous on angles. Leaves 10-25(-40) × 1-4(-5) mm, linear-lanceolate, usually glabrous, broad-based, apex acute to obtuse, mucronulate, glands scattered. Capitulescence terminal or axillary, diffuse, corymbiform, held slightly above subtending leaves; peduncles 0.8-2.5 cm, glabrous, minutely 2-3-bracteolate; bracteoles 1-1.5 mm, subulate. Capitula 3.5-5 mm, pedunculate, inconspicuously radiate; involucre 3-4 × 1-2 mm, cylindrical; phyllaries 5, 0.5-0.9 mm diam., linear-oblanceolate, apex always acute to acuminate, glands few, linear-elliptic. Ray florets 5; corolla pale yellow or pinkish abaxially, limb 1-
1.8 × 0.3-0.5 mm, linear-oblanceolate, faintly c. 3-nerved. Disk florets usually 3-7; corolla 1.3-1.9 mm, cylindrical, 1 lobe longer than others, without pellucid glands; style branches nearly included. Cypselae 1.4-2.5 mm, strigillose; pappus minutely fimbriate squamulose-coroniform c. 0.2 mm or sometimes also with 1 bristle 1-2 mm, spreading but never horizontally refracted. 2n = 24. Ruderal. Ch (Purpus 9162A, MO); G (cited by Keil, 1996); H (Keil 9509, MO); ES (Calderón 983, MO); N (Moreno 24798, MO); CR (Heithaus 349, MO). 0-700(-800) m. (Veracruz, Oaxaca, Mesoamérica, Colombia.)

The holotipo of Pectis uniaristata var. holostemma is an isotypo of P. dichotoma. This species is very similar to few-aristate plants of P. bonplandiana, and as such raised doubt as to the utility of infraspecies recognition. The report by Hokche et al. (2008) of this species in Venezuela is possibly based on a misdetermination, but illustrates the point that perhaps a name will need to be raised from synonymy to house this entity.

7. **Porophyllum** Guett.
Por J.L. Strother.

Strongly scented annuals, perennials, or shrubs; leaves or phyllaries pellucid-glandular. Leaves opposite or alternate, simple, sessile or petiolate, entire to crenate, marked with pellucid glands. Capitulescence open, solitary or in leafy cymose clusters of few capitula. Capitula discoid, ecalyculate; involucre 5-25 mm, cylindrical to turbinate; phyllaries 5-10, uniseriate, free to base, marked with round to linear pellucid glands. Ray florets none. Disk florets 10-100. Cypselae fusiform to cylindrical; pappus of 25-50+ fine to coarse, unequal, scabrellous free bristles. c. 25 spp. SW. United States, Mexico, West Indies, C. America, S. America.


1. Subshrubs or shrubs; involucres 8-12 mm.
2. Leaf blades obovate to elliptic, length (2-)3-6 times width; capitula solitary; peduncles slender, 2-4 cm; florets 15-30.

1. **P. nelsonii**
2. Leaf blades ovate to broadly elliptic, length 1-2 times width; capitula mostly cymose-clustered; peduncles often clavate, 1-2(-3) cm; florets 10-20.

3. **P. punctatum**

1. Robust annual herbs; involucres 1.5-2.5 cm.

3. Plants mostly less than 0.6 m; florets 12-15 per capitulum; cypselae c. 7 mm.

2. **P. pringlei**

3. Plants mostly 1-1.5 m tall; florets 30-80+ per capitulum; cypselae 8-12 mm.

4. Leaf blades 1-3(-5) cm; peduncles usually inflated; cypselae mostly 9-12 mm.

4a. **P. ruderale var. macrocephalum**

4. Leaf blades 2-9 cm; peduncles relatively slender, slightly or not at all inflated; cypselae mostly 8-9 mm.

4b. **P. ruderale var. ruderale**


*Porophyllum guatemalense* Rydb.

Shrubs to 0.6 m. Leaves mostly opposite, petiolate; blade 1.5-3 cm, obovate to elliptic, length 3-6 × width, bearing pellucid glands. Capitula solitary, erect on slender peduncles 2-4 cm; involucre 8-12 mm; phyllaries 5, linear-oblong, purplish, somewhat glaucous, marked with pellucid glands. Florets 15-30; corolla 5-8 mm, ochroleucous, tinged with purple distally. Cypselae 5-7 mm; pappus c. 30 bristles to 6 mm. 2n = 24. *Wooded slopes.*

Ch (*Breedlove 46595*, CAS); G (*Nelson 3523*, US). 600-1100 m. (Oaxaca, Mesoamerica.) Both Johnson (1969) and Turner (1996) treated *P. nelsonii* and *P. guatemalense* as synonyms of *P. punctatum*.


Robust annual herbs to 0.6 m. Leaves opposite or alternate; blade 2-4 cm, elliptic to obovate, sometimes glaucous, bearing pellucid glands; petioles to 2.4 cm. Capitula erect, solitary or loosely cymose-clustered, peduncles 1-3 cm; involucre 15-18 mm; phyllaries 5, narrowly linear, marked with pellucid glands. Florets 12-15; corolla 7-10 mm,
ochroleucous. Cypselae c. 7 mm; pappus of c. 30 bristles to 8 mm. *Wooded slopes*. Ch
(*Breedlove 41160, CAS*). 700-1500 m. (S. Mexico.)


*Porophyllum millspaughii* B.L. Rob., *Porophyllum pittieri* Rydb.

Erect to sprawling, subshrubs to shrubs to 2+ m. Leaves mostly opposite; blade 0.9-2(-3) cm, ovate to broadly elliptic, length 1-2 × width, bearing pellucid glands; petiole to 1 cm. Capitula mostly loosely cymose-clustered, often nodding, peduncles often clavate, 1-2(-3) cm; involucre 9-12 mm; phyllaries 5, linear to oblong, marked with pellucid glands. Florets 10-20; corolla 6-8 mm, ochroleucous to brown or purple. Cypselae 5-7 mm; pappus of 20-30 unequal bristles to 7 mm. 2n = 24. *Dry, brushy slopes, secondary forests, duna costera, thorn scrub woodlands, dry thickets*. T (*Cowan y Magna 3216, MO*); Ch (*Breedlove 45954, CAS*); Y (*Gaumer 523, US*); C (*Cabrera y Cabrera 2327, MO*); QR (*Ramamoorthy et al. 2072, MO*); B (*Arvigo 953, MO*); G (*Williams et al. 41843, US*); H (*Williams et al. 13232, US*); ES (*Standley 20422, US*); N (*Rueda et al. 16024, MO*); CR (*Wilbur 20046, OS*). 0-1300 m. (Mexico, Mesoamerica.)


*Cacalia ruderalis* (Jacq.) Sw., *Porophyllum ellipticum* var. *ruderale* (Jacq.) Urb.

Coarse robust annual herbs 0.5-1.5 m. Leaves opposite or alternate, petiolate; blade 1-9 cm, ovate to elliptic or obovate, marked with pellucid glands. Capitula solitary on slender or clavate peduncles 15-65 mm; involucres 15-25 mm; phyllaries 5, linear to lance-linear, marked with pellucid glands. Florets 30-80+; corolla greenish below, purplish distally, 8-13 mm. Cypselae 8-12 mm; pappus of 50-100 bristles 5-11 mm. 2n = 22, 44. Throughout much of the Neotropics.

The two vouchers cited by Balick et al. (2000) as documenting *P. ruderale* in Belize have each been redetermined as *P. punctatum*. 
4a. **Porophyllum ruderale** var. **macrocephalum** (DC.) Cronq., *Madroño* 20: 255 (1970). Holotype: Mexico, *Mendez s.n.* (G-DC). Illutr.: none. N.v. Hierba del cadejo, ES. Leaf blades 1-3.5(-5) cm. Peduncles usually clavate, strongly inflated distally. Cypselae mostly 9-12 mm. $2n = 22$. *Disturbed areas, edge of secondary forests, wooded slopes, roadsides, canyon walls.* T (as cited by Cowan, 1983 and Villaseñor, 1989); Y (*Gaumer 23453*, US); Ch (*Breedlove 46496*, CAS); QR (*Darwin 2356*, MO); G (*Harmon y Dwyer 3512*, MO); H (*Standley 55058*, US); ES (*Calderon 1890*, US); N (*Moreno 24830*, MO); CR (*Jimenez y Lepiz 2353*, MO); P (*Nee 8149*, OS). 30-1500 m. (SW. United States, Mexico, Mesoamerica, Colombia, Venezuela, Ecuador, Peru, Bolivia, Brazil.)


8. **Tagetes L.**

*Adenopappus* Benth., *Diglossus* Cass., *Enalcida* Cass., *Solenotheca* Nutt., *Vilobia* Strother

Por J.F. Pruski.

Erect (Flora Area) or rarely decumbent, glabrous or sometimes pubescent, annual to perennials herbs or sometimes shrubs, typically aromatic or malodorous; stems frequently much branched, branching opposite to typically alternately so distally, branches usually ascending at least 45°, usually leafy from mid-stem to apex, generally subterete, often striate; leaves or phyllaries typically pellucid-glandular or pellucid-streaked (lined). Leaves simple to much more frequently basically pinnatisect and divided nearly to narrowly winged rachis, opposite proximally to sometimes alternate adaxially, usually petiolate to sometimes sessile, often slightly dilated basally and subclasping; blade chartaceous, second or third order veins often visible but not prominent, surfaces mostly glabrous and
concolorous, glands typically round, scattered to sometimes associated with individual teeth or lobes; leaflets generally spreading laterally to only slightly directed forward, leaflets or teeth occasionally spinulose distally. Capitulescence terminal, corymbiform to sometimes solitary, typically few-many-capitulate, open to infrequently congested; peduncles short to elongate, filiform to stout, cylindrical to often dilated distally, sometimes bracteolate, then bracteoles typically alternate. Capitula inconspicuously to conspicuously radiate or rarely discoid, small to large, few-many-flowered; involucre cylindrical or narrowly urceolate to campanulate, ecalyculate; phyllaries usually 5-13, uniseriate, green or sometimes with membranous margins, connate more than half of their length to near apex, infrequently separating (or should I use "splitting") to mid-phyllary when mature, glands linear-elliptic gradually diminishing in size apically and thence round or round throughout, in 2(-4) vertical rows, otherwise typically glabrous; receptacle convex to conic. Ray florets (0-)few-many, pistillate, not equal in number to phyllaries, each ray not closely associated with an individual phyllary; corolla glabrous or infrequently tube papillose, tube shorter to longer than limb, limb erect to spreading, usually yellow, less commonly white, violet, or reddish, tissue somewhat thickened, nerves of limb sometimes divaricating or even anatomizing distally. Disk florets few-numerous, actinomorphic or rarely modified and ray-like, funnelform to narrowly so; corolla yellow to sometimes orange, glabrous or infrequently tube or throat papillose, lobes much shorter than tube and throat; anther stramineous, appendage abruptly penicillate to attenuate; style branches arcuate, appendage acuminate to deltate. Cypselae black, usually oblongoid-fusiform, sometimes the outer compressed, less commonly all short-cylindrical, 3-5-angled, setulose or sometimes glabrous, faces very finely striate; pappus stramineous, usually a combination of 3-10 scales and elongate awns, scales sometimes connate, often truncate, awns subulate, typically shorter than disk corollas, infrequently narrowed and bristle-like, pappus very rarely lacking. n = 11, 12. Aprox. 45 spp. SW. Estados Unidos (no endemics) to Tropical America.

The embedded glands of the herbage range from orange-resinous to vacated and fully transparent. The medicinal and ornamental uses and derivation of some common names of some species are discussed in Williams (1976).

Specimen identifications and names used have differed widely, for example, none of the four names used in Central America by Bentham (1845) are recognized here. Neher's (1965) fine revision stabilized many uses. Nevertheless, some recent name uses vary especially with regards to cultivated material, as seen by Keil's (2001) recognition of T.
microglossa and *T. patula*, the reduction of *T. patula* to *T. erecta* by Turner (1996) and Strother (1999), Strother's (1999) use of *T. elongata* countered by its reduction to *T. erecta* by Turner (1996), the broad definition herein of *T. tenuifolia* as including *T. microglossa*, and my resurrection herewith of *T. sororia*, albeit synonymized variously by Williams (1976), Turner (1996), and Strother (1999). That I do not agree *a priori* that each ploidy level represent a taxon distinct specifically from a parental diploid (as discussed, for example, by Soltis et al., 2007) may be inferred by my treating diploid and tetraploid individuals, as well as the name *T. patula*, in formal synonymy of *T. erecta*.


1. Leaves simple.  
   4. *T. lucida*

1. Leaves pinnatisect.  

2. Leaves 1-2-pinnatisect, leaflets linear, c. 0.5 mm wide.  

3. Leaves 1-pinnatisect; phyllaries green, not separating in fruit, glands round, apex aristate, aristae 0.2-0.4 mm; ray florets (when present) with corolla white to pale yellow, tube 2-2.5 mm; disk corolla lobes 4(-5); pappus awns 5-7 mm.  

2. *T. filifolia*

3. Leaves usually 2-pinnatisect; phyllaries green proximally with distal half purplish, sometimes separating in fruit, glands linear-elliptic to elliptic, apex rounded to triangular; ray corollas yellow, less commonly pale yellow, tube 8-11 mm; disk corolla lobes 5; pappus awns 8-11 mm.  

7. *T. subulata*

2. Leaves 1-pinnatisect, leaflets linear-lanceolate to ovate, ≥ 1 mm wide.  

4. Capitula dimorphic, most multiflorus, but usually one uniflorous or biflorous capitulum per cluster; pappus squamellae 0.3-0.6 mm.  

9. *T. terniflora*

4. Capitula monomorphic, all multiflorus; pappus squamellae or scales ≥ 1 mm.  

5. Pubescent perennial herbs to shrubs; involucre not splitting when mature.
6. Branching mostly opposite; leaves mostly opposite, 5-12 cm, leaflets 3-7, usually closely spaced on distal part rachis, (1-)2-8 cm, abaxial surface usually sparsely puberulent to glabrescent; phyllary apex broadly triangular, to c. 1 mm, obtuse; ray florets 5(-7).

5. T. nelsonii

6. Branching mostly alternate; leaves mostly alternate, 2-6 cm, leaflets 9-15, evenly spaced on rachis, (0.5-)1-3.5 cm, abaxial surface densely pilosulose; phyllary apex long-triangular, 2.5-3 mm, acuminate to attenuate; ray florets 8.

6. T. sororia

5. Glabrous annual or biennial herbs; involucre often splitting when mature.

7. Capitula inconspicuously radiate; phyllary apex with a single central round gland; disk florets 4-12, not exserted from involucre; ray and disk corolla tubes papillose-setose.

3. T. foetidissima

7. Capitula short-radiate to conspicuously radiate; phyllary apex usually with paired linear-elliptic or round glands; disk florets 13-numerous, lobes exserted from involucre; ray and disk corolla tubes glabrous or subglabrous

8. Capitula conspicuously radiate; peduncles stout, strongly dilated distally; involucre narrowly to broadly campanulate, usually ≤ 2 times as long as broad, 6-18(-25) mm diam.; phyllaries often separating to near mid-phyllary with age, proximal glands in 3-4 rows; ray corolla limb 10-28 × 10-20 mm wide.

1. T. erecta

8. Capitula short-radiate; peduncles slender or sometimes becoming slightly stout and dilated distally; involucre narrowly cylindrical to narrowly urceolate, typically at least c. 3 times as long as broad, 3-7 mm diam.; phyllaries infrequently separating in fruit, glands in 2 rows; ray corolla limb 3-7(-9) × 4-7 mm wide.

8. T. tenuifolia

Tagetes elongata Willd., T. major Gaertn., T. patula L.

Glabrous annual herbs 0.3-0.8(-1.3) m; stems often few-several alternate-branched distally, green with stramineous striations. Leaves 5-12(-20) cm, alternate or opposite proximally, pinnatisect, elliptic to obovate in outline, primary leaflets (5-)7-13, (0.7-)1.5-5 × (0.2-)0.4-1(-1.5) cm, linear-lanceolate to oblanceolate, subopposite to opposite and evenly spaced on rachis, the terminal larger than laterals, basal 2-4 pairs abruptly reduced and often merely c. 0.2 cm, base acute, margins coarsely serrate to sometimes subentire, apex acute to acuminate, teeth of distal-most leaves often spinulose; petiole usually 1-2 cm and c. 1/4 length of leaf, subclasping. Capitulescence monocephalous to few-capitulate and corymbiform then open and leafy; peduncles mostly 3-12 cm, stout, clavate, dilated distally, proximally 1-3-bracteolate; bracteoles 5-10 mm, setose-pinnatisect. Capitula 1.5-3 cm, conspicuously radiate; involucre 13-22 × 6-18(-25) mm, narrowly to broadly campanulate (usually c. 2× as long as broad); phyllaries (5-)7-11, 3-4.5 mm diam., green often becoming purplish distally, often separating to near mid-phyllary with age, glands linear-elliptic, (at least in proximal half) in 3-4 rows, apex triangular, with paired round glands, ciliolate to minutely puberulent apically. Ray florets (5-)8-12 and uniseriate to numerous and 2+-seriate from modified disk florets in cultivated plants; corolla yellow to orange or red, well-exserted, glabrous or subglabrous, tube usually 5-12 mm, limb 10-28 × 10-20 mm, obovate to orbicular, 10-15+-nerved, 2-lobed to emarginate or truncate. Disk florets 30-100+, the outer or occasionally all modified and appearing ray-like in cultivated plants, lobes exserted from involucre; corolla 10-20 mm, most often concolorous with ray corollas but sometimes purple-streaked ventrally, tube glabrous or subglabrous, lobes subequal or more commonly unequal (4+1), the longer 2.5-4 mm, the shorter 1-2.5 mm, linear-lanceolate, mostly inwardly purplish (less commonly yellowish), margins setose, setae 0.2-0.3 mm; anther thecae 2-3 mm, stramineous; style branches 1-2.5 mm. Cypselae 5.5-10(-12) mm, sparsely setulose; pappus of 4-8 scabridulous awns and connate scales, awns 6-11 mm, faintly 1-3 parallel-nerved, scales forming an irregular crown 3-6 mm., but splitting apart at maturity. 2n = 24, 48. Brushy plains, disturbed areas, fields, gardens, hillside, oak forests, potreros, roadsides, streamside, thickets. T (cited by Villaseñor, 1989); Ch (Mendez Ton 4558, MO); Y (Gaumer 1129, MO); C (Cabrera y Cabrera 15262, MO); QR (cited by Villaseñor, 1989); B (Lundell 4971, MO); G (Standley 24309, MO); H
(Molina 34409, MO); ES (Calderón 95, MO); N (Chavez 302, US); CR (Polakowsky 372, W); P (Wedel 2832, MO). 5-2700 m. (Estados Unidos, C. y S. México, Mesoamérica, Colombia, Venezuela, Guyana, Surinam, Ecuador, Perú, Bolivia, Paraguay, Cuba, Jamaica, Hispaniola, Puerto Rico, Virgin Islands, Lesser Antilles, Trinidad and Tobago; Europa, África, Asia, Australia, New Zealand, Islas del Pacífico.)

This is our commonly cultivated often multiple-flowered Tagetes, and is recognized by large campanulate long-rayed capitula on peduncles dilated distally. Grierson (1980) cited one of two unspecified sheets BM-CLIFF as type, but Howard (1989) effected typification by citing the sole sheet in LINN. Rydberg (1915), Neher (1965), and Keil (2001) recognized both T. patula and T. erecta, but recently Turner (1996) and Strother (1999) recognized a single variable (especially in size of capitula and ray floret number and size) species. Many neotropical specimens of T. erecta are from cultivated plants or presumed to be escapes from cultivation, and many have most or all disks modified into ray florets that do not bear viable pollen. All Old World and temperate specimens are from cultivated plants.

Tagetes elongata, T. ernstii, T. heterocarpa Rydb., and T. remotiflora Kunze were cited by Turner (1996) as synonyms of T. erecta, but only the first is admitted into synonymy herein, and then only as a possible synonym, as I have seen no type material of it in B-W. On the other hand, T. ernstii is synonymous with T. tenuifolia, and each T. heterocarpa Rydb. and T. remotiflora are possibly distinct (albeit each most similar to T. tenuifolia) and extra-Mesoamerican. Indeed, Villarreal (2003) recognized T. remotiflora as extra-Mesoamerican. The citation by Standley (1938) of T. remotiflora in Costa Rica is in reference to plants I determine as T. tenuifolia.


Frequent slender glabrous annual herbs 0.1-0.4 m; stems subhexagonal distally, leafy throughout, simple or more commonly several opposite-branched to sometimes becoming alternately so distally, lateral branches much longer than main stem internodes, green to purplish with stramineous striations. Leaves 1.5-3 cm, opposite or sometimes alternate distally, pinnatisect, ovate in outline, leaflets 7-13, (1-)4-13 × c. 0.5 mm, directed forward at c. 45°, linear, alternate to sometimes subopposite on rachis, the proximal-most leaflets sometimes reduced to spinules, margins of individual leaflets entire, scabridulous to glabrescent, apices mucronulate to aristate; petiole 1-4 mm, connate-subclasping. Capitulescence corymbose, open, leafy, not held well above subtending leaves; peduncles 1-10(-20) mm, filiform, often 1-bracteolate; bracteole 2-7(-10) mm, linear. Capitula 0.9-1 cm, inconspicuously radiate or discoid; involucre 6-8 × c. 2(-2.5) mm, narrowly cylindrical; phyllaries 5, c. 1 mm diam., green, glands round, few-several in 2 rows, apex truncate, abruptly short-aristate, eglandular, arista 0.2-0.4 mm, glabrous or very sparsely puberulent. Ray florets 0-3; corolla 3-5 mm and about as long as to often shorter than pappus awns, inconspicuous, white to pale yellow, tube 2-2.5 mm, limb 1-2.5 × to c. 1 mm, ovate, more or less erect to slightly spreading, nerves inconspicuous to obsolete, apex truncate-mucronate, sometimes bilobed. Disk florets 4-10; corolla 3-4 mm and about as long as to often shorter than pappus awns, yellow or sometimes orangish, lobes 4(-5), c. 0.5 mm, subequal, lanceolate, glabrous or nearly so; anther thecae to c. 0.8 mm; style branches 0.5-1 mm. Cypselae 4-6 mm, many-costate, setulose; pappus usually of 2-3 scabrous awns and c. 2 scales or squamellae, awns 3-4.3 mm, about as long as or longer than the corolla, scales or squamellae 1-2 mm. 2n = 24. Disturbed areas, cafetales, dry open oak woodland, fields, hillsides, jardins, oak forests, old volcano flow, open areas in forest, pine-oak forests, roadsides, rocky hillsides, steep slopes, streamsides, subalpine meadows, thickets, thorn scrub. T (cited by Cowan, 1983); Ch (Mendez Ton 4556, MO); G (Tuereckheim II 1958, NY); H (Molina R. y Molina 34790, MO); ES (Padillo 217, MO); N (Garnier 1350, F); CR (Skutch 2884, NY); P (Folsom y Page 6008, MO). 300-2500(-3200) m. (C. y S. México, Mesoamérica, Colombia, Venezuela, Ecuador, Perú, Bolivia, Argentina.)

Tagetes filifolia (along with T. tenuifolia) is one of our two most common Tagetes in Flora Area. Keil (2001) reported that the species occurs in Chile, but I know of no vouchers. The plants of subalpine meadows flower when only a few centimeters, whereas at lower elevations it is often so common a weed as to resemble roadside grasses. It is very similar to Mexican T. micrantha Cav., which differs by its longer peduncles and
longer pappus awns. *Tagetes silenoides* Meyen et Walp. is described as having 7-9 phyllaries per capitulum and red ray corollas, but matches our species in most other features. *Tagetes foeniculacea* Desf. is excluded from synonymy, is described (by Cassini sub *Enalcida pilifera* Cass.) as having bipinnatisect leaves, and is taken here as a presumed synonym of Mexican *T. coronopifolia* Willd. *Solenotheca tenella* Nutt., listed in synonym of *T. filifolia* by Strother (1999), is instead synonymous with South American *T. multiflora* Kunth.


*Tagetes triradiata* Greenm.

Glabrous annual herbs 0.1-1 m; stems few-several opposite-branched proximally to alternate-branched distally, green or often maroon, striate. Leaves 2.5-6(-8) cm, alternate or opposite proximally, pinnatisect, elliptic to obovate in outline, leaflets, 11-21(-25), 7-25 × 1-4(-5) mm, oblanceolate, alternate to subopposite to opposite, regularly spaced on rachis, base attenuate, margins serrate to coarsely so, basal most teeth becoming spinulose, apex obtuse; petiole short, sometimes pectinate. Capitulescence cymbiform, few-capitulate, closely spaced groups on leafy branches; peduncles mostly 5-22 mm, slender, slightly dilated distally, usually 1-bracteolate; bracteoles 2-5 mm, pinnatisect. Capitula 1.2-1.8 cm, inconspicuously radiate; involucre 12-18 × 3-4.5(-6.5) mm, cylindrical-urceolate to ellipsoid; phyllaries 5, c. 1.5 mm diam., deep-purple or sometimes green, infrequently separating to near mid-involucre when mature, glands, few, linear-elliptic, gradually diminishing in size distally, in 2(-4) rows, apex deltate, sometimes slightly spreading, acute to obtuse, usually with a single central round gland, minutely fringed. Ray florets 3-5; corolla greenish yellow, weakly-exserted and erect or ascending, tube 5.5-6.5(-8) mm, much longer than limb, papillose-setose, limb 1-2.5 × c. 1 mm, oblong, apex sometimes emarginate. Disk florets 4-12, typically not exserted from involucre; corolla 5-7(-8) mm, narrowly funnelform, greenish yellow, papillose-setose, lobes c. 1 mm, subequal, linear-lanceolate; anther thecae c. 1.2 mm; style branches c. 1 mm. Cypselae 5-6.5 mm, strigilllose; pappus of 1-2 awns and 2-4 scales or squamellae, awns 4.5-8 mm, scales or squamellae 1-2 mm, connate or when separate oblong.

*Disturbed areas, edges of forests, meadows, moist banks, open forest, pine-oak forests, roadsides, volcano slopes.* Ch (Ghiesbrecht 536, MO); G (Mario Véliz 96.5563, MO); ES
(Berendsohn y Sipman 1557, MO); CR (Rodríguez y Ramírez 2169, MO). 1000-3600 m.
(C. y S. México, Mesoamérica.)

The collections from Costa Rica tend to have capitula with c. 12 disk florets and green
involucres that are to 6.5 mm diam., whereas the collections from the northwestern
Mesoamerican have c. 8 disks and sometimes green involucres c. 4 mm broad. This range
of variations is acceptable IMO, and thus the Costa Rican materials annotated with the
unpublished name "inclusa" are accepted by me as falling within T. foetidissima.

4. Tagetes lucida Cav., Icon. 3(2): 33, t. 264 (1794). Type: Cult. en Madrid, de
Mantzania wamal, pericón, pimente wamal, Ch; hierba de San Juan, hipericón, iya,
jolomocox, liya, pericón, ucá, G; hipericón, pericón, ES.

Tagetes anethina Sessé et Moc., Tagetes schiedeana Less., Tagetes seleri Rydb.

Subglabrous perennial herbs 0.2-0.9 m; stems 1-5 from short caudex, strict or few
opposite-branched distally, suberecte to sometimes strigate-sulcate distally, distal
internodes about as long as leaves, nodes often puberulent. Leaves 1.5-8 × 0.2-1(-1.4)
cm, simple, opposite, sessile, linear-lanceolate to oblanceolate, venation inconspicuously
pinnate from very base, veins few, strongly arching towards but never reaching apex,
base narrowly connate, margins finely serrulate to sometimes bristly especially basally,
bristles (when present) 0.5-1.5 mm, apex acute to attenuate, rarely obtuse. Capitulescence
3-12 cm broad, corymbiform, few-many capitulate, more or less compact and flat-topped,
held slightly above subtending leaves; peduncles usually 5-15(-25) mm, slender,
alternately 1-2-bracteolate; bracteoles 2-3 mm, subulate. Capitula 1-1.3 cm, short-radiate;
involucre 5-7.5 × 2-3 mm, narrowly cylindrical; phyllaries 5-7, c. 1.1 mm diam., green,
glands round, few-several in 2 rows, apex truncate-cuspidate, often membranous,
eglandular, tip to c. 0.5 mm, with many scattered glands. Ray florets 3(-4); corolla
yellow, slightly exerted, tube c. 3 mm, limb 3-4 × 3-5(-7) mm, orbicular, c. 10-nerved,
apex emarginate or truncate. Disk florets 5-10; corolla 4.5-6 mm, yellow, lobes 1.5-1.8
mm, subequal; anther thecae c. 1.5 mm; style branches c. 1.5 mm. Cypselae 5-7 mm,
angles setulose; pappus of c. 4 scales or squamellae, 1-1.5 mm and of 2(-3) awns 3-4 mm.
2n = 22, 24. Fields, oak forests, pine-oak forests, roadsides, rocky hillsides, sabanas. T
(Cowan 1630, CAS); Ch (Seller y Seller 3085, NY); C (cited by Martínez et al., 2001); G
(Heyde y Lux 3798, MO); H (Williams y Molina 13301, MO); ES (Padilla 218, MO).
200-2400 m. (México, Mesoamérica.)

Subglabrous to puberulent subshrubs to shrubs to c. 1 m; stems opposite-branched, glabrous to sparsely puberulent, distal stem internodes c. 5+ cm and usually as long as leaves, internode lengths abruptly reducing (to c. 2 cm) within capitulescence. Leaves 5-12 cm, opposite or sometimes alternate distally, pinnatisect, deltoid to ovate in outline, leaflets 3-7, (1-)2-8 × 0.6-2.5 cm, opposite on rachis, usually closely spaced on distal c. 2(-5) cm of rachis, lanceolate or elliptical to narrowly ovate, the distal three leaflets larger than proximal leaflets which gradually diminish in size within the blade proper and thence abruptly so onto the petiole where typically manifest as pseudopectinae, adaxial surface glabrous to sparsely puberulent, abaxial surface usually sparsely puberulent to glabrescent, base and apex acute to acuminate, margins coarsely serrate; petiole usually c. 1/4 to 1/2 the length of leaf, often pseudopectinate, subclasping. Capitulescence 3-8 cm broad, flat-topped and many-capitulate, ultimate clusters somewhat densely corymbiform to subglomerulate, not held well above subtending leaves; peduncles 1-4(-15) mm, short-stout, dilated apically, naked or alternately 1-2-bracteolate; bracteoles 2-4 mm, pinnatisect. Capitula to c. 1 cm, shortly but conspicuously radiate; involucre 6-8 × 2.5-4 mm, cylindrical; phyllaries 5-8, c. 1.5 mm diam., green sometimes drying nearly black, glands few, linear-elliptic in 2 lines, apex to c. 1 mm, broadly triangular, obtuse, usually with a single central elliptic gland. Ray florets 5(-7); corolla yellow, moderately exserted, tube 2-3 mm, papillose, limb 5-8 × 2-3 mm, elliptic-ovate, faintly 5-10-nerved, obtuse to emarginate. Disk florets 9-20; corolla 5-6.5 mm, greenish yellow, lobes c. 1-1.5 mm, subequal; style branches c. 1.5 mm. Cypselae 4-5 mm, sparsely setulose; pappus of 4-7 unequal scales, 1-2(-3) mm, sometimes awn-tipped. 2n = 24. Thickets, marshes, steep slopes with evergreens or pines. Ch (*Breedlove 29225*, MO); G (*Melhus y Goodman 3690*, F). 1200-2700 m. (Endemic.)

The "cuspidate" phyllary apex mentioned by Neher (1965) is not manifested in any of the specimens in front of me.

Pubescent perennial herbs to subshrubs with woody base to 1 m; stems mostly alternately-branched, sparsely short-pilose or villosulous especially at nodes, distal stem internodes 2-10+ cm, often longer than leaves to those just below capitulescence shorter than leaves. Leaves 2-7 cm, opposite to more commonly alternate distally, pinnatisect, obovate in outline, leaflets 9-15, (5-)1-35 × (2-)4-8 mm, narrowly elliptical, opposite, evenly spaced on rachis, distal leaflets gradually larger, adaxial surface puberulent to pilosulose, abaxial surface densely pilosulose, base and apex acute to acuminate, margins coarsely serrate; petiole to c. 1 cm, sometimes pseudopectinate, subclasping. Capitulescence corymbiform, open, few-several-capitulate, held well above subtending leaves; peduncles 5-9 cm, slender, slightly dilated distally, naked or alternately 1-2-bracteolate; bracteoles 2-4 mm, pinnatisect. Capitula c. 1.5 cm, conspicuously radiate; involucre 8-12 × 4.5-6 mm, narrowly campanulate; phyllaries 8, c. 2 mm diam., green, glands few, elliptical, 2-lined, apex 2.5-3 mm, long-triangular, acuminate to attenuate, glands 0-3, otherwise glabrous. Ray florets 8; corolla yellow to golden yellow, exserted, glabrous, tube c. 4.5 mm, limb 9-12 × 4-5 mm, elliptic-ovate, faintly c. 10-nerved, obtuse to emarginate. Disk florets 35-46; corolla 5.5-7 mm, narrowly funnelform, yellow, lobes c. 1 mm, subequal; style branches 1-1.5 mm. Cypselae 5-6 mm, subglabrous; pappus of 2(-3) awns and c. 3 squamellae, awns 2.5-4 mm, squamellae 0.7-1.2 mm. Edges of fields, roadsides, open forests, pine-oak forests. G (Hartweg 537, NY). 2000-3700 m. (Endemic)

Rydberg (1915) used the northern Andean name *T. zypaquirensis* Bonpl. for Guatemalan material, but Standley y Steyermark (1944), segregated the similar (as the epithet infers) *T. sororia*. *Tagetes sororia* was reduced to synonymy of *T. nelsonii* by Williams (1976) and Strother (1999), placed in synonymy of otherwise South American *T. zypaquirensis* by Turner (1996), but is here resurrected from synonymy and used in the sense of Neher (1965). No geographic intermediates between Guatemala and Colombia are known (Standley y Steyermark (1944). The features of obtuse leaflets apices, pubescent phyllaries glandular in 2-4 rows, and short-triangular phyllary apices c. 1.5 mm of *T. zypaquirensis*, in addition to geography, serve to distinguish it from *T. sororia*, as well as from *T. nelsonii*.

Tagetes multiseta DC., Tagetes wislizenii A. Gray.

Slender glabrous annual herbs 0.1-0.5 m; stems leafy except towards base, few-several opposite-branched to often becoming alternately so distally, rarely simple-stemmed, lateral branches much longer than main stem internodes and sometimes over-topping central axis, green with stramineous striations. Leaves 1-2(-3.5) cm, (1-)2-pinnatisect, opposite or sometimes alternate distally, obovate in outline, first order leaflets (5-)9-13, 1-10 × c. 0.5 mm, linear, subopposite on rachis, very deeply toothed to much more commonly secondary pinnatisect, the distal leaflets usually the longest, apices sometimes spinulose. Capitulescence corymbiform, open, held well above subtending leaves on peduncles much longer than internodes; peduncles 3-9 cm, elongate, filiform, naked. Capitula 1.4-1.9 cm, inconspicuously radiate; involucre 13-18 × 3-6 mm, narrowly cylindrical or urceolate; phyllaries 5, c. 2.5 mm diam., green with distal half purplish, partly separating in fruit, glands few-several, linear-elliptic usually in 2 lines, diminishing in size apically, apex acute, often with a single central elliptic gland, sparsely puberulent at very apex. Ray florets 3-5; corolla inconspicuous, yellow, tube 7-11 mm, slender, limb 1-2.5 × 1-2.5 mm, slightly exserted and slightly spreading, ovate to orbicular, c. 5-nerved, apex obtuse to truncate. Disk florets (5?-)10-20(-40?); corolla 10-12 mm, slender-cylindrical, yellow often with purplish lobe apices, lobes 1-1.5 mm, subequal, lanceolate, sometimes papillose; anther thecae to c. 1.2 mm; style branches to c. 1 mm. Cypselae 3-5 mm, angles often strigillose; pappus of 5 connate scales forming a corona 4-6 mm, usually with (1-)2 scabrous awns 8-11 mm, about as long as the corollas or the corolla tubes. 2n = 24. Disturbed areas, grassy hillsides, mixed forest, moist pastures, pine-oak forests, streamsides. Ch (Purpus 6792, MO); G (Bernoulli 113, NY); H (Molina R. 3778, MO); ES (Standley 22709, MO); N (Oersted 172, K); CR (Grayum 4296, MO). 400-1400 m. (w. México, Mesoamérica, Colombia, Venezuela.)

In addition to Tagetes multiseta DC. and Tagetes wislizenii A. Gray, Neher (1965) also listed Tagetes aristata Klatt and Tagetes oligocephala DC., as synonyms of Tagetes subulata, but the Klatt name is a Dyssodia and the Candolle name is referred here to Tagetes tenuifolia. Neher (1965) described the capitula as having only "5-9" disk florets, whereas Strother (1999) gives the number of disks as "20-40," neither extreme being observed within the suite of specimens in front of me.

8. Tagetes tenuifolia Cav., Icon. 2(2?): 54, t. 169 (1793). Type: Cult. en Madrid, de "Perú" [presumably México], Anon. (MA 476409). Illustr.: Cavanilles, Icon. 2: t. 169
Tagetes ernstii H. Rob. et Nicolson, Tagetes jaliscensis var. minor Greenm., Tagetes macroglossa Pol., Tagetes microglossa Benth., Tagetes oligocephala DC.

Frequent glabrous annual herbs 0.3-1.1 m; stems few-several alternate-branched, green or less frequently maroon, often with stramineous striations. Leaves 3-10 cm, alternate or opposite proximally, pinnatisect, elliptic to obovate in outline, leaflets 9-23, 5-30(-38) × 1-7 mm, linear-lanceolate to narrowly elliptic, subopposite to opposite, regularly to irregularly spaced on rachis, base and apex acute, margins coarsely serrate, teeth of distal-most leaves often spinulose; petiole usually 0.5-1 cm and usually less than 1/5 length of leaf, subclasping. Capitulescence few-capitulate and corymbiform, open and leafy; peduncles mostly 2-6(-7) cm, slender or sometimes becoming slightly stout and dilated distally, 1-4-bracteolate; bracteoles 5-10 mm, pinnatisect with leaflets long-linear.

Capitula 1.2-2.3 cm, short-radiate; involucre 10-20 × 3-7 mm wide (typically at least c. 3 times as long as broad), narrowly cylindrical to narrowly urceolate; phyllaries 5, c. 2 mm diam., green or sometimes purplish distally, infrequently separating in fruit, glands few, linear-elliptic, in 2 rows, apex short-triangular, usually with paired round glands towards very tip, glabrous. Ray florets 3-5; corolla yellow to orange, moderately-exserted, glabrous or subglabrous, tube 4-7 mm, as long as to longer than limb, limb 3-7(-9) × 4-7 mm, more or less orbicular, 10-nerved, truncate-mucronate. Disk florets 13-25, lobes exserted from involucre; corolla 5-9 mm, yellow, tube glabrous or subglabrous, lobes c. 1(-1.7) mm, typically subequal, lanceolate, margins inwardly mostly yellowish-setose, setae 0.1-0.2 mm; anther c. 2 mm; style branches c. 1.2 mm. Cypselae 7.2-8.5 mm, angles setulose; pappus of 3-6 scabrous awns and appressed scales, awns 5-7(-9) mm, rarely lacking, those of disks often reaching to corolla lobe bases, scales 3-4.5 mm, ovate, sometimes fully connate. 2n = 24. Bosque seco, disturbed areas, fields, gardens, hillsides, oak forest, open forests, pastures, pine forest, roadsides, streamsides, thickets, volcano craters. T (cited by Villaseñor, 1989); Ch (Breedlove and Thorne 20560, NY); Y (cited by Turner, 1996); G (Pruski y MacVean 4508, MO); H (Molina R. 34776, MO); ES (Padilla 219, MO); N (Budier 6354, MO); CR (Skutch 2170, MO); P (Gentry 3069, MO). (300-)700-2700 m. (c. + s. México, Mesoamérica, Colombia.)

The broadly circumscribed Tagetes tenuifolia has cylindrical moderate-sized non-clustered short-rayed capitula, and is one of our two most (along with T. filifolia) common Tagetes in Central America, including for example Chiapan Breedlove and
Thorne 20560 (annotated in sched. as the type of the unpublished "excelsa"), the synonyms T. macroglossa and T. microglossa from Keil (2001), the synonyms T. jaliscensis var. minor and T. oligocephala DC. from Turner (1996), as well as T. ernstii, treated by Turner (1996) in synonymy of T. erecta. While the Mexican type of T. tenuifolia has oblong leaves with leaflets evenly diminishing in size towards both ends and T. macroglossa Pol. is the sole component described from Mesoamerican material, the bulk of material here was earlier (e.g., Standley, 1938) referred to Tagetes microglossa Benth., typified by material from Ecuador. Some material from Ecuador is occasionally determined as T. verticillata Lag. et Rodr. Chiapan material occasionally determined as T. lunulata Ortega proves to be T. tenuifolia. Neher (1965) treated T. heterocarpha in synonymy of Tagetes tenuifolia, but it is here excluded and is possibly distinct.


Tagetes cabrerae M. Ferraro, Tagetes gigantea Carrière, Tagetes graveolens L'Hér.

Glabrous annual or biennial herbs 1-2 m; stems few-several opposite-branched proximally to alternate-branched distally, green with stramineous striations, lateral branches often as long as main axis. Leaves 4-10 cm, opposite to sometimes alternate distally, pinnatifid, elliptic to obovate in outline, leaflets 7-13, 15-50 × 2-10 mm, linear-lanceolate to lanceolate, subopposite and regularly spaced on rachis, the terminal usually the longest, base and apex acuminate, margins coarsely serrate; petiole short, sometimes pectinate, subclasping. Capitulescence flat-topped and many-capitulate, ultimate clusters c. 2 cm broad, somewhat densely cymbiform, of 3-9 capitula, each cluster typically with a smaller proximal-lateral uniflorous capitulum; peduncles 1-15 mm, often subtended by a single linear to few-pinnatisect bracteole 2-4 mm. Capitula 0.9-1.2 cm, short-radiate, dimorphic; multiflorous capitula 8-15-flowered, phyllaries 5; uniflorous(biflorous) capitulum usually towards base of an individual cluster, phyllaries 2, ray 1(-2), disks 0(-1). Involucre 8-11 × 3-4.5 mm, that of all capitula cylindrical-urceolate, sometimes flattened; phyllaries (2)5, 1.5-3 mm diam., green, glands few, linear-elliptic, in 2 rows, midvein often prominent and sometimes keeled, apex triangular, acute to slightly obtuse, sometimes with a pair of elliptic glands, glabrous. Ray florets (1-)3-5; corolla pale yellow, weakly-exserted, tube 3.5-4 mm, longer than limb, costate, papillose, limb 2-2.4
× 1.5-2 mm, obovate or spatulate, 5-nerved proximally, nerves fading distally, apex rounded to truncate. Disk florets (0-)5-9; corolla 3.8-5 mm, narrowly funnelform, pale yellow, tube costate, glabrous or minutely papillose, lobes 0.4-0.8 mm, subequal, triangular; anther thecae 1-1.5 mm; style branches c. 1 mm. Cypselae 4-6 mm, strigillose; pappus of 1-2 awns and 3-6 squamellae, awns 2-4 mm, squamellae 0.3-0.6 mm, apices of awns and squamellae pointed. 2n = 48. Disturbed areas, fallow fields, gardens, pine-oak forest. Ch (Breedlove 40843, MO). 800-2800 m. (Mesoamérica, Colombia, Venezuela, Ecuador, Perú, Bolivia, Argentina.)

This species in not native to México nor to Central America, and is known there only as an escape from cultivation.

XXIII. Tribus Vernonieae Cass.

Trichospirinae Less.

Por J.F. Pruski.

Mostly perennial (infrequently annuals) herbs to shrubs or trees, sometimes subscandent, very rarely emergent aquatic herbs; herbage typically with simple trichomes lacking enlarged bulbous subsidiary cells, trichomes infrequently branched, stellate, or lepidote. Leaves alternate, rarely opposite or whorled, sometimes in a basal rosette, sessile or petiolate, entire or remotely toothed, rarely lobed, pinnately to infrequently trinerved. Capitulescence typically terminal or rarely axillary, monocephalous to paniculate, often in moderately scorpioid cymes with individual capitula often regularly and closely subtended by bracteate leaves or glomerate to synccephalous, infrequently densely scorpioid cymose with curved apices, very rarely monocephalous of a leafy bracted sessile capitulum. Capitula homogamous, typically discoid to sometimes discoid-subligate (but then 4-flowered and with 8 phyllaries in 4 decussate pairs), often moderately small (Mesoamerica), 1-many-flowered, less commonly consistently 4-flowered; involucre cylindrical to hemispherical or globose, sometimes somewhat compressed; phyllaries usually spirally imbricate, (1-)several-seriate, infrequently in 4 decussate pairs or with phyllaries equitant, not obviously scarious nor thinly papery, not usually squarrose or subsquarrose; receptacle flat to somewhat convex, epalate or rarely paleate. Disk florets regular to sometimes zygomorphic with 1 or 2 deeper incisions between the lobes, bisexual; corolla tubular, usually regular (subligulate with deeply toothed limb, in Elephantopus group), (3-)5-lobed, often closing by mid-day, usually white to reddish or purplish, very rarely yellowish (Mesoamerica never yellow), very rarely
stipitate-glandular, often glandular and sometimes setose; anthers calcarate but mostly ecaudate, thecae often sagittate basally with obtuse auricles, stramineous to reddish or purplish, never blackened, apical appendage distinct, and elongate, obtuse-rounded, rarely thin and transparent; endotheccial pattern polarized; pollen usually echinate, with continuous tectum or lophate (basic types enumerated in Keeley y Jones, 1979; and Jones, 1981), rarely psilolophate (Mesoamerica); style base cylindrical or nodular, distal portion of trunk and abaxial face of branches papillose, branches usually long and slender, apex subulate or at least acute, stigmatic surfaces continuous. Cypselae terete to rarely compressed, often 10-ribbed or 4-5-angled, vary rarely smooth or finely 5-striate and not angled, monomorphc or very rarely dimorphic, the carpodium symmetric or nearly so; pappus usually of squamellae and/or bristles (sometimes double), sometimes coroniform or reduced, rarely absent, very rarely of 2 divergent awns. Aprox 120 genera and 1200+ spp. Mostly Pantropical.

Tribe Vernonieae was treated as including Liabeae in Nash (1976), whereas D’Arcy (1975) treated Liabeae within the most distantly related Senecioneae. Even in the narrower concept of Vernonieae, taxa may have opposite leaves but they are rarely trinerved, and the corollas are even more rarely yellowish. In Nash (1976), D’Arcy (1975), Rzedowski, y Calderón de Rzedowski (1995), Turner (2007), and Redonda-Martínez y Villaseñor-Ríos (2009) *Vernonia* was treated broadly but several segregates have been recognized in the past 30 years, were used by Pruski (1997) and were summarized in Robinson (1999). Jones (1977) noted that the base chromosome numbers and sesquiterpene lactone types of *Vernonia* s. lat. in the Old World material is typically different from those of New World taxa. Robinson (1999) provided a thorough review of New World genera and their subtribal distribution.


*Stokesia laevis* (Hill) Greene, native to the SE United States, is occasionally cultivated in Mesoamerica, but is not known to escape. It is characterized by outer florets with subligulate corollas as in genera of the *Elephantopus* group, but differs from these by being much longer and by non-decussate phyllaries.

1. Capitula discoid-subligulate, usually 4-flowered; phyllaries 8, in 4 decussate pairs.  
   2. Pappus bristles dissimilar, 2 lateral ones spiral or plicate near tips.

15. *Pseudelephantopus*

2. Pappus bristles straight, all alike.  
   3. Pappus of 5-8 bristles.  

6. *Elephantopus*

11. *Orthopappus*

1. Capitula discoid, 1-many-flowered; phyllaries usually spirally imbricate  
   4. Cypselae compressed; pappus of 2 divergent awns.  
   5. Corollas stipitate-glandular; capitulescence rarely monocephalous of a leafy bracted sessile capitulum.  

19. *Struchium*

5. Corollas not stipitate-glandular; capitulescence various, not monocephalous of a leafy bracted sessile capitulum.  

6. Capitulescence of sessile axillary (terminal) capitula single or glomerate; pappus coroniform (of short bristles).  

7. Leaf blade surfaces concolorous; capitula 30-60-flowered.  

19. *Struchium*

7. Leaf blade surfaces discolorous; capitula 1-11-flowered.  


9. Perennial herbs or subshrubs; pappus coroniform; glomerule ebracteate.  

16. *Rolandra*

9. Annual to short-lived perennial herbs; pappus of short bristles; glomerule ebracteate.  

17. *Spiracantha*

6. Capitulescence either terminal or not glomerate; pappus not coroniform.  

10. Emergent aquatic herbs with capitulescence of axillary sessile solitary capitula; cypselae 8-12 mm; pollen psilolophate.  

12. *Pacourina*

10. Plants not emergent aquatic herbs with capitulescence of axillary sessile solitary capitula; cypselae < 8 mm; pollen usually echinate.

11. Herbage often with trichomes stellate or lepidote; inner phyllaries usually readily deciduous.
12. Inner series of pappus of 5-8 flattened, elongate scales; involucre moderately compressed and with phyllaries equitant; styles without basal node.

14. Piptocoma

12. Inner pappus of many elongate bristles; involucre not compressed, phyllaries spirally imbricate; styles with slightly enlarged basal nodes.

13. Capitulescence terminal, often a large pyramidal panicle; anther thecae sagittate to obtuse at base, without sclerified tails.

2. Critoniopsis

13. Capitulescence of axillary fascicles; anthers caudate, the tails sclerified.

11. Herbage not with trichomes stellate or lepidote; inner phyllaries not readily deciduous.

14. Capitulescence open cymose with few large capitula; phyllaries squarrose or subsquarrose.

9. Lepidonia

14. Capitulescence not open cymose usually with several-many capitula; phyllaries not squarrose.

15. Annual herbs; anther appendage thin and transparent; cypselae smooth or finely 5-striate and not angled.

3. Cyanthillium

15. Usually perennial herbs to shrubs or trees; anther appendage thin and transparent; cypselae Usually 10-ribbed or 4-5-angled

16. Capitulescence densely scorpioid cymose with curved apices.

4. Cyrtocymura

17. Capitulescence with the older capitula at base of cyme deciduous; inner series of pappus bristles clavate apically.

5. Eirmocephala

17. Capitulescence with the older capitula at base of cyme not deciduous; inner series of pappus bristles not clavate apically.

18. Pollen with tectum continuous.

21. Vernonia

18. Pollen usually echinolophate.

19. Capitulescence usually strict and not arcuate; capitula (5-)6(-7)-flowered; cypselae without raphids.

18. Stenocephalum
19. Capitulescence branches usually somewhat arcuate; capitula ≥ 8-flowered; cypselae usually with quadrate to elongate raphids.

20. Leaves lanceolate to ovate; cypselae usually with quadrate to elongate raphids.

8. Lepidaploa

20. Leaves linear to linear-lanceolate; cypselae usually with quadrate raphids.

10. Lessingianthus


*Ampherephis* Kunth

Por J.F. Pruski.

Much-branched herbs or rarely subshrubs < 1 m; stems villous to glabrate; herbage with simple trichomes and often indistinct dolabrirform trichomes. Leaves cauline, alternate, petiolate to sessile; blade linear to ovate or obovate, chartaceous, pinnately veined, surfaces glabrous to glandular or pubescent, base cuneate to attenuate at base, margins serrate or lobed. Capitulescence monocephalous or occasionally clustered 2-3-capitulate, terminal or less commonly axillary, capitula sessile and subtended by leafy bracts or pedunculate and not immediately subtended by leafy bracts. Capitula discoid, 50-100-flowered; involucre campanulate to hemispherical, seemingly double by subtending leafy bracts, bracts spreading laterally; phyllaries proper imbricate, graduate, several-seriate, appressed, often glandular or pubescent distally, apex rounded to awned or mucronate; receptacle flat to subconvex, epleate, often alveolate. Florets bisexual; corolla actinomorphic, funnelform, 5-lobed, reddish purple to blue, stipitate-glandular, sometimes pubescent; anthers sagittate at base; pollen tricolporate, echinate (tectum continuous); style without basal node, long-papillose in distal half, the branches slender. Cypselae cylindrical to broadly obconical, 8-10-ribbed, glabrous; pappus of a few short deciduous stramineous bristles much shorter than the corolla, rarely absent. \( x = 16 \). 3 species.

Neotropics, Asia, Australia, Pacific Islands.

The genus was revised by Kirkman (1981), from where the synonymy of our subspecies is mostly adapted.


Phyllaries chartaceous or sometimes basally indurate. Cypselae 1.2-3.9 mm. 3 subspecies, one neotropical which is occasionally cultivated in other regions. (Neotropics, Asia, Australia, Pacific Islands.)

The holotype is extant, thus Kirkman's (1981) neotypification cannot be followed.


Herbs 20-60 cm; stems sprawling to erect, costate, villous, trichomes to 1+ mm, patent or crisped, the sparse dolabriform trichomes nearly appressed. Leaves (1-)2-7(-10) × (0.2-)0.8-3(-5) cm, lanceolate to ovate or obovate, 2° about 4-8 per side, ascending at about 45°, both surfaces commonly glandular and villosulous, base cuneate to attenuate, margins usually sharply and deeply double-serrate, teeth 2-4 mm, apex usually obtuse. Capitulescence axis below capitulum usually leafless for distal 2-5(-7) cm. Capitula 0.8-2 cm; involucre 0.7-1 × 1-2(-3) cm; leafy bracts 3-10, 1-3 cm; phyllaries proper 1.5-2 mm diam., 4-5-seriate, deltap to lanceolate, chartaceous, purplish distally, often glandular or pubescent at apex, apex rounded to awned or mucronate, the awns 1-3(-4) mm, outer series with longer awns than inner series, the inner series sometimes obtuse and awnless apically; receptacle ≥ 1 cm. Florets: corolla 7-8(-10) mm, exserted from involucre, the outer ones often spreading lateral from involucre, tube longer than limb, lobes 1-1.5 mm; style branches 1-2 mm. Cypselae 1.6-2.5 mm; pappus bristles 1.2-2.5 mm. 2n = 32.

Flowering year-round. *Disturbed areas, forest edges, roadsides, pastures, rocky hillsides.*
sabanas, thickets, sometimes cultivated and escaping. T (Perez et al. 2005: 84); H (Nelson 2186, MO); ES (Berendsohn y Berendsohn 167, MO); N (Rueda y Caballero 14163, MO); CR (Campos 73, MO); P (Lewis 653, NY). 0-1500(-2000) m. (Mexico, Mesoamerica, Colombia, Venezuela, Guyana, French Guiana, Ecuador, Peru, Bolivia, Brazil, Paraguay, Argentina, Hispaniola, Puerto Rico, Lesser Antilles, Trinidad and Tobago; occasionally cultivated in the paleotropics as well as in temperate zones.)

Kirkman (1981) listed *Ampherephis pulchella* Cass. in synonymy of *Centratherum punctatum* subsp. *punctatum*, but the type was cultivated from material supposedly from New Zealand, where *Centratherum punctatum* does not occur. The description of *A. pulchella* matches Australian *C. punctatum* subsp. *australianum* K. Kirkman, and thus *A. pulchella* is referred there to synonymy and thus excluded from synonymy of *C. punctatum* subsp. *punctatum*.


Por J.F. Pruski.

Shrubs, vines, or trees to 13 m; stems subterete to striate, sometimes angled; herbage with simple or sometimes lepidote or branched trichomes. Leaves alternate (ours) or opposite, petiolate or rarely sessile; blade lanceolate to ovate or obovate, chartaceous to subcoriaceous, pinnately veined, surfaces pubescent to tomentose, often glandular, infrequently completely glabrous, margins entire to serrulate or denticulate. Capitulescence terminal (infrequently axillary), often a large pyramidal panicle, ultimate capitula sometimes subglomerate. Capitula discoid, 1-10(-20)-flowered, usually sub sessile or short-pedunculate; involucre cylindrical to campanulate; phyllaries imbricate, graduate, 4-7+-seriate, usually tan-chartaceous often with a small apical herbaceous zone, outer phyllaries often closely inserted and densely imbricate, persistent, inner phyllaries somewhat loosely imbricate and readily deciduous; receptacle epaleate. Florets: corolla actinomorphic, funnelform to narrowly campanulate, infrequently salverform, 5-lobed, white to lavender, often glandular especially on the lobes; anther thecae sagittate to obtuse at base, without sclerified tails; pollen tricolporate, echinate (non-lophate); style with slightly enlarged basal node, trunk papillose distally, branches slender, papillae blunt-tipped. Cypselae obconical-prismatic, 3-10-ribbed, glabrous, glandular, or pubescent; pappus of many fragile elongate white scabrid
bristles, sometimes biseriate with an outer series of smaller bristles. \( x = 17, 18, 19 \). Aprox. 85 spp. Mexico, Central America, Andean South America, very few spp. in Brazil.

Gleason (1922) recognized our species as *Eremosis*, but Jones (1973), who revised the Mexican and Central American species, recognized the group as *Vernonia* sect. *Eremosis*. Cuatrecasas (1956) treated the South American species as *Vernonia* sect. *Critoniopsis*. Robinson (1993) recognized *Critoniopsis* at the generic rank, and treated *Eremosis* in synonymy of it. *Critoniopsis* has long been recognized as generically distinct, but the earliest name *Turpinia* Lex. is a later homonym of *Turpinia* Vent. Another early name including species of *Critoniopsis* is *Gymnanthemum* Cass., which as lectotypified, however, proves to be a paleotropical genus.

Breedlove (1986) cited *C. pallens* (Sch. Bip.) H. Rob. (sub *Vernonia pallens* Sch. Bip.) for Chiapas based on Breedlove 24648 and Ton 2073. Turner (2007), however, listed this species as occurring only far to the NW of Chiapas, and Breedlove 24648 is determined here as *C. triflosculosa*. Thus, *C. pallens* is excluded from Mesoamerica. *Critoniopsis leiocarpa*, *C. standleyi*, and *C. triflosculosa* are occasional to moderately common in Mesoamerica, whereas the other species are all rather infrequent. The report Sousa y Cabrera (1983: 81) of *Critoniopsis barbinervis* (Sch. Bip.) H. Rob. (sub *Vernonia barbinervis* Sch. Bip.) in Quintana Roo is based on a misdetermination.


1. Capitula 1-flowered.

1. Capitula \( \geq \) 3-flowered.

2. Cypselae sometimes glandular, otherwise glabrous.

3. Cypselae equally 10-costate, terete, 4-6.5 mm; involucres 10-13 mm.

5. *C. shannonii*

3. Cypselae unequally 3-4-costate-angled, 2.5-3.2 mm; involucres 4-7 mm.

4. Leaf blades pilose-hirsute to sparsely tomentulose; corolla lobes c. 1/3 length of corollas.

2. *C. heydeana*

4. Leaf blades usually densely tomentose abaxially; corolla lobes nearly 1/2 length of corollas.

3. *C. leiocarpa*

2. Cypselae pubescent, sometimes also glandular.

5. Capitulescences of axillary glomerules, glomerules usually sessile; corolla lobes about 1/2 length of corollas.

6. *C. standleyi*
5. Capitulescences variously paniculate, terminal or sometimes lateral; corolla lobes usually 1/3-1/4 length of corollas.

6. Capitulescences cylindrical-paniculate, mostly on lateral branchlets along length of stems.  
   4. C. oolepis

6. Capitulescences rounded-paniculate or pyramidal-paniculate, terminal.

7. Involucres narrowly campanulate.  
   7. C. thomasii

7. Involucres cylindrical.  
   8. C. triflosculosa


*Vernonia angusta* (Gleason) Standl.

Shrubs or small trees to 5 m; stems tomentulose. Leaves petiolate; blade 5-19(-6) × 1.5-2(-3) cm, lanceolate to elliptic-lanceolate, usually widest above the middle, 2° veins usually 5 per side, adaxial surface scabrous, abaxial surface sparsely tomentulose with dolabriform trichomes, also glandular, base cuneate, margins entire, revolute, apex acute to acuminate; petiole 5-10 mm. Capitulescence c. 10 cm diam., densely subglomerate-paniculate, rounded, terminal from distal-most nodes, capitula subsessile to short-pedunculate. Capitula 1-flowered; involucre 6-8 × c. 1.5 mm, narrowly cylindrical; phyllaries c. 6-seriate, sparsely tomentulose, apical mucro to c. 0.5 mm; outer phyllaries c. 1.7 × c. 1.1 mm, broadly ovate, apex obtuse; inner phyllaries 5.5-8 × ≤1 mm, oblanceolate, apex acute. Florets: corolla c. 6.6 mm, white. Cypselae 2-2.5 mm, weakly costate, pilose-hirsute, eglandular; pappus inner bristles c. 6 mm. Flowering Feb-Mar. *Habitat unknown.* G (Kellerman 7922, F). 100-1100 m. (Endemic.)


*Eremosis heydeana* (J.M. Coult.) Gleason.

Shrubs to 2 m; stems sometimes vining, hirsutulous or finely tomentulose to glabrate. Leaves petiolate; blade 5-10 × 2.8-6 cm, usually ovate, usually widest at or below the middle, 2° veins usually 5-7 per side, adaxial surface hirsutulous to glabrate, sometimes glandular, abaxial surface pilose-hirsute to sparsely tomentulose, also glandular, base cuneate, margins entire to remotely denticulate, apex acute to acuminate; petiole 9-20 mm. Capitulescence 10-15 cm diam., densely subglomerate-paniculate, rounded to long-pyramidal, terminal from distal-most nodes, capitula
subsessile to short-pedunculate. Capitula 3-6-flowered; involucre 4-6 × 3-4 mm, campanulate, on bracteolate stipe; phyllaries 5-7-seriate; outer phyllaries many, 1-1.5 × 0.4-0.6 mm, triangular, sparsely tomentulose, apex acute to obtuse; inner phyllaries 4-6 × 0.8-1.1 mm, ob lanceolate, subglabrous, apex obtuse. Florets: corolla 5.2-6.3 mm, distal 1/2 glandular, lobes 1.4-2 mm, c. 1/3 length of corolla. Cypselae c. 3 mm, unequally 3-4-costate-angled, glabrous or sometimes sparsely glandular; pappus somewhat biseriate, outer bristles few, to c. 1 mm, inner bristles 5-6 mm. Flowering Jan-Apr. Oak forests, selva caducifolia. Ch (Garcia et al. 1448, MO); G (Heyde y Lux 3392, US). 900-1800 m. (Mexico, Mesoamerica.)


Cacalia leiocarpa (DC.) Kuntze, Eremosis leiocarpa (DC.) Gleason, Eremosis melanocarpa Gleason, Vernonia melanocarpa (Gleason) S.F. Blake.

Common shrubs or trees 1-5 m, crowns dense and rounded; stems densely tomentose to proximally glabrate. Leaves petiolate; blade 6-14(-18) × 2-9 cm, elliptic-ovate to ovate, usually widest below the middle, 2° veins usually 5-8 per side, adaxial surface villous-pilose or sparsely tomentulose to glabrate, abaxial surface usually densely tomentose, base cuneate to obtuse or sometimes rounded, margins entire to denticulate, apex acute to acuminate; petiole 10-30 mm. Capitulecence 5-23 cm diam., densely subglomerate-paniculate, pyramidal, terminal from distalmost nodes, main lateral branches usually longer than subtending leaves, capitula subsessile to short-pedunculate. Capitula 3-5(-7)-flowered; involucre 3.5-7 × 2.2-3 mm, narrowly campanulate; phyllaries 5-6-seriate, sometimes in distinct vertical ranks, distally tomentose to tomentulose; outer phyllaries 1.3-2.2 × 1-1.9 mm, broady triangular, apex broadly obtuse; inner phyllaries 3.5-6 × 1-1.9 mm, ob lanceolate, subglabrous, apex obtuse or sometimes acute. Florets: corolla 6-6.7 mm, white to pink, lobes sometimes distally glandular or setulose, lobes cut to near tube, nearly 1/2 length of corolla. Cypselae 2.5-3.2 mm, unequally 3-costate-angled, glabrous, eglandular; pappus inner bristles 5-6.5 mm. 2n = 34, 36. Flowering (Oct-)Nov-Jun(+ Aug). Open hillsides, pine forests, pine-oak forests, quebradas secas, rocky hillsides, selva caducifolia, selva perennifolia, thickets. Ch (Jones y Jones 21675, MO); B (Jones, 1973: 95-96); G (Heyde y Lux
3416, NY); H (Clewell 3771, MO); ES (Standley 20372, NY); N (Moreno 23515, MO). 600-2500 m. (Mexico, Mesoamerica.)


*Eremosis oolepis* (S.F. Blake) Gleason.

Vining shrubs to 3 m; stems densely and finely tomentulose, sometimes glabrate proximally. Leaves petiolate; blade 6-10 × 2-5 cm, elliptic-ovate, widest at the middle, 2° veins usually 5-7 per side, adaxial surface glabrous, eglandular, abaxial surface tomentulose, also glandular, base cuneate, margins entire, subrevolute, apex acuminate; petiole 2-5 mm. Capitulescence to c. 40 cm, cylindrical-paniculate, mostly on lateral branchlets 5-15 cm along length of elongate vining stems, each branchlet rounded apically with several 3-8-capitulate glomerules, these lateral flowering branchlets about 1.5× as long as subtending leaves, capitula sub sessile; peduncles 0-1(-2) mm. Capitula 3-5-flowered; involucre 5-6 × 2-3 mm, narrowly campanulate; phyllaries 5-7-seri ate, arachnoid-ciliate; outer phyllaries 1-1.8 × 0.7-1.1 mm, triangular-ovate, apex broadly acute; inner phyllaries 5-6.5 × 1-1.4 mm, oblong, apex obtuse. Florets: corolla 5.5-7 mm, glabrous, lobes c. 1.5 mm, c. 1/3 length of corolla. Cypsela 1.5-3 mm, 6-7-costate, the 3 abaxial costae prominent, setulose-substrigillose throughout; pappus somewhat biseriate, outer bristles usually 1-2 mm, inner bristles 5-6 mm. Flowering Dec-Apr. *Dry bushlands, selva subperennifolia.* Y (Gaumer 23648, MO); C (Villaseñor, 1989: 109 sub *Vernonia oolepis*); QR (Ucan y Poot 5102, MO). 0-100 m. (Endemic.)

Jones (1973) gave the corollas as about "13 mm" long. Turner (2007) noted that *Critoniopsis triflosculosa* is very similar to *C. oolepis*, which supposedly differs by corollas longer than 10 mm. The material in my hands determined as *C. oolepis* has corollas ≤ 7 mm.


*Eremosis shannonii* (J.M. Coult.) Gleason.

Shrubs to trees 3-10 m; stems sparse tomentulose to glabrate. Leaves petiolate; blade (7-)10-17 × (2.5-)4-7 cm, usually elliptic-ovate, usually widest at the middle, 2° veins usually 7-9 per side, surfaces eglandular, usually glabrous (arachnoid-tomentulose when young), base cuneate to acuminate, margins entire, apex acute to acuminate; petiole 5-20 mm. Capitulescence 5-10 cm
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Vernonia calderonii S.F. Blake.

Shrubs 1-3 m; stems finely tomentulose and glandular becoming glabrate, sometimes slightly fractiflex. Leaves short-petiolate; blade 4-12 × 1.5-5 cm, elliptic to obovate, usually widest at or above the middle, 2° veins usually 5-9 per side, adaxial surface finely puberulent especially along the midrib and glandular, abaxial surface densely pilosulose to tomentose, also glandular, base cuneate, margins entire to serrulate, apex acute to acuminate (infrequently obtuse); petiole 2-7 mm. Capitulescence of sessile (infrequently on short stalks 1-2 cm) rounded dense axillary glomerules 1-2.3(-3) cm diam., capitula subsessile on peduncles to 1 mm. Capitula 4-5-flowered; involucre 4-5.5 × 2-3 mm, campanulate; phyllaries 5-7-seriate, distal 1/2 arachnoid to villous and also glandular, outer phyllaries 1.5 × 0.5-1 mm, ovate, apex acute to obtuse; inner phyllaries 4-5.5 × 1-1.4 mm, lanceolate, apex acute to acuminate. Florets: corolla 4-5 mm, ochroleucous, glandular and sometimes also hispidulous especially on tube, lobes to c. 2.5 mm, about 1/2 length of corolla Cypselae 2-3.5 mm, 5-7-costate, densely sericeous, annulus glabrous; pappus inner bristles 3.7-5 mm. Flowering Sep-Mar. Brushy hillsides, pine forests, pine-oak forest. G (Standley 74968, F); H (Standley 28221, MO); ES (Calderon 2499, US); N (Moreno 22722, MO). 600-1400 m. (Endemic.)

Vining shrubs 4-10 m; stems tomentulose; herbage with some trichomes dolabrniform or stellate. Leaves short-petiolate; blade 2.5-9 × 1-5 cm, elliptic-ovate, usually widest at or above the middle, 2° veins usually 5-7 per side, surfaces hirtellous, adaxial surface sometimes also glandular, abaxial surface also glandular, base cuneate to obtuse, margins entire, apex acute to obtuse; petiole 4-7 mm. Capitulescence terminal, pyramidal-paniculate, capitula subsessile in many clusters; peduncles 0-1.6 mm. Capitula 3-4-flowered; involucre 4.5-6.5 × 2.5-3 mm, narrowly campanulate; phyllaries 5-6-seriate, glabrous or apex puberulent; outer phyllaries 0.6-1 × 0.4-0.6 mm, broadly ovate; inner phyllaries 4-5 × 1-1.4 mm, obovate, apex acute. Florets: corolla 4.6-5.8 mm, white, glandular distally, lobes c. 1.5 mm, c. 1/3 length of corolla. Cypselae 2-2.3 mm, c. 8-costate, setulose-substrigillose, annulus glabrous; pappus bristles c. 4.5 mm, subequal. Flowering Mar-Apr. Moist forests. H (Hawkins 884, MO). 1100-1700 m. (Endemic.)


Common shrubs or small trees (2-)4-12 m, crowns dense and rounded; stems canescent or tomentose becoming glabrate; herbage sometimes with trichomes dolabrniform or stellate. Leaves short-petiolate; blade 5-13 × 1-3 cm, obovate to obovate, usually widest above the middle, 2° veins usually 5-7 per side, adaxial surface puberulent to commonly glabrate, abaxial surface glandular, otherwise glabrous to submentulose, base obtuse to more commonly acuminate to attenuate and subdec-current, margins entire to serrulate or denticulate, apex acute to acuminate; petiole 4-12(-17) mm. Capitulescence terminal rounded-paniculate, capitula subsessile in numerous clusters. Capitula 3(-4)-flowered; involucre 4.5-6.5 × 1.3-2.5 mm, cylindrical; phyllaries 4-6-seriate, subglabrous; outer phyllaries 0.5-1 × 0.7-1.4 mm, broadly ovate, apex obtuse to rounded; inner phyllaries 3.5-6.5 × 1-1.6 mm, obovate, apex acute. Florets: corolla 5-6 mm, white, lobes to 1.5 mm, usually 1/3-1/4 length of corolla. Cypselae 2-3 mm, setose, 7-10-costate; pappus inner bristles 4-5.5 mm. Flowering Feb-Jun. Deciduous forests, fields, forested rocky slopes, matorrales secos, pastizal, rocky hillsides, secondary vegetation, selva baja caducifolia, thickets. Ch (Breedlove 24648, MO); QR (Turner, 2007: 133); G (Heyde y Lux 3421,
The northern lanceolate-leaved *Vernonia triflosculosa* subsp. *palmeri* (Rose) S.B. Jones was recognized by Jones (1973). Here I recognize *Critoniopsis triflosculosa* in the sense of *V. triflosculosa* subsp *triflosculosa* in Jones (1973), but without making judgment on the status of *V. triflosculosa* subsp. *palmeri*, which was not transferred nomenclaturally to *Critoniopsis* by Robinson (1993).

### 3. Cyanthillium Blume


Por J.F. Pruski.

Annual (ours) or rarely short-lived perennial herbs; stems usually erect, striate, puberulent; herbage with some asymmetric dolabriform trichomes. Leaves alternate, sessile or petiolate; blade lanceolate to obovate, chartaceous, venation pinnate, subentire to serrate; petiole sometimes winged. Capitulescence terminal, corymbiform or corymbiform-paniculate, branching divaricate, held well above leaves. Capitula discoid, 13-94-flowered; involucre campanulate; phyllaries imbricate to weakly so, graduated, c. 3(-5)-seriate, narrowly lanceolate to ovate, sparsely pilose, glandular, the apex sharply attenuate, reflexed in fruit, the outer phyllaries much reduced; receptacle flat to convex, epaneate. Florets bisexual; corolla actinomorphic, funnelform to campanulate, shortly 5-lobed, distally blue or lavender, the tube long, narrow, the limb short, the lobes lanceolate, pilose or glandular, non-glandular trichomes 3-4-celled, terminal cell elongate, glands dome-shaped; anthers stramineous, basally spurred or tailed, appendage thin and transparent; pollen echinolophate; style without basal node, trunk long-papillose distally, the branches long-papillose, blue or lavender, gradually attenuate. Cypselae subcylindrical to obconical, smooth to finely 5-striate, not angled, appressed-pilose, idioblast sometimes apparent; pappus biseriate, white, the outer series of persistent, squamellae sometimes connate into a crown, the inner series of many fragile or deciduous, scabrid or barbellate, capillary bristles longer than cypselae. \( x = 9, 10, 11. \) 7-25 spp.; U.S.A. (Florida), Mexico, Central America, northern South America, West Indies; Africa, Asia, Pacific Islands. Presumably native to tropical Asia.

Although *Cyanthillium* was resurrected from synonymy of *Vernonia* by Gleason (1913), who reported *C. chinense* (L.) Gleason in the West Indies, Gleason (1922) treated *Cyanthillium* and *Vernonia* sect. *Tephrodes* DC. as distinct. Robinson (1990) placed *Vernonia* sect. *Tephrodes* DC.
in synonymy of *Cyanthillium* and provided the needed combination for our Mesoamerican species. *Cyanthillium cinereum* was treated within *Vernonia* by Nash (1976), Clewell (1975), and D'Arcy (1975), but as noted by Robinson (1990), *Cyanthillium* differs from *Vernonia* by its smooth to finely 5-striate (vs. 5-10-ribbed) cypselae, and by its echinolophate (vs. tricolporate) pollen, and by base chromosome number usually reported as \( x = 9 \) or 10 (vs. \( x = 17 \)).


Common weedy annual herbs, to c. 0.8 m; stems unbranched or more commonly few-branched. Leaves petiolate or distal ones sessile; petiole (when present) 0.5-4 cm, narrowly winged distally; blade 1.5-5 × 1-4 cm, elliptic to ovate or obovate, with 3-6 ascending secondary veins per side, base attenuate to the winged petiole, apex acute to obtuse, adaxial surface puberulent to nearly glabrous, abaxial surface pilose, also usually glandular. Capitulescence more or less flat-topped, to c. 15+ cm broad, lateral branches nearly over-topping central axis, of 5-many pedunculate capitula; peduncles 1-2-bracteolate, 0.4-2 cm. Capitula 13-20-flowered, to c. 5(-5.5) mm; involucre 2.5-3 mm diam.; outer phyllaries much reduced, linear-lanceolate, 0.5-1.5 × 0.2-0.4 mm, quickly grading into inner c. 2-series, these subequal, ob lanceolate, 3-3.5(-4) × c. 0.7 mm, apex purplish. Florets: corolla 3-4 mm, exserted 1.5-2 mm from involucre, the tube long and narrow, 2-3 mm, the limb short, few-setose, throat c. 0.5 mm, the lobes c. 0.5 mm, few-glandular at apex; anthers c. 0.4 mm; style branches c. 0.6 mm. Cypselae 1-1.5 mm; outer pappus 0.3-0.5 mm, squamae lanceolate, lacerate, inner pappus bristles 3-4 mm, exserted from involucre by c. 1+ mm and nearly as long as corolla. \( 2n = 18 \). Beaches, cultivated areas, disturbed areas, pastures, potreros, roadsides, rocky areas, savannas, secondary vegetation, wet areas. T (Pruski et al. 4232, MO); Ch (Pruski y Ortiz 4176, MO); C (Alvarez M. 525, MO); QR (Cabrera y Cabrera 15427, MO); B (Lundell 4712, MO); G (Contreras 8915, MO); H (Clewell et al. 4286, MO); N (Seymour 4413, MO); CR (Pruski y Sancho 3813, MO); P (D'Arcy y D'Arcy 6020, MO). 0-500 m. United States (Florida), S. Mexico, Mesoamerica, Colombia, Venezuela, Guyana, Surinam, French Guiana, Ecuador, Brazil, Cuba,
This species might reasonably be expected in Yucatan, but not necessarily so in El Salvador. It has been reported to be used medicinally and also as a fish poison. *Erigeron pisonis* Burm. f. appears to be the only possible heterotypic synonyms based on material from the neotropics. Several varietal names have been proposed, for example Candolle (1836) proposed five, but either recognizing or synonymizing any are beyond the scope of this work. I presume the report by Gleason (1913, 1922) of *C. chinense* (L.) Gleason in the West Indies is based on misdeterminations of *C. cinereum*.

4. **Cyrtocymura** H. Rob.

Perennial herbs to shrubs, sometimes vining, 0.5-3 m tall; stems moderately branched, sometimes strongly angled, densely pubescent to tomentose. Leaves alternate, petiolate; blade lanceolate to ovate, chartaceous, pinnately veined, surfaces discolorous, adaxial surface hirsute or pilose to weakly so, green, the abaxial surface densely pubescent to tomentose, glandular, pale green to gray, base tapering to subcordate, entire to serrate or dentate. Capitulescence terminal on branches from distal most nodes, of few to several, somewhat compact to elongate, densely scorpioid cymose with curved apices, sometimes divaricately 1- or 2-forked, each with 6-30 or more capitula, the branches densely pubescent to tomentose, capitula sessile, the older capitula at base of cyme deciduous, the individual capitula not leafy (ours) to often regularly and closely subtended by bracteate leaves. Capitula discoid, 14-30-flowered; involucre narrowly campanulate; phyllaries subimbricate, graduate to nearly subequal, 3-4-seriate, pilose to tomentose and sometimes also glandular, narrowly acute to filiform and sinuous, persistent or inner ones deciduous; receptacle flat to convex, epaleate. Florets bisexual; corolla funnelform, 5-lobed, violet, glabrous or lobes pilose or glandular; anthers spurred; pollen tricolporate, echinate, non-lophate; styles with a basal node (ours), the branches ascending, weakly exserted. Cypselae obconical, 10-ribbed, sericeous; pappus 2-seriate to obscurely so, sometimes fragile and falling from base, white to cream-colored, outer series of minute squamellae or short bristles, inner series of elongate bristles, apices not clavate. 6 spp. Mexico, Central America, tropical and subtropical South America, Hispaniola, Trinidad.


Clambering perennial herbs to vining shrubs 1-3 m; stems few-branched, striate, short-pilose to densely so, trichomes patent to antrorse. Leaves narrowly inserted onto stem; blade 2-12(-15) × 2-6(-8) cm, elliptic-lanceolate to ovate, chartaceous, with about 3-6 strongly arching secondary veins per side, the adaxial surface eglandular, strigillose to hirsutulous, the abaxial surface often glandular, also hirsute to pilose or tomentose, base abruptly contracted, attenuate or rarely nearly truncate, margins subentire to sometimes serrulate, apex acute to attenuate. petiole 0.5-1.5(-2) cm. Capitulescence few-branched, of 3-7 spreading scorpioid cymes (2-)5-11 cm, cymes 10-20-campanulate, leafless, unbranched or less commonly 1-branched and then typically with a sessile capitulum in axil, sometimes few-bracteolate, capitula sessile or subsessile, spaced 3-7 mm apart, 2-ranked on adaxial axis, corollas infrequently opened when young cymes are subglomerate, branch supporting cymes 1-6 cm, subpannose. Capitula usually 20-25-flowered, 6-9 mm; involucre campanulate, 3.5-5.5 × 3-6 mm; phyllaries c. 4-seriate, lanceolate, pilosulose to villosulous, ciliate, outermost leaf-like in cyme, the outer series of phyllaries c. 1.5 × 0.5-0.8 mm; inner series of phyllaries 3.5-5.5 × 0.6-1.2 mm, apex often purplish, acuminate to attenuate, sometimes glandular, sometimes recurved; receptacle folveolate, ridges sometimes lacerate or setose. Florets well-exserted from involucre; corolla 4-7.5 mm, narrowly campanulate, lavender, the lobes 1.3-2.5 mm, sometimes unequal, lanceolate, long-setose or much less commonly sparsely so, rarely also glandular; anthers 1-2 mm, appendages eglandular; pollen echinate; style base not swollen, branches 1.5-2 mm. Cypselae c. 1(-1.7) mm, slow maturing, obconical, striate, strigillose-setose, eglandular, carpopodium annular; pappus biseriate, white, the outer series .7-1.8 mm, narrow, the inner bristles 4.5-6.5 mm, elongate. 2n = 34. *Beaches,*
disturbed areas, forest edges, gallery forests, lagoon shores, potreros, roadsides, savannas, secondary forests, thickets. Ch (cited by Breedlove, 1986); Y (cited by Turner, 2007); C (Ortiz y Herrera 831, MO); B (cited by Nash, 1976); G (Harmon y Fuentes 1884, MO); H (Yuncker et al. 8260, MO); N (P.P. Moreno y W. Robleto 20456, MO); ?CR. 0-400(-1100) m. (Mesoamerica, Colombia, Venezuela, Guyana, Surinam, French Guiana, Ecuador, Peru, Bolivia, Brazil, Uruguay, Paraguay, Argentina, Hispaniola, Trinidad and Tobago.)

5. Eirmocephala H. Rob.

Por J.F. Pruski.

Perennial herbs to shrubs 1-6 m; stems moderately branched, angled. Leaves alternate, short-petiolate, broadly inserted on stem; blade lanceolate to ovate, chartaceous, pinnately veined, surfaces variously pubescent, abaxial surface glandular, nearly winged to base, margins usually serrate. Capitulescence terminal on branches from distal most nodes, of few to several, somewhat elongate, divaricate, densely scorpioid cymose with curved apices, capitula sessile, the older capitula at base of cyme not deciduous. Capitula discoid, 7-35--flowered; involucre with 24-65 phyllaries; phyllaries subimbricate, graduate, pluriseriate; receptacle flat to convex, epleate. Florets bisexual; corolla funnelform, 5-lobed, violet, glabrous or lobes sparsely glandular; anthers spurred, appendage glandular or eglandular; pollen tricolporate, echinate, lophate or non-lophate; styles with a basal node. Cypselae obconical, 10-ribbed, setose, glandular at base; pappus 2-seriate, inner series of elongate bristles not clavate apically. 3 spp. Mesoamérica, northern South America.


Cacalia brachiata (Benth.) Kuntze

Shrubby herbs to shrubs, 1-3 m tall, infrequently with latex; stems ascending, subterete and angulate distally, striate, short-hirsutulous to glabrate. Leaves sessile or winged-pseudopetiolate, broadly inserted onto stem; blade 5-30 × 2.5-14 cm, elliptic to elliptic-ovate, thinly chartaceous, with about 5-10 secondary veins per side diverging from midrib about 45° or more sharply distally, tertiary venation often indistinct, the adaxial surface eglandular, subglabrous to sparsely strigillose, the abaxial surface sparsely glandular, strigillose to hirtellous, base contracted
and attenuate as a winged pseudopetiole, sometimes subauriculate, margins subentire or serrulate to infrequently serrate, apex acuminate. Capitulescence of few elongate scorpioid cymes, cymes 0-40 cm, main axis erect, few-branched in proximal c. 10 cm, branches without leaves and ebracteolate, rarely a proximal branch subtended by a non-expanded leaf and rarely a few linear bracteoles 1-2 mm present distally, distally spreading and crescent-shaped, 20-45-capitulate, capitula subsessile, spaced 3-8 mm apart in a single row along a common axis, few-striate-sulcate, hirsute; peduncles 0.1-0.3 mm. Capitula 18-22-flowered, 7-10 mm; involucre 3-4.5 × 4-5 mm, turbinate; phyllaries 1-4.5 mm, 4-5(-6)-seriate, ultimately deciduous or outermost sometimes persistent, the outer series to c. 0.5 mm wide, linear-lanceolate, apex acute, usually puberulent throughout, grading to the inner ones, these c. 1 mm diam., oblanceolate, usually glabrous and stramineous proximally, puberulent to sparsely so and green to violet distally and along midvein, sometimes glandular, apex acute to obtuse. Florets well-exserted from involucre, the outer sometimes laterally so; corolla 5.2-6.5 mm, lavender, sparsely glandular especially distally, tube and limb subequal, the lobes 2-2.5 mm; anthers 2.5-3 mm, appendages eglandular, tails pointed; pollen echinolophate; style branches 2-2.5 mm. Cypselae slow maturing, 1-2.4 mm, narrowly obconical, pilosulose with subappressed or more commonly patent trichomes, sometimes glandular, carpopodium swollen, broader than cypsela base; pappus fragile, biseriate, stramineous, the outer series 0.3-0.5 mm, the inner bristles 4-5 mm, sometimes very slightly clavate apically. Forest edges, roadsides, secondary vegetation, streamsides. CR (Gillis y Plowman 10075, MO); P (Liesner 10, MO). 100-1500 m. (Mesoamerica, Colombia, Venezuela, Ecuador.)

In a treatment of Peruvian Vernonieae, Jones (1980) recognized *Eirmocephala brachiata* (sub *Vernonia brachiata*) and treated *V. digitata* Rusby and *V. megaphylla* Hieron. as synonyms of it. Here *Vernonia digitata* Rusby and *V. megaphylla* Hieron. are excluded here from synonymy of *E/brachiata*. *Eirmocephala brachiata* appears to be much less common in Panama than in Costa Rica.

### 6. Elephantopus L.

Por J.F. Pruski.

Perennial rhizomatous herbs; stems erect, simple or few-branched, glabrous or sparsely pilose, leaves mostly basal and proximal-cauline, plants sometimes scapose. Leaves alternate, sessile, narrowly lanceolate to ovate or obovate, chartaceous, pinnately veined, both surfaces pilose, the abaxial surface also finely glandular, base often clasping or amplexicaul, the margins entire to crenate or
dentate. Capitulescence terminal or axillary, corymbiform-paniculate, the capitula glomerate into a
synflorescence, synflorescence hemispherical, dense, with 4-many capitula, subtended by 2 or 3
bracts; bracts cordate to ovate, foliar, green, venation open-reticulate. Capitula discoid-
subligulate, (1-)4(-5)-flowered; involucre cylindrical but somewhat compressed, biseriate;
phyllaries 8, conduplicate, in 4 decussate pairs, the outer 4 shorter than the inner 4, lanceolate,
glandular, acute to attenuate; receptacle flat or nearly so, epaleate, sometimes alveolate. Florets
bisexual; corolla discoid but zygomorphic with lobes radiating outwards, deeply and unequally 5-
lobed, more deeply cut between the two adaxial-lateral lobes, cream-colored to deep blue or
reddish, limb short, broad; anthers white, very short-spurred basally, the spurs shorter than
filament collar; pollen triporate, echinolophate; style without basal node, trunk long-papillose
distally, the branches linear, long-papillose, slender, gradually attenuate. Cypselae obconical or
somewhat flattened, c. 10-ribbed, hispidulous or substrigillose, sometimes glandular; pappus
uniseriate and subequal or less commonly biseriate and unequal, of 5-8 (rarely more) straight
bristles, all alike, often basally enlarged, rarely reduced to a low crown. Aprox. 25-30 spp. Mostly
Pantropical.

I agree with the lectotypification by Gleason (1906) of Elephantosis upon Elephantosis biflorus
Less., and I also follow Gleason's simultaneous segregation of Orthopappus from Elephantopus.
Although in the Americas Orthopappus is clearly distinct by its many pappus bristles, some African
species of Elephantopus approach this condition. Clonts (1972) treated Orthopappus and
Pseudelephantopus in synonymy of Elephantopus.

Reports of Elephantopus scaber L. and E. tomentosus L. in Mesoamerica are in reference to
material determined here as E. mollis. The Mesoamerican material formerly determined as E.
tomentosus L. is interpreted here as a growth form of E. mollis with leaves mostly basal but having
pappus bristles usually abruptly (vs. usually gradually as in E. tomentosus s. str.) dilated at base.
Similarly, Mesoamerican material formerly determined as E. scaber is interpreted here as a cauline-
leaved form of E. mollis with pappus bristles somewhat gradually (vs. the more typical abruptly)
dilated at base. It should be noted that both Linnaean names have priority over E. mollis. Also similar
to E. mollis is north temperate E. carolinianus Rausch., which resembles it by leaves mostly cauline
at anthesis, but which differs by pappus bristles very gradually broadened basally. Elephantopus
mollis is used here following the traditional regional application of the name.

Bibliography: Clonts, J.A. 1972. A revision of the genus Elephantopus, including Orthopappus

1. Leaves narrowly oblanceolate, 0.6-2.2 cm diam. 1. E. dilatatus
1. Leaves oblanceolate to obovate, (0.6-)1-6.5 (-10) cm diam.  

2. *E. mollis*

1. **Elephantopus dilatatus** Gleason, *Bull. New York Bot. Gard.* 4: 240 (1906). Isotype: Costa Rica, *Pittier 3733* (US!). Illustr.: Clonts, Tesis de Doctorado, Mississippi State University, t. 10a (1972). N.v.: none. Herbs 15-45 cm; stems simple into capitulescence, ascending to stiffly erect, pilose-substrigose, leaves densely inserted proximally. Leaves 5-18 × 0.6-2.2 cm, narrowly oblanceolate, surfaces pilose-substrigose, abaxial surface also glandular, base long-attenuate, clasping, margins serrulate, apex acute. Capitulescence open, held well above cauline leaves, of several to many glomerulate synflorescence, loosely subdivaricate-branched, synflorescences to c. 8 × c. 15 mm, hemispheric, c. 10-capitulate, secondary leaf subtending proximal-most branch much smaller than primary cauline leaves; bracts 2-3, 4-8 mm, typically shorter than involucre, sometimes subequal with involucre, ovate, synflorescence stalks usually 2-5 cm. Capitula: involucrē 7-8 mm; phyllaries 3-8 mm, glandular, sparsely substrigillose in distal 1-2 mm with trichomes 0.2-0.3 mm, also often glandular, apex acuminate to cuspidate. Florets: corolla 5-6 mm, lavender, mostly glabrous, tube longer than limb, lobes 1.2-2 mm. Cypselae 2-3 mm, sparsely glandular and strigulose; pappus bristles 5-6, 3-4.5 mm, commonly abruptly dilated basally. Flowering Nov-Apr. *Cloud forests, quebradas, epipetric along streamsides, sandy riverbanks.* CR (*Pittier 3733*, US); P (*Dodge y Allen 17383*, MO). 0-1200 m. (Mesoamerica, Colombia.)

surface pilose, abaxial surface pilose to tomentose, finely glandular, gradually attenuate basally and clasping the stem, the margins crenulate to serrulate, the apex obtuse to acute. Capitulescence diffuse; synflorescence stalks 1-6 cm, pilose or substrigose; synflorescence 7-15 × to c. 20 mm, 10-25(-40)-headed; bracts (2-)3, 7-13 × 7-10 mm, about as long as or shorter than the synflorescence, broadly cordiform to deltoid, the abaxial surface pilose to tomentose, glandular, margins sometimes ciliate, apex acute to acuminate. Individual capitula 6-8 × 1-2 mm, typically 4-flowered; phyllaries apically pilose and/or glandular, apiculate, the outer 4 phyllaries 2-3.6 mm, the inner 4 phyllaries c. 5-7 mm. Florets: corolla 4-5.5 mm, cream-colored or pinkish distally, glabrous or lobes occasionally glandular, tube c. 2.5-3.5 mm, narrow, throat c. 0.6 mm, abruptly broadened, lobes 0.9-1.4 mm. Cypselae 1.5-3.1 mm, light brown or when mature ribs pale and sulci brown; pappus of 5-8 bristles, 3-4.5 mm, reaching to base of corolla limb, uniseriate, subequal, base 0.1-0.3 mm diam., slightly gradually or more commonly abruptly dilated basally, bases of adjacent bristles not overlapping. 2n = 22. Cafetal, cultivated areas, disturbed areas, fields, forest borders, gallery forests, gardens, open fields, orillo de camino, pine forests, pine-oak forests, rocky hillsides, sabanas, secondary vegetation, weedy areas. T (Cowan 2767, MO); Ch (Breedlove 41241, MO); B (Schipp 723, NY); G (Pruski et al. 4514, MO); H (Clewell 3736, MO); ES (Carballo y Aldana RAC00565, MO); N (Atwood 3001, NY); CR (Holway 314, GH); P (Busey 329, MO). 0-2400 m. (Mexico, Mesoamerica, Colombia, Venezuela, Guyanas, Ecuador, Peru, Bolivia, Brazil, Uruguay, Paraguay, Argentina, Cuba, Jamaica, Hispaniola, Puerto Rico, Virgin Islands, Lesser Antilles, Trinidad and Tobago; Africa, Asia, Pacific Islands.)

7. **Harleya** S.F. Blake

Por J.F. Pruski

Perennial stoloniferous herbs or subshrubs; stems erect, simple or few-branched in the capitulescence, tomentose to subglabrate, suberete to irregularly angled distally, distal half leafy; herbage with contorted trichomes. Leaves alternate, subsessile to petiolate; blade broad, chartaceous, pinnately veined, surfaces discolored, abaxial surface tomentose with a dense mat of appressed trichomes, margins subentire or sinuate to dentate. Capitulescence axillary (infrequently terminal), glomerate, glomerules often subtended by a young leaf. Capitula discoid, sessile or nearly so, 8-11-flowered; involucre oblong-turbinate; phyllaries imbricate, graduated, several-seriate, erect, apically acuminate-cuspidate; receptacle flat, epaleate, foveolate. Florets bisexual; corolla actinomorphic, tubular-funnelform, 5-lobed, glandular, slightly exserted from involucre, violet to purple; anther stramineous, apical appendage obtuse to rounded, basally
spurred, spurs fertile, rounded basally; pollen tricolporate, lophate; style trunk long-papillose
distally, branches ascending-elongate, long-papillose, base commonly with stylar node. Cypsela
isomorphic, obconical-turbinate, 4-5-angled, glandular, faces sometimes 1-nerved; pappus
coroniform, stramineous. 1 sp., endemic to Mesoamerica.

_Harleya oxylepis_, described by Bentham (in Bentham and Hooker, 1873) in _Oliganthes_ Cass.
(Vernonieae), was excluded from the tribe by Gleason (1922), but reinstated as a member of the
Vernonieae by Blake et al. (1926). Blake (1932) described _Harleya_ as a unispecific genus of
Vernonieae, and Nash (1976), Pruski (1992), and Robinson (1999) followed Blake by
recognizing _Harleya_. Pruski (1996) transferred most American species once placed in _Oliganthes_
to _Piptocoma_, and treated _Oliganthes_ s. str. as endemic to Madagascar.


Infrequent erect perennial herbs or subshrubs to c. 1 m; stems slightly striate, distally
tomentose, becoming subglabrate proximally. Leaves subsessile or short-petiolate; blade (3-)6-13
× (1.5-)2.5-5 cm, elliptic-ovate to sometimes oblong or obovate, tertiary veins more or less
obscure, adaxial surface dark green, glabrous or finely glandular-punctate, abaxial surface white-
tomentose, base cuneate to slightly attenuate and decurrent onto petiole, marginal teeth, when
present, occurring in distal 2/3 of blade, 10-13, each typically subtended by a secondary veins,
apex acute to less commonly obtuse; petiole winged to base or nearly so, 0.3-0.6 cm.
Capitulescence glomerate, typically held slightly above subtending leaves on tomentose branches
0.4-4 cm; individual glomerules 1.5-3 cm diam., 9-15-capitulate; peduncles (0-)1 mm, 1-2-
bracteolate, bracteole 1-2 mm, resembling outer phyllaries, but not as apically pointed. Capitula
9-13 mm; involucre 2.5-4 mm diam.; phyllaries 25-30, 5-6-seriate, lanceolate, medially and
distally reddish or purplish, glabrous, margins thin and somewhat hyaline; outer series 3-4 mm,
apically long-cuspidate, mucro to c. 2 mm; inner series 8-9 × c. 1.5 mm, apically short-cuspidate,
muco to c. 1 mm. Florets: corolla 6-8 mm, violet to purple, glandular, tube very narrow, not
nearly as broad as cypselae apex, not well-differentiated from throat, lobes to c. 2 mm, often
recurved; anthers slightly exserted from throat; style branches 1.3-2 mm, ascending. Cypselae 1.4-2 mm, stramineous, corona 0.4-0.5 mm, very thick. Disturbed areas, fields, roadsides, streamsides, tintal. ?T (Johnson 21, NY); Ch (Martínez 17860, MO); ?Y (Johnson 21, NY); QR (Sanders 9904, MO); B (Bartlett 12042, MO); G (Steyermark 45774, MO). 0-200 m. (Endémica).


Por J.F. Pruski.

Annual or perennial, pubescent, often glandular herbs to subshrubs or shrubs to 3+ m; stems erect, often much-branched, often pubescent, usually eglandular. Leaves alternate, sessile or petiolate; blade usually elliptic, pinnately veined. Capitulescence terminal or axillary, cymose, branches usually somewhat arcuate, capitula single or clustered, often subtended by reduced bracteate leaves. Capitula homogamous, discoid, 8-40-flowered, sessile or nearly so; involucre campanulate; phyllaries persistent, graduate, 3-6-seriate, lanceolate, often dimorphic, the outer phyllaries often spreading, slender with aristate apices, the inner phyllaries commonly erect with acute apices; receptacle epealeate. Florets bisexual; corolla actinomorphic, funnelform, commonly violet, often pubescent or glandular, especially so on the 5 elongate lobes; anthers with appendages commonly eglandular, spurred at base, the spurs longer than collar; pollen tricolporate, usually echinolophate; styles branches ascending-elongate, filiform-subulate, base commonly with stylar node. Cypselae prismatic, commonly 8-10-ribbed, generally setose with antrorse trichomes, often also glandular, surface cells usually with elongate raphids; carpododium well-developed; pappus double, persistent, outer series of several distinct short scales, inner series of numerous long capillary bristles. Aprox 120 spp. Neotropics.

Lepidaploa is a segregate of Vernonia, most consistently differing by echino-lophate (vs. echinate tricolporate) pollen. Keeley (1982) treated Lepidaploa as a synonym of Vernonia and V. canescens as a synonym of a broadly distributed V. arborescens L., but here L. canescens is recognized as distinct as in Pruski (2010). The citation by Hemsley (1881: 73) of Vernonia punctata Sw. ex Wikstr.[a synonym of West Indian Lepidaploa glabra (Willd.) H. Rob.] in Belize is presumably in reference to material I would determine as Lepidaploa uniflora.


1. Capitula (9-)11-15 mm.
2. Leaf blades chartaceous; corolla lobes 1-1.6 mm. 6. L. salzmannii
2. Leaf blades stiffly chartaceous; corolla lobes (2.2-)3.5-4 mm. 8. L. tortuosa

1. Capitula ≤ 12 mm.

3. Capitulescences leafy, capitula often in axils of stem leaves.
   3. L. canescens
   4. Outer phyllaries with apices typically spinose-aristate.
   2. L. canescens
   4. Outer phyllaries with apices long-subulate.

5. Annual or short-lived perennial herbs; corollas 4-5 mm, lobes c. 1.1 mm.
   5. L. remotiflora
   5. Perennial herb to subshrubs 1-1.5 m; corollas 6-7 mm, lobes c. 2.5 mm.
   9. L. uniflora

3. Capitulescences non-leafy, held above stem leaves.

6. Leaves with 2° veins not prominent abaxially. 3. L. chiriquiensis
6. Leaves with 2° veins prominent to prominulous abaxially.
   7. Capitula 17-25-flowered; inner pappus bristles 4-5 mm. 4. L. polypleura
   7. Capitula 8-15-flowered; inner pappus bristles c. 6 mm.
   8. Capitula 8-9-flowered. 1. L. boquerona
   8. Capitula c. 15-flowered. 7. L. tenella


Shrubs to 2.5 m; stems arching, distal internodes about 1/2 as long as leaves. Leaves petiolate; blade (5-)7-12 × 1.6-2.6 cm, lanceolate to oblanceolate, venation pinnate, 2° veins prominent abaxially, adaxial surface glabrous, abaxial surface subglabrous to puberulent or hirtellous, base acuminate, margins entire, apex acute to acuminate; petiole 0.3-1 cm. Capitulescence a terminal non-leafy diffuse scorpioid-panicle, capitula usually 1-2 cm apart, sessile, ultimate branches 6-10 cm, appressed-pubescent. Capitula 8-9 mm, 8-9-flowered; involucre 7-8 mm, campanulate; phyllaries graduated, 3-4-seriate, erect, apex never long-subulate; inner series strigose-sericeous. Florets: corolla c. 7 mm, purplish, lobes c. 3 mm. Cypselae c. 3 mm, substrigose; pappus biseriate, fulvous (or stramineous); outer squamellae c. 1 mm; inner bristles c. 6 mm. Flowering Nov. Pine-oak forests on steep slopes. Ch (Breedlove y Sigg 66139, CAS). 2200-2300 m. (Endemic.)


Subshrubs to shrubs 1-5(-8) m; stems erect to scandent, laxly branched, sprawling, subterete, striate, villous or densely puberulent, glabrate proximally, leaves usually well-spaced. Leaves alternate or rarely opposite, short-petiolate; blade (3-)5-14(-20) × (1.5-)2.5-5(-7) cm, lanceolate to ovate-elliptic, rarely ovate or oblong, secondary veins typically 6-11 per side, prominent abaxially, diverging from midrib at about a 50° angle and thereafter strongly arching towards apex, surfaces occasionally slightly discolorous, adaxial surface sometimes rugulose or bullate, eglandular, scabrid with short erect trichomes to subtrigose or pilose with elongate trichomes, trichome base sometimes prominent, abaxial surface typically glandular, pilosulose to densely sericeous, rarely glabrate and eglandular, base cuneate to broadly obtuse or rounded, margins entire to remotely serrulate, sometimes revolute, apex acute to long-acuminate; petiole 0.3-1.7 cm, villous. Capitulescence terminal from distal most nodes, exserted, non-leafy, of few-many sparsely branched scorpioid-cymes typically 4-10 cm, cymes frequently arranged in large spreading panicles to 20 × 15 cm, ultimate branchlets with several typically sessile (rarely short-pedunculate) and ebracteolate (seldom inconspicuously linear bracteolate) capitula remote and occurring singly, branchlets less commonly shortened with capitula somewhat congested. Capitula 5-8 mm, 18-27-flowered; involucre usually 4-6 × 4-5 mm, campanulate; phyllaries 0.5-1 mm diam., 4-6-seriate, graduate, frequently tinged with violet; the outer series 1-2.5 mm, narrowly lanceolate, somewhat spreading, sericeous to laxly arachnoid-tomentose, these and mid-series phyllaries typically strongly 1-costate, apex typically spinose-aristate; inner series 4-6 mm, lanceolate, subapressed, sericeous or only apically so, apex occasionally slightly glandular, typically obtuse, frequently short-apiculate, less much commonly aristate. Florets not greatly exerted from involucre; corolla 3.8-5.3 mm, white to violet, tube 2.1-2.7 mm, lobes 1.5-2.2 mm, longer than the throat, usually setose and sometimes also lightly glandular; anthers 1.5-2.3 mm,
tails 0.2-0.4 mm, appendage rarely glandular; style branches 1.5-2.1 mm. Cypselae 1.2-2(-2.5) mm, turbinate, ribbed, sericeous or strigulose, usually with resiniferous idioblasts; pappus stramineous to white, the outer series of fimbriate scales 0.6-1 mm, the inner series of bristles, usually 3.5-5 mm. $2n = 32, 34$. 2 vars.

D'Arcy (1975) and Nash (1976) used the name *Lepidaploa canescens* for Mesoamerican material, but Millspaugh y Chase (1904) and Rzedowski y Calderón de Rzedowski (1995) cited *V. arborescens* in the Yucatan. Keeley (1982) treated *L. canescens* as a synonym of a broadly defined *L. arborescens* (L.) H. Rob. Robinson (1999) recognized *L. arborescens* as a West Indian endemic, and referred South American and Central American material to *L. canescens*. Robinson (1990) noted that *L. canescens* usually differs from West Indian material by having larger leaves, smaller involucres, more densely pubescent phyllaries, and by generally lacking capitulescence bracts. Pruski (2010) applied the name *L. canescens* to South American material, which he characterized as typically having setose corolla lobes. Pruski (2010) noted that that Antillean *L. arborescens* often has densely glandular corolla lobes, thus differing from continental material. The non-typical variety, *L. canescens* var. *opposita* (H. Rob.) H. Rob., appears to be endemic to Colombia.

*Vernonia patens* which lacks spinose-aristate outer phyllaries is often misdetermined as *L. canescens*, and many records of *L. canescens* from the Yucatan may be based on misdeterminations. For example, Cowan (1982) cited Cowan 1986 from Tabasco as *L. canescens*, but Cowan 1986 is redetermined here as *Vernonia patens*. *Lepidaploa canescens* is similar to South American *Lepidaploa lehmannii* (Hieron.) H. Rob., which should be expected in Mesoamerica.


Leaves alternate. Flowering year round. Cloud forests, cultivated areas, deciduous forests, disturbed areas, dry open slopes, grassy hillsides, orillo de camino, pine-oak forests, pine forests, secondary vegetation, selva baja caducifolia, thickets, weedy areas. ?T (Villaseñor, 1989: 108); Ch (Purpus 7189, MO); Y (Gaumer 1325, NY); QR (Soto et al. 22593, MO); ?B (Villaseñor, 1989: 108); G (Standley 87473, F); H (Keeley 4026, MO); ES (Standley 20301, NY); N (Greenman y Greenman 5800, MO); CR (King 6773, MO); P (Fendler 160, MO). 0-2500 m. (Mexico, Mesoamerica, Colombia, Venezuela, Ecuador, Peru, Bolivia, Brazil, Trinidad and Tobago.)

Shrubs c. 1 m; stems sometimes vining, glabrous to strigose or hispid. Leaves petiolate; blade 6-16 × 1.5-3.5 cm, lanceolate to elliptic-lanceolate, chartaceous, venation pinnate, 2° veins 5-10 per side, not prominent abaxially, surfaces glabrous to sparsely substrigillose, base cuneate, margins entire, apex acuminate; petiole 0.6-1 cm. Capitulescence 5-15 cm diam., open corymbiform, non-leafy, held above stem leaves; peduncles 5-20 mm. Capitula 10-12 mm, 19-21-flowered; involucre 8.9-5 × 6-8 mm, campanulate; phyllaries 5-6-seriate, substrigillose to subsericeous, outer phyllaries 1-2 × c. 0.6 mm, triangular, apex acuminate; inner phyllaries 6-7 × 1-2 mm, oblanceolate, apex acute to obtuse. Florets: corolla 6-7 mm, white to pinkish, tube sparsely glandular, lobes 2.5-3 mm. Cypselae c. 2 mm, sericeous; pappus biseriate, outer squamellae c. 1 mm, inner bristles 6-8 mm. Flowering Dec-Mar. Forested slopes, low forest. P (McPherson 13561, MO). 1300-2100 m. (Endémica.)


Shrubs to trees 3-19 m; stems densely tomentulose to tomentose, distal internodes much shorter than leaves. Leaves petiolate; blade 10-22 × 2-5-7.5 cm, lanceolate or elliptic-lanceolate to oblanceolate or rarely obovate, chartaceous, venation pinnate, 2° veins 8-12(-17) per side, prominent abaxially, diverging from midrib at about 45° then near margins becoming arcuate, adaxial surface eglandular or sometimes glandular, also sparsely pilose-hirsute to only so on veins with areolae subglabrous, trichomes patent or subappressed, often deciduous above prominulous base, abaxial surface densely pilose-villous to tomentose, also glandular, base acuminate, margins entire or subentire, apex acute to acuminate; petiole 1-3 cm. Capitulescence terminal, non-leafy, held above stem leaves (infrequently a few proximal capitula bracteate), a series of scorpioid cymes or a diffuse scorpioid-panicle, capitula usually 1-1.5(-2) cm apart, sessile, ultimate branches 5-25 cm, densely tomentulose. Capitula 7-10 mm, 17-25-flowered; involucre 6-7 × 5-8 mm, campanulate; phyllaries graduated, 5-6-seriate, erect, villosulous to strigillose-sericeous; outer series 1-2 × c. 0.5 mm, triangular-lanceolate, apex acuminate but never long-subulate; inner series 6-7 × 0.8-1.3 mm, elliptic-lanceolate, apex acute to obtuse, sometimes slightly constricted below the apex. Florets: corolla 5-6 mm, pink to lavender, limb and especially lobes setulose,
lobes c. 2 mm. Cypselae 1.6-2.5 mm, substrigose, eglandular; pappus biseriate, stramineous to fulvous; outer squamellae 0.5-0.8 mm; inner bristles 4-5 mm. Flowering Dec-Mar. Cloud forest, deciduous forests, disturbed forest, forest edges, montane rain forests, pine-oak forests, selva baja perennifolia. Ch (Breedlove y Almeda 58096, MO); G (Nash, 1976: 28); H (Evans 1116, MO); ES (Martinez 528, MO). 1300-2400 m. (Mexico [Oaxaca], Mesoamerica.)


Cacalia remotiflora (Rich.) Kuntze, Vernonia acilepis Benth.

Annual or short-lived perennial herbs 0.2-1 m; stems simple to few-branched, striate, thinly strigillose-villosulose, eglandular, sparsely leafy with internodes about 1/2+ as long as leaves. Leaves short-petiolate; blade (2-)3-6(-8) × 1-3(-4) cm, ovate to oblanceolate (widest at or above the middle), thinly chartaceous, venation pinnate, 2° veins 4-5 per side, both surfaces eglandular, thinly and sparsely villose-pilose, trichomes 0.5-1 mm, base cuneate to acuminate, margins serrulate to serrate, apex acute to acuminate; petiole 0.1-0.5 cm. Capitulescence of (1-)3-5+ leafy subscorpioid cymes in distal 1/2-2/3 of stem, each cyme 4-8+-capitulate, capitula remote, 1(-2) per node, sessile, capitula usually 2-3 cm apart. Capitula 8-10 mm, 12-19-flowered; involucre 7-9.5 × 4-6(-7) mm, cylindric to turbinate-campanulate, about as long as florets; phyllaries 3-4-seriate, erect or outer ones somewhat spreading, villous-strigillose, eglandular; outer series of phyllaries 2-4 × 0.3-1 mm, linear-lanceolate, 1-costate in distal 1/2, apex long-subulate with apical mucro 1-2 mm; inner phyllaries 7-9.5 × 1.2-1.7 mm, elliptic-lanceolate, margins scarious, purplish distally, apex acuminate. Florets: corolla 4-5 mm, funnelform, pale pink to lavender, glabrous, tube and limb subequal, throat and lobes subequal, lobes c. 1.1 mm. Cypselae 1.3-2 mm, substrigose, trichomes to c. 0.4 mm, eglandular; pappus biseriate, white or sometimes brown; outer squamellae 0.6-1 mm; inner bristles 4-5 mm, reaching to middle of corolla lobes. Flowering Sep-Dec. Disturbed areas, open or rocky areas, pine forests, selva baja caducifolia.

?T (Cowan, 1983: 27); ?Ch (Breedlove 1986: 57; Nash, sub Vernonia acilepis); G (Nash, 1976: 21 sub Vernonia acilepis); ES (Sandoval ES-01704, MO); N (Neill 2925, MO); CR (Heithaus 482, MO). 100-700(-1500) m. (Mesoamerica, Colombia, Venezuela, Guyanas, Bolivia, Brazil, Paraguay, Chile, Argentina, Antilles.)

The citations by Breedlove (1986), Cowan (1983), and Nash (1976) of this species as Mexican (based on Cowan 2773 and Matuda 17442) are possibly incorrect, and Turner (2007) did not give this species as occurring in Mexico.


Perennial herbs or subshrubs 0.5-2 m; stems erect, simple or few-branched, striate, hirsute to pilose with appressed or ascending trichomes. Leaves subsessile or short-petiolate; blade 3-14 × 0.7-3.5 cm, lanceolate to elliptic-lanceolate or sometimes oblanceolate, chartaceous, venation pinnate, 2° veins usually 4-6 per side, prominent, strongly arching toward apex, adaxial surface puberulent to hispid or strigose, veins impressed and leaves appearing rugose, abaxial surface strigose to villous with trichomes to c. 1+ mm, also glandular, base cuneate or obtuse to sometimes rounded, margins usually entire or sometimes minutely serrulate, sometimes subrevolute, apex acute to acuminate; petiole 1-5 mm. Capitulescence of leafy few-branched weak-scorpioid cymes, ultimate branches usually 10-15 cm, 5-12-capitulate, capitula sessile, remotely spaced (internodes 1-3 cm) and always subtended by a leaf much larger than capitulum, capitulescence leaves similar to vegetative leaves but slightly smaller. Capitula 9-12 mm, 21-35(-40)-flowered; involucre 6-10 × 9-14 mm, campanulate to nearly hemispheric, phyllaries moderately graduate with outer usually at least about half as long as inner, 4-6-seriate, nerves indistinct or sometimes midrib prominent, pilose to inner series sometimes only sparsely pilose; outer and mid-series phyllaries 3-6 × 0.3-0.8 mm, linear-lanceolate, apex subulate-spinose, sometimes recurved; inner series of phyllaries 6-10 × 1-1.5 mm, lanceolate, sometimes purplish, apex acuminate; receptacle to 3 mm diam., often dome-shaped. Florets: corolla 5-8 mm, tubular-funnelform, reddish-purple, glabrous, or apex of lobes sometimes papillose-glandular, lobes 1-1.6 mm. Cypselae 1.5-2.8 mm, densely substrigose to hirsutulous, eglandular or sometimes at maturity glandular especially proximally (sometimes with resiniferous idioblasts prominent throughout); pappus biseriate, white, outer squamellae 1-1.5 mm, inner bristles 6-8 mm, usually slightly exserted from involucre. Flowering (Aug-)Dec-May(-Jun). Cloud forest, forest edges, open areas, open forest, pine forest, pine-oak forests, potrero, rocky hillsides, sabanas, secondary vegetation, selva baja caducifolia, streamsides, thickets, weedy roadsides. T
(Villaseñor, 1989: 108 13 sub *Vernonia argyropappa*); Ch (Matuda 1914, MO); C (Martínez et al., 2001: 25 sub *Vernonia argyropappa*); QR (Sousa y Cabrera, 1983: 80 sub *Vernonia argyropappa*); B (Gentle 8144, NY); G (Veliz 95.4360, MO); H (Nelson et al. 7905, MO); ?ES (Berendsohn y Araniva de González, 1989: 290-7: 13 sub *Vernonia argyropappa*); N (Atwood 4018, MO); CR (Skutch 4176, MO); P (Correa et al. 4786, MO). 0-1500(-1800) m. (Mexico, Mesoamerica, Colombia, Venezuela, Guyana, Ecuador, Peru, Bolivia, Brazil, ?Paraguay, ?Argentina.)

By relatively large capitula *Lepidaploa salzmannii* is somewhat similar to *L. tortuosa*, but *L. salzmannii* differs by subsessile chartaceous leaves, by corolla lobes only 1-1.6 mm, by outer and mid-series phyllaries often more pubescent than inner phyllaries, and by subequal outer and mid-series phyllaries with midrib indistinct or merely prominulous. The corolla tube of *L. salzmannii* often noticeably elongates during flower.

The citation by Berendsohn y Araniva de González (1989) of *L. salzmannii* in El Salvador is possibly based on misidentified material of either *L. canescens* or *L. tortuosa*, both of which are common in the El Salvador.


Shrubs 2.5-3 m; stems arching to subscandent, striate, puberulent to strigillose or glabrate, distal internodes about 1/2 as long as leaves. Leaves petiolate; blade 5-12 × 1.5-3 cm, lanceolate to oblanceolate, chartaceous, venation pinnate, 2° veins usually 5-7 per side, prominulous abaxially, diverging from midrib at about 45°, surfaces eglandular, adaxial surface glabrous or costa puberulent, abaxial surface puberulent especially on the veins, base acuminate to attenuate, margins entire, apex acute to acuminate; petiole 0.3-1.5 cm. Capitulescence a terminal non-leafy diffuse scorpoid-panicle, capitula usually 1-2 cm apart, sessile, ultimate branches 5-10 cm, appressed-pubescent to tomentulose. Capitula 8-10 mm, c. 15-flowered; involucre 6-8 mm, campanulate; phyllaries graduated, 4-5-seriate, erect, villosulous to strigose-sericeous; outer series 1-2 × c. 0.5 mm, triangular-lanceolate, apex acute to acuminate but never long-subulate; inner series 6-8 × 0.9-1.3 mm, lanceolate or oblanceolate, apex acute to obtuse. Florets: corolla 6-7 mm, purplish, lobes 2-3 mm. Cypselae c. 2(-3) mm, substrigose; pappus biseriate, stramineous to fulvous; outer squamellae c. 1 mm; inner bristles c. 6 mm. Flowering Dec-Jan. *Montane forest.*

G (Williams et al. 26876, F). 1800-2400 m. (Endemic.)


Shrubs 1-5 m; stems usually scandent or climbing, striate, villosulous or pilosulous to more typically densely tomentulose (rarely glabrous). Leaves petiolate or short-petiolate; blade (5-)8-17 × 2-6(-8) cm, elliptic-lanceolate to ovate, stiffly chartaceous, venation pinnate, 2° veins usually prominent, usually 6-10 per side, spreading to slightly ascending, adaxial surface glabrous to strigillose or hirsute especially along midrib, veins sometimes impressed, abaxial surface weakly sericeous or strigillose to tomentose (rarely glabrous), sometimes also slightly glandular, base cuneate to rounded (rarely subcordate), margins usually entire, sometimes subrevolute, apex acuminate to broadly obtuse; petiole 3-16 mm, often tomentulose. Capitulescence of bracteate leafy scorpionid cymes to weakly leafy freely branched scorpionid panicles with ultimate paniculate branchlets usually 7-15 cm, capitula remotely spaced (internodes 1-4 cm), sessile or subsessile, bracteate leaves similar to vegetative leaves but much smaller; peduncles 0-2(-3) mm. Capitula (9-)11-15 mm, (18-)25-40(-50)-flowered; involucre (7-)9-12 × (5-)7-11 mm, campanulate; phyllaries strongly graduate, 5-8(-10)-seriate, substrigillose or subsericeous especially medially in mid-series to subglabrous or infrequently glabrous; outer phyllaries spreading; outer and mid-series phyllaries 1-6 × 0.5-1.5 mm, triangular to lanceolate, midrib thick and raised in distal 1/2-1/3, apex stoutly cuspidate; inner 1-2 series of phyllaries (6-)8-12 × 2-3 mm, oblanceolate to oblong, nerves indistinct, margins often distally villous-ciliate, apex often slightly constricted then distally slightly dilated, often scarious, obtuse to rounded; receptacle to 6 mm diam., usually flat. Florets: corolla (6-)8-11 mm, funnelform, white to violet, usually glabrous throughout or lobes sometimes setulose or glandular, usually quickly deciduous, lobes (2.2-)3.5-4 mm, often fully exserted from involucre; anther thecae longer than filaments, nearly as long as corolla lobes. Cypselae (1.5-)2-2.5 mm, densely substrigose to hirsutulous, eglandular; pappus biseriate, white to stramineous, outer squamellae 1-2 mm, inner bristles (5-)6-8 mm, reaching to about top of involucre and to about base of corolla lobes. Flowering (Nov-)Dec-Apr(-Aug). *Charral, forest edges, open areas, open forest, pine forest, pine-oak forest, rocky hillsides, sabanas, secondary vegetation, streamsides, thickets, weedy roadsides. T (Cowan 2772, MO); Ch (Pruski et al. 4239, MO); B (Arvigo y Shropshire 202, NY); G (Türckheim II 1627, MO); H (Nelson y Clewell 404,
Gleason (1922) recognized each *Vernonia schiedeana*, *V. seemanniana*, and *V. vernicosa* as distinct, but Blake (1926) recognized *V. tortuosa* and placed *V. schiedeana* in synonym of it. Robinson (1999) expanded Blake's synonymy by also treating *V. seemanniana* and *V. vernicosa* in synonymy. Costa Rican *V. vernicosa* is nearly glabrous and large-capitate, but has strongly graduate phyllaries and the outer and mid-series phyllaries thickly costate distally as diagnostic of *Lepidaploa tortuosa*.

The citation by Hemsley (1881: 74) of *Vernonia schiedeana* in "Yucatan and Tabasco" vouched by *Johnson 15* (K) is in reference to a collection I presume to be from Tabasco. I know of no Johnson collections from Edo. Yucatan, where this species remains undocumented.


*Cacalia uniflora* (Mill.) Kuntze, non Schumach. y Thonn., *Vernonia ctenophora* Gleason.

Perennial herb to subshrubs 1-1.5 m; stems few-branched, striate, villosulous, also glandular. Leaves short-petiolate; blade 2.5-5.5 × 0.8-2.3 cm, lanceolate to elliptic-lanceolate (widest below the middle), chartaceous, venation pinnate, 2° veins 4-6 per side, both surfaces glandular, adaxial surface also thinly and sparsely villosulous-strigillose, abaxial surface villosulous-strigillose to villos-strigose with antrorse, sometimes griseous, trichomes to c. 0.5 mm, base rounded or obtuse, margins entire, apex acuminate; petiole 1-4 mm. Capitulescence of leafy subscorpioid cymes, capitula remote, single and sessile at the distal nodes. Capitula 7-10 mm, 18-23-flowered; involucre 6-7(-8) × 4-6(-7) mm, turbinate to campanulate, reaching to about base of corolla lobes; phyllaries 0.2-1.5 mm diam., subtrigillose to subsericeous and glandular distally, c. 4-seriate; outer 1-3 series of phyllaries linear-lanceolate, 1-costate distally, apex long-subulate with apical mucro 1-2 mm; inner 1-2 series of phyllaries elliptic-lanceolate, purplish distally, apex acuminate. Florets: corolla 6-7 mm, narrowly funnelform, reddish to pinkish, tube slightly longer than limb, throat short, lobes c. 2.5 mm, sparsely to moderately setose distally to sometimes proximally to near throat, glandular distally. Cypselae 1.3-1.5 mm, strigillose, also sparsely glandular; pappus biseriate, outer squamellae 0.6-1 mm, inner bristles 4-5 mm, reaching to proximal 1/3 of corolla lobes. Selva baja, tintal. Flowering Nov-May. T (*Matuda 3112*, MO); C (*Goldman 508*, US); QR (*Carnevali et al. 5437*, MO); B (*Davidse y Brant 32784*, MO); G (*Contreras 8545*, MO). 30-200 m. (Endemic.)
*Lepidaploa uniflora* is a Yucatan peninsula endemic, occurring in Guatemala only in Petén, and presumably typified by material from Campeche.

**9. Lepidonia** S.F. Blake

Por J.F. Pruski

Shrubs to trees; stems typically leafy only distally. Leaves alternate, petiolate, large; blade pinnately veined. Capitulescence terminal or subterminal, open cymose from distal few nodes, the individual capitula never regularly and closely subtended by bracteate leaves, the peduncles shorter than the leaves. Capitula discoid, large; involucre hemispheric; broad; phyllaries imbricate, graduated, several-seriate, outer ones loosely imbricate, spreading, inner ones imbricate, appressed, base usually stramineous and indurate, apex often obtuse to rounded or sometimes acuminate, outer and/or mid-series phyllaries usually with a well-developed, herbaceous or subherbaceous, squarrose or subsquarrose, appendage (absent in *L. corae*), rarely herbaceous to base (*L. callilepis*); receptacle broad, epaleate or less commonly paleate, convex. Florets bisexual; corolla actinomorphic, funnelform, 5-lobed, violet to purple, tube and throat much longer than lobes; anther stramineous, spurred, auricles obtuse to rounded, apical appendage ovate; obtuse to rounded, pollen tricolporate, echinate, tectum continuous (type A, Keeley y Jones, 1979); style without basal node, trunk long-papillose distally, branches linear-subulate, long-papillose, papillae pointed apically. Cypselae isomorphic, obconical-turbinate, 4-5-angled, glabrous, idioblasts sometimes obvious, truncate or nearly so apically, apex with narrow callous-annulus; pappus (1-)few-seriate, of numerous very fragile- caducous bristles, bristles typically stramineous, barbellate, gradually unequal and never clearly double, the longest reaching only to about the base of the corolla lobes. \(x = 19\). 7 spp., Mexico, Mesoamerica.

*Lepidonia* is similar to *Leiboldia* Schltdl. ex Gleason, in which Gleason (1922) placed *L. salvinae*, but *Leiboldia* differs by its tightly appressed pointed phyllaries. Also similar by large capitula with subsquarrose phyllaries is *Pacourina*, which differs by its sessile axillary capitula. *Centauropsis* Bojer ex DC. from Madagascar, especially the large-capitulate *C. rhaponticoides* (Baker) Drake, closely resembles *Lepidonia* by woody habit, lactone chemistry (fide Turner, 1981), pollen type, squarrose phyllaries, short fragile pappus bristles, and paleate receptacles.

*Lepidonia* may generally be recognized as differing from American genera by its woody habit in montane zones, by large capitula with at least some phyllaries obviously squarrose (the related *Leiboldia* Schltdl. ex Gleason is exappendiculate), and by extremely fragile pappus bristles. The type of *Lepidonia* has a paleate receptacle, but as circumscribed by Robinson (1999), all species
except the type have an epaleate receptacle. The epaleate species were revised by Jones (1979) as *Vernonia section Leiboldia* Benth. & Hook. f., but were treated by Turner (1981) as *Vernonia* sect. *Lepidonia* (S.F. Blake) B.L. Turner.

*Lepidonia lankesteri* and *L. salvinae* are occasional, but *L. corae* and *L. paleata* are rare and known only from very few collections. The Mesoamerican species are superficially similar by their relatively few large capitula to *Vernonia alamanii* DC., which by its double pappus of persistent bristles was retained in *Vernonia* by Robinson (1999).


1 Leaf surfaces bicolorous; receptacles paleate; involucres ≤ 8 mm.  3. *L. paleata*
1 Leaf surfaces concolorous; receptacles epaleate; involucres ≥ 13 mm.
2. Corolla lobe apices dense setulose when young; phyllaries not obviously squarrose.

1. *L. corae*
2 Corolla lobe apices not setulose, phyllaries squarrose.

3. Phyllaries green distally; abaxial leaf surface usually subglabrate.

2. *L. lankesteri*
3. Phyllaries purplish-green distally; abaxial leaf surfaces moderately strigillose to strigose.

4. *L. salvinae*


Shrubs to small trees 1.5-4 m; stems distally tomentulose, becoming subglabrate proximally, distal internodes c. 1 cm, much shorter than leaves. Leaves: blade (10-)20-30 × (2.5-)6-9.5 cm, oblanceolate to oblong or obovate, widest at or above the middle, thin-chartaceous, 2° veins usually 6-8 per side, surfaces concolorous, adaxial surface sparsely appressed-pilose to glabrate or veins tomentellous, abaxial surface hispid-pilosulose or veins tomentellous, also glandular, base attenuate, margins serrulate, apex acute to acuminate; petiole 1.5-3.5 cm. Capitulescence a 3-4-capitulate cyme; peduncles 3-8 cm, ebracteate. Capitula 20-25 mm, 100-150-flowered; involucre 15-20 × 25-35 mm; phyllaries 6-7-seriate, chartaceous-scarious throughout and not obviously squarrose, olive-green distally, scabridulous-strigillose distally; outer series 7-10 × 5-9 mm, ovate, squarrose, apex obtuse to rounded; inner phyllaries 16-18 × 1.9-4.8 mm, oblanceolate to spatulate, apex acute to acuminate, mucronate, fimbriate; receptacle epaleate. Florets: corolla
16-19 mm, moderately-exserted from involucre, glandular, lobes c. 4.5 mm, apex dense setulose when young. Cypselae 2.7-3 mm, 4-angled, dark brown; pappus bristles 2-3 mm, subequal, brownish. Flowering Feb-Mar. Moist shaded slopes and stream banks, wooded volcano slopes. G (Standley 68574, F). 1200-2700 m. (Endemic.)


Shrubs to trees (1-)2-10 m; stems usually villosulous distally to sometimes tomentose, glabrate proximally, distal internodes usually 1-3 cm, much shorter than leaves. Leaves: blade 9-25 × 3-9 cm, obovate, widest at or above the middle, chartaceous, 2° veins usually 9-12 per side, surfaces concolorous, adaxial surface sparsely puberulent, sparsely glandular, abaxial surface densely glandular, otherwise usually subglabrate or sometimes especially on larger veins sparsely puberulent-strigillose, base long-acuminate to attenuate, margins serrulate to serrate, apex acuminate; petiole 2-9 cm. Capitulescence a 3-13-capitulate cyme; peduncles 3-6(-8.5) cm, ebracteate. Capitula (20-)25-30 mm, 75-100+-flowered; involucre 15-18 × 16-25 mm; phyllaries c. 7-seriate, outer c. 5 series slightly spreading, green distally, sparsely strigillose-villosulous distally, squarrose with reflexed herbaceous tips usually 3-4 mm; outer few phyllaries 3-4 × 1-1.5 mm, triangular-lanceolate, apex acute; mid-series and inner phyllaries 11-18 × 1.8-5 mm, oblong to obovate, apex obtuse to rounded, mid-series phyllaries broader than inner phyllaries; receptacle epaleate. Florets: corolla 15-22 mm, moderately-exserted from involucre, sparsely papillose-glandular, lobes 4-6 mm, apex not setulose. Cypselae 2-3.5 mm, 5-angled, dark brown, sometimes with resinous idioblasts; pappus bristles 1.5-4(-5) mm, unequal but only gradually so, the longest much shorter than corolla. Flowering Jan, Apr-Jul, Oct. Cloud forests, open forest, premontane rain forest, quebradas. CR (Proctor 32381, MO). 1000-1800(-2600) m. (Endemic.)

As noted by Turner (1981), Lepidonia lankesteri is very similar to L. salvinae, which differs by its few-capitulate capitulescences and densely tomentose stems.


Vernonia paleata (S.F. Blake) B.L. Turner, Vernonia salvinae var. canescens J.M. Coult.

Shrubs c. 2 m; stems densely lanate-pilose, distal internodes 1-2 cm, much shorter than leaves. Leaves: blade 16-21.5 × 6-8 cm, obovate, widest above the middle, thin-chartaceous, 2° veins 8-
10 per side, surfaces discolorous, adaxial surface thinly pilosulose, abaxial surface densely and closely white-tomentose but veins merely pilose and brownish, base attenuate, margins serrulate, apex acute to acuminate; petiole 1-2 cm. Capitulescence a c. 4-capitulate cyme; peduncles 4-6 cm, ebracteate. Capitula 10-15 mm, c. 50-flowered; involucre 7-8 × 13-18 mm; phyllaries 5-8-seriate, green distally, apex obtuse; outer series 2-3 mm, ovate, squarrose, densely pilosulose distally; inner phyllaries 7-8 × 1.3-1.8 mm, ob lanceolate, margins ciliate, glandular distally; receptacle paleate; paleae 5-7.5 mm, linear-lanceolate, rigid, stramineous, sparsely strigillose, persistent. Florets: corolla 10.5-12 mm, moderately-exserted from involucre, glandular, lobes 3.5-3.8 mm. Cypselae (immature) c. 1.8 mm, 4-angled, brown-green; pappus bristles 1.5-3 mm, subequal. Flowering Mar. Wet forests. G (Tuerckheim 583, F). 1400-1500 m. (Endemic.)


Shrubs to small trees 1.5-6 m; stems densely tomentose distally, sometimes glabrate proximally, distal internodes 1-5 cm, much shorter than leaves. Leaves: blade (7-)11-20(-25) × (1.5)2.5-6(-9) cm, ob lanceolate to oblong, widest at or above the middle, thin-chartaceous, 2° veins 4-9 per side, surfaces concolorous, glandular, adaxial surface sparsely strigillose to glabrate, abaxial surface moderately strigillose to strigose with appressed trichomes, base attenuate to long-attenuate, margins subentire to serrulate, apex acuminate; petiole (0.5-)1-2(-4) cm. Capitulescence a 1-4-capitulate cyme; peduncles (1-)2-8 cm, ebracteate. Capitula 16-30 mm, 50-75+-flowered; involucre 13-18 × 15-30 mm; phyllaries 4-5-seriate, purplish-green distally, pilosulose-vilosulous distally, subsquarrose with reflexed subherbaceous tips usually 4-6 mm; outer series 6-9 × 2-3 mm, lanceolate, apex acute to acuminate; mid-series and inner phyllaries 13-18 × 2-7 mm, spatulate to oblong, apex obtuse to rounded, mid-series phyllaries broader than inner phyllaries; receptacle epaleate. Florets: corolla 19-28 mm, well-exserted from involucre, often papillose-glandular, lobes 3.5-5 mm, apex not setulose. Cypselae 3-5 mm, 4-angled, dark brown; pappus bristles usually 5-8 mm, unequal but only gradually so, the longest only about half as long as tube. Flowering Nov-Apr. Cloud forests, mixed forests, pine-oak forests, thickets, volcano slopes. Ch (Matuda 2761, MO); G (Castillo 723, MO). 1200-2700 m. (Endemic.)

Gleason (1922) gave the pappus bristles of *Lepidonia salvinae* as "0.8-1.1" mm. The Costa Rican collections cited by Gleason (1922) and Jones (1979) as *L. salvinae* (sub *Vernonia*
salvinae) are determined here as *Lepidonia lankesteri*. The Jones (1979) citation of *L. salvinae* in Costa Rica was based on *Stork 2241* (WIS), which he also cited as *L. lankesteri*.

10. **Lessingianthus** H. Rob.

Por J.F. Pruski.

Scapose perennial herbs to shrubs to 2 m tall, sometimes xylopodial; stems (when present) simple to moderately branched, sometimes angled, puberulent to densely tomentose, rarely glabrous. Leaves basal or much more commonly cauline, alternate, sessile or short-petiolate; blade linear to ovate, commonly subcoriaceous, 1-veined or pinnately veined, surfaces glabrous or more commonly puberulent to densely sericeous or densely tomentose, the abaxial surface often also glandular and typically more densely pubescent than the adaxial surface, margins usually entire. Capitulescence terminal or axillary, monocephalous to cymose, rarely subumbelliform, branches usually somewhat arcuate, the capitula sessile to long-pedunculate, often subtended by gradually reduced leaves. Capitula discoid, 15-200-flowered; involucre campanulate to hemispherical; phyllaries imbricate, graduate to subequal, few-several-seriate, persistent, linear-lanceolate to broadly triangular, glabrous to tomentose, the inner series and outer series usually the same shape; receptacle commonly flat, epaleate. Florets: corolla actinomorphic, funnelform, deeply 5-lobed, usually violet, glabrous or lobes sometimes glandular or puberulent, the tube elongate, the lobes ascending to spreading; anthers commonly exserted, spurred at base, the apical appendages eglandular; pollen (type B, Keeley y Jones, 1979) tricolporate, echinolophate, tectum discontinuous; style trunk upwardly hispidulous, the base without a node. Cypselae obconical to cylindrical, 5-10-striate, glabrous to more commonly densely sericeous, always eglandular, infrequently with resinous idioblasts, raphids in the cypsela walls quadrate to subquadrate; pappus 2-seriate to somewhat indistinctly so, the outer series of squamellae to lanceolate scales shorter than the cypselae, the inner series of many capillary bristles much longer than the cypselae. $x = 17$. Aprox 110 spp. Mostly tropical and subtropical South America, concentrated in the Planalto of Brazil, 1 sp. also extending into Mesoamerica.


Xylopodial subshrubs 0.8-2 m; stems stiffly erect, simple proximally to few-branched in the capitulescence, striate, reddish, tomentose-villose to glabrate, puberulent to substrigillose or glabrate, distal internodes much shorter than the leaves. Leaves sessile; blade 4-14 × 0.2-0.6(-1) cm, linear to linear-lanceolate, stiffly chartaceous, appearing 1-veined, midrib protruding abaxially, prominent, surfaces discolorous, eglandular but sometimes trichome bases glassy, adaxial surface glabrous to scabridulous-hirtellous, abaxial surface densely velutinous-tomentulose with trichomes to c. 0.2 mm or midrib glabrate, base attenuate, margins subrevolute, apex acute to acuminate. Capitulescence terminal, of 1-few leafy scorpoid cymes, capitula several-many, usually 1-3 cm apart, sessile, lateral branches 5-15+ cm, strongly ascending. Capitula 10-15 mm, 20-30(-40)-flowered; involucre 6-7.5 × 6-10 mm, campanulate; phyllaries graduated, 4-6-seriate, erect or the outer ones spreading, sparsely arachnoid-tomentose distally, apex usually acute and short-apiculate; outer series 1-2 × 0.8-1 mm, triangular to ovate; inner series 5-7.5 × 1-1.5 mm, oblanceolate, usually purplish distally. Florets: corolla 9-10 mm, well-exserted form involucre, purplish, glabrous, lobes 3-4 mm; style branches 2-3 mm. Cypselae 2.5-3.5 mm, turbinate, c. 10-striate, sparsely setulose distally, sometimes with resinous idioblast; pappus biseriate, white; outer squamellae c. 1 mm; inner bristles 5-7 mm, reaching only to base of the corolla lobes. 2n = 32. Flowering Jun. Pine savannas. N (Neill 4403, MO). Aprox. 10 m. (Mesoamerica, Colombia, ?Venezuela, Peru, Bolivia, Brazil, Uruguay, Paraguay, Argentina.)

The synonymy is adopted from that in Dematteis (2004), who excluded many formerly synonymized names. The genus is known in Mesoamerica from a single collection.

11. Orthopappus Gleason

Por J.F. Pruski

Perennial caespitose herbs; stems single or few from caudex, unbranched or sometimes few-branched in capitulescence, pubescent; herbage with simple stiff trichomes. Leaves mostly basal and much smaller when proximal-cauline, alternate, subsessile, spatulate to oblanceolate or distal ones linear-lanceolate, chartaceous, pinnately veined, base long-attenuate, clasping, subentire to crenate, acute to rounded at apex, both surfaces pubescent, abaxial surface glandular and more strongly pubescent. Capitulescence 1-few per caudex, terminal, not leafy, of several glomerules,
simple and spicate to racemose-spicate and weakly branched with proximal glomerules peduncled, each glomerule bracteolate, of 6-20+ sessile capitula. Capitula discoid-subligulate, 4-flowered; involucre cylindrical but somewhat compressed, phyllaries 8, 2-3-seriate, in 4 decussate pairs, appressed or spreading with age, the first and third pairs conduplicate and subcarinate, second and fourth pairs flat, the outer two pairs shorter than the inner, pubescent, lanceolate, attenuate; receptacle epaleate. Florets bisexual; corolla zygomorphic, subligulate, campanulate, cream-colored to lavender, lobes mostly radiating outward, deeply and unequally 5-lobed, more deeply cut between the two lateral lobes; anthers very short-spurred basally; pollen triporate, short-echinolophate; style trunk long-papillose distally, branches thin, long-papillose. Cypselae brown, obconical, c. 10-ribbed, pubescent; pappus of 20-40 erect, elongate, subequal stramineous bristles, 1(-2)-seriate, base not abruptly broadened. x = 11. 1 species, Neotropical.

*Orthopappus* was segregated from related *Elephantopus* by Gleason (1906) and returned to *Elephantopus* by Busey (1975) and Clonts and McDaniel (1978), but is generally recognized as distinct (e.g., Gleason, 1922; Pruski, 1997; Robinson, 1999). I agree with the lectotypification by Gleason (1906) of *Elephantosis* based upon the first of two species (Brazilian *E. biflorus* Less.) placed by Lessing in *Elephantosis*. The name *Elephantosis* is a synonym of *Elephantopus*, and the name *Orthopappus* coined by Gleason (1906) is thus available for use here for Lessing's second species, *Elephantosis quadriflora*, as synonym of *O. angustifolius*. I also agree with Gleason (1906) that the attempted typification of *Elephantosis* by Baker (1902) upon "*angustifolia Sw.*" is incorrect, being so because *Elephantopus angustifolius* Sw. is not an original element of *Elephantosis*.


Frequent erect fibrous-rooted herbs 0.3-1(-1.5) m tall from creeping rootstock; stems strigose to hirsute, trichomes mostly appressed and antrorse. Basal and proximal leaves several, (6-)10-25 × (0.7-)1.5-4.2(-6) cm, crowded, surfaces pilose or more frequently strigose, midrib more so; distal cauline leaves few, linear-lanceolate, ultimately 2-4 × c. 0.2 mm. Capitulescence with floriferous axis (5-)15-30 cm, axis villous-strigose, glomerules well-spaced proximally to sometimes crowded distally, glomerules 1.5-2.5 cm diam., bracteoles lanceolate, to c. 8 mm, typically densely strigose, non-flowering supporting axis generally much longer than fertile portion. Capitula with involucre 9-11 × c. 2(-3) mm wide; the two outer pairs of phyllaries 3-5 mm, the two inner pairs of phyllaries 7-11 × 1-2 mm, proximally stramineous, green and long-strigose distally, midrib green distally. Florets slightly exserted from involucre at maturity; corolla (4-)6-8 mm, tube slender, (3-)4-5 mm, the lobes (1-)1.5-3 mm, glandular apically.

Cypselae c. 2 mm, setose-substrigose; pappus bristles (4-)7-8 mm. 2n = 22. Savannas, edge of thickets, grassy slopes, open pine flats, old pastures, potrero, roadsides. T (cited by Cowan, 1983); Ch (Breedlove 27534, MO); B (Schipp 756, NY); G (M. Aguilar 301, MO); H (Yuncker et al. 5949, MO); ES (as cited by Nash, 1976); N (Friedrichsthal 1197, W); CR (Hammel y Nepokroeff 18267, MO); P (Standley 26319, US). 0-1000(-1300) m. Mexico (Oaxaca, Veracruz), Mesoamerica, Colombia, Venezuela, Guyana, Surinam, French Guiana, Peru, Bolivia, Brazil, Uruguay, Paraguay, Argentina, Cuba, Jamaica, Hispaniola, Lesser Antilles, Trinidad and Tobago.)


Por J.F. Pruski.

Emergent aquatic herbs; stems erect, simple or few-branched, glabrous or subglabrous to sparsely pilose, fistulous; herbage (when pubescent) with small simple trichomes. Leaves cauline, simple to pinnatilobed, alternate, sessile or narrowly winged petioliform in proximal 2-4 cm; blade chartaceous, pinnately veined, spinose-dentate, surfaces glandular, otherwise glabrous or subglabrous. Capitulescence of axillary sessile solitary capitula in distal nodes. Capitula large, discoid, many-flowered; involucre hemispherical to globose; phyllaries 35-50, imbricate, graduate, c. 3-seriate, appressed proximally, margins scarious, somewhat loosely spreading and subherbaceous-subsquarrose distally, apex spinulose; receptacle flat, epalectate. Florets bisexual, c. 50; corolla actinomorphic, funnelform-campanulate, white to violet, 5-lobed, lobes sclerified distally; anthers spurred (calcarate), tan, apical appendage lanceolate or oblong, flat, sclerified;
pollen triporate, psilolophate, emicropunctate; style without obvious basal node, trunk sparsely papillosal distally, branches subulate, papillae elongate, apex pointed. Cypselae cylindrical-prismatic, c. 10-costate, brown, glandular; pappus unequal, pluriseriate, the outer series of many short caducous stramineous barbulate bristles much shorter than cypselae, the inner series a persistent squamulose lacerate corona seemingly sometimes with a few intermediate bristles. 1 sp. Neotropics.

The protologue described the receptacle as paleate, which is erroneous. Epaleate

Pacourinopsis was subsequently described, but proves synonymous.


Infrequent herbs, 1-2 m; stems sometimes subsucculent, striate, 1-3 cm diam. at base, internodes typically much shorter than leaves. Leaves 10-25 × 1-5(-9) cm, oblong-elliptic to spatulate, secondary veins c. 9 per side, at c. 70° to midrib, base acute to acuminate, subclasping, margins irregularly and sharply toothed to lobed, apex attenuate. Capitula 1.5-2 cm; involucre 2-3 cm diam.; phyllaries 7-20 × 6-8 mm, oblong to ovate, thinly pluristriate, finely glandular. Florets: corolla 10-11 mm, tube and throat subequal, gradually ampliate, lobes 4-5 mm, spreading to revolute, lobes with veins intramarginal, often elongate-glandular in 1-2 longitudinal rows between veins; anthers 5-6.5 mm, spurs c. 0.7 mm, appendage c. 1 mm; style branches 5.5-7 mm. Cypselae 8-12 mm; pappus bristles 2-3 mm, squamulose corona 0.2-0.3 mm. Flowering Apr-Jun, Aug-Jan. G (Steyermark 31876, F); ES (Villacorta y Echeverría RV-02376, MO); N (Nee y Robleto T. 28139, MO); CR (Herrera et al. 1894, MO); P (Montenegro 1370, MO). 20-100(-500) m. (Mesoamerica, Colombia, Venezuela, Guyanas, Ecuador, Peru, Bolivia, Brazil, Paraguay, Argentina, Cuba, Hispaniola.)


Carphobolus Schott ex Sch. Bip., Monantherum Griseb., non Scheele.

Por J.F. Pruski.
Climbing vines, scandent shrubs, or trees; herbage with stellate or lepidote trichomes. Leaves alternate, petiolate; blade lanceolate to ovate, stiffly chartaceous to coriaceous, pinnately veined, glabrate adaxially, the abaxial surface lepidote, stellate-tomentose, or glandular, base often oblique, margins entire to serrate. Capitulescence axillary or less commonly terminal, generally corymbiform, glomerate, or umbellate, less commonly thyrsoid-paniculate. Capitula 1-35-flowered, sessile or pedunculate; involucre campanulate, cylindrical, or turbinate; phyllaries imbricate, graduate, often pubescent and darkened at apex, inner phyllaries somewhat loosely imbricate and readily deciduous; receptacle ecaleate or rarely paleate. Florets: corolla actinomorphic, funnelform to weakly campanulate, deeply 5-lobed, cream-colored, commonly glandular, lobes recurved; anthers cream-colored to purplish, about as long as corolla throat, commonly exserted, especially when corolla lobes coil, with sterile basal tails (caudate), the tails sclerified, pointed or blunt at proximal end; pollen tricolporate, echinate (non-lophate); style with slightly enlarged basal node, trunk long-papillose distally, branches slender, long-papillose. Cypselae obconical, 10-ribbed, glabrous, glandular, or sparsely pilose at apex; pappus commonly 2-seriate, outer series of unequal bristles or scales, sometimes absent, inner series of many elongate bristles. $x = 17$. 46 species, neotropical, 45 species South American (not known in Chile and Uruguay), 44 of these endemic to South America and Trinidad, one widespread species occurs from Mexico into Brazil, one species endemic to West Indies.

Our Mesoamerican species was treated by Nash (1976), Clewell (1975), and D'Arcy (1975) in the Floras of Guatemala, Honduras, and Panama, respectively, as *Piptocarpha chontalensis* Baker, which was placed in synonymy of *P. poeppigiana* (DC.) Baker by Smith y Coile (2007).


Scandent shrubs to low vines, branches widely spreading, 3-9(-20) m long; stems striate, lepidote-tomentose. Leaves: blade (4-)6-15(-20) × (1.5-)3-9(-11) cm, elliptical to ovate, subcoriaceous, with about 7-10 lateral secondary veins per side, base oblique, margins entire to weakly denticulate, apex acute to shortly acuminate, adaxially glabrous, abaxially brownish-
yellow, stellate-tomentose and occasionally glandular; petiole (5-)8-15 mm. Capitulescence of axillary fascicles of c. 20-60 tightly clustered capitula in the distal 10+ nodes, each fascicle broad-based, with about 10 primary branchlets, each usually 5-10 mm and few-capitulate; peduncles stout, 1-5 mm, stellate-tomentose. Capitula c. 6-flowered; involucre narrowly campanulate, 4.5-5.5 × (2) 3-4 mm wide; phyllaries c. 4-seriate, the outer series deltoid, tomentellous, apex acute, the inner ones caducous, lance-elliptic, tomentellous to weakly so, margins ciliate to arachnoid, apex obtuse. Florets: corolla 5-6.5 mm, cream-colored, lobes 1.5-2.5 mm, setose or less commonly glabrous; anthers 3-3.5 mm, tails c. 0.5 mm, pointed; style branches c. 2 mm. Cypselae 2.5-3.2 mm, glandular, otherwise glabrous; pappus weakly biseriate, the outer bristles c. 1 mm, the inner bristles elongate, 4.5-6 mm. Forest on limestone ridges, low forests, high forests, disturbed forests, riparian forests, thickets, bosques húmedo tropical, bosques húmedo subtropical, bosques premontano húmedo subtropical, motorral, banks of streams, sotobosque. Ch (Breedlove 34507, MO); B (Schipp 138, MO); G (Contreras 6692, MO); H (Molina & Molina 25646, MO); N (Tate 163, K); CR (Pittier 4927, GH); P (McPherson 12269, MO). 15-800(-2000) m. (S. Mexico, Mesoamerica, Colombia, Venezuela, Guyana, Ecuador, Peru, Bolivia, Brazil.)


Por J.F. Pruski

Trees or shrubs, less commonly vines, much-branched; stems angled, commonly tomentose; herbage with stellate or lepidote trichomes. Leaves alternate, petiolate; blade narrowly lanceolate to ovate or cordiform, chartaceous or subcoriaceous, pinnately veined, broadly acute to acuminate apically; margins entire or serrulate, usually glandular on both surfaces, white- or rust-tomentose on abaxial surface, trichomes stellate. Capitulescence terminal, corymbiform-paniculate, ultimate capitula sometimes glomerate; peduncles short. Capitula discoid, 1-12-flowered; involucre narrowly campanulate or more commonly cylindrical; phyllaries imbricate, graduate, spiral or equitant, scarious or membranous, the inner sometimes deciduous; receptacle subconvex to flat, epaleate or rarely with 1 or 2 palea-like bristles. Florets bisexual; corolla actinomorphic, funnelform, deeply 5(6)-lobed, glandular, white to purple; anthers cream-colored, with fertile basal spurs (calcariate); pollen tricolporate, echinate (non-lophate); style without basal node, base glabrous, trunk long-papillose distally, the branches slender, long-papillose. Cypselae obconical, less commonly plump and pyriform, 3-5-angled when young, 8-10-ribbed at maturity, glandular,
otherwise glabrous to puberulent; pappus white to cream-colored, pappus and cypselae strongly
discolorous, 2-seriate or rarely one or both series absent, outer series of c. 10 distinct to falsely
crown-like, short squamellae, these deciduous or fragile and persistent, inner series of (0)1-15
flattened, slightly twisting elongate scales. Costa Rica, Panama, Colombia, Venezuela, Guyana,
Surinam, French Guiana, Ecuador, northern Peru, northern and western Brazil, Hispaniola, Puerto
Rico, Virgin Islands, Trinidad and Tobago; 18 species, 4 of these in the West Indies, ours and the
13 remaining species in South America.

Continental members of the genus were recognized as *Pollalesta* by Aristeguieta (1963), Elias
(1975), and Stutts (1981), with Aristeguieta and Stutts treating *Oliganthes* as endemic
Madagascar. Stutts and Muir (1981) recognized *Piptocoma* as containing only 3 species, these
restricted to the West Indies. Pruski (1996) reduced *Pollalesta* to synonymy of *Piptocoma*,
expanding the range of the genus to the continental neotropics and increasing to 18 the number of
species recognized in *Piptocoma*. Pruski (1997) and Robinson (1999) followed Pruski (1996) and
treated *Pollalesta* as a synonym of *Piptocoma*.


*Dialesta discolor* var. *polychaeta* Steetz, *Oliganthes corei* Cuatrec., *Oliganthes discolor*
argentea* Aristeg., *Pollalesta Brasiliana* Aristeg., *Pollalesta colombiana* Aristeg., *Pollalesta corei*
(Cuatrec.) Aristeg., *Pollalesta discolor* (Kunth) Aristeg., *Pollalesta ecuatoriana* Aristeg.,
*Pollalesta ferruginea* (Gleason) Aristeg., *Pollalesta karstenii* (Sch. Bip.) Aristeg., *Pollalesta
klugii* Aristeg., *Pollalesta peruviana* Aristeg.

Large shrubs to trees 5-30 m tall, unbuttressed, with a single trunk to 30+ cm dbh, branched in
crown; stems stellate tomentose, irregularly angled distally, finely striate. Leaves with petiole
(0.5-)1-3.5 cm; blade narrowly elliptic to obovate, (3-)5-20 × (1.5-)3-9 cm, chartaceous, basally
cuneate to obliquely attenuate, apically attenuate to less commonly acute, the margins entire to
less commonly remotely serrulate, abaxially glabrous to thinly puberulent, abaxially often gray-
colored, stellate-tomentose, glandular, glands usually obscured by stellate-tomentum. Capitulescence held slightly above distal most leaves on tomentose, ultimate capitula glomerate, individual glomerules c. 20+-capitulate, c. 1.5 cm tall, c. 2 cm wide; peduncles 2.5-4 mm. Capitula (1-)2(-3)-flowered; involucre cylindrical to narrowly turbinate, moderately compressed and with phyllaries equitant, 4.5-7(-8) × 1.5-3 mm, 5-8-ranked; phyllaries graduated, equitant, persistent, outer 2 or 3 squamiform, deltate, 0.5-1.5 mm, lanate to merely apically pubescent, grading to the inner ones, these elliptic-lanceolate, conduplicate, 5-7 mm, stramineous or greenish-brown apically, glabrous or rarely very loosely arachnoid pubescent distally. Florets sometimes fragrant; corolla (4-)5-6.5 mm, cream-colored to lavender, the limb exserted from involucre, slightly glandular, tube and throat (2-)3-3.5, lobes 2-3 mm; style branches c. 1.1 mm. Cypselae 1.8-2.4 mm; pappus double, dimorphic, outer series of squamellae, to c. 0.2 mm, inner series of 5-8 scales, linear-oblanceolate, 3-4.5 mm. "Parches de bosques, borde de bosques, bosque secondario, premontane wet forests, cloud forests, roadsides, cafetal, coastal thickets, savanna." CR (Pittier 12138, US); P (Allen 1036, MO). 100-1400 m. (Mesoamerica, Colombia, Ecuador, Peru, Brazil).

This is the most widespread species of *Piptocoma* being found from Mesoamerica to South America, and the southernmost species of the genus. This species is a fast growing tree of disturbed areas, potentially valuable as a fuel wood crop, in this respect similar to *Tessaria integrifolia*.

15. **Pseudelephantopus** J.B. Rohr, nom. et orth. cons.


Perennial herbs, stoloniferous or not; stems erect, simple to few-branched, pilose to subglabrous; herbage with simple stiff trichomes. Leaves mostly basal and proximal-cauline, alternate, sessile, commonly clasping, distal ones progressively much-reduced into bracts of the capitulescence, oblanceolate to obovate, chartaceous, pinnately veined, sinuate or subentire to weakly serrate, glabrescent to pilose, commonly glandular abaxially. Capitulescence terminal and lateral, of few- to several ascending bracteate, spicate branches, spike indeterminate, interrupted or continuous, the capitula clustered, clusters few-many per spike, each cluster cylindrical, 1-5-capitulate, generally subtended by 1 or 2 bracts or bracteoles, bracts often foliar, often oblanceolate. Capitula discoid-subligulate, 4-flowered; involucre cylindrical but somewhat compressed; phyllaries 8, 2-3-seriate, in 4 decussate pairs, appressed, the first and third pairs conduplicate and subcarinate, second and...
fourth pairs flat, the outer two pairs shorter than the inner, lanceolate, often glandular and sometimes setose distally, especially inner phyllaries; receptacle epealeate. Florets bisexual; corolla discoid but zygomorphic, all lobes radiating outward from involucere, white to purple, funnelform, deeply and unequally 5-lobed, more deeply cut between the two lateral-ventral lobes, tube longer than limb; very short-spurred basally; pollen triporate, short-echinolophate; style without basal node, cylindrical to base, trunk long-papillose distally, branches linear, long-papillose. Cypselae brown, obconical, c. 10-costate, costae prominent, pubescent, glandular between the ribs; pappus of 3-12 similar or dissimilar, equal or unequal stramineous bristles, the lateral or all plicate or spirally twisted at tip, gradually wider or abruptly dilated basally, pappus usually longer than the cypselae. $x = 13$. 2 spp. Native to the neotropics, but one species a pantropical weed.

*Pseudelephantopus* is generally recognized (e.g., Busey, 1975; Cronquist, 1971; Gleason, 1922; Pruski, 1997; Robinson, 1999; Rzedowski & Calderón, 1995) as distinct from *Elephantopus*. Both *Pseudelephantopus* and synonymous *Spirochaeta* were recognized by Baker (1902), whereas Clonts & McDaniel (1978) treated both genera in synonymy of the related *Elephantopus*. Important nomenclatural and typification observations were made by Nicolson (1981).

Cassini (1830) was the first to treat *Pseudelephantopus* as containing solely two species, albeit under the synonymous generic name *Distreptus*. Cassini described the pappus of *Pseudelephantopus spiralis* (sub the illeg. *Distreptus crispus* Cass., a synonym of *P. spicatus*) as "très tortillées et comme frisées supérieurement" and that of *P. spicatus* (sub *Distreptus spicatus*) as "pliées et repliées deux fois."

It should be noted that included in synonymy of *P. spicatus* are *Distreptus crispus* Cass., *Elephantopus crispus* Sch. Bip., and *P. crispus* Cabrera, each an illegitimate renaming of synonymous *Elephantopus nudiflorus* Willd., whereas the heterotypic *E. crispus* D. Dietr. based in part on the material determined by Cassini as "Distreptus crispus" Cass. with pappus bristles "très tortillées et comme frisées supérieurement" proves synonymous with *P. spiralis*.

1. Pappus bristles unequal, noticeable broader than phyllary trichomes, the lateral two plicate distally; rhizomatous herbs; spikes commonly bracteate and interrupted.

1. **P. spicatus**

1. Pappus bristles subequal, filiform and about as thin as phyllary trichomes, all curled or spiraled distally; stoloniferous herbs; spike commonly bracteolate and dense.

2. **P. spiralis**


Frequent perennial rhizomatous herbs to c. 1 m; stems simple or few-branched basally, striate, pilose to substrigose to subglabrous. Leaves obovate or oblanceolate, basal and proximal ones 4-17(-21) × (0.7-)2-4.2(-6) cm, adaxially strigose to glabrescent, abaxially glandular and generally also substrigose, base attenuate and sometimes dilated, margins subentire to serrulate, apex acute to obtuse. Capitulescence 10-30 cm, spike axis commonly interrupted to much less commonly continuous, of few(-15) axillary clusters each 1-3(-5)- capitulate, proximal clusters generally spreading-bracteate, distal clusters generally ascending-bracteolate; bracts and bracteole oblanceolate, sometimes longer than capitulum, margins often long-ciliate, dilated and clasping basally. Capitula with involucre 9-12 × 2-3 mm wide; phyllary proximal part and midrib
stramineous, margins green distally, apex mucronate, glabrous to distally glandular, apex rarely setose, the two exterior pairs of phyllaries 6-7 × 1.5-2 mm, the two inner pairs (8-)9-12 × 1.5-2.5 mm. Florets slightly exserted from involucre at maturity; corolla 7-10 mm, white or purplish, the tube slender, 4-6 mm, the lobes 2-3 mm, glabrous or sometimes glandular; anthers c. 1.5 mm; style branches to c. 2 mm. Cypselae 4-7 mm, strigose; pappus heteromorphic, of 8-12 unequal biseriate bristles noticeable broader than the phyllary trichomes, proximal 2-3 mm of each bristle gradually broadened, sometimes lacerate, lateral two bristles 5-7 mm and conspicuously once-plicate (plicate portion c. 1 mm) distally to very rarely twice-plicate and seemingly spiral, all other bristles erect, c. 4 longer bristles 4-6 mm, usually with 2-6 shorter bristles c. 3 mm. 2n = 22

I have examined one sheet (Kirkbride y Bristan 1570, MO) where the bristles are twice-plicate. This sheet was cited by Busey (1976) as *P. spiralis*, and indeed the bristles could be misinterpreted as spiraled. The spike is interrupted and the bristles not filamentous distally, however, features typical of *P. spicatus*.


Stoloniferous herbs, 0.1-0.8(-1.2) m high, erect, branched, the long stolons freely rooting; stems striate, pilose, occasionally fistulose. Leaves 2-7 (14) × 1.2-2 (4.5) cm, oblanceolate to oblong, both surfaces pilose, base cuneate to attenuate, margins sinuate to weakly serrate, apex acute to broadly obtuse. Capitulescence to c. 20 cm, commonly densely floriferous to less
commonly interrupted, of up to 25 of more axillary clusters, clusters subtended by bracteoles generally slightly longer than clusters or proximal clusters with expanded clasping leafy bracts, bracteoles commonly ascending, long-ciliate; clusters of 1-5 capitula. Capitula with involucre 5.5-7 × 1.5-2 mm wide; phyllaries apically green, otherwise cream-colored with hyaline or less frequently purplish margins, the green apex generally glandular, often sparsely setose, otherwise glabrous, at least some phyllaries apically setose, apex mucronate, weakly carinate, the two exterior pairs of phyllaries 2-3 × to c. 1 mm, the two inner pairs oblong-oblancoate, 5.5-7 × 1.5-2 mm wide. Florets slightly exserted from involucre at maturity; corolla 3.5-5.5 mm, white or purplish, glabrous, the tube c. 1.7-3.5 mm, the lobes 0.7-1.3 mm; anthers c. 1.1 mm; style branches to c. 1.2 mm. Cypselae 2.5-3.2 mm, short-hispidulous; pappus of 3-8 subequal bristles, filiform and about as thin as phyllary trichomes, uniseriate, 4-5.5 mm, some abruptly dilated basally, all curled or spiraled distally. Pastizales, disturbed areas, roadsides, charral junto a camino, potrero y orillo de rio. CR (González 833, MO); Panama (Lewis et al. 2775, MO). 5-1800 m. (Mesoamerica, Colombia, Venezuela, Ecuador, Peru, Bolivia, Brazil, Argentina, ?Jamaica, Puerto Rico, Lesser Antilles, Trinidad and Tobago.)

The holotype is labeled "Jamaica" as cited in Lessing protologue, yet this species was not reported for Jamaica by either Moore (1936) or Adams (1972). The fact that it does, however, occur in Puerto Rico, coupled with the species not being listed for Jamaica by either Moore (1936) or Adams (1972) raises the possibility that the protologue type locality of "Jamaica" is possibly incorrect.

Although Baker (1902) and Cabrera (1944) treated Distreptus crispus Cass. as legitimate, I agree with Clonts & McDaniel (1978) that this name is a superfluous renaming, and thus a nomenclatural synonym, of Elephantopus nudiflorus Willd. Were Distreptus crispus of 1830 to be taken as a new species, it would predate Distreptus spiralis Less. by one year, necessitating a name change. Thankfully this is not the case, and we can continue safely to treat the name Distreptus crispus Cass. as illegitimate and based on Willdenow's type, albeit with a description matching the heterotypic P. spiralis.


Por J.F. Pruski.

Perennial herbs or subshrubs; stems white-sericeous distally, glabrescent with age; herbage with simple trichomes. Leaves mostly cauline, alternate, short-petiolate; blade chartaceous, venation pinnate, surfaces strongly discolorous. Capitulecence mostly axillary in the distal nodes each with a
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sessile ebracteate dense spherical ebracteate glomerule, each glomerule resembling a single capitulum but actually composed of numerous capitula, occasionally 1-4 lateral 10-20 cm branches present subdistally. Capitula discoid, 1-flowered, sessile or nearly so; involucre cylindrical, compressed; phyllaries 2, opposite (one within the other), unequal, cymbiform, subcarinate, the outer aristate and the inner apiculate, a smaller lanceolate bracteole sometimes loosely subtending 2 principal phyllaries; receptacle minute, epaleate, weakly pilose. Florets 1, bisexual; corolla actinomorphic, campanulate, deeply 3-4-lobed, generally white, glabrous, throat nearly absent with lobes cut nearly to apex of the narrow tube, lobes sclerified apically; anthers basally spurred, spurs longer than filament collar; pollen triplicate, echinolophate; style without basal node, trunk long-papilllose distally, the branches very short, semisubulate, gradually attenuate, papillae elongate, apex pointed. Cypselae obconic, weakly 4-5-striate, glandular, otherwise glabrous; pappus coroniform, crown low, thin, lacinate, stramineous. 1 sp. Neotropics; naturalized in parts of the paleotropics.

This treatment is adapted from that of Beltrán y Pruski (2000).


Common herbs or subshrubs, (0.2-)0.5-1.5(-2) m, sometimes branched basally; stems ascending to climbing, sometimes trailing, usually unbranched in distal 30-70 cm, sometimes few-branched, subterete. Leaves: blade 3-11 × 1-5 cm, elliptic to lanceolate, secondary veins usually 8-12 per side, subparallel, arching at about 45°, secondaries usually straight, base cuneate to obtuse, margins entire or serrulate, apex acute to acuminate, sometimes mucronulate, adaxial surface green, sparsely pilose to glabrate, abaxial surface closely white-tomentose between the secondary veins, glandular vestiture obscured by tomentum, the midrib and secondary veins often tan to brownish below the white-sericeous vestiture; petiole 0.2-0.8(-1.5) cm, dilated basally, subclasping, sericeous. Capitulescence glomerules usually at least in distal 7-9 nodes, each glomerule 1-2(-2.5) cm diam. with the terminal often the largest, (50-)100-150+ capitulate. Capitula with the single floret often exserted laterally from the aristate involucre; involucre 0.6-1.3 mm diam.; phyllaries elliptic-lanceolate, scarious, brownish, glabrous to weakly sericeous and glandular apically, the outer phyllary 4.5-6.5 mm, the arista 1-1.5 mm, erect, the inner phyllary 2.5-4.5 mm. Florets: corolla 2.7-3.5 mm, tube 1.6-2 mm, lobes 1.1-1.5 mm; anthers 1-1.2 mm; style branches c. 0.2 mm. Cypselae 1.5-2 mm; pappus crown
0.2-0.3 mm. Flowering Nov-Sep. Lake shores, open areas, roadsides, sabanas, secondary vegetation, streamsides, thickets, weedy areas. H (Beltrán y Pruski, 2000: 17); N (Moreno 14614, MO); CR (Gómez P. 3289, MO); P (Fendler 143, MO). 0-900 m. (Mesoamerica, Colombia, Venezuela, Guyanas, Peru, Bolivia, Brazil, Hispaniola, Puerto Rico, Lesser Antilles, Trinidad and Tobago; naturalized in Japan, Java.)

17. Spiracantha Kunth

Por J.F. Pruski.

Annual to short-lived perennial herbs; stems erect or decumbent, few-branched throughout, subterete, loosely white-sericeous distally; herbage with simple trichomes. Leaves mostly cauline, alternate, short-petiolate; blade chartaceous, venation pinnate, surfaces moderately discolorous, eglandular. Capitulescence sessile in globose bracteate glomerules glomerules, leafy, terminal on short branchlets or infrequently axillary and sessile, bracteate glomerules, each glomerule (3-)4-13(-22)-capitulate, subtended by (3-)4-5(-8) leafy bracts, appressed proximally, thence exerted laterally, each bract complicate-concave surrounding a peripheral capitulum within its proximal cupular cavity, the central capitula of each glomerule ebracteate, bract indument as on leaves. Capitula discoid, 1-flowered, sessile or nearly so within glomerule; involucre cylindrical-turbinate; phyllaries 5-8, imbricate, slightly unequal, subgraduate with outer more than 1/2 as long as penultimate series 2-3-seriate, most phyllaries spirally inserted or sometimes distichous, apex spinose, spine horizontally refracted, (ultimate inner c. 2 much shorter, obscure and not visible laterally, their apex attenuate but espinose); receptacle epauleate. Florets 1, bisexual; corolla actinomorphic, tubular-funnelform, deeply 4-5-lobed, violet or lavender, limb exerted, lobes setulose; anthers basally spurred, spurs longer than filament collar, appendage elliptic; pollen triporate, echinolophate; style without basal node, trunk long-papillose distally, the branches very short, subulate, papillae elongate, apex pointed. Cypselae turbinate, subcompressed, weakly 5-striate, pale brown, glandular or resinous in an apical ring, otherwise glabrous or sparsely setulose; pappus of 10-12 short unequal stramineous bristles, 1-2-seriate, some fragile. x = 8. 1 sp. Neotropics.

Herbs, (0.1-)0.3-1(-1.5) m; stems often reddish or purplish. Leaves: petiole (1-)3-15 mm, dilated basally, subclasping to rarely sheathing; blade 2-11 × 1-5.5 cm, elliptic or less frequently lanceolate, secondary veins usually 7-10 per side, subparallel, at 45-55° to midrib, closely spaced, base obtuse to sometimes with acumen, margins entire or denticulate to serrulate, apex acute or less commonly acuminate, sometimes mucronulate, adaxial surface green, sparsely pilose to glabrate, abaxial surface loosely white-sericeous. Capitulescence glomerules usually in distal 5-10+ nodes, each glomerule 1-3 cm diam. (including bracts), bracts 1-2 cm, exserted laterally or somewhat down-turned, ovate to oblong, stiff but thin, reticulate, spinulose; subtending branches (0-1)-4(-10) cm, their apex (glomerule receptacle) pilose with trichomes to 1+ mm. Capitula 5-7 mm, the single floret partly exserted; involucre 2-3 mm diam., often appearing comose apically; outer to penultimate series phyllary lamina 3-5 mm, obovate, subcarinate, appressed, scarious, stramineous, pilose-sericeous, sometimes fine-glandular, apex abrupt-spinose, the spine 1.3-1.8 mm, often purplish basally. Florets: corolla 2-3 mm, glabrous, lobes 1-1.4 mm, cut 1/2-2/3 to tube, slightly spreading with anther cylinder mostly exposed; anthers 0.7-0.9 mm; style branches c. 0.3 mm. Cypselae c. 2 mm; pappus bristles 0.5-1 mm, about 1/2 as long as cypselae. 2n = 16. Flowering Sep-Jul. Cultivated areas, disturbed areas, muddy ditches, pastures, river banks, roadsides, selva baja alterada, sandy areas, strand vegetation. T (Novelo R. et al. 88, MO); Y (Duno et al. 1834, MO); C (Martínez S. et al. 29488, MO); QR (Carnevali et al. 4779, MO); B (Gentle 5000, NY); G (Nash 1976: 18); H (Molina et al. 34399, MO); ES (Sandoval ES-01680, MO); N (Seymour 1866, F); CR (Grayum 10456, MO); P (Busey 327, MO). 0-800(-1300) m. Mexico [Veracruz], Mesoamerica, Colombia, Venezuela, Hispaniola, Puerto Rico.)


Por J.F. Pruski.

Perennial herbs, to 1 m, commonly xylopodial; stems weakly branched, glabrous or more commonly pilose; herbage with simple trichomes, those of stems and abaxial leaf surfaces often contorted. Leaves cauleine, alternate, sessile or short-petiolate; blade stiffly chartaceous, pinnately veined, sometimes auricled basally, margins entire to weakly serrulate, often revolute, surfaces discolored, usually eglandular, adaxial surface green, often with flagelliform trichomes, the lower surface white- to brown-tomentose. Capitulescence usually strict and not arcuate, leafy, usually of 1-several closely spaced axillary sessile capitula, sometimes terminating proximally leafy lateral branches. Capitula discoid, 3-6(-10)-flowered; involucre cylindrical; phyllaries imbricate, strongly graduate, 3-5-seriate, weakly pilose to densely sericeous, obviously spinose
and spreading to recurved for much of its length (ours), sometimes rounded to attenuate, receptacle flat, epaleate. Florets bisexual; corolla actinomorphic, funnelform, exserted from involucre, glabrous or lobes long-pilose, deeply 5-lobed, lobes violet, ascending, tube elongate, pale-colored; anthers short-spurred, base rounded; pollen tricolporate, echinolophate; style with poorly developed basal node immersed within a cylindrical nectary, trunk short-papillose distally, branches ascending, papillae short, apex pointed. Cypsela obconical, 10-costate, surface brown, white-sericeous in lines on costae, eglandular, surface cells without raphids, carpopodium distinct, symmetric; pappus double (2-seriate), persistent, tan, outer series of c. 20 short bristles, inner series of many elongate scabridulous bristles, slightly exserted from tips of phyllaries. $x = 12, ?17. 5$ spp. Neotropics.


Infrequent slender herbs or subshrubs, 0.4-1 m; stems stiffly erect, distal lateral branches 10-25 cm, pilose or villous to glabrate, internodes typically much shorter than leaves. Leaves short-petiolate; petiole 2-4 mm, tomentose; blade 1.5-9 × 0.8-4 cm, elliptic or infrequently elliptic-lanceolate, secondary veins 4-7 per side, at c. 50° to midrib, base obtuse to rounded, margins sometimes revolute, apex acute to acuminate, adaxial surface sometimes rugulose, glabrous to thinly pilose, adaxial surface cinereous-white-tomentose, eglandular below tomentum. Capitulescence distal nodes 1-2(-5)-capitulate, capitula either axillary or opposite the leaves, infrequently supraxillary. Capitula 8-12(-13) mm, (5-)6(-7)-flowered; involucre 9-12(-13) × 2-3 mm diam.; phyllaries c. 15+, c. 3-seriate, pilosulous distally, progressively grading from the outer ones (c. 2 mm and lanceolate) to the inner, these 10-12(-13) × c. 2 mm, oblong, appressed proximally, spreading-subsquarrose in distal c. 2 mm, apex spinose. Corollas 8-9 mm, tube and throat gradually ampliate, glabrous, lobes 2-3 mm; anthers 2.6 mm, style branches 1.1-1.5 mm; nectary 0.3-0.5 mm, white to stramineous. Cypsela 2-3(-4) mm, the annular carpopodium c. 0.3 mm; pappus outer bristles 0.9-1.3 mm, inner bristles 5.5-6.5 mm, c. twice as long as cypsela, reaching to about the base of corolla lobes. $2n = 24$. Disturbed areas, grassy hillsides, pacific slope seasonal evergreen forest, pacific slope tropical deciduous forests, pine-oak forests. Ch (Reyes-García, y Alvarado 5516, MO); G (Turner 2007, 97). 100-1000 m. (Mexico [Oaxaca, Chiapas], Mesoamerica, Colombia, Venezuela.)
**Stenocephalum jucundum** is similar to South America *S. apiculatum* (Mart. ex DC.) Sch. Bip., which differs by its lanceolate leaves and much narrower capitula. The South American populations of *S. jucundum* typically have larger capitula than do the Mesoamerican populations, but match otherwise. By similar discolorous leaves and by most phyllaries with spreading to horizontally refracted, spinose apices, *S. jucundum* resembles *Spiracantha cornifolia*, which differs by a glomerulate capitulescence, capitula with subgraduate phyllaries, and pappus bristles about 1/2 as long as the glandular cypsela.

19. **Struchium** P. Browne

*Athenaea* Adans. nom. rej., *Sparganophorus* Boehm.

Por J.F. Pruski.

Annual herbs; stems erect, simple or few-branched, subglabrous to sparsely pilose, fistulous; herbage with simple trichomes. Leaves cauline, alternate, petiolate; petiole slender; blade thin-chartaceous, pinnately veined, glabrous or nearly so. Capitulescence axillary, sessile, single or glomerate. Capitula discoid, many-flowered; involucre hemispherical; phyllaries 20-25, imbricate, graduate, 3-4-seriate, appressed, subcarinate apically; receptacle subconvex, epaleate. Florets bisexual; corolla actinomorphic, deeply 3-4-lobed, greenish white to ochroleucous; anthers included, stramineous, base spurred (calcarate), connectives sometimes glandular; pollen subtriporate with a single polar lacuna (non-lophate); style with indistinct basal node, trunk long-papillose distally, branches semisubulate, papillae elongate, apex pointed. Cypselae narrow-obpyramidal, 3-5-angled, costate, brown, glabrous or finely glandular; pappus cylindrical-coroniform, corona thick, cartilaginous, persistent, white to stramineous, thus discolorous from darker cypselae body, entire or crenulate. \(x = 16\). 1 sp. Neotropics, Paleotropics.

**Struchium** is a valid generic name (Pruski, 1997), although treated as invalid by Jeffrey (1988).


*Ethulia struchium* Sw., *Sparganophorus africanus* (P. Beauv.) Steud., *Sparganophorus americanum* Poir., *Sparganophorus ethulia* Crantz, *Sparganophorus fasciatus* Poir.,

Semiaquatic herbs, 0.4-1 m tall, erect; stems sometimes subsucculent, subterete, striate, internodes typically much shorter than leaves. Leaves: petiole 0.4-1.6(-2.5) cm, commonly shortly winged from decurrent blade; blade (2.5-)5-14(-17) × (0.3-)1.5-4.5(-7) cm, oblong to elliptic, rarely lanceolate, secondary veins c. 7 per side, at 50-60° to midrib, then curving distally, base attenuate, margins entire to serrulate or less commonly serrate, apex acute to attenuate, surfaces concolorous, adaxial surface glabrous or weakly strigulose, abaxial surface commonly weakly strigulose, also often indistinctly fine-glandular, occasionally glabrate. Capitulescence nodes 1-5(-8)-capitulate. Capitula 35-65-flowered; involucre 4-4.5 × 5-7 mm; phyllaries 2-4.5 × 1-1.5 mm, deltoid to broadly lanceolate-elliptical, margins scarious, thinly arachnoid becoming glabrate, apex acuminate to aristate. Corollas 1.5-1.9 mm, narrowly campanulate, glabrous or lobes sparsely glandular, tube 0.9-1 mm, limb ampliate, usually exserted from pappus cylinder, lobes c. 0.6-0.9 mm; anthers c. 0.7 mm, appendage elongate, narrowly acute apically; style violet or lavender, basal node < 0.1 mm, trunk partly exserted, branches 0.2-0.4 mm. Cypselae 1.4-2 mm, glandular; pappus crown 0.9-1.2 mm, about 1/2 as long as cypselae. 2n = 32. Flowering Jan-Aug, Nov. Cultivated areas, muddy areas, marshes, roadsides, stream banks, thickets, wet areas, wet forests. T (Matuda 3419, MO); B (Schipp 942, NY); G (Steyermark 46308, MO); H (Clewellyn Cruz 4072, MO); N (Pipoly 3695, MO); CR (Lent 2558, MO); P (Fendler 142, MO). 0-500(-900) m. (Mexico [Tabasco], Mesoamerica, Colombia, Venezuela, Guyanas, Ecuador, Peru, Bolivia, Brazil, Cuba, Jamaica, Hispaniola, Puerto Rico, Virgin Islands, Lesser Antilles, Trinidad and Tobago; Africa, Asia.)

20. **Trichospira** Kunth

Por J.F. Pruski.

Short-lived perennial herbs; stems often several from base, prostrate to erect, sparsely branched distally, often rooting at proximal nodes, puberulent to arachnoid-pubescent; herbage with contorted trichomes. Leaves mostly cauline, alternate to subopposite distally in capitulescence, sessile; blade chartaceous, pinnately veined, base clasping or auriculate, surfaces discolorous, sometimes finely glandular adaxially, white-tomentose and eglandular abaxially. Capitulescence of sessile single or paired capitula in the leaf axils of several distal pairs of leaves, the
subopposite clasping or auriculate leaves with a broadly cupular proximal depression surrounding capitula. Capitula discoid; involucre campanulate; phyllaries 5-10, subequal, 1-2-seriate; receptacle flat, irregularly subpaleate; paleae perhaps relicts of syncephaly, few, oblanceolate. Florets c. 10; corolla actinomorphic, funnelform, deeply 4-lobed, blue to purple, tube glabrous, lobes glandular; anthers short-obtuse basally, appendages obtuse; pollen tricolporate, echinate (non-lophate); style without basal node, distal trunk and branches long-papillose (papillae sometimes sepalate, apex pointed), the branches semisubulate. Cypselae cuneate, compressed or obcompressed, tan, finely spiculiferous especially on edges and striations, also glandular distally; pappus of 2 divergent awns, stramineous, smooth at least distally, sometimes with a few intermediate narrow squamellae. \(x = 10\). 1 sp. Neotropics.

*Trichospira* is isolated among Mesoamerican Vernonieae by its subopposite fertile leaves, irregular-paleate receptacle, and flat fruits.


Herbs, 15-50 cm; stems striatulate. Leaves 1.5-5(-9) × 0.5-2(-3.5) cm, obovate-oblong to spatulate or sometimes lyrate, secondary veins usually 3-6 per side, at c. 50° to midrib, base cuneate, margins irregularly and deeply few-crenate to dentate or infrequently lyrate, apex obtuse to rounded, adaxial surface green, glabrous to infrequently weakly tomentellous. Capitula 4-5 mm; involucre 2.5-3.5 mm diam., the pappus awns exserted in fruit; phyllaries 2.5-3.5 × 0.5-0.7 mm, lanceolate to oblong, membranous-scarious, apex rounded, villosulous and sometimes viscid-glandular distally; paleae 2.5-4 mm, about as long as cypselae, flat, pubescent and glandular at apex. Corollas 1.6-2 mm, much shorter than mature cypselae, lobes 0.8-1 mm; anthers c. 0.5 mm; style branches c. 0.2 mm. Cypselae 2.5-4 mm, 2-3-striate per face; pappus awns 1.5-3 mm, squamellae 0.2-0.4 mm. \(2n = 20\). Flowering Feb, Apr-Aug. *Muddy areas, clearings, roadsides, sandy areas, sabanas, stream banks, wet areas.* T (Ventura A. 20566, MO); Ch (Matuda 2710, MO); B (Nash, 1976: 328); G (Heyde y Lux 4495, MO); H (Clewell 1975: 233); ES (Nash, 1976: 328); N (Nee y Miller 27545, MO); CR (Zamora y Chacón 1391, MO); P (Bartlett y Lasser 16393, MO). 0-800(-1000) m. Mexico [Veracruz, Oaxaca], Mesoamerica, Colombia, Venezuela, Guyana, French Guiana, Peru, Bolivia, Brazil, Cuba, Hispaniola.)
21. Vernonia L.

_Vernonanthura_ H. Rob.

Por J.F. Pruski.

Herbaceous stemmed subshrubs to trees to 16 m tall, occasionally xylopodial, sometimes vining; stems few- to much-branched, sometimes strongly angled, puberulent to tomentose; herbage with simple or dolabriform trichomes. Leaves alternate, sessile to petiolate; blade linear to broadly elliptic, most commonly lanceolate to oblanceolate, usually chartaceous, pinnately veined, entire to serrate, occasionally revolute, occasionally cordate basally, the adaxial surface glabrous to densely tomentose, sometimes glandular, the abaxial surface puberulent to tomentose, rarely glabrous, often glandular. Capitulescence terminal from the distal nodes, typically cymose-paniculate, immediately subtended by, but often held above, distal leaves, non foliar, typically ebracteolate, few- to several-branched, the individual branches short, the capitula sessile or nearly so. Capitula discoid, 4-45-flowered, sessile or nearly so; involucre turbinate to more commonly campanulate; phyllaries imbricate, graduate, in few to several series, glabrous to puberulent or ciliate, rarely to tomentose or apically so; receptacle flat to convex, epaleate, sometimes pubescent. Florets bisexual; corolla actinomorphic, funnelform, well-exserted from involucre, violet or sometimes white, deeply 5-lobed, glabrous or more commonly with glandular (but never setose) lobes, the lobes, throat, and tube more or less subequal, each vein branching at to well proximal to sinus of lobes, lobes with veins marginal or submarginal; anthers stramineous, often partly exserted, basally spurred or more commonly calcarate, apical appendage long-triangular, often glandular; pollen tricolporate, echinate, tectum continuous (type A, Keeley y Jones, 1979); style sometimes well-exserted, base with a well-developed node, trunk long-papillose distally, the branches long-papillose. Cypselae obconical to prismatic, (5-)8-10-ribbed, setose or glandular, less commonly glabrous, carpopodium narrow to enlarged, often cream-colored; pappus 2-seriate to vaguely so, white to brown, the outer series of several short squamellae to bristles shorter than to about as long as the cypselae, the inner series of many elongate bristles exserted from the involucre to about as long as the corollas. 80-200+ spp. Mostly pantropical.

_Vernonia_, as recognized traditionally includes the _Lepidaploa_ group, which is here recognized as distinct. The genus _Vernonanthura_ was segregated because of its slightly more pointed anther spurs, but this distinction is minor and _Vernonanthura_ is treated here in synonymy of its parent genus _Vernonia_.

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Tribe Vernonieae was treated as including Liabeae in Nash (1976), whereas D’Arcy (1975) treated Liabeae within the most distantly related Senecioneae. Even in the narrower concept of Vernonieae, taxa may have opposite leaves but they are rarely trinerved, and the corollas are even more rarely yellowish. In Nash (1976), D’Arcy (1975), Rzedowski, y Calderón de Rzedowski (1995), Turner (2007), and Redonda-Martínez y Villaseñor-Ríos (2009) *Vernonia* was treated broadly but several segregates have been recognized in the past 30 years, were used by Pruski (1997) and were summarized in Robinson (1999). Jones (1977) noted that the base chromosome numbers and sesquiterpene lactone types of *Vernonia* s. lat. in the Old World material is typically different from those of New World taxa. Robinson (1999) provided a thorough review of New World genera and their subtribal distribution. I am uncertain of generic disposition of the numerous Old World species.


The citation by Hemsley (1881: 73) of *Vernonia odoratissima* Kunth. [a synonym of South American *Vernonanthura brasiliiana* (L.) H. Rob.] in Nicaragua is presumably in reference to material I would determine as *Vernonia patens*. *Vernonia karwinskii* DC. should be expected in Mesoamerica.

*Stokesia laevis* (Hill) Greene, native to the SE United States, is occasionally cultivated in Mesoamerica, but is not known to escape. It is characterized by outer florets with subligulate corollas as in genera of the *Elephantopus* group, but differs from these by being much longer and by non-decussate phyllaries.


1. Capitula 15-25 mm; corollas 12-19 mm.
2. Cypselae glabrous.
   1. *V. alamanii*

1. Capitula 6-13 mm; corollas (5-)5.5-9 mm.
2. Cypselae pubescent.
   3. *V. mima*
3. Capitulescences subscorpioid-paniculate; capitula (14-)15-27--flowered..

5. V. patens

3. Capitulescences corymbiform-paniculate or subumbellate; capitula 10-14-flowered.


2. V. chiriquiensis

4. Shrubs.

2. V. oaxacana


Cacalia alamanii (DC.) Kuntze, Vernonia alamanii var. dictyophlebia (Gleason) McVaugh, Vernonia dictyophlebia Gleason.

Subshrubs to shrubs 1-2.5(-4) m; stems striate, villous to subtomentose, distal internodes usually 2-5 cm, about 1/3-1/2 as long as leaves. Leaves short-petiolate: blade 7-14 × 2.5-6 cm, lanceolate to ovate, widest below the middle, stiffly chartaceous, 2° veins 5-8 per side, reticulations prominulous, surfaces more or less concolorous, adaxial surface hirtellous to hirsutulous, abaxial surface pilose-hispid to subglabrate, also glandular, base cuneate to sometimes obtuse, margins closely and sharply serrulate, apex acute to acuminate; petiole 0.3-0.7(-2) cm. Capitulescence terminal or subterminal, open, rounded to flat-topped, corymbiform-cymose or subumbellate, usually 3-15(-25)-capitulate; peduncles 1-4(-8) cm, usually 1-few-bracteolate. Capitula 15-25 mm, 45-75-flowered; involucre 10-22 × 11-19 mm, broadly campanulate; phyllaries 5-6-seriate, graduate, chartaceous-scarious throughout and never squarrose, glabrous, sometimes apiculate, outer ones spreading to recurved, inner ones appressed or ascending; outer series 4.5-9 × 1.5-3 mm, broadly lanceolate to apex obtuse to rounded; mid-series phyllaries 3-4.5 mm diam., oblong; inner phyllaries 11-19 × c. 1.5 mm diam., lanceolate distally; receptacle epealeate. Florets: corolla 12-19 mm, violet to purple, sparsely glandular, lobes 3-5.5 mm. Cypselae 3-4.5 mm, obconic, 10- striate, glandular; pappus bristles double, outer bristles 0.7-1.6 mm, inner bristles 7.5-11 mm. 2n = 34. Pine-oak forests. Ch (Turner, 2007: 63). Aprox. 2000 m. (Mexico.)

Vernonia alamanii is common in central Mexico, was reported by Jones (1976) as far south as Guerrero, is known to me from Oaxaca as well, but was reported as far south as Chiapas by Turner (2007). The species group centering about V. alamanii was revised by Jones (1976), who treated the species in V. subsect. Paniculatae. Gleason (1906) drew attention to the habit similarities between V. alamanii and Lepidonia.

Vernonanthura cocleana (S.C. Keeley) H. Rob.

Vines; stems glabrous to subglabrous. Leaves petiolate; blade 2-8 × 0.8-2.5 cm, elliptic, venation pinnate, 2° veins c. 4 per side, adaxial surface glabrous, abaxial surface sparsely strigillose to villous-pilose, base cuneate, margins entire, somewhat undulate, apex acute to subobtuse; petiole 0.5-1.5 cm. Capitulescence corymbiform-paniculate, subcylindrical; peduncles 5-15 mm, glabrous. Capitula 6-7 mm, 10-11-flowered; involucre 5.5-6.5 × 4-7 mm, campanulate; phyllaries c. 5-seriate, oblong to oblanceolate, glabrous to subglabrous, apex usually obtuse. Florets: corolla 5.5-7 mm, white, lobes c. 2.8 mm. Cypselae c. 2 mm, setulose; pappus 1-seriate, bristles 5-7 mm. Flowering Apr. Habitat unknown. P (Allen 2397, MO). Aprox. 1000 m. (Endémica.)


Shrubs 2-3 m; stems subscandent, striate, tomentulose to villosulous. Leaves petiolate; blade 5-12.5 × 3-8 cm, ovate or elliptic-ovate, widest at or below the middle, venation pinnate, 2° veins 5-8 per side, adaxial surface sparsely puberulent to hirtellous or glabrate, abaxial surface tomentulose to villous, base obtuse or rounded, sometimes with short-decurrent acumen, margins subentire, apex acute; petiole 1-3 cm. Capitulescence in distal 20-30 cm of larger stems, corymbiform-paniculate or subumbellate, of several broadly rounded somewhat congested clusters 5-10 cm diam. on lateral branches (3-)7-15 cm from distal 3-7 nodes, lateral branching at about 45-80° from larger stems; peduncles 2-6 mm, tomentulose to villosulous, capitula infrequently subsessile. Capitula 10-13 mm, c. 10-flowered; involucre 8-9 × 4-5 mm, turbinate-campanulate; phyllaries 5-6-seriate, ascending, sometimes the outer slightly decurrent onto peduncle, pale-greenish, margins sometimes ciliate-villose; outer phyllaries 0.1-2 × 0.5-1 mm, triangular-lanceolate, villosulous, apex acute or acuminate; inner phyllaries 7-9 × 1-1.4 mm, about as tall as pappus, lanceolate, distally slightly spreading and ultimately deciduous, subglabrous or sometimes villosulous, apex acute or sometimes obtuse. Florets: corolla 7-8 mm, ochroleucous, glandular, tube c. 5 mm, longer than the limb, slender, throat campanulate, lobes 1.5-2.5 mm, longer than throat, c. 1/3 length of corollas. Cypselae 2.3-2.9 mm, turbinate, unequally 3-4-costate-angled, glabrous, eglandular; pappus inner bristles 4.5-6 mm. Flowering Jan-Mar. Oak forests, thickets, volcano slopes. G (Castillo y Vargas 2765, MO). 1700-2100 m. (Endemic.)

Shrubs 1-3 m; stems striate, tomentose to hirsutulous-villosulous, infrequently subglabrate. Leaves short-petiolate; blade 3-14 × 2-7(-8.5) cm, elliptic to ovate, widest below the middle, venation pinnate, 2° veins 5-7 per side, adaxial surface hirtellous to hirsutulous, abaxial surface tomentose to hirsute-villosous, base cuneate to obtuse or sometimes rounded, margins subentire to more commonly serrulate, apex acute to sometimes obtuse; petiole 0.5-1.2(-2) cm. Capitulescence corymbiform-paniculate or subumbellate, pyramidal or broadly rounded, on lateral branches 5-12 cm from distal 3-6 nodes, subdistal branchlets often 1-2.5 cm, branching at about 45° from main lateral branches; peduncles (0-)1-10 mm, usually puberulent. Capitula 6-10 mm, 10-14-flowered; involucre 5-7 × 3-5 mm, turbinate-campanulate; phyllaries 4-6-seriate, appressed-ascending, purplish distally, glabrous or subglabrous, apex acute or acuminate; outer phyllaries 0.7-2 × 0.3-0.8 mm, triangular-lanceolate; inner phyllaries 5-7 × 0.8-1.4 mm, lanceolate. Florets: corolla 7.5-9 mm, purplish, glabrous, tube about as long as or slightly longer than limb, lobes 2-2.5 mm. Cypselae 1.5-3 mm, setulose, sometimes glandular; pappus indistinctly 2-seriate, white, outer bristles to c. 1(-1.5) mm, inner bristles 5-7 mm. Chromosome number 2n = 34. Flowering Dec-Feb. *Dry subtropical forest, grassy slopes, oak forests, open or rocky areas, roadsides, thorn forests*. Ch (Martínez et al. 19984, MO). 300-1100 m. (S. Mexico, Mesoamerica.)

Redonda-Martínez y Villaseñor-Ríos (2009) described the phyllaries as pilose and the corolla lobes as pubescent, but I find them both to be usually glabrous.


Shrubs to trees 1.5-8 (13) m; stems glabrous to tomentulose or lanate. Leaves petiolate; blade 4-22(-29) × 2-6(-9.5) cm, elliptical to lanceolate or rarely oblanceolate, 2° veins usually 10+ per side, abaxially sparsely very short-strigillose (with broad L-shaped appressed trichomes c. 0.1 mm and initially appearing solid and white), also hirsute to sometimes villous or tomentose with thin trichomes, occasionally glandular, base generally cuneate or obtuse, margins entire to remotely serrulate, apex generally acute to acuminate; petiole 0.3-2(-3.8) cm. Capitulescence subscorpioid-paniculate, capitulescence of lateral branches typically to c. 20 cm × c. 15 cm, the terminal ones usually much longer; peduncles (0-)2-5 mm, tomentulose, subcylindrical; peduncles 5-20 mm, glabrous. Capitula 6-9 mm, (14-)15-27-flowered; involucre (3.3-)4-5(-5.5) × (2.5-)4-5 mm, campanulate; phyllaries 4-6(-7)-seriate, glabrate to outer ones and apex of inner ones puberulent to less commonly hirtellous, sometimes glandular apically; outer phyllaries 0.6-1.3 mm, elliptic-lanceolate, apex usually acute; inner phyllaries 4-5(-5.5) × 1.2-1.7 mm, oblanceolate, apex usually acute to apiculate. Florets: corolla (5-)5.5-7 mm, white to pale violet, glabrous or rarely sparsely glandular, lobes (1.8-)2-2.5 mm. Cypselae 1.5-2.5 mm, setose; pappus 2-seriate, outer bristles 0.3-0.6 mm, inner bristles 4-5.5 mm, bristles 5-7 mm. 2n = 34. Flowering year-round. 

*Cafetal, cultivated areas, deciduous forests, disturbed areas, dry open slopes, fields, forest borders, forested rocky ravines, gallery forests, grassy hillsides, open areas, orillo de camino, pine-oak forests, potreros, sabanas, secondary vegetation, selva baja caducifolia, thickets, weedy areas. T (Cowan 1986, MO); Ch (Matuda 1081, MO); C (Chan 4699, MO); QR (Sousa y Cabrera, 1983: 81 sub *Vernonia deppeana*); B (Schipp 31, NY); G (Keeley y Keeley 3297, MO); H (Williams y Molina 13443, MO); ES (Berendsohn 1258, MO); N (Baker 2252, US); CR (Skutch 2488, MO); P (McDade 745, MO). 0-1900 m. (Mexico, Mesoamerica, Colombia, Venezuela, Ecuador, Peru, Bolivia, Brazil.)

*Vernonia patens* is treated broadly as in Pruski (2010), where complete synonymy was given. The species is often very variable and includes plants with leaves abaxially grading from sparsely strigillose to tomentose, either glandular or eglandular and with corolla tube longer than the throat or rarely with the corolla throat longer than the tube. The L-shaped trichomes of *Vernonanthura patens* resemble those of *V. cabralensis* as seen in Robinson (2005, t. 6c-d). Such trichomes are prominent on less pubescent-leaved material and the possible absence of such trichomes in tomentose-leaved *V. deppeana* may be taxonomically significant.

**Bibliography for Vernonieae (partial)**


