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51. URTICACEAE

Family description and key to the genera by A.K. Monro.

Herbs, shrubs, trees or lianas, monoecious or dioecious. Stems with or without stinging hairs, rarely with spines, occasionally releasing watery latex when cut. Leaves alternate or opposite; blades simple, frequently toothed or entire, rarely lobed, 3-nerved rarely pinnately nerved; upper and or lower surface of leaves with cystoliths embedded below the epidermis, visible only in dried leaves; stipules 1 or 2 at each node or absent, borne in the axils of the leaves or adjacent to the petiole, free or fused, where fused simple or forked. Inflorescences axillary, rarely terminal, paniculate, cymose, racemose or spicate, frequently composed of glomerules, bracteate, the bracts discrete or completely enclosing the flowers. Flowers unisexual or bisexual, when bisexual also with unisexual flowers; perianth present or absent, when present, consisting of a single whorl of tepals. Staminate flowers 2-5-merous, actinomorphic; tepals free, valvate or imbricate in bud, frequently with a subapical appendage, frequently opening explosively; stamen number equal to the tepal number; filaments frequently inflexed in bud; anthers 2-locular, opening lengthwise; pollen mono- or polycolporate; pistillode 1. Pistillate flowers 1-4-merous, zygomorphic or actinomorphic; tepals, when present, free or fused and connate; staminodes present or absent, opposite the tepals, frequently inflexed; ovary 1-locular, the ovule solitary; style simple, or absent; stigma capitate, penicillate, subulate or filiform. Fruit usually a dry achene or a fleshy drupe, the perianth frequently persistent and enlarged in fruit; seed with endosperm; embryo straight; cotyledons ovate elliptical or orbicular. Aprox. 46 gen., 1500 spp.; 12 gen., 107 spp. in Mesoamerica. Cosmopolitan.

There is strong molecular evidence for the inclusion of Cecropiaceae within a monophyletic Urticaceae (Sytsma et al., 2002; Datwyler & Weiblen, 2004; Monro, 2006). In *Flora Mesoamerica* we have treated Cecropiaceae as a distinct family (Family 50).

Many of the characters used in the key to genera are very small, and it may be necessary to make measurements at a scale of 0.1 mm; a dissecting microscope (to $\times 200$) is therefore recommended. The terminology used for the description of leaf shape is based on those in Stearn's *Botanical Latin* (1992). Because of their small size and large number, it is usually fairly easy to find well-preserved flowers in all genera of Urticaceae.

Bibliography: Friis, I. *Evol., Syst., and Foss. Hist. Hamamelidae*, 2: 285-308 (1989). Weddell, H.A., *Prodr.* 16(1): 32-235 (1869).

1. Leaves opposite, occasionally strongly unequal at each node and appearing alternate.
 2. Stems and leaves with stinging hairs; stipules forked; stigma capitate. **13. Urtica**
 2. Stems and leaves without stinging hairs; stipules not forked; stigma capitate or threadlike.
 3. Herbs, shrubs, small trees or vines; leaves never succulent, with punctiform cystoliths; stipules narrowly ovate with a length to width ratio greater than 1:4; stipules free, lateral; stigma thread-like. **1. Boehmeria**
 3. Herbs, epiphytes or shrublets; leaves always succulent, with fusiform, "V" or "X" shaped cystoliths; stipules fused, intrapetiolar, deltate, cordiform, auriculate, ovate, obovate or oblong with a length to width ratio less than 1:4; stigma capitate. **9. Pilea**
1. Leaves alternate.
 4. Inflorescences strongly congested, the flowers obscured by numerous or prominent bracteoles.

5. Pistillate inflorescences or portions of the inflorescence with 2-4 prominent green bracts and bracteoles.
6. Shrubs; leaf margins dentate or serrate. **4. Hemistylus**
6. Herbs; leaf margins entire.
7. Inflorescences enveloped by 2 prominent cordiform bracts, these completely obscuring the flowers. **11. Rousselia**
7. Inflorescences subtended by 3-4 linear bracts, these not completely obscuring the flowers. **7. Parietaria**
5. Pistillate inflorescences with more than 10 brown, grey-brown, brown or green-brown bracts and bracteoles.
8. Leaf margins entire. **10. Pouzolzia**
8. Leaf margins dentate, serrate or crenate for some part of their length.
9. Leaves not strongly unequal-sized at consecutive nodes; pistillate perianth tube absent; bracteoles conspicuous, glossy, much longer than the pistillate flowers. **8. Phenax**
9. Leaves of unequal sized at consecutive nodes or not; pistillate perianth tube present, bracteoles inconspicuous, papery less than 1/2 as long as the pistillate flowers.
10. Leaves of almost equal size at consecutive nodes or, where of unequal size, not consistently so; achene easily released from the perianth in fruit, shiny. **10. Pouzolzia (1. P. parasitica)**
10. Leaves of strongly unequal size at consecutive nodes; achene not easily released from the perianth in fruit, not shiny. **1. Boehmeria**
4. Inflorescences not strongly congested, although flowers sometimes borne in compact glomerules or on a few-branched spike-like panicle, the flowers not obscured by prominent bracteoles even though frequently very small.
11. Upper leaf surface with punctiform cystoliths.
12. Trees more than 3 m; young stems and leaves with stinging hairs, the leaves clustered at the stem apices; inflorescences unisexual, without foliar bracts; achene/fruit 3.5-4 mm, a papery disc. **2. Discocnide**
12. Shrubs less than 3 m; young stems and leaves without stinging hairs, the leaves not clustered at the leaf apices; inflorescences bisexual or unisexual, if unisexual, foliar bracts present or absent; achene/fruit subcompressed 1.5-3 mm, never papery, ovoid. **4. Hemistylus**
11. Upper leaf surface with fusiform cystoliths.
13. Young stems and leaves with stinging hairs; stipules forked for 1/2 or more of their length. **5. Laportea**
13. Young stems and leaves with or without stinging hairs; stipules forked or not forked, if forked, divided for 1/3 or less of their length.
14. Stipules forked. **12. Urera**

14. Stipules not forked.

15. Pistillate inflorescences pendulous, thread-like; stigma foot-shaped; the achene in fruit dry, not surrounded by a fleshy tepal or panicle branch; pistillate inflorescences with flowers borne singly along the peduncle; plants without stinging hairs; stems without spines. **6. Myriocarpa**

15. Pistillate inflorescences erect, not thread-like; stigma penicillate; staminate inflorescence with the flowers borne in clusters of 3-10.

16. Plants without stinging hairs; pistillate infructescence branches becoming fleshy in fruit giving the appearance of a spadix; tepals reduced, covering less than 1/4 of the achene length. **3 Gyrotaenia**

16. Plants with or without stinging hairs; pistillate infructescence not becoming fleshy; tepals becoming fleshy, covering more than 1/2 of the achene length giving the appearance of a berry. **12. Urera**

1. Boehmeria Jacq.

Splitgerbera Miq., *Duretia* Gaudich., *Ramium* Kuntze

By C.M. Wilmot-Dear, I. Friis & A.K. Monro.

Shrubs, small trees, herbs or climbers, perennial; monoecious or dioecious. Leaves opposite or alternate, often in dimorphic pairs, occasionally distichous, 3-nerved from the base with or without upper nerves, frequently bilaterally asymmetrical, the margins toothed; cystoliths punctiform, stipules interpetiolar, free. Inflorescences bisexual or unisexual, borne on terminal or axillary branches, these often modified by partial or complete reduction of the leaves, the flowers sessile or short-pedicellate, borne in densely congested glomerule-like panicles in the axils of unmodified or reduced bract-like leaves or along axillary stems lacking leaves. Flowers unisexual, subtended by a deltate red-brown bracteole. Staminate flowers (3)4-merous, tepals frequently with a subapical appendage; pistillode present. Pistillate flowers with the tepals fused to form a tube that completely encloses the ovary, the tube apically toothed; stigma 1, rarely 2, filiform and laterally papillose, frequently persistent in fruit. Fruit an achene with an accrescent tepal tube, rarely the perianth tube longitudinally winged; achene ovoid, dorsiventrally compressed, the surface not shiny. Approx. 40-50 spp. Cosmopolitan.

Terminology for asymmetrical, anisophyllous and leaves associated with the inflorescence-bearing axes is based on that of Wilmot-Dear & Friis (1996): leaves in a dimorphic pair (whether opposite or alternate) are referred to as 'minor' and 'major' leaves.

Bibliography: Weddell, H. A. *Archiv. Mus. Hist. Nat.* 9: 1-22 (1856); Prodr. 16(1): 195-218 (1869). Wilmot-Dear, C.M. & Friis, I. *Opera Bot.* 129: 5-103 (1996).

1. Leaves on main stem opposite or subopposite (occasionally alternate on lateral stems).

2. Leaves in a pair subopposite and of unequal size and shape; major leaves markedly asymmetrical, (10-)12-50(-70) times as long as minor leaves (minor leaves frequently caducous,

their position marked by an inflorescence or axillary bud); pistillate flowers more or less sessile.

11. B. ulmifolia

2. Leaves in a pair opposite or subopposite and of equal or unequal size and shape, weakly asymmetrical or symmetrical, where unequal 3-5(-9) times as long as minor leaves; pistillate flowers pedicellate or sessile.

3. Leaves subopposite; major leaves of the main stems 3-5(-9) times as long as the minor leaves; fruiting perianth spindle-shaped, not winged, tapering into a conspicuous pedicel 1 mm or longer.

5. B. celtidifolia

3. Leaves strictly opposite; major leaves of the main stems 2 times as long or longer as the minor leaves; fruiting perianth not spindle-shaped, occasionally winged, subsessile or sessile.

4. Fruits consisting of 2 or 3 laterally fused ovaries, forming prominently ribbed triangular conical "double fruits" or compressed "triple fruits", these never winged; stigmas 2, less than 0.5 mm, partially fused; staminate flower buds 2-3 mm, twice as long as wide with a subapical appendage 1/2-2/3 of the total length; plants prostrate in part, rooting at nodes.

3. B. burgeriana

4. Fruits consisting of 1 ovary, dorsiventrally compressed with distinct marginal wings; stigma 1, 0.5-2 mm; staminate flower buds to 1.2 mm, almost as wide as long, the tepals with or without a small subapical appendage less than 0.1-0.2(-0.5) mm or a minute apiculus; plants erect.

5. Inflorescence borne on pendent, entirely leafless spike-like stems; stigma c. 2 mm; fruiting perianth c. 2.5×1.5 mm, with wings as broad as the achene; leaves subcoriaceous, (25-)35-50(-70) teeth each side, the basal 1/4 of the margins entire, the apex bearing several teeth.

4. B. caudata

5. Inflorescences borne on a leafy main stem or ascendent almost leafless spike-like stems, where borne on almost leafless spike-like stems, these with an apical tuft of reduced leaves; stigma c. 0.5 mm; fruiting perianth c. 1×1 mm, with wings 1/2 as broad as the achene; leaves subchartaceous to membranous, 12-23 teeth on each side, the basal 1/4 of the margins toothed, the apex bearing a single tooth.

6. B. cylindrica

1. Leaves on main stem alternate, never subopposite.

6. Major leaves (10-)12-50(-70) times as long as the minor leaves (or the minor leaves absent but marked by a scar or axillary inflorescence cluster), markedly asymmetrical; minor leaves different in shape to the major ones; pistillate flowers sessile or subsessile.

11. B. ulmifolia

6. Major leaves 2-3(-9) times as long as the minor leaves, markedly asymmetrical, when 5(-9) times as long, almost symmetrical; minor leaves with the same shape as the major ones; pistillate flowers pedicellate.

7. Leaves with the lower surface (except for nerves) completely obscured by a whitish matted tomentum; inflorescence-bearing stems paniculate, differing from the vegetative stems (cultivated and naturalized).

7. B. nivea

7. Leaves with the lower surface without any whitish matted tomentum; inflorescence-bearing stems not paniculate.

8. Inflorescence-bearing stems entirely leafless or with reduced leaves at the apex, spike-like.

9. Pistillate flowers in loose clusters, pedicellate, pedicel 1 mm or longer, clearly visible in the inflorescence; staminate tepals without a subapical appendage.

5. B. celtidifolia

9. Pistillate flowers in tight clusters, sessile or pedicellate, pedicel 0.3 mm or less, not readily visible in the inflorescence; staminate tepals with a prominent subapical appendage 0.3-0.5 mm.

9. B. radiata

8. Inflorescence-bearing stems with leaves present throughout their length, the major leaves not reduced, not spike-like.

10. Lower leaf surface silky due to dense a pubescence, the hairs strongly adpressed, orientated in a well-marked pattern, pointing away from the veins towards the centre of the areoles, frequently completely obscuring the surface between the nerves; lamina (2.75-)3-6(-7) times as long as wide.

11. Leaf margins clearly dentate to base; major leaves (3.5-)4-6(-7) times as long as wide, almost symmetrical, narrowly ovate to lanceolate, the basal 1/2 with almost parallel margins; minor leaves markedly different shape from the major leaves, frequently pointing downwards; tertiary venation not scalariform.

1. B. aspera

11. Leaf margins serrate, the teeth absent or obscure towards the base; major leaves (2.75-)3-4 times as long as wide, asymmetrically elliptic to ovate, the basal 1/2 never with parallel margins; minor leaves not markedly different shape from the major leaves, rarely pointing downwards; tertiary venation distinctly scalariform.

8. B. pavonii

10. Lower leaf surface not silky, pubescent, the hairs spreading or adpressed, where adpressed not orientated in a well-marked pattern, never completely obscuring the surface between the nerves; lamina 2-3 times as long as wide.

12. Staminate flowers 3-merous, not apiculate in bud; leaves markedly asymmetrical, the base asymmetrically cuneate; leaf margins serrate, leaf margins with the broader side entire for the basal 1/4-1/3 or obscurely toothed.

10. B. ramiflora

12. Staminate flowers 4-merous, apiculate in bud or not; leaves not markedly asymmetrical, the base obtuse or subcordate; leaf margins dentate or serrate to base.

13 Major leaves more than 3 times as long as wide.

14. Pistillate inflorescence a loose cluster, the flowers pedicellate, the pedicel 1 mm or longer, clearly visible; stigma 'bottle-brush' shaped; staminate

tepals lacking subapical appendages; leaves subchartaceous or subcoriaceous, the margins serrate.

5. B. celtidifolia

14. Pistillate inflorescence a tight cluster, the flowers sessile or pedicellate, where pedicellate the pedicel 0.5 mm or less, not clearly visible; stigma not 'bottle-brush'-like; staminate tepals with a subapical appendage; leaves subcoriaceous to coriaceous, the margins dentate or crenate.

1. B. aspera

13. Major leaves c. 2 1/2 times as long as wide.

15. Leaves subcoriaceous to coriaceous, the margins dentate, dentate-serrate or dentate-crenate, where dentate-serrate or dentate-crenate, the upper leaf-surface glabrous or glabrescent, the hairs when present, not arranged in a regular pattern.

2. B. bullata subsp. coriacea

15. Leaves subchartaceous to subcoriaceous, the margins serrate, the upper surface pubescent, the hairs adpressed, arranged in a regular pattern.

16. Pistillate inflorescences loose clusters; flowers pedicellate, the pedicel 1 mm or more, clearly visible; staminate tepals lacking dorsal projections.

5. B. celtidifolia

16. Pistillate inflorescences tight clusters; flowers sessile or pedicellate, the pedicel 0.3 mm or less, not clearly visible; staminate tepals with a prominent dorsal projection of 0.3-0.5 mm.

9. B. radiata

1. Boehmeria aspera Wedd., *Arch. Mus. Hist. Nat.* 9: 349 (1857). Holotype: Colombia, *Goudot s.n.* (P!).

Illustr.: Burger, *Fieldiana, Bot.* 40: 225, t. 28 (1977).

Boehmeria diversifolia Wedd. non (Blume) Miquel, *B. pavonii* Wedd. var. *diversifolia* Wedd.

Shrubs, 1-6 m; branches spreading horizontally or somewhat pendulous; stems 2-2.5 mm diameter at their apex, densely pubescent, the hairs 0.2 mm or less, more or less spreading. Leaves alternate, unequal by a ratio of 1: 2.5-4(-9), unequal in shape; major lamina (3.5-)6-15(-19) × (1-)1.5-3.2(-4) cm, lanceolate, weakly asymmetrical, the minor lamina ovate to elliptic, ratio of width to length 1:1.5-7 (ratio increasing with leaf-size), frequently pointing

downwards; subcoriaceous to coriaceous, frequently bullate, lateral primary nerves visible for 3/4 or more of the lamina length, the secondary nerves 2 or 3, arising from the apical half of the midrib, secondary and tertiary nerves deeply impressed above, prominent below; upper surface sparsely or densely pubescent, rarely glabrous, where pubescent, the hairs 0.2 mm or less, appressed; lower surface densely pubescent, giving the leaf a silky appearance; base of major lamina asymmetrically cuneate, of minor lamina rounded to cordate; margins distinctly dentate to mucronate to the base on each side, the teeth (25-)35-75, 0.5-2 mm; apex of major lamina acute, of minor lamina broadly acute; stipules (3-)4-8 mm, deltate, red-brown, chartaceous, pubescent; petiole of major leaves 3-7(-10) mm; minor leaves subsessile. Inflorescences axillary, borne on an unmodified stem, (2-)4-5 mm in diameter, grading from staminate, staminate dominated, pistillate dominated to pistillate, bearing (15-)30-over 70 flowers, the flowers densely pubescent, in bud; all bracts 0.4 mm or less. Staminate inflorescences bearing pedicellate flowers; pedicels less than 0.5 mm; flowers 4-merous, c. 1 mm diameter immediately prior to anthesis, globose, tepal apices forming a minute apiculus, subapical tepal appendage 0.2 mm or less. Pistillate inflorescences bearing pedicellate flowers, flowers 0.5-1 × 0.3-0.4 mm, narrowly ovoid to obovoid; stigma 1-2 mm, solitary, not bottle brush like; pedicel 0.5 mm or less. Fruiting perianth tube 0.6-1.1 × c. 0.5 mm, weakly dorsiventrally compressed, occasionally with two marginal ridges; achenes c. 0.4 × 0.3 mm. *Dry forests, wet pastures, riversides, disturbed vegetation, roadsides.* CR (Burger *et al.* 10034, AAU); P (Croft 10570, NEB). (100-)650-2700 m. (Mesoamerica, Colombia, Ecuador, Peru.)

This species most closely resembles *Boehmeria pavonii*, it may be distinguished from the latter by the distinctly dentate leaf margin, narrow major leaves and downward pointing minor leaves.

2. *Boehmeria bullata* Kunth in Humb., Bonpl. & Kunth, *Nov. Gen. Sp.* 2: 35 (1817). Holotype: Ecuador, *Humboldt & Bonpland s.n.* (P!).

Comment [a1]: ref.

This species encompasses a complex of three partly differentiated subspecies that largely replace each other from Costa Rica to Peru. Only subsp. *coriacea* is known from Mesoamerica.

2a. *Boehmeria bullata* Kunth subsp. *coriacea* (Killip) Friis & Wilmot-Dear, *Opera Bot.* 129: 32 (1996). *Boehmeria coriacea* Killip, *J. Wash. Acad. Sci.* 13: 359 (1923). Holotype: Colombia, Pennell 10381 (US!). Illustr.: Burger, *Fieldiana, Bot.* 40: 225, t. 28 (1977).

Herbs or shrubs, occasionally scandent, to 6 m; stems 1-1.5 mm diameter at their apex, densely pubescent, the hairs 0.3-0.5 mm, appressed, occasionally minute spreading hairs also present. Leaves alternate, unequal by a ratio of 1:2-3; major lamina (3.5-)8-15.5(-18) × (1.5-)3.5-7(-7.5) cm, ovate to ovate-elliptic, weakly asymmetrical, ratio of width to length 1:2-2.5, the minor lamina relatively broader, frequently pointing downwards, coriaceous to chartaceous, weakly bullate; lateral primary nerves visible for 3/4 or more of the lamina length, the secondary nerves 2 or 3, secondary and tertiary nerves reticulate and frequently deeply impressed above, prominent below; upper surface glabrous or soon glabrescent; lower surface sparsely or densely pubescent, the hairs appressed, pale coloured, restricted to the nerves, occasionally spreading hairs also present on secondary nerves; base of major lamina weakly asymmetrically cuneate to rounded, the base of minor lamina frequently truncate; margins broadly dentate (rarely crenate-dentate or dentate-serrate) to base, with 25-30(-33) teeth, 1-1.5 mm, becoming shallow towards the base; apex long acute to indistinctly acuminate; stipules 4-7 mm, narrowly triangular with hyaline margin, red-brown, the midrib pubescent; petiole of major leaves 15-40 mm, petiole of minor leaves sessile to 0.5 mm. Inflorescences 5-8 mm in diameter, axillary, on unmodified stems, occasionally also along stout lateral branches, the basal half of which lack

leaves, stems or whole plants frequently with inflorescences of only one sex; inflorescences unisexual, rarely a few staminate flowers in a pistillate-dominated inflorescence, 30-70 flowers, the flowers pubescent; all bracts 0.2-0.5 mm. Staminate inflorescence bearing sessile to pedicellate flowers; pedicels to 1 mm; flowers 4-merous, c. 0.8 mm diameter immediately prior to anthesis, tepal apices forming a minute apiculus, subapical appendage 0.2-0.4 mm. Pistillate inflorescences bearing sessile flowers; flowers 0.8-1(-1.8) × c. 0.5 mm, perianth tube ovoid, slightly dorsiventrally compressed; stigma solitary, 1-1.5(-2) mm, not bottle brush like. Fruiting perianth tube 1.5-2 × c. 0.8 mm, frequently dorsiventrally compressed towards the apex giving a winged appearance; achenes 1-1.5 × c. 0.6 mm, winged on each side. *Forest edges, open forest, cloud forest, roadsides, river banks.* CR (Burger & Liesner 6861, F); P (Allen 4913, BM). 1100-2800 m. (Mesoamerica, Colombia, Ecuador.)

Variable in habit and leaf texture. This species is most similar to *Boehmeria aspera* from which it may be distinguished by the leaf length-width ratio.

3. *Boehmeria burgeriana* Wilmot-Dea, Friis & Kravtsova, *Kew Bull.* 58: 213 (2003). Holotype: Costa Rica, Burger 4137 (F!). Illustr.: Burger, *Fieldiana, Bot.* 40: 221, t. 21 (1977), as 'Genus?'

Perennial herbs or subshrubs, to 0.5 m, partly prostrate, rooting at the nodes; stems 6 - 15 mm diameter, densely pubescent but soon glabrescent, the hairs 0.1-1.5 mm, spreading. *Leaves* opposite, equal or unequal by a ratio of 1:1.5 or less; lamina 1.7-11 × 1-7 cm, ovate, weakly asymmetrical, ratio of width to length 1:1.5-2.5, membranous to subchartaceous, lateral primary nerves visible for 1/2 or more of the lamina length, the secondary nerves 2-4, finely prominulous beneath; upper surface sparsely pubescent, the hairs spreading, bulbous-based; lower surface densely pubescent on nerves only; base asymmetrical, narrowly cuneate to rounded or truncate; margins coarsely serrate or crenate, nearly to the base, with 10-20 teeth, 2-4 mm, the teeth increasing in size and number with leaf size; apex acuminate, consisting of a single tooth; stipules 3-10 mm, conspicuous, lanceolate, golden brown, glabrous; petiole 2-60 mm. Inflorescences borne on unmodified stems, 8 mm in diameter or less, those near the stem apex consisting of 30 flowers or fewer, those near the base with 15 flowers or fewer, grading from staminate, staminate dominated, pistillate dominated to pistillate, the flowers sparsely pubescent; all bracts 0.4 mm or less. Staminate inflorescence bearing subsessile or pedicellate flowers, pedicels 2.5 mm or less; flowers 4-merous, 1-1.5 mm in diameter immediately prior to anthesis, ovate; tepals with long convergent subapical projections 1-1.5(-2) mm, comprising 1/2-2/3 total staminate flower length. Pistillate inflorescences bearing sessile flowers; flowers c. 1 mm, laterally fused in pairs, rarely three's, perianth tube with a longitudinal groove on one side; stigmas 2(-3), c. 0.3 mm, not bottle brush like. Fruit the product of 2(-3) laterally fused ovaries, 1-2 × 1-1.5 mm, triangular-conical, 3 or several angled; perianth tube more or less fused to the pericarp, glabrous; achenes 2-3 per fruit. *Wet slopes, stream-sides, remnant and secondary forests, pastures.* CR (Haber et al. 11280, INB). (300-)900-1600 m. (Endemic.)

This species is so far known only from the wet Pacific slopes of central Costa Rica.

The lateral fusion of the pistillate flowers makes this species unique in the genus. It is also distinguished by the long subapical appendages comprising 1/2-2/3 total staminate flower length. It most closely resembles *Boehmeria cylindrica* in its leaf arrangement and texture.

4. *Boehmeria caudata* Sw. *Prodr.*, 34 (1788). Lectotype (designated by Wilmot-Dea & Friis, 1996): 'Jamaica,' *Anon. s.n.* (sheet that consists of two branches with flowers and leaves) (S!). Illustr.: Burger, *Fieldiana, Bot.* 40: 221, t. 24 (1977).

Boehmeria flagelliformis Liebm, *B. guatemalensis* Gand., *B. palmeri* Watson, *Urtica spicata* Sessé & Moç.

Spreading shrubs or trees, 1-8 m; stems to 2.5 mm diameter near their apex, densely pubescent, the hairs of varying length. Leaves opposite, subequal at each node, lamina 11-22 × 4.5-12(-17) cm, weakly asymmetrically ovate, ratio of width to length 1: 2-2.5, chartaceous, occasionally weakly bullate; lateral primary vein in broader half of the leaf visible for 2/3 or more of the lamina length, the secondary nerves 3-5, prominent beneath; upper surface sparsely to densely pubescent, the hairs 0.2-0.5 mm, appressed; lower surface sparsely to densely pubescent, the hairs of varying lengths, spreading, pale coloured, where dense giving a velvety feel to the leaf; base obliquely cuneate to rounded; margins serrate, crenate-serrate, dentate, the basal 1/4 entire, teeth (25-)35-50(-70) on each side, 2-4 mm; apex short-acuminate; stipules (4-)8-18 mm, conspicuous, deltate to lanceolate, densely pubescent, red-brown; petiole (10-)20-75 mm. Inflorescences borne on pendent axillary leafless branches, the axes 7-30 cm, unisexual, pistillate and staminate inflorescences frequently completely obscuring the stem, 4-7 mm in diameter, bearing c. 10-40 flowers, the flowers sparsely pubescent; all bracts 0.6 mm or less. Staminate inflorescences bearing subsessile flowers; flowers 4-merous, 1.5 mm diameter immediately prior to anthesis, globose; tepals not forming an apiculus, frequently with an indistinct subapical appendage 0.1 mm or less. Pistillate inflorescences bearing sessile flowers; flowers c. 1 × 0.5 mm, perianth tube ovoid to obovoid, markedly dorsiventrally compressed; stigma solitary, 2-3 mm, not bottle brush like. Fruiting perianth tube 2.5 × 1.5 mm, markedly dorsiventrally compressed, broadly winged, the wings membranous, c. 0.5 mm wide; achenes c. 0.5 × 0.4 mm. Forests, *cloud forests*, *streamsides*, *ravines*, *waterlogged ground*. B (*Davidse et al.* 35709, BM); G (*Ortiz 1648*, US); H (*Yuncker et al.* 6388, K); ES (*Molina et al.* 21565, F); N (*Moreno et al.* 15869, MO); CR (*Tonduz 13279*, G); P (*Correa et al.* 1421, MO). 100-2200(-2650) m. (Mexico, Mesoamerica, Colombia, Venezuela, Ecuador, Peru, Brazil [south of 20° S], Bolivia, Paraguay, Argentina, Jamaica.)

This species is unique in Mesoamerica because of its long, pendulous entirely leafless inflorescence-bearing axes.

5. *Boehmeria celtidifolia* Kunth in Humb., Bonpl. & Kunth, *Nov. Gen. Sp.* 2: 34 (1817). Holotype: Ecuador, *Humboldt & Bonpland s.n.* (P!). Illustration: Wilmot-Dear & Friis, *Opera Bot.* 129: t. 22, J-V (1996).

Scrambling shrubs or trees, 1.5-15 m; stems 0.7-1 mm diameter at their apex, sparsely or densely pubescent, the hairs 0.15 mm or less, appressed. Leaves alternate or subopposite, the lamina unequal in size by a ratio of 1:3-5(-9), occasionally unequal in shape; major lamina (4-)5-12(-16) × 1.5-4(-6) cm, narrowly ovate, occasionally weakly asymmetrical, ratio of width to length 1:(2-)2.5-3(-5); subchartaceous to subcoriaceous, occasionally weakly bullate, lateral primary nerves visible 1/3 or more of the lamina length, the secondary nerves 1 or 2(3), distinctly impressed above, prominent beneath; upper surface densely pubescent, the hairs appressed, orientated in one direction, very rarely arranged around areoles, occasionally bulbous-based; lower surface densely pubescent, the hairs spreading, giving the leaf a velvety feel; base broadly cuneate; margins serrate almost to base, teeth 20-30 on each side, 1-2(-3) × 1-2(-5) mm; apex of major lamina acute to short-acuminate, apex of minor lamina broadly acute; stipules 4-8 mm, red-brown, chartaceous, midrib pubescent; petiole of major leaves 5-10 mm, minor leaves subsessile. Inflorescences axillary, 2-5 mm in diameter, borne on unmodified or short leafless lateral stems, lateral stems with an apical tuft of unmodified leaves, bearing 20-75 flowers, the flowers loosely packed, sparsely pubescent, unisexual, all bracts c. 0.3 mm. Staminate flowers 4-merous, 1 mm diameter immediately prior to anthesis, globose, distinctly apiculate, subapical tepal appendage absent; pedicels 1-2(-4) mm. Pistillate inflorescences bearing pedicelate flowers, flowers 1-1.5 × c. 0.4 mm, spindle shaped to ovoid, perianth tube narrowing to an apical beak; stigma solitary, 1.5-2 mm, 'bottle-brush' like;

pedicel 1-1.5(-2) mm. Fruiting perianth tube c. 0.5 mm in diameter, weakly dorsiventrally compressed, lacking marginal ridge; achenes c. 0.6×0.4 mm. *Forest remnants, secondary forests, dry scrub, gorges, open pastures, hedges, roadsides, cloud forests.* P (Stevens 18232, MO). 1600-3300 m. (Mesoamerica, Colombia, Venezuela, Ecuador, Peru.)

This species is unique in Mesoamerica because of its long-pedicellate spindle-shaped pistillate flowers and bottle-brush shaped stigma. It most closely resembles *B. radiata* in general appearance

6. *Boehmeria cylindrica* (L.) Sw., Prodr. 34 (1788). *Urtica cylindrica* L., Sp. Pl. 984 (1753). Lectotype (designated by Wilmot-Dear & Friis, 1996): Jamaica, Virginia and Canada (LINN-1111-12); Illustr.: Burger, *Fieldiana, Bot.* 40: 221, t. 24 (1977).

Perennial herbs or shrubs to 1.5 m; stems to 2.5 mm in diameter at their apex; pubescence sparse or abundant, the hairs 0.3 mm or less, more or less spreading. Leaves opposite (occasionally alternate on lateral, inflorescence-bearing, branches), equal or subequal at each node, lamina 4-10(-13) \times 1-4(-6) cm, weakly asymmetrically ovate or narrowly ovate, ratio of width to length 1:2-4, chartaceous to thinly membranous; lateral primary nerves visible for 1/2 or more of the lamina length, robust secondary nerves in broader half of leaf 1-2(-3), prominulous on lower surface; upper surface sparsely pubescent, rarely glabrescent, the hairs 0.3 mm or less, appressed; lower surface as upper surface; base obliquely cuneate to rounded; margins serrate, almost to base, up to c. 25 teeth, 4-5(-7) mm; apex of a single tooth almost equal in length to the whole acumen; stipules 2.5-4.5(-7) mm, red-brown, glabrous; petiole 10-40 mm. Inflorescences axillary, borne on both unmodified and leafless axes, a terminal tuft of reduced almost bract-like leaves or unmodified leaves present distally, unisexual, occasionally bisexual dominated by staminate flowers, 1.5-3(-5) mm in diameter, bearing 10-30 flowers, the flowers sparsely pubescent; all bracts 0.4 mm or less. Staminate inflorescence bearing sessile flowers; flowers 4-merous, c. 1 mm diameter immediately prior to anthesis, subglobose; tepals not forming an apiculus, subapical tepal appendage 0.2 mm or less. Pistillate inflorescences bearing sessile flowers; flowers 0.5-0.8 mm, perianth tube narrowly ovoid, markedly dorsiventrally compressed, winged; stigma solitary, 0.5 mm, not bottle brush like. Fruiting perianth tube c. 1×1 mm, strongly dorsiventrally compressed, with a narrow subcoriaceous wing, the wing 0.2-0.3 mm wide; achenes c. 0.7×0.5 mm. *Moist primary and secondary forests, dry forests, streamsides, clearings, grasslands, swamps, a weed in plantations.* T (Matuda 3357, K); G (von Türckheim II 173, Z); H (Standley 54920, F); N (Levy 34, C); CR (Burger, 1977: 232); P (Dunlap 365, US). 0-200(-600) m. (Canada, USA, Bermuda, Mexico [Morelos, Nuevo Leon, Tamaulipas, Veracruz], Mesoamerica, Colombia, Venezuela, French Guiana, Brazil, Paraguay, Uruguay, Argentina, Cuba, Jamaica, Hispaniola.)

This species most closely resembles *Boehmeria caudata* in inflorescence arrangement and winged fruit. It may be distinguished from the latter by its ascendent inflorescence-bearing axes bearing leaves at their apex, its narrow and thick fruiting perianth tube wing, often membranous leaves and leaf acumen consisting of a single elongated tooth.

7. *Boehmeria nivea* L. Gaudich., Voy. Uranie: 499 (1826). *Urtica nivea* L., Sp. Pl. 2: 985 (1753). Lectotype (designated by Ghafoor, 1977): China, *Anon.s.n.* (LINN-1111.19). Illustr.: Burger, *Fieldiana, Bot.* 40: 221, t. 24 (1977).

Shrubs to 2 m; stems 3-4 mm diameter at apex, densely pubescent, the hairs long, coarse, spreading, pale. Leaves alternate, occasionally unequal in size, lamina 7-20 \times 4-18 cm, broadly ovate to elliptic or rarely almost orbicular, symmetrical, ratio of width to length 1:(1-1) 1/2-2; chartaceous or membranous; lateral primary nerves visible for 1/2-2/3 of the lamina length, the secondary nerves (1-)-2-3(-4), inconspicuous above and below; upper surface glabrous or sparsely pubescent; lower surface densely pubescent, the hairs more than 1 mm, very fine and thickly matted

obscuring the surface, absent from primary nerves; base truncate or broadly rounded, frequently abruptly narrow cuneate, rarely cordate; margins coarsely dentate-serrate or crenate, 14-20(-25) teeth on each side, entire close to base, teeth (2-)3-5 × 4-10 mm; apex broadly acute to long acuminate; stipules 5-12 mm, red-brown, chartaceous, pubescent or glabrous; petiole (3-)6-11 cm. Inflorescences axillary, 2-4 mm diameter, borne on modified leafless racemose-paniculate branched stems, the side-branches 3-10 cm, branched, each branch bearing several inflorescences, those towards the base staminate, staminate inflorescences bearing 3-10 flowers, pistillate inflorescences bearing 10-30 flowers; all bracts c. 0.3 mm. Staminate flowers 4-merous, c. 1 × 1.5 mm immediately prior to anthesis, subglobose, lacking subapical tepal appendages, sparsely pubescent. Pistillate inflorescences bearing sessile flowers; flowers 0.5-0.8 × 0.2-0.3 mm, narrowly ovoid, densely pubescent, the hairs spreading; stigma solitary, 0.5-1 mm, not bottle brush like. Fruiting perianth tube c. 1.5 × 0.6 mm, not noticeably compressed. *Moist premontane forests, roadsides, wastelands.* G (Harmon 2396, MO); H Wilmot-Dear & Friis, 1996: xxx; ES (Standley & Calderón: 94); CR (Tonduz 14908, K). 0-1200 m. (Native to South East Asia or China; naturalized elsewhere.)

Gaudichaud in his description of this species cites *Urtica nivea* L. as a possible synonym (indicated by a “?”), for this reason this name is not considered a basionym. A lectotype was selected as the lack of locality information on the type collection does not allow the holotype status of *Gaudichaud s.n.* (P) to be confirmed.

8. *Boehmeria pavonii* Wedd., *Ann. Sci. Nat., Bot., ser. 4*, 1: 202 (1854). Holotype: Peru, *Pavón s.n.* (P!).

Illustr.: Wilmot-Dear & Friis, *Opera Bot.* 129: 40, t. 16 (1996).

Boehmeria pallida (Rusby) Killip.

Shrubs or trees, 2-8 m; stems c. 1.5 mm in diameter at their apex, pubescent, occasionally densely so, the hairs 0.5 mm or less. Leaves alternate, unequal in size by a ratio of 1:3-4(-5), major lamina 9-21(-23) × 3-5.5(-7.5) cm, ratio of length-width 1:(2 3/4-)3-4, narrow elliptic-ovate, strongly asymmetrical; chartaceous to subcoriaceous; lateral primary nerves visible almost to lamina apex, the secondary nerves (0)1 or 2(3), arising from apical half of the midrib, distinctly impressed above, tertiary venation scalariform occasionally obscured by reticulation; upper surface sparsely to densely pubescent, the hairs 0.2 mm or less, adpressed; lower surface densely pubescent, the hairs very closely appressed, giving shiny-silky appearance, arranged in a distinct pattern, pointing into the areoles, occasionally spreading hairs present on the nerves; base of major lamina broadly cuneate, the base of minor lamina rounded; margins serrate, teeth (25-)35-50, teeth c. 0.5(-1) × 1-3 mm, becoming indistinct towards the base; apex of major lamina long-acuminate, apex of minor lamina acute more or less mucronate at the apex; stipules triangular, 3-5 mm, red to brown, chartaceous, glabrous or midrib pubescent; petiole of major leaves (0.5-)1-5 cm, of minor leaves subsessile. Inflorescences axillary, 2-5 mm in diameter, borne on unmodified stems, apical inflorescences all pistillate, the basal inflorescences all staminate, bearing c. 15-50 flowers, the flowers pubescent; pistillate inflorescence bracts 0.2 mm or less, staminate inflorescence bracts 0.4 mm or less. Staminate flowers 4-merous, 0.5-1.2 mm prior to anthesis, globose or ovoid, not apiculate, subapical tepal appendage 0.2 mm or less; sessile or pedicellate, where pedicellate 1 mm or less. Pistillate inflorescences bearing sessile or pedicellate flowers, flowers 0.8-1.3 × c. 0.5 mm, perianth tube ovoid, obovoid or spindle-shaped, tapering to a short beak; stigma solitary, 1-2 mm, not bottle brush like; where pedicellate 0.5 mm or less. Fruiting perianth tube 1-1.8 × c. 0.8 mm, dorsiventrally compressed; achenes not seen. *Moist tropical evergreen forests, semi-deciduous forests, montane forests, secondary forests, riversides.* Ch (Croat 47148, MO); G (Steyermark 43749, F); P (Davidson 830, F). 200-2100 m. (Mesoamerica, Colombia, Ecuador, Peru, Brazil, Bolivia, Paraguay.)

This species is distinct in having silky indumentum abaxially on the leaves. Otherwise it most closely resembles *Boehmeria aspera* and may be distinguished from the latter by the proportions of the major leaves, the indistinctly toothed leaf margins and the minor leaf not pointing downwards.

9. *Boehmeria radiata* Burger, *Phytologia* 31: 267 (1975). Holotype: Costa Rica, *Tonduz 12733* (US). Illustr.: Burger, *Fieldiana, Bot.* 40: 225, f. 28 (1977).

Shrubs or trees to 3(-15) m; stems to 1.5 mm diameter at their apex, sparsely pubescent, the hairs 0.4-0.7 mm, adpressed, occasionally also with hairs of 0.1-0.2 mm. Leaves alternate (rarely subopposite), lamina unequal in size by a ratio of 1:(1 1/2-2(-4)), unequal in shape; major lamina (4-)6-12(-23) × (2-)3-7(-10) cm, ratio of length-width 1:2-2.5, weakly asymmetrical, ovate to elliptic, chartaceous to subchartaceous, occasionally bullate, lateral primary nerves visible for 2/3 or more of the lamina length, the secondary nerves 2-4, not distinct from tertiary nerves, weakly impressed above, strongly impressed below; upper surface densely pubescent, rarely glabrous, the hairs 0.3-0.6 mm, adpressed, often arranged radially towards the centre of the areoles; lower surface very sparsely pubescent; base broadly cuneate to rounded to subcordate; margins serrate almost to the base, rarely crenate-dentate, 20-36(-45) teeth; apex acuminate; stipules c. 4-6 mm, narrowly triangular, red-brown, chartaceous, sparsely pubescent; petiole of major leaves 2-5(-8.5) cm, of minor leaves 0.3-2 cm. Inflorescences axillary, 3-5 mm in diameter, borne on an unmodified stem, occasionally also on slender almost or entirely leafless side-branches 10 cm or less, apical pistillate-dominated inflorescences grading into basal staminate-dominated inflorescences, bearing 30-60 flowers, the flowers densely pubescent; all bracts c. 0.5 mm. Staminate flowers 4-merous, c. 1 × 1 mm prior to anthesis, broadly ovoid, subapical tepal appendages 0.3-0.5 mm, conspicuous, forming an apical crown; subsessile. Pistillate inflorescences bearing sessile or pedicellate flowers. Pistillate flowers 0.8-1 × 0.2-0.3 mm, perianth tube narrowly ovoid; stigma solitary, (1.5-)2-3(-4) mm, not bottle brush like; where pedicellate 0.3 mm or less. Fruiting perianth tube ovoid, c. 1 × 0.5 mm, dorsiventrally compressed, with a marginal ridge either side; achenes c. 0.6 × 0.5 mm. *Seasonally dry vegetation along the Pacific coast: thickets, forested gorges, Pinus forests, riversides.* Ch (*Breedlove 44397*, MO); G (*Steyermark 30961*, F); ES (*Standley 19763*, GH); CR (*Brenes 323*, MO); P (*Pittier 5317*, GH). 500-2000(-2500) m. (Mexico [Jalisco, Nayarit, Oaxaca, San Luis Potosí, Sinaloa], Mesoamerica, Ecuador.)

This species most closely resembles *Boehmeria celtidifolia*, from which it can be distinguished by the relative size of the major to minor leaves, tightly packed subsessile pistillate inflorescence and larger pistillate flowers and staminate subapical tepal appendages. The distribution of this species corresponds to that of the seasonally dry forest (with dry season November to May) along the Pacific coast of Mesoamerica and (dry season May to October) in central Ecuador.

10. *Boehmeria ramiflora* Jacq., *Enum. Syst. Pl.*: 31 (1760). Type: Jacq., *Stirp. Amer. Hist. Pl.* t. 157 (1763). Illustr.: Burger, *Fieldiana, Bot.* 40: 225, f. 28 (1977).

Boehmeria cuspidata Wedd., *B. ramiflora* Jacq. var. *cuspidata* (Wedd.) Wedd., *B. rhynchophylla* Wedd.

Shrubs, 1-5 m; stems c. 1.5(-2.5) mm diameter at their apex, pubescent, the hairs 0.2 mm or less, appressed. Leaves alternate, unequal in size by a ratio of 1: 2-3, major lamina (5.5-)9-20(-22) × (1.5-)4-9(-9.5) cm, asymmetrical, ovate or elliptic, ratio of width to length 1:(2-)2 1/2-3 (-4), minor lamina ovate; chartaceous to subcoriaceous, weakly bullate; lateral primary nerves visible almost to lamina apex, the secondary nerves (1)2-4, present in broader half of lamina, frequently absent in narrower half; upper surface pubescent, frequently sparsely so, the hairs 0.1-0.2 mm,

appressed; lower surface sparsely to densely pubescent, rarely glabrescent, the hairs c. 0.1 mm, spreading or appressed; base of major lamina asymmetrically cuneate, the base of minor lamina truncate or cordate; margins of narrower side occasionally entire and sinuate, margins of the broader side serrate to crenate, the teeth 15-35, 1-1.5 × 1.5-3 mm, lower 1/4-1/3 entire; apex of major lamina long acuminate, apex of minor lamina acute to acuminate; stipules 5-10(-18) mm, red-brown, narrowly triangular, very sparsely pubescent; petiole of major leaves (1-)3-5(-7) cm, minor leaves subsessile or sessile. Inflorescences axillary, borne on unmodified stems, 2-4 mm in diameter, pistillate or staminate dominated, bearing (20-)40-50 flowers; all bracts 0.8 mm or less. Staminate flowers 3-merous, c. 1 × 1 mm prior to anthesis, globose, not apiculate, subapical tepal appendage c. 0.1 mm, very sparsely pubescent, subsessile. Pistillate inflorescences bearing subsessile or pedicellate flowers, flowers c. 1 × 0.5 mm, perianth tube narrowly ovoid to obovoid, narrowing into a short beak; stigma solitary, 1.5-2.5(-4.5) mm, not bottle brush like; where pedicellate 0.5 mm or less. Fruiting perianth tube 1.5-2 × 0.8-1 mm, markedly dorsiventrally compressed with an apical marginal wing on each side, resulting in obtriangular or obcordate outline; **achenes** ?. *Evergreen forests, disturbed forests, river banks, rocky hillsides, roadsides.* T (*Matuda 3441*, K); Ch (*Breedlove 21143*, MO); B (*Whitefoord 2026*, MO); G (*Bernoulli et al. 2556*, K); B (*Whitefoord 2026*, BM); H (*Edwards 417*, MO); N (*Atwood 3223*, UC); P (*Hammel 5454*, MO). 0-1600 m. (Mexico [Oaxaca], Mesoamerica, Colombia, Venezuela, Surinam, French Guiana, Ecuador, Peru, Cuba, Jamaica, Hispaniola, Leeward Islands, Windward Islands, Dutch Antilles, Trinidad, Tobago.)

This species is unique to Mesoamerica in having 3-merous flowers. Otherwise it is most similar to *Boehmeria pavonii*, differing from the latter in leaf proportions, indument of the lower leaf surface and large staminate inflorescence bracts.

11. *Boehmeria ulmifolia* Wedd., *Ann. Sci. Nat., Bot., ser. 4*, 1: 202 (1854). Holotype: Mexico, Veracruz, *Galeotti* 311 (P!). Illustr.: Burger, *Fieldiana, Bot.* 40: 225, f. 28 (1977).

Boehmeria anomala (Wedd.) Killip, *B. fallax* Wedd., *B. fallax* var. *cordata* Wedd., *B. pavonii* var. *anomala* Wedd.

Shrubs, erect or semi-scandent, or trees, 1-5(-13) m; stems 0.7-1 mm at their apex, sparsely pubescent, the hairs 0.5-1 mm, occasionally also with hairs of 0.1-0.2 mm. Leaves alternate or subopposite, lamina unequal in size by a ratio of 1:(10-)12-50(-70), unequal in shape, minor leaves frequently absent (early caducous?); major lamina 6-20 × 1.5-6 cm, narrowly ovate, rarely elliptic or slightly obovate, markedly asymmetrical, ratio of length-width 1:(2 1/2-)3-4, minor lamina 0.1-0.7(-1.2) cm, broadly ovate, orbicular, reniform or deeply bilobed; membranous or subchartaceous, rarely subcoriaceous; lateral primary nerves visible 2/3 or more of the lamina length, the secondary nerves (1)2 or 3; upper surface sparsely to densely pubescent, the hairs 0.3-1 mm, appressed; lower surface sparsely to densely pubescent, the hairs 0.3-1 mm, appressed or spreading; base of major lamina obliquely rounded or broadly cuneate, the base of minor lamina deeply cordate(-rounded); margins serrate or crenate-serrate, teeth 20-30(-40), 0.5-1(-2) × 2.5 mm, the basal quarter of lamina subentire to entire, margins of minor lamina shallowly crenate-dentate or subentire; apex long-acuminate with a long apical tooth comprising most of the acumen, apex of minor lamina acute, rounded or emarginate; stipules 3.5-7 mm, linear-lanceolate, with a hyaline margin, red-brown, pubescent; petiole of major leaves 0.5-0.8 cm, minor leaves sessile to subsessile. Inflorescences axillary, borne on an unmodified stem, plants usually unisexual but occasionally staminate and pistillate dominated inflorescences found on the same stem. Staminate and pistillate inflorescences bearing 3-45 flowers; staminate bracts 0.5 mm or less; pistillate bracts 0.3 mm or less. Staminate flowers 4-merous, c. 1 mm in diameter immediately prior to anthesis, globose, distinctly apiculate, subapical

tepala appendage 0.15 mm or less, sessile, rarely pedicellate, where pedicellate 1 mm or less. Pistillate inflorescences bearing subsessile flowers, flowers c. 1×1.3 mm, sparsely pubescent, the perianth tube narrowly ovoid or ellipsoid; stigma 0.5-2 mm; the pedicel 0.1(-0.2) mm or less. Fruiting perianth tube $0.8-1.5 \times c. 0.5$ mm, weakly to moderately dorsiventrally compressed, with a weak marginal ridge; achenes c. 0.7×0.5 mm. *Wet undisturbed and disturbed forests, damp rocks, riversides, damp scrub.* Ch (*Matuda 2969*, GH); B (*Bartlett 11430*, US); G (*Standley 61289*, F); H (*Standley & Steyermark, 1952: 400*); ES (*Tucker 1289*, K); CR (*Liesner 5195*, MO); P (*Hampshire et al. 334*, F). 500-2800 m. (Mexico [Veracruz], Mesoamerica, Venezuela, Ecuador, Peru, Bolivia, Brazil.)

This species is highly variable with respect to 'major' leaf morphology. It most closely resembles *Boehmeria celtidifolia* and *B. pavonii*, from which it can be distinguished on the relative size of the major and minor leaves.

2. *Discocnide* Chew

By A.K. Monro.

Shrubs or trees, perennial. Stems without stinging hairs, not releasing watery latex when cut. Leaves alternate, the margins crenate to undulate; cystoliths punctiform or oblong; stipules borne in the axils of the leaves, simple, caducous. Inflorescences unisexual, paniculate; pedicels subtended by inconspicuous bracts. Staminate flowers 4- or 5-merous; tepals equal, lacking a subapical appendage. Pistillate flowers with the tepals 4, strongly unequal (appearing 2); stigma filiform. Achene a papery disc. 1 spp. Mexico and Mesoamerica.

Bibliography: Chew, W.L. *Gard. Bull. Singapore* 21: 207 (1965).

1. *Discocnide mexicana* (Liebm.) Chew, *Gard. Bull. Singapore* 21: 207 (1965). *Discocarpus mexicanus* Liebm., *Kongel. Danske Vidensk. Selsk. Skr., Naturvidensk. Math. Afd., ser. 5, 2: 308* (1851). Holotype: Mexico, Oaxaca, *Liebmann 14222* (C). Illustr. not known. N.v.: Mala mujer negra.

Discocarpus nicaraguensis Liebm., *Laportea liebmannii* Wedd., *L. mexicana* (Liebm.) Wedd., *L. nicaraguensis* (Liebm.) Wedd., *Urticastrum nicaraguense* (Liebm.) Kuntze.

Monoecious shrubs or trees, 2-10 m, the roots tuberous. Young shoots sparsely pubescent, the hairs bulbed, c. 1 mm, strongly appressed, straight to weakly curved, internodes $4-17 \times 3-8$ mm, stems hollow at c. 5 mm diameter. Laminae $80-155 \times 55-125$ mm, elliptic or ovate, upper surface sparsely pubescent, the hairs bulbed, 0.5-0.8 mm, appressed, weakly curved, the cystoliths punctiform, inflated, scattered; lower surface sparsely pubescent, occasionally densely pubescent when young, two (where non-bulbed hairs present) classes of hair present, the bulbed hairs 0.8-1.3 mm, appressed, weakly curved, mainly on primary nerves, the non-bulbed hairs 0.3 mm, erect, straight or crooked, the cystoliths fusiform or oblong, randomly scattered; base truncate, obtuse or rarely cordate; margins weakly crenate or dentate, frequently irregularly so; apex acute; petiole $70-125 \times 1.5-2$ mm; stipules 6-7 mm, deltate, glabrous. Inflorescences 60-280 mm, pubescent, the hairs 0.8-1 mm; staminate flowers 5-merous, $1.5-1.8 \times 2-3$; pistillate flowers $1.3-1.5 \times 0.5-0.8$ mm, the lateral tepals 0.5-0.7 mm, ovate to deltate, the dorsal and abaxial tepals c. 0.3 mm. Achenes $3.5-4 \times 4.5-5$ mm, glabrous, margins thickened, the seed visible inside. *Undisturbed forests on limestone, disturbed forests, low forests, Pinus-Quercus forests.* G (*Tun O. 1145*, BM); H (*Evans 1780*, MO); N (*Araquistain 2242*, MO); CR (*Bello 828*, MO). 600-1800 m. (Mexico, Mesoamerica.)

3. *Gyrotaenia* Griseb.

By A.K. Monro.

Trees. Leaves alternate, simple, 3-veined from the base, the margins toothed; cystoliths present on the upper surface only; stipules borne adjacent to the leaves. Inflorescences unisexual, paniculate; pedicels subtended by inconspicuous bracts, the flowers borne in compact glomerules. Staminate flowers 4-merous; tepals equal, imbricate. Pistillate flowers with the tepals 3- or 4-merous; tepals unequal, the dorsal tepal with a subapical thickening; stigma penicillate.

Infructescence a spadix-like structure at maturity, the panicle branches becoming fleshy and surrounding the base of each glomerule; achene compressed, asymmetrically elliptic or ovate. 5 or 6 spp. Mesoamerica, Greater Antilles.

1. *Gyrotaenia microcarpa* (Wedd.) Fawc. & Rendle, *Fl. Jamaica* 3: 56 (1914). *Urera microcarpa* Wedd., *Arch. Mus. Hist. Nat.* 9: 156 (1856). Type: Jamaica, *Swartz s.n.* (BM). Illustr. not known.

Trees, to 7 m. Young shoots pubescent, the hairs strongly appressed; internodes 6-25 × 2.5-3.5 mm, hollow at c. 10 mm diameter. Laminae 21-110 × 14-56 mm, ovate, quarternary nerves reticulate; upper surface glabrous, the cystoliths fusiform, randomly scattered; lower surface pubescent, the hairs straight to weakly curved; base obtuse; margins serrate-crenate; apex subacuminate; stipules 6-8 mm, narrowly ovate to lanceolate; petioles 4.5-8 × 0.5 mm. Peduncular bracts 2-2.5 mm, broad ovate. Staminate inflorescences 1 or 2 per stem, 20-30 mm, bearing c. 90 flowers in sessile glomerules; flowers c. 1 × 1.3 mm. Pistillate inflorescences 4-40 per stem, 28-45 mm, bearing 550-1200 flowers in subsessile glomerules of c. c. 50 flowers; flowers 0.5 × 0.8 mm, the tepals 0.30-0.4 mm. Infructescence white to cream where fleshy; achene c. c. 1 × 0.8 mm. Pinus-Quercus *montane forests*. c. 2000 m. Ch (*Breedlove 68859*, K). Mexico [Oaxaca], Mesoamerica, Greater Antilles.)

Material of *Gyrotaenia microcarpa* from Mesoamerica differs from Antillean material by the presence of smaller more densely pubescent leaves.

4. *Hemistylus* Benth.

By A.K. Monro.

Shrubs or small trees, perennial. Stems without stinging hairs, not releasing watery latex when cut Leaves alternate, the margins toothed or entire; cystoliths punctiform; stipules borne either side of the petiole, simple, caducous.

Inflorescences bisexual or unisexual, if bisexual, dominated by staminate flowers. Staminate and staminate-dominated inflorescences racemose spikes, frequently with a few 2-flowered pistillate cymes towards the base; pedicels of staminate flowers subtended by inconspicuous bracts, borne in subsessile capitata heads. Staminate flowers 4-merous; tepals equal, lacking a subapical appendage. Pistillate inflorescences axillary and terminal, 2-flowered cymes or panicles of 2-flowered cymes, both frequently on the same stem, if paniculate, foliar bracts present; 2-flowered cymes subtended by a pair of prominent cordiform lobed bracts. Pistillate flowers conduplicate through the reduction of the pedicels and peduncles; tepals fused to form a perianth tube, the mouth toothed; stigma filiform. Achene compressed, subelliptic. 4 spp. Neotropics.

This genus is very similar to *Rousselia*.

Weddell, H.A. *Arch. Mus. Hist. Nat.* 9: 524-527 (1856-1857).

1. Hemistylus odontophylla Wedd., *Prodr.* 16(1): 235 (1869). Holotype: Venezuela, *Fendler 1827* (K).

Illustr.: **not known**.

Shrubs to 3 m. Stems hollow at c. 5 mm diameter, pubescent, the hairs 0.5-0.7 mm, weakly appressed, weakly curved to curved, the stem frequently with a dark stain on the cut portion of the stem in dry material (probably indicating latex). Laminae 9.2-19.5 × 4.8-11.5 cm, ovate or rhombic; upper surface pubescent, the hairs 0.5 mm, erect, weakly appressed or curved, the cystoliths punctiform, densely scattered; lower surface pubescent (occasionally lanate), the hairs 0.5-1 mm, erect, curved to crooked; the cystoliths not visible; base obtuse; margins coarsely serrate, except entire where leaf is subtending the inflorescence; apex acuminate; petioles 4-130 × 0.5-1.5 mm. Staminate-dominated inflorescences 67-110 mm, densely pubescent, the hairs to 0.5 mm; staminate flowers 1.3 × 1.5-1.8 mm, densely pubescent, the pistillode 0.3 mm in diameter; basal pistillate flowers as in pistillate inflorescence. Pistillate inflorescences 5-170 mm, if paniculate, the panicle with 1 or 2 orders of branching; foliar bracts 6-21 × 2.5-9 mm; 2-flowered cymes 5 mm, the bracts of the cyme persistent in fruit; stigma 4.5-5 mm. Infructescences as inflorescences, the bracts of the cyme bracts to c. 7 mm. Achenes c. 1.5 mm, green, shiny. *Disturbed and undisturbed deciduous forests.* Ch (*Breedlove 46152*, MEXU); G (Standley & Steyermark, 1952: 403). 800-1000 m. (Mesoamerica, Venezuela.)

Rarely collected, the unusual disjunct distribution of this species merits further study.

5. *Laportea* Gaudich.

By A.K. Monro.

Herbs or shrubs, perennials. Stems with stinging hairs, not releasing watery latex when cut. Leaves simple, alternate, the margins toothed; cystoliths fusiform; stipules borne in the axils of the leaves, fused from the base for some of their length, simple or forked, persistent or caducous. Inflorescences bisexual or unisexual, staminate and pistillate inflorescences paniculate, the flowers not subtended by bracts. Staminate flowers 4- or 5-merous; tepals equal, lacking a subapical appendage. Pistillate flowers with the tepals 4, strongly unequal (appearing 2-merous); stigma penicillate. Achene laterally compressed, ovoid. **Approx. 22 spp.** North America, Mesoamerica, Africa and Asia, centre of diversity in Africa and Madagascar.

Bibliografía: Chew, W.L. *Gard. Bull. Singapore* 25: 111-178 (1969).

1. *Laportea aestuans* (L.) Chew, *Gard. Bull. Singapore* 21: 200 (1965). *Urtica aestuans* L., *Sp. Pl. (ed. 2)* 1397 (1763). Lectotype (designated by de Rooij, 1975): Cultivated at Upsala from material from Surinam, *Anon.* (LINN-1111.14!). Illustr. Chew, *Gard. Bull. Singapore* 25: 165, t. 19 (1969).

Fleurya aestuans (L.) Gaudich.

Herbs or shrubs 0.2-1 m. Stems frequently red when fresh, pubescent with two or three (where glandular hairs present) classes of hair, the bulbous hairs 1-1.8 mm, the glandular hairs 0.5-1 mm, the neither bulbous or glandular hairs 0.3 mm. Laminae 3.2-16 × 1.8-13 cm, ovate, approaching cordiform, chartaceous; upper surface pubescent as the stem, the cystoliths fusiform, randomly scattered, occasionally very faint; lower surface pubescent as the stem; the cystoliths oblong or fusiform, densely scattered; pinnately veined although appearing 3-veined; base truncate or obtuse; margins coarsely dentate; apex acute to acuminate; petioles 12-145 × 0.8-1.8 mm, pubescent as stem; stipules 7-12 mm, fused at base for 1/3-1/2 their length. Inflorescences bisexual, dominated by pistillate or staminate flowers, more frequently by pistillate flowers; staminate dominated inflorescences with staminate flowers borne in 1-15 compact heads, the flowers 4-merous, 0.5-1.5 × 0.5-1 mm, pubescent, pedicellate; pistillate-dominated inflorescences with flowers borne in 20-80

subcompact heads, the flowers 0.5-1 mm. Achenes 1.3-1.8 mm, the base enclosed by the perianth which is reflexed; asymmetrically elliptic, keeled. *Disturbed vegetation, roadsides*. B (*Schipp 807*, BM); G (*Tun O. 1371*, BM); ES (*Montalvo 6213*, LAGU); N (*Miller 1377*, MO); CR (*Chavarría 263*, MO); P (*Knapp y Monro 9246*, PMA). 0-700(-1200) m. (Mesoamerica, Colombia, Venezuela, Ecuador, Peru, Greater Antilles, Leeward islands, Windward Islands, Bermuda, Africa, Madagascar.)

Possibly native to Madagascar and spread by man to its current distribution. Considered a weed throughout Mesoamerica (García et al., 1975).

6. *Myriocarpa* Benth.

By A.K. Monro.

Shrubs or trees, perennial. Stems without stinging hairs, frequently releasing watery latex when cut. Leaves alternate, the margins toothed to subentire; cystoliths fusiform, frequently appearing branched; stipules borne in the axils of the leaves, simple, caducous, rarely persistent. Inflorescences unisexual, pistillate and staminate inflorescences few-branched racemose spikes; pedicels subtended by inconspicuous bracts. Staminate flowers 4-merous; tepals equal, lacking a subapical appendage; pistillode prominent. Pistillate tepals 2, 3 or 4, equal; stigma foot-shaped. Achene subcompressed, ovoid. **Aprox. 12 spp.** Neotropics.

It is difficult to distinguish between pistillate flowers and fruit in *Myriocarpa* as the tepals, ovary and achene, and stigma remain the same size and shape during their development from flower to fruit. For this reason no distinction is made between pistillate flower and fruit in this treatment. There has been disagreement between authors as to whether the structures at the base of ovary are bracts or tepals. For the purpose of clarity with regards to the other generic accounts, I here refer to these structures as tepals although further research may indicate they are homologous with bracts.

Bibliography: Weddell, H.A. *Arch. Mus. Hist. Nat.* 9: 484-490 (1856). Monro, A.K. *Novon* 19: 85-95 (2009).

Key to staminate material

1. Cystoliths present on lower leaf surface.
 2. Cystoliths on upper leaf surface randomly scattered throughout, leaves subcoriaceous to chartaceous. **6. *M. obovata***
 2. Cystoliths on upper leaf surface arranged radially around hair bases and glands. **3. *M. cubilgüitzensis***
1. Cystoliths absent on lower leaf surface.
 3. Upper leaf surface pitted, occasionally only in part, the cystoliths randomly scattered throughout. **4. *M. heterospicata***
 3. Upper leaf surface never pitted, the cystoliths arranged radially around hair bases and glands.

4. Plants deciduous; peduncle very densely pubescent, drying silvery grey in colour, the peduncle completely obscured by the hairs; stamens 1-1.5 mm.

1. *M. bifurca*

4. Plants evergreen, rarely deciduous; peduncle glabrous, pubescent, densely pubescent, the peduncle visible or completely obscured by the hairs, where completely obscured drying orange-brown in colour; stamens 1.3-2.3 mm.

5. Inflorescence less than 90 mm.

7. *M.*

trifurca

5. Inflorescence 90 mm or longer.

6. Flowers 2-2.8 mm wide immediately prior to anthesis, stamens 2-3 mm; pedicels 0.13-0.3 mm.

2. *M. cordifolia*

6. Flowers 1.13-2 mm wide immediately prior to anthesis, stamens 1.3-1.8 mm; pedicels 0.3-0.8 mm.

5. *M. longipes*

Key to pistillate material

1. Cystoliths present on lower leaf surface.

2. Cystoliths on upper leaf surface randomly scattered throughout, leaves subcoriaceous to chartaceous; inflorescences 140 mm or less.

6. *M. obovata*

2. Cystoliths on upper leaf surface arranged radially around hair bases and glands; inflorescences 140 mm or longer., leaves membranous to subchartaceous; inflorescences 140 mm or longer

3. *M. cubilgüitzensis*

1. Cystoliths absent on lower leaf surface.

3. Upper leaf surface pitted, occasionally only in part, the cystoliths randomly scattered throughout.

4. *M. heterospicata*

3. Upper leaf surface never pitted, the cystoliths arranged radially around hair bases and glands.

4. Inflorescences coiled or curled in part, especially at the tip, drying very dark brown, almost black, to very dark purple, peduncle densely pubescent; plants deciduous.

1. *M. bifurca*

4. Inflorescences not loosely curled or coiled, drying green, green-brown, pale brown,

red-brown to dark brown, peduncle sparsely pubescent to pubescent; plants evergreen.

5. Inflorescence less than 2.5 mm in diameter, flower density 10-36 per cm.

5. *M. longipes*

5. Inflorescence 2.5 mm or more in diameter, flower density 36-112 per cm.

6. Inflorescence 3.5-5.5 mm in diameter, bearing more than 3000 flowers; flower 1.8-2.3 mm.

2. *M. cordifolia*

6. Inflorescence 2.50-3.3 mm in diameter, bearing fewer than 2000 flowers; flowers 1.3-1.5 mm.

7. *M. trifurca*

1. *Myriocarpa bifurca* Liebm., *Kongel. Danske Vidensk. Selsk. Skr., Naturvidensk. Math. Afd., ser. 5, 2: 307* (1851). Lectotype (designated by Monro, 2009): Nicaragua, *Oersted 5850 '12/47' (C!)*. Illustr.: not known. N.v.: *Chichicaste manso, pica-pica, ES.*

Shrubs or trees, to 8 m, deciduous. Young shoots pubescent to densely pubescent, the hairs (0.3-)0.5-0.8(-1.5-1.8) mm, erect to weakly appressed, rarely strongly appressed, curved or crooked; internodes 4-38 × 2.5-7 mm. Leaves 8.6-25 × 4.5-13.5 cm, broadly ovate, broadly elliptic, rhombic, or occasionally cordiform or oblong, chartaceous to subchartaceous, 3-veined, the lateral nerves visible for 1/2-3/4 of the leaf length, the secondary nerves (2-)3-6 pairs, 30-45° to the midrib, with domatia in axils of primary and secondary nerves; upper surface sparsely to densely pubescent, the hairs 0.5-1.3 mm, weakly curved, occasionally crooked or straight, the cystoliths fusiform, occasionally "V" and rarely "Y" shaped, arranged radially around hair bases and or glands, perpendicular to nerves, not pitted; lower surface densely pubescent, the hairs 0.5-1.3 mm, appressed to weakly appressed, occasionally erect, weakly curved or crooked, occasionally straight, the cystoliths absent; base obtuse, occasionally cordate; margins serrate to crenate serrate to base; apex acute, subcuspidate, cuspidate, occasionally subcaudate; stipules 4-17 mm; petioles 18-150 × 1-2.5 mm, densely pubescent to pubescent, the hairs 0.5-0.8(-1.5-1.8) mm. Staminate inflorescences 25-140 mm, branched (1-)2(-5) times, with a total flower-bearing length of 77-395 mm; peduncular bract 3-9 mm; peduncle densely pubescent, the hairs 0.3-0.5(-0.8-1.5) mm; flowers pedicellate to sessile, 0.63-1 × 1-1.8 mm immediately prior to anthesis; tepals 0.8-1.3 mm; stamens (0.8-)1-1.5(-1.8-2) mm; pedicels, if present, 0.3-0.5 mm. Pistillate inflorescences 1-12 per stem, 25-270 × 1.8-3.3 mm, bearing 624-6148 flowers, dichotomously 3-4(-5)-branched, the total flower bearing length 61-530 mm, with 57-169 flowers per cm, spreading, frequently curled, especially at tips, pendant where longer than 150 mm, very dark brown, almost black to very dark purple when dry; peduncular bract 1.8-4.5 mm; peduncle 2.5-18 mm, densely pubescent, the hairs 0.3-0.5(-0.8) mm, erect; flowers and fruits sessile, rarely pedicellate, (0.5-)0.8-1.3 × 0.38-0.63 mm; tepals 2(-3), 0.3-0.63 mm, appressed; ovaries and achenes 0.3-0.8 mm, ellipsoid to ovate, occasionally constricted from base for 1/4 of its length, pubescent, rarely glabrous, the hairs 0.3-0.38(-0.5) mm; style 0.3-0.38(-0.5) mm; stigma asymmetrical; pedicels, if present, 0.13-0.5 mm. *Disturbed and secondary deciduous broad leaf forests, riparian vegetation, shade coffee farms.* Ch (*Breedlove y Thorne 30386*, MEXU); G (*Steyermark 42725*, US); H (*Molina R. 792*, F); ES (*Calderón y Berendsohn 569*, LAGU); N (*Moreno 22625*, BM); CR (*Liesner 4968*, C). 100-1600 m. (Mexico [Oaxaca], Mesoamerica.)

There are two sheets of the type collection at C, both have been numbered *Oersted 5850*. However, they appear to have been collected in different months, one sheet being annotated '12/47' and the other '11/47' and therefore probably represent different collections. The sheet annotated '12/47' has been selected as lectotype.

2. *Myriocarpa cordifolia* Liebm., *Kongel. Danske Vidensk. Selsk. Skr., Naturvidensk. Math. Afd., ser. 5, 2: 306* (1851). Lectotype (designated by Monro, 2009): Mexico, Chiapas, *Liebmann 14226* (C!). Illustr.: not known.

Myriocarpa brachystachys S. Watson, *M. colipensis* Liebm., *M. cordifolia* Liebm. var. *colipensis* (Liebm.) Wedd., *M. malacophylla* B.L. Rob. & Bartlett.

Shrubs or trees to 12.5 m, evergreen. Young shoots densely pubescent, the hairs 1-2.3 mm, erect or weakly appressed, weakly curved to curved; internodes 6-34 × 3-8 mm. Leaf lamina 9.1-30 × 4.9-18.9 cm, broadly oblanceolate, oblanceolate, obovate, broadly elliptic, elliptic or ovate, chartaceous, subcoriaceous, 3- or 5-nerved, the lateral nerves visible for 1/4-2/3 of the leaf length, the secondary nerves 3-7 pairs, 30-60° to the midrib, with domatia in axils of primary and secondary nerves; upper surface not pitted, pubescent, the hairs 0.5-1.5 mm, weakly curved, straight or crooked, the cystoliths fusiform and “V” shaped, arranged radially around hair bases and or glands, perpendicular to nerves; lower surface pubescent to densely pubescent, the hairs 0.50-2.3 mm, appressed, erect or weakly appressed, weakly curved, the cystoliths absent; base cordate, obtuse or truncate; margins serrate to base; apex acute, subcuspidate or cuspidate; stipules 11-30 mm; petioles 13-62 × 1.3-2.50 mm, densely pubescent to pubescent, the hairs (0.5-)1-2.3 mm. Staminate inflorescences 90-310 mm, branched 2 times, with a total flower-bearing length of 335-511 mm; peduncular bract 5.5-10 mm; peduncle pubescent to densely pubescent, the hairs 0.38-0.8 mm; flowers pedicellate, 2-2.8 mm immediately prior to anthesis; tepals c. 2 mm; stamens 2-3 mm; pedicels 0.13-0.3 mm. Pistillate inflorescences 2-8 per stem, 80-450 × 3.5-5.5 mm, bearing (665-)3931-6480 flowers, dichotomously branched 1-2(-6) times, the total flower-bearing length 107-1092 mm, with 36-108 flowers per cm, pendent, pale brown to brown when dry; peduncular bract 2.3-8 mm, peduncle 9-42 mm, pubescent to sparsely pubescent, the hairs 0.38-1 mm, weakly appressed; flowers and fruits pedicellate, 1.8-2.3 × 0.5-0.8 mm; tepals (2-)3(-4), 0.5-1 mm, weakly spreading to spreading; ovaries and achenes 0.8-1.3 mm, ovoid to ovoid-ellipsoid, constricted from base for 1/4-1/3 of its length, pubescent, frequently only on the margin, the hairs 0.5-0.8 mm; style c. 1 mm; stigma very strongly asymmetrical; pedicels 0.3-0.5 mm. *Riparian vegetation, disturbed and undisturbed wet tropical forests, montane forests, cloud-forests, Quercus-Pinus-Liquidamber forest formations.* Ch (*Croat y Hannon 65220*, MO); G (*Skutch 1751*, NY); ES (*Allen 6948*, US); CR (*Garwood et al. 392*, BM). 900-3000 m. (Mexico [Jalisco to Veracruz], Mesoamerica.)

Myriocarpa cordifolia is very variable in leaf shape, pubescence, pistillate inflorescence structure and pistillate flower bracteole number, but divides into several geographically discrete morphological groups, but variation is continuous throughout the species range. Material from Guatemala, El Salvador and Costa Rica has relatively longer, broader pistillate inflorescences and more densely pubescent lower leaf surfaces and young shoots than material from Veracruz and Chiapas. In addition there are a number of morphological variations: material from Chiapas, *Breedlove 9415* (F), *Croat y Hannon 65220* (BM) and *Shilom T. 2088* (NY) is distinct in having pistillate inflorescences which are divided 3-6 times. Some material from Costa Rica (*Breedlove 30171*, MEXU) is distinct in having fruit with long, prominent (c. 0.8 mm) marginal hairs. Material from Chiapas (*Laughlin 533*, MEXU), Guatemala (*Standley 85087*, F) and El Salvador (*Allen 6948*, US), corresponding to *M. colipensis* Liebm., is distinct in having narrow leaves and pistillate flowers with four tepals. All of these characters vary within my delimitation of *M. cordifolia*.

Comment [SK2]: How does a fruit have a margin? Does this mean on the tepals in fruit? No the fruit is ellipsoid and the margin has hairs.

3. *Myriocarpa cubilgüitzensis* A.K.Monro, *Novon* 19: 88 (2009). Holotype: Guatemala, *Steyermark 44346* (US!). Illustr.: Monro, *Novon* 19: 89, t. 1 (2009).

Shrubs or trees to 9 m, evergreen. Young shoots pubescent to sparsely pubescent, the hairs 0.3-0.5 mm, erect, appressed, weakly curved, straight, crooked; internodes 6-25 × 2.5-4 mm. Leaf lamina 10.6-20.6 × 4.8-7.9 cm, obovate, rhombic, oblanceolate, ovate, membranous to subchartaceous; 3-veined, the lateral nerves visible for 1/2-2/3 of the leaf length, the secondary nerves 2-4 pairs, 30-60° to the midrib, domatia absent; upper surface pitted, glabrous, the cystoliths fusiform and “V” shaped fusiform, arranged radially around hair bases and or glands, perpendicular to nerves; lower surface sparsely pubescent, glabrous, the hairs c. 0.8 mm, appressed, weakly appressed, erect, weakly curved, straight, crooked, cystoliths fusiform, “V” and “X” shaped fusiform, arranged radially around hair bases and or glands, perpendicular to nerves; base acute, obtuse, cuneate; margins serrate, the basal 1/10-1/5 entire; apex cuspidate, subcuspidate; stipules 5-11 mm; petioles 13-98 × 1-2 mm, petioles of younger leaves pubescent, becoming glabrous, the hairs 0.5-0.8 mm. Staminate inflorescences not seen. Pistillate inflorescences 1-5 per stem, 140-300 × 3-4 mm, bearing 1083-2950 flowers, dichotomously and or trichotomously branched 1-2 times, the total flower bearing length 550-770 mm, with 16-50 flowers per cm, pendent, pale green-brown, pale brown when dry; peduncular bract c. 1 mm, peduncle 11-30 mm, sparsely pubescent or glabrous, where pubescent the hairs 0.3 mm, erect, straight; flowers pedicellate to subsessile, 1.8-2.50 × 0.68-1 mm; tepals 2, 0.8-1 mm, appressed; ovaries and achenes 0.8-1 mm, ellipsoid, constricted from base for 1/3-1/2 of its length, sparsely pubescent, pubescent, the hairs 0.3-0.5 mm; style 0.5-0.8 mm; stigma very strongly asymmetrical; pedicels 0.13-0.30 mm. *Riparian vegetation, lowland forests*. T (*Hanan A. 607*, MEXU); Ch (*Martínez-Icó 361*, MEXU); G (*von Türckheim 7982*, NY). 250-350 m. (Endemica.)

4. *Myriocarpa heterospicata* Donn. Sm., *Bot. Gaz.* 12: 133 (1887). Holotype: Guatemala, *von Türckheim 892* (US!). Illustr.: not known. N.v.: Canilla de venado, loasam, G; mumun taruche, saki che, Ch.

Myriocarpa heterostachya Donn. Sm.

Shrubs or trees to 9 m, evergreen. Young shoots sparsely pubescent, occasionally densley pubescent, the hairs 0.3-0.5 (0.8-1.8) mm, appressed, occasionally weakly appressed, weakly curved, straight; internodes 4-36 × 1.5-4 mm. Leaf lamina 2.7-26 × 1.4-8.4 cm, elliptic-ovate, elliptic, oblanceolate, obovate, lanceolate, rhombic, oblong, membranous to subcoriaceous; 3-veined, the lateral nerves visible for 1/3-2/3 of the leaf length, the secondary nerves 2-7 pairs, 30-90° to the midrib, with domatia in axils of primary and secondary nerves, occasionally absent; upper surface pitted, occasionally in parts only, rarely not pitted, glabrous, occasionally pubescent on midrib, the hairs 0.8-1.8 mm, weakly curved, curved, straight, crooked, the cystoliths fusiform, “V” shaped, “Y” shaped, rarely “X” shaped, rarely amorphous, randomly scattered throughout or occasionally radially; lower surface sparsely pubescent, occasionally pubescent, frequently only on nerves and in axils of secondary nerves, occasionally pubescent, the hairs 0.3-2 mm, appressed, occasionally weakly so, straight, weakly curved, crooked, cystoliths absent; base obtuse, acute, obtuse-acute, cuneate, minutely cordate; margins entire, minutely and sparsely and irregularly serrate or minutely and sparsely and irregularly crenate, occasionally serrate or crenate, the basal 1/10-1/2 entire; apex cuspidate, subcuspidate, attenuate, subcaudate; stipules 4-20 mm; petioles 6.5-125 × 0.8-1.8 mm, sparsely pubescent, pubescent, occasionally densely pubescent, the hairs 0.3-0.5(-0.8-2) mm. Staminate inflorescences 25-170 mm, branched 1, 2(-3) times, with a total flower bearing length of 32-355 mm; peduncular bract 0.8-2 mm; peduncle sparsely pubescent, pubescent or densely pubescent, the hairs 0.3-0.38(-0.5-0.8) mm; flowers pedicellate, subsessile or sessile; 0.8-1 × 1.3-2 mm immediately prior to anthesis; tepals 1-1.3 mm; stamens 1.3-2.5 mm; pedicels 0.3-0.5 mm. Pistillate inflorescences 1-21 per stem,

62-330 × 1.8-3(-3.75) mm, bearing 289-2394 flowers, dichotomously (occasionally appearing trichotomously) branched 1-4 times, the total flower bearing length 130-510 (565-815) mm with 10-114 flowers per cm, pendent, dark brown, green-brown, pale brown, red-brown when dry; peduncular bract 0.5-4 mm, peduncle 6-65 mm, sparsely pubescent to pubescent, the hairs 0.3-1 mm, appressed, occasionally weakly appressed or erect; flowers and fruits pedicellate, subsessile, sessile, 1-2 × 0.5-0.8 mm; tepals 2, 3, frequently varying within the same inflorescence, 0.5-1 mm, appressed, spreading; ovaries and achenes 0.68-1.3 mm, ellipsoid to ovoid, compressed, occasionally constricted from base for 1/4-1/2 of its length, otherwise unconstricted, pubescent, especially margin, the hairs 0.3-0.68 mm; style 0.3-1 mm; stigma asymmetrical; pedicels 0.13-0.5 mm. *Disturbed and undisturbed evergreen wet forests, cloud forest or Quercus-Pinus-Liquidamber forest formations*. T (*Magaña y Zamudio 870*, MEXU); Ch (*Breedlove 33068*, F); B (*Schipp 1033*, BM); G (*Standley 89901*, F); H (*Yuncker et al. 8477*, MO); N (*Stevens y Krukoff 23023*, BM). 40-2000 m. (Endémica.)

Material from the Department of Atlántida in Honduras: *Liesner 26318* (BM, MO), *Yuncker 8477* (BM, F, MO, NY, US) and *Yuncker 8761* (F, NY) is notable for having significantly longer and more floriferous pistillate inflorescences than other material from Mesoamerica. Donnell Smith sought to correct his hybrid (Latin-Greek) species epithet *heterospicata* by superfluously publishing *M. heterostachya* Donn. Sm., *Bot. Gaz.* 13: 29 (1888), and this name has been used in error.

5. *Myriocarpa longipes* Liebm., *Kongel. Danske Vidensk. Selsk. Skr., Naturvidensk. Math. Afd., ser. 5, 2: 306* (1851). Lectotype (designated by Monro, 2009): Costa Rica, *Oersted s.n. '5851'* (C!). Illustr.: Liebm., *Kongel. Danske Vidensk. Selsk. Skr., Naturvidensk. Math. Afd., ser. 5, 2: 306* (1851). N.v.: Lagarto, CR; barbade viejo, G; chichicaste de montaña, chilillo blanco, membracho, N.

Myriocarpa inaequilateris Liebm., *M. longipes* Liebm. var. *yzabalensis* Donn. Sm., *M. magnifica* Rusby, *M. yzabalensis* (Donn. Sm.) Killip.

Shrubs or trees, occasionally herbaceous, to 8(-12) m, evergreen, occasionally deciduous. Young shoots pubescent to densely pubescent, the hairs 0.5-1(-1.3-2) mm, appressed, erect, weakly curved to straight; internodes 10-53(-100) × 1.8-8(-20) mm. Leaf lamina (8.5-13-)18-59.7 × (3.1-7.5-)9-27.2 cm, lanceolate, elliptic, oblanceolate, ovate, obovate, subchartaceous to chartaceous, rarely subcoriaceous; 1, 3-veined, the lateral nerves visible for 1/3-2/3 of the leaf length, the secondary nerves (2-)3-8(-10) pairs, 30-60° to the midrib, with domatia in axils of primary and secondary nerves; upper surface not pitted, sparsely pubescent, occasionally glabrous, the hairs 0.5-1.3(-2) mm, weakly to strongly curved or crooked, the cystoliths fusiform, "V" shaped, "Y" shaped, rarely "X" shaped, arranged radially around hair bases and or glands, perpendicular to nerves, rarely randomly scattered throughout; lower surface pubescent, occasionally densely so, the hairs 0.5-1.5 mm, erect to weakly appressed, weakly curved, occasionally strongly curved or straight, cystoliths absent, **arranged na**; base obtuse, cordate, rarely acute or hastate; margins serrate, occasionally crenate-serrate to base; apex acute, cuspidate, occasionally subcuspidate, rarely subcaudate; stipules 9-34 mm; petioles (17-23-)40-185(-295) × 1-4(-6) mm, pubescent or densely pubescent, the hairs 0.5-1 mm. Staminate inflorescences weakly appressed, 90-220 mm, **branched 2, 3 times**, with a total flower bearing length of 130-450 mm; peduncular bract 3.5-8 mm; peduncle sparsely pubescent to pubescent, the hairs 0.3-0.5(-1) mm; flowers pedicellate, occasionally subsessile, 0.8-1.3 × 1.13-2 mm immediately prior to anthesis; tepals 0.8-1 mm; stamens 1.3-1.8 mm; pedicels 0.3-0.8 mm. Pistillate inflorescences 1-6(-11) per stem, 70-600 × 1.8-2.3 mm, bearing 1224-5278 flowers, dichotomously (occasionally trichotomously) branched (1-)2-3(-5) times, the total flower bearing length (490-580-)715-

2300 mm with 10-36(-58) flowers per cm, weakly appressed, lax, pendent, brown, red-brown, dark brown when dry; peduncular bract 4-6(-8-10) mm, peduncle 11-53 mm, sparsely pubescent, occasionally glabrous, the hairs 0.3-1 mm, appressed, occasionally erect; flowers and fruits pedicellate to subsessile, occasionally sessile; flowers/fruit 0.8-1.5(-2) × 0.38-0.80 mm; tepals 2, 0.38-0.68(-0.8) mm, appressed to weakly appressed; ovaries and achenes 0.5-0.8 mm, ovate, compressed, occasionally constricted from base for 1/4-1/3 of its length, pubescent, occasionally sparsely pubescent, the hairs 0.13-0.3 mm; style 0.3-0.5-0.68(-0.8) mm; stigma asymmetrical; pedicels 0.13-0.5 mm. *Disturbed, undisturbed and secondary evergreen wet forests, along streams.* Ch (Reyes G. et al. 1605, MEXU); B (Schipp 1178, NY); G (Donnell Smith 6775, BM); H (Standley 54061, US); N (Sandino 4113, MO); CR (Molina R. et al. 17405, F); P (Correa A. y Dressler 873A, PMA). 0-1800 m. (Mexico [Oaxaca], Mesoamerica, Colombia.)

This species is very variable for leaf shape size and fruit colour. The black shiny fruit cited by Donnell-Smith as one of the diagnostic characters for *Myriocarpa longipes* Liebm. var. *yzabalensis* Donn. Sm. (later raised to specific rank by Killip, 1927) appears to be variable within Mesoamerican species. For example it also occurs in some collections of *M. heterospicata* Donn. Sm., and it may be that it is associated with the maturity of the fruit.

6. *Myriocarpa obovata* Donn. Sm., *Bot. Gaz.* 46: 117 (1908). Type: Honduras, *Thieme 5500* (US). *Illustr.*: not known. N.v.: Chichicaste de tierra fria, ES.

Shrubs or trees to 17 m, evergreen. Young shoots sparsely pubescent, the hairs 0.3-0.5 mm, appressed, straight to weakly curved, rarely curved; internodes 5-18(30-) × 1.3-6 mm. Leaf lamina 4.2-21 × 1.8-7.6 cm, oblanceolate, obovate, oblong to elliptic, rarely ovate, chartaceous to subcoriaceous; 3-veined, the lateral nerves visible for (1/5-1/3-2/3) of the leaf length, the secondary nerves 2-3(-4) pairs, 45-60° to the midrib, domatia absent; upper surface rarely pitted, glabrous, the cystoliths fusiform, frequently "V" shaped fusiform and or elliptic, randomly scattered throughout, occasionally perpendicular to nerves; lower surface sparsely pubescent on nerves, the hairs 0.38-0.63 mm, appressed, straight, weakly curved, occasionally crooked, cystoliths fusiform, "V" shaped fusiform, rarely elliptic or absent, randomly scattered throughout; base acute, occasionally obtuse; margins irregularly crenate, minutely and sparsely dentate, serrate, rarely completely entire, the basal (1/5-1/2-2/3) entire; apex subcuspidate to cuspidate, occasionally acute; stipules 4-9(-12) mm; petioles 3.5-21(-48) × 0.8-1.8 mm, sparsely pubescent to pubescent, the hairs 0.3-0.5 mm. Staminate inflorescences weakly appressed, 32-140 mm, branched 1, 2 times, with a total flower bearing length of 66-211 mm; peduncular bract 2-3 mm; peduncle sparsely pubescent, the hairs 0.3-0.38; flowers pedicellate to subsessile, 0.8-1 × 1.3-1.8 mm immediately prior to anthesis; tepals 1-1.3 mm; stamens 1.5-2.3 mm; pedicels 0.5-1.3 mm. Pistillate inflorescences 2-15 per stem, 11-150 × 3-6 mm, bearing 48-480 flowers, dichotomously branched 1-3 times, the total flower bearing length 65-546 mm with 10-23 flowers per cm, weakly appressed, spreading, pale brown when dry; peduncular bract 1-2.5 mm, peduncle 2-15(-20-30) mm, pubescent to sparsely pubescent, the hairs 0.3-0.5 mm, appressed; flowers and fruits pedicellate to subsessile, (1.5-1.8-)2-2.8(-3) × (0.38-)0.5-1 mm; tepals 3, occasionally 4, (0.38-)0.5-0.8(-1) mm, appressed or spreading; ovaries and achenes (0.5-)0.8-1.3(-1.5) mm, ovate, occasionally ellipsoid, strongly compressed, constricted from base for (1/5-)1/4-1/3 of its length, pubescent, the hairs 0.5-0.8 mm; style (0.63-)0.8-1.3 mm; stigma asymmetrical, occasionally branched; pedicels 0.3-1 mm. *Semi-evergreen and evergreen disturbed and undisturbed tropical moist forests.* T (Hanan A469, MEXU); Ch (Breedlove 382495, MEXU); B (Gentle 2212, F); G (Lundell 15241, MEXU); H (Blackmore y Heath 2033, BM); ES (Calderón 1514, NY); N (Sandino 4264, MO); CR (Jiménez M. 450, F). 50-1400 m. (Mexico [Veracruz], Mesoamerica.)

A few collections from Guatemala and Oaxaca (Mexico) (*Caldéron 1360* (NY), *Williams et al. 40159* (US) and *Williams et al. 40201* (BM, F, NY)) have pitted upper leaf surfaces.

7. *Myriocarpa trifurca* A.K. Monro, *Novon* 19: 93 (2009). Holotype: Mexico, Veracruz, *Rebolledo V. 302* (F!). Illustr.: Monro, *Novon* 19: 94, t. 2 (2009).

Shrubs or trees to 6 m, evergreen. Young shoots pubescent, densely pubescent, the hairs to 0.5 mm, appressed, weakly appressed, curved, straight, weakly curved; internodes 7-17 × 2.5-4 mm. Leaf lamina 100-151 × 41-75 mm, elliptic, frequently asymmetrically so, membranous to chartaceous; 3-veined, the lateral nerves not prominent, visible for 1/3-1/2 of the leaf length, the secondary nerves 3-5 pairs, 45-60° to the midrib, with domatia in axils of primary and secondary nerves; upper surface not pitted, pubescent, the hairs 1-1.3 mm, crooked, straight, weakly curved, the cystoliths fusiform, "V" and "Y" shaped fusiform, appearing flattened, arranged radially around hair bases and or glands and perpendicular to nerves; lower surface pubescent, densely pubescent, the hairs 0.3-0.8 mm, appressed, weakly curved, straight, cystoliths absent; base cuneate, acute, obtuse; margins serrate to base; apex cuspidate; stipules 6.5-10 mm; petioles 17-62 × 1-1.5 mm, pubescent, densely pubescent, the hairs 0.3-0.8 mm. Staminate inflorescences c. 42-68 mm, branched 2,3 times, with a total flower bearing length of 69-102 mm; peduncular bracts c. 1.5 mm; peduncle densely pubescent, the hairs c. 0.5 mm; flowers subsessile, sessile; flowers c. 0.68 × 1.8-2 mm immediately prior to anthesis; tepals c. 1.5 mm; stamens not seen. Pistillate inflorescences 3-14 per stem, 45-240 × 2.5-3.3 mm, bearing 707-1204(-5600) flowers, trichotomously and dichotomously branched 1-2 times, the total flower bearing length of 108-500 mm, with 52-112 flowers per cm, pendent or spreading, green, green-brown, pale brown when dry; peduncular bract 1.5 mm, peduncle 8-30 mm, pubescent, sparsely pubescent, the hairs 0.38-0.5 mm, appressed or erect, weakly curved, crooked or straight; flowers and fruits subsessile to sessile c. 1.3-1.5 × 0.38-0.5 mm; tepals 2, 0.5-0.7 mm, weakly appressed; ovaries and achenes 0.68-0.8 mm, ellipsoid or ovate, constricted from base for 1/4-1/3 of its length, pubescent, the hairs 0.13-0.5 mm; style 0.5 mm; stigma asymmetrical; pedicels c. 0.13 mm.

Riparian and secondary forests, wet forests. 1250-1600 m. (Mexico [Veracruz], Mesoamerica.)

Although not collected from Mesoamerica, given the presence of this species in Veracruz, it is likely that it may also be present in Tabasco or Chiapas.

7. *Parietaria* L.

By A.K. Monro.

Herbs, annual or perennial. Stems without stinging hairs, not releasing watery latex when cut. Leaves alternate, simple, the margins entire; cystoliths punctiform; stipules absent. Inflorescences bisexual, bearing a mixture of bisexual and unisexual flowers, the flowers borne in short and frequently truncated panicles; pedicels subtended by prominent bracts. Staminate flowers bisexual, 4-merous, the tepals equal. Pistillate flowers unisexual or bisexual, 4-merous; tepals equal; stigma penicillate. Achenes weakly compressed, ovoid. Approx. 8 spp. Cosmopolitan.

Bibliography: Weddell, H.A. *Arch. Mus. Hist. Nat.* 9: 503-520 (1856).

1. *Parietaria debilis* G. Forst., *Fl. Ins. Austr.* 73 (1786). Holotype: New Zealand, *Forster s.n.* (BM-000582336!).

Herbs, perennial, prostrate, spreading to 40 cm. Stem woody with age, pubescent, the hairs 0.4 mm, erect, curved or crooked. Leaf lamina 3-28 × 2-15 mm, ovate, rarely elliptic, weakly 3-nerved to pinnately nerved on the same plant; upper surface pubescent, the hairs 0.5-1.3 mm, appressed, weakly curved to curved, the cystoliths punctiform, randomly (evenly?) scattered; lower surface pubescent, the hairs as upper surface; the cystoliths fusiform, sparsely scattered, obscure; base asymmetrical, acute/obtuse; apex acute or obtuse; petioles 3-18 × 0.30-0.4 mm, pubescent as stem. Inflorescences 1.5-3 mm, the pedicels subtended by 3 or 4 linear bracts, the bracts 1-2 mm; staminate (bisexual) flowers 1-1.5 mm, the tepals fused from their base for 1/4 or less of their length, elliptic-ovate, persistent in fruit becoming brown and lanceolate with age; pistillate flowers 1-1.5 mm, the tepals fused from their base for c. 1/2 of their length forming a tube, persistent in fruit, remaining green and narrow ovate. Achenes 0.7-1 × 0.5-0.7 mm, dark brown, very shiny. *Habitat unknown, probably disturbed, stony areas.* G (von Türckheim II-2012, BM); CR (Burger 1977: 240). c. 1400 m. (United States, México, Mesoamerica, Colombia, Venezuela, Ecuador, Galapagos, Perú, Bolivia, Brasil, Paraguay, Chile, Argentina, Antilles, Africa, New Zealand.)

8. *Phenax* Wedd.

By A.K. Monro.

Herbs, shrubs or small trees, perennial. Stems without stinging hairs, not releasing watery latex. Leaves alternate, simple, 3-veined, the margins toothed; cystoliths punctiform; stipules borne either side of the petioles, simple, persistent. Inflorescences bisexual, dense fascicles of glomerules; pedicels subtended by prominent bracts. Staminate flowers (3)4(5)-merous; tepals equal, frequently with a reduced subapical appendage, the pistillode surrounded by a tuft of white crooked hairs. Pistillate flowers lacking tepals; stigma filiform. Achenes weakly compressed, ovoid. 12 spp. Neotropics, with 1 sp. naturalised in Asia and Africa

Weddell, H.A. *Arch. Mus. Hist. Nat.* 9: 490-502 (1857).

1. Leaves narrow ovate or narrow lanceolate; bracts entire.

2. Petioles 3-7 mm; lower leaf surface 3-veined, the secondary nerves much finer than the lateral basal nerves, 15-21 pairs, borne at c. 75° to the midrib; achenes 0.5-0.7 mm, tuberculate, glabrous.

1. *P. angustifolius*

2. Petioles 4-55 mm; lower leaf surface 3-veined, the secondary nerves of similar thickness to the lateral basal nerves, 2-4 pairs, borne at 30-45° to the midrib; achenes 0.8-1 mm, tuberculate or smooth, sparsely pubescent.

3. *P. mexicanus*

1. Leaves rhombic, elliptic, ovate or lanceolate, rarely narrowly so; bracts ciliate and or pubescent 3

3. Leaves rhombic or narrow ovate; stipules 1.8-2 mm; bracts ciliate, otherwise glabrous (check); staminate flowers 0.8-1.5 mm, tepals with a laminate subapical appendage (check); stigma 1.5-4 mm.

4. *P. sonneratii*

3. Leaves ovate or elliptic; stipules 2.3-8 mm; bracts ciliate and pubescent; staminate flowers 1.8-3 mm, tepals with a corniculate subapical appendage; stigma 1.5-4 mm.

4. Young stems pubescent, the hairs 0.3-1 mm, weakly curved, straight or crooked; achenes 0.7-1 mm, olive green to dark brown, smooth, frequently with prominently tuberculate.

2. *P. hirtus*

4. Young stems pubescent, the hairs 0.3mm, strongly curved; achenes 1-1.3 mm, dark brown to black, smooth or areolate, tuberculate, the tubercles frequently with a concave apex.

5. P. sp. A

1. *Phenax angustifolius* (Kunth) Wedd. *Ann. Sci. Nat., Bot., sér. 4* 1: 193 (1854). *Boehmeria angustifolia* Kunth in Humb., Bonpl. & Kunth, *Nov. Gen. Sp.* 2: 34 (1817). Isotype: Colombia, *Humboldt y Bonpland s.n.* (P-00129789). Illustr.: Burger, *Fieldiana Bot.* 40: 226, t. 29 (1977).

Phenax ulei Krause.

Shrubs to 3 m. Young stems pubescent, densely so at shoot tips, the hairs 0.4-0.5 mm, strongly appressed, weakly curved, white. Leaf lamina 31-140 × 5-25 mm, lanceolate to narrowly lanceolate, 3-veined at base, the lateral nerves visible for 7/8 or more of the leaf length, equal in diameter to the midrib, the secondary nerves 15-21 pairs, borne at c. 75° to the midrib; upper surface glabrous to sparsely pubescent on midrib, the hairs 0.4 mm, strongly appressed, weakly curved, the cystoliths punctiform, densely scattered, the midrib and basal secondary nerves appearing sunken; lower surface pubescent with two classes of hair, the major hairs 0.5-0.7 mm, strongly appressed, weakly curved, the minor hairs 0.13-0.30 mm, weakly appressed, curved, the cystoliths not visible; base asymmetric, attenuate/decurent or obtuse, narrowly concave; margins minutely and sparsely serrate; apex attenuate, occasionally caudate; stipules 3-8 mm, lanceolate; petioles 3-7 × 0.5-0.7 mm, pubescent as stem. Inflorescences 5-9 mm in diameter, the individual clusters of flowers 1-1.8 mm; bracts entire or divided for c. 2/3 their length, narrow ovate or lanceolate. Staminate flowers c. 1 × 1.3 mm, valvate, the tepals 4, fused for c. 1/2 of their length, the tepal apex corniculate; pistillode surrounded by a tuft of white hairs; stigma 2-5 mm. Achenes 0.5-0.7 × 0.4 mm, ovoid, weakly triangular in cross-section, tuberculate. *Streamsidese, gallery forests, steep open banks.* CR (Burger *et al.* 10438, MO); P (Wilbur *et al.* 15614, MEXU). 0-900 m. (Mesoamerica, Colombia, Peru, Bolivia.)

Comment [A3]: teeth shallow and sparse

A collection from Panama (Allen 764, US) differs from other material seen in petiole length and cystolith distribution. The petioles are relatively long (up to 20 mm) and the lower leaf surface is densely covered in prominent punctiform cystoliths.

2. *Phenax hirtus* (Sw.) Wedd. in A. DC., *Prodr.* 16(1): 235(38) (1869). *Boehmeria hirta* Sw. *Prodr.* 34 (1788). Holotype: Jamaica, Swartz *s.n.* (S). Illustration: Burger, *Fieldiana Bot.* 40: 226, t. 29 (1977).

Boehmeria rugosa (Poir.) Pers., *B. urticifolia* (Poir.) Pers., *Phenax hirtus* (Sw.) Wedd. var. *minor* Wedd., *P. petiolaris* Wedd., *P. rugosus* (Poir.) Wedd., *P. urticifolius* (Pers.) Wedd., *Procris rugosa* Poir., *P. urticifolia* Poir.

Shrubs or shrublets to 2.5 m. Young stems pubescent to densely pubescent, the hairs 0.3-1 mm, strongly to weakly appressed or erect, weakly curved, crooked or straight, gray to white. Leaf lamina 23-145 × 12-71 mm, ovate, occasionally elliptic, rarely lanceolate, 3-veined at base, the lateral nerves visible for 2/3 the leaf length, equal in diameter to the midrib, the secondary nerves 2-5(-12) pairs, borne at 45-60° to the midrib, the midrib and basal secondary nerves appearing sunken; upper surface sparsely pubescent to pubescent, frequently with two (where minor hairs present) classes of hairs, the major hairs 0.8-1.3 mm, weakly appressed, weakly curved or crooked, the minor hairs 0.4-0.5 mm, appressed, weakly curved to straight, the cystoliths punctiform, densely scattered; lower surface pubescent, frequently with two (where minor hairs present) classes of hair, the major hairs 0.4-0.8 mm, appressed or erect, curved or crooked, minor hairs 0.13-0.30 mm, strongly appressed, weakly curved, the cystoliths not visible; base cuneate, occasionally decurrent, frequently narrowly concave; margins serrate or serrate-dentate; apex cuspidate or

subacuminate; stipules 2.3-5 mm, lanceolate; petioles 5-90 × 0.5-1 mm, pubescent as stem. Inflorescences 5-11 mm in diameter, the individual clusters of flowers 1.3-1.5 mm; bracts 1.30-1.4 mm, entire, obovate, oblanceolate or oblong, occasionally spatulate, pubescent, frequently with marginal 'ciliate' hairs. Staminate flowers 1.8-2.50 × 1.3-1.5 mm, valvate, the tepals 4, fused for c. 1/2 of their length, frequently pubescent along the principal vein and subapical appendage, the tepal with a corniculate subapical appendage, the appendage 0.5-1 mm; pistillode surrounded by a tuft of white hairs; stigma 1.5-4 mm. Achenes 0.7-0.80 × 0.5-0.7 mm, ovoid, elliptical in cross-section, tuberculate.

Disturbed and undisturbed forests, montane forests, cloud forests, dry forests, frequently streamsides, common in hedgerows. Ch (Miranda 5756, MEXU); G (Steyermark 52303, F); H (Molina R. 11446, F); ES (Rohweder 2776, ITIC); N (Moreno 7724, MO); CR (Tonduz 12733, MO); P (Hammel 1523, MO). 700-2400 m. (Mexico, Mesoamerica, Colombia, Venezuela, Ecuador, Peru, Bolivia, West Indies.)

The young stems of material from Nicaragua are noticeably less pubescent than material from the rest of Mesoamerica.

3. *Phenax mexicanus* Wedd. *Ann. Sci. Nat., Bot., sér. 4*, 1: 193 (1854). Isotype: Mexico, Oaxaca, *Galeotti 325* (US! ex photo!). Illustr.: Burger, *Fieldiana Bot.* 40: 226, t. 29 (1977). N.v.: Chichicaste manso, chichicaste pesote, ES; saqi če, G.

Shrubs or trees to 10 m. Young stems sparsely pubescent to pubescent, pubescent at shoot tips, the hairs 0.30-0.4 mm, strongly appressed, weakly curved, grey to transparent. Leaf lamina 23-170 × 7-55 mm, lanceolate, narrowly ovate, oblanceolate or narrow elliptic; 3-veined at base, the lateral nerves visible for 6/8 the leaf length, equal in diameter to the midrib, with flap-like domatia in their axils at the leaf base, the secondary nerves 2-4 pairs, borne at 30-45° to the midrib; upper surface sparsely pubescent, occasionally glabrous, where glabrous with crystalline accretions similar to hair bases, where pubescent the hairs 0.4 mm, strongly appressed, weakly curved, the cystoliths punctiform, occasionally sunken in small pits and or with an apical point, scattered, the midrib and basal secondary nerves appearing sunken; lower surface pubescent, the hairs 0.4-0.5 mm, strongly appressed, straight or weakly curved, cystoliths not visible; base asymmetrical, attenuate/decurent, narrowly concave; margins finely to coarsely serrate, crenate-serrate; apex attenuate to acuminate; stipules 2-7 mm, lanceolate; petioles 4-55 × 0.8-1 mm, pubescent as stem. Inflorescences 3-12 mm in diameter, either pistillate or where staminate with an equal number of staminate and pistillate flowers, the individual clusters of flowers 1-1.8 mm, bracts entire, elliptic or ovate. Staminate flowers 1.5-2 × 0.8-1.3 mm, valvate, obovoid in bud, the tepals 3, fused for c. 2/3 of their length, the tepal apex corniculate; pistillode surrounded by a tuft of white hairs; stigma 2.5-6 mm. Achenes 0.8-1 × 0.4-0.7 mm, ovoid, weakly triangular or elliptic in cross-section, tuberculate or smooth, sparsely pubescent. *Montane forest, Pinus-Quercus-Liquidamber forests, cloud forests, alpine forests, streamsides, roadsides, disturbed vegetation.* Ch (Breedlove y Smith 21717, MEXU); G (Standley 86689, F); H (Molina R. 22087, NY); ES (Sidwell et al. 711, LAGU); CR (Williams et al. 28931, US); P (Davidson 722, MO). 600-2000 m. (Mexico [Veracruz], Mesoamerica, Peru.)

A collection from Honduras (*Holmes 4398B*, NY) is unusual in having very large membranous leaves, distinct secondary venation and hollow stems.

4. *Phenax sonneratii* (Poir.) Wedd. in A. DC., *Prodr.* 16(1): 235(37) (1869). *Parietaria sonneratii* Poir., *Encycl.* 5: 15 (1804). Holotype: India, *Sonnerat s.n.* (P-LAM-605-III-2). Illustr.: Burger, *Fieldiana Bot.* 40: 226, t. 29 (1977).

Phenax vulgaris Wedd.

Herbs or shrublets to 1(-2) m. Young stems pubescent, the hairs 0.5-0.7 mm, strongly appressed, curved, white to pale grey. Leaf lamina 13-60 × 5.5-23(-95 × 60) mm, rhombic, ovate or lanceolate; 3-veined at base, the lateral nerves visible for 2/3 or more of the leaf length, equal in diameter to the midrib, the secondary nerves 1 or 2 pairs, borne at c. 45° to the midrib; upper surface sparsely pubescent to pubescent with two classes of hair, the major hairs 0.8-1 mm, weakly appressed, curved, the minor hairs 0.4 mm, appressed, curved, the cystoliths punctiform, densely scattered, the midrib and basal secondary nerves not appearing sunken; lower surface pubescent, the hairs 0.30-0.7 mm, strongly appressed, curved, the cystoliths not visible; base cuneate or decurrent; margins serrate or serrate-dentate; apex cuspidate or acute; stipules 1.8-2.50 mm, lanceolate, persistent; petioles 5-50(-62) × 0.5-0.7 mm, pubescent as stem. Inflorescences 2.5-4 mm in diameter, the individual clusters of flowers 1.5-1.8 mm with staminate and pistillate flowers evenly mixed, two classes of bract present, major bracts 1.3-1.5 mm, broadly spatulate, the apical margins ciliate, occasionally sparsely pubescent towards apex, the minor bracts 0.8-1.3 mm, spatulate, the apical margins ciliate, glabrous. Staminate flowers 0.8-1.5 × 0.8-1 mm, valvate, the tepals 4, fused for c. 2/3 of their length, the free portion of the tepals forming a pyramid-like cone in bud, with a ring of hooked hairs at their base, the tepal apex attenuate; pistillode surrounded by a tuft of white hairs; stigma 1-1.5 mm. Achenes 1-1.3 × 0.7-0.8 mm, ovoid, tuberculate. *Disturbed riparian vegetation, roadsides, fields, banana plantations and coffee plantations.* Ch (Croat 47550, MO); G (Croat 40777, MO); N (Moreno 13795, MO); CR (Opler 1847, F); P (Gentry y Nee 8696, MO). 0-1000 m. (Mesoamerica, Colombia, Venezuela, Guayanas, Ecuador, Galapagos, Perú, Bolivia, Brasil, Argentina, Lesser Antilles, Asia, Africa.)

The disjunct distribution of this species is discussed by Friis (1993).

5. *Phenax* sp. A

Trailing herbs or repent shrublets to 0.6(-1) m. Young stems sparsely pubescent to pubescent, the hairs 0.3 mm, erect, strongly curved, white. Leaf lamina 27-70 × 15-29 mm, ovate; 3-veined at base, the lateral nerves visible for 2/3 the leaf length, equal in diameter to the midrib, the secondary nerves 7-10 pairs, frequently connecting with the lateral primary nerves, the basal secondary nerves borne at 90° to the midrib, the apical secondary nerves borne at 45-60° to the midrib; upper surface sparsely pubescent, the hairs 0.5-0.8 mm, weakly appressed, weakly curved, broad based, the cystoliths punctiform, densely scattered, the midrib and basal secondary nerves appearing sunken?; lower surface pubescent, the hairs 0.5 mm, weakly appressed, strongly curved, the cystoliths not visible; base attenuate; margins crenate-serrate; apex acuminate; stipules 5-8 mm, lanceolate; petioles 8-23 × 0.7-0.8 mm, pubescent as stem. Inflorescences 6-8 mm in diameter, the individual clusters of flowers 2.50-2.8 mm, bracts entire, ovate or lanceolate, the apex ciliate. Staminate flowers 2.5-3 mm, valvate, the tepals (3-)4, fused for 1/3-1/2 of their length, the tepal with a corniculate subapical appendage 0.5-1.3 mm in length, appendage spreading at anthesis; pistillode surrounded by a tuft of white hairs; stigma 2-3 mm. Achenes 1-1.3 mm, irregularly ovoid, dark brown to black, areolate, tuberculate, the tubercles frequently with their apex concave. *Forest floor, steep slopes in shade, cloud forests.* CR (Wilbur y Stone 10115, MO). 1000-1700 m. (Endemica.)

This species closely resembles *Phenax hirtus* (Sw.) Wedd. but differs in pubescence, leaf texture and colour.

9. *Pilea* Lindl.

Adicea Raf. ex Britton & A. Br., *Dubreulia* Gaudich.

By A.K. Monro.

Herbs, rarely shrubs, occasionally epiphytic, perennial, rarely annual. Stems without stinging hairs, not releasing watery latex when cut. Leaves opposite, frequently unequal at each node, the margins toothed or entire; cystoliths fusiform, frequently appearing branched; stipules borne in axils of the leaves, persistent, rarely caducous. Inflorescences unisexual, rarely bisexual, panicles or cymes; pedicels subtended by inconspicuous bracteoles. Staminate flowers 4- or rarely 2- or 3-merous; tepals equal, each bearing a subapical appendage. Pistillate flowers with the tepals 3, unequal or more rarely equal, the adaxial tepal frequently bearing a subapical appendage. Achenes weakly to strongly compressed ovoid to sub-ellipsoid, the persistent perianth parts forming a fruit-like assemblage. Approx. 715 spp. Cosmopolitan, except for Australia and New Zealand. A number of species are cultivated as ornamentals.

Bibliography: Adams, C.D. *Mitt. Bot. Staatssamml. München*. 8: 99-110 (1970). Monro, A.K. *Bull. Nat. Hist. Mus. Lond. (Bot.)* 31: 9-25 (2001). Weddell, H.A. *Arch. Mus. Hist. Nat.* 9: 172-277 (1856-1857).

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|---|--------------------------------|
| 1. Leaves pectinate. | 45. P. pteridophylla |
| 1. Leaves entire, serrate, crenate or pinnately lobed but never pectinate. | |
| 2. Leaves sinuate. | 57. P. trichomanophylla |
| 2. Leaves entire, serrate or crenate. | |
| 3. Leaves 4-6 at each node, verticillate. | 54. P. senarifolia |
| 3. Leaves 2 at each node, opposite. | |
| 4. Stipules generally more than 2 mm, prominent (clearly visible to the naked eye), auriculate, cordiform, ovate, oblong or obovate, occasionally early caducous. | |
| 5. Leaf margins entire. | |
| 6. Stipules auriculate; upper leaf surface densely pubescent, the hairs to 1.3 mm. | 31. P. lindeniana |
| 6. Stipules narrowly ovate to ovate; upper surface glabrous to sparsely pubescent, where pubescent the hairs to 2.3 mm. | 41. P. parietaria |
| 5. Leaf margins serrate or crenate, at least towards the leaf apex. | |
| 7. Upper leaf surface glabrous. | |
| 8. Petioles winged. | |
| 9. Stipules ovate, 2-6 mm; upper leaf surface frequently with "V" shaped cystoliths. | 28. P. irrorata |
| 9 Stipules obovate or oblong, 6-23 mm; upper leaf surface lacking "V" shaped cystoliths. | 46. P. pteropodon |
| 8. Petioles not winged. | |
| 10. Leaves of unequal length in pair, ratio of minor to major greater than 1:1.5. | |
| 11. Lateral nerves visible for 1/3 - 2/3 of the leaf length; bracts 2-4 mm; achenes 0.8-1 mm. | 36. P. moragana |
| 11. Lateral nerves visible for 2/3 or more of the leaf length; bracts 2 mm or less; achenes 1.3 mm or longer. | |
| 12. Petioles pubescent; leaf margins profoundly serrate, the teeth weakly appressed; bracts 1.5-2 mm; staminate tepal subapical appendage 1-1.3 mm. | 7. P. centradenoides |

12. Petioles glabrous; leaf margins weakly serrate, not profoundly so, the teeth strongly appressed; bracts 0.8-1 mm; staminate tepal subapical appendage 0.5-1 mm.

13. P. costaricensis

10. Leaves of equal or subequal length in pair, if subequal, then ratio of minor to major less than 1:1.5.

13. Lower surface pubescent.

14. Petioles glabrous.

12. P. cornuto-cucullata

14. Petioles pubescent.

15. Leaf margins entire in the lower 1/2 or more.

16. Secondary nerves 5-9 pairs, 30-65° to the midrib; stipules 2.5-5 mm; staminate inflorescence less than 10 mm.

38. P. ovalis

16. Secondary nerves 7-16 pairs, 60-75° to the midrib; stipules 5-14 mm; staminate inflorescence more than 30 mm.

20. P. forgetii

15. Leaf margins entire in the lower 1/3 or less.

17. Secondary nerves 4-6 pairs; lower leaf surface eglandular; staminate flowers 3-merous; fruit 2 mm or more.

59. P. tripartita

17. Secondary nerves 6-28 pairs; the lower leaf surface punctate glandular; staminate flowers 4-merous; fruits 1.5 mm or less.

18. Leaves lanceolate, or narrowly elliptic, sometimes falcate; lateral nerves visible for over 3/4 of the leaf length; staminate inflorescences less than 15 mm.

39. P. pallida

18. Leaves ovate, elliptic, broadly elliptic, rhomboid, obovate, but never falcate; lateral nerves visible 2/3-3/4 the leaf length; staminate inflorescences more than 15 mm.

19. Leaf base cordate, or occasionally subcordate; stipules widest at or below the midpoint; staminate flowers borne in 1-3 compact heads.

42. P. pittieri

19. Leaf base acute, cuneate, decurrent, obtuse, subcordate or cordate; stipules widest at or above the midpoint; staminate flowers borne in a loose panicle, or in 5 or more compact heads borne on a loose panicle.

20. Leaves oblanceolate, rhomboid or elliptic; stipules 3-6 mm; nerves subapical appendage of staminate tepals 1.3-1.5 mm.

30. P. latifolia

20. Leaves ovate to elliptic; stipules 6 mm or longer; nerves subapical appendage of staminate tepals less than c. 0.6 mm.

21. Stipules forked; secondary nerves 75-90° to the midrib; staminate bracteoles 5-12 mm; pistillate bracteoles 0.8-2.5 mm.

32. P. longibracteolata

21. Stipules entire, never forked; secondary nerves 35-45° to the midrib; staminate bracteoles 0.3-0.8 mm; pistillate bracteoles 0.3-0.8 mm.

1. P. acuminata

13. Lower surface glabrous.

22. Petioles pubescent, the hairs short, curved and appressed (frequently difficult to see with the naked eye).

23. Laminae 63-235 mm, with 13-28 pairs of secondary nerves 60-80° to the midrib.

39. P. pallida

23. Laminae 6.5-47 mm, with 3-7 pairs of secondary nerves 30-45° to the midrib.

5. P. auriculata

22. Petioles glabrous.
24. Upper leaf surface variegated, the variegation visible when dry. **6. P. cadierei**
24. Upper leaf surface never variegated, or if so, the variegation not visible when dry.
25. Leaf margins entire in the lower 2/3 or more, thereafter remotely crenate. **2. P. adamsiana**
25. Leaf margins entire to the lower 1/2 or less, thereafter serrate, crenate or serrate-crenate.
26. Leaves obovate, never ovate or elliptic. **20. P. forgetii**
26. Leaves ovate, lanceolate or elliptic, never obovate.
27. Leaves peltate to subpeltate; lateral nerves visible for 3/4 or more of the leaf length, leaf margins minutely and sparsely serrate. **21. P. gamboana**
27. Leaves basifixed, never peltate; lateral nerves visible for 2/3 or less of the leaf length, leaf margins prominently serrate or dentate.
28. Upper surface of leaves drying bright green, yellow-green or, occasionally pale brown. **50. P. quercifolia**
28. Upper surface of leaves drying dark brown, almost black. **12. P. cornuto-cucullata**
7. Upper leaf surface pubescent.
29. Leaves of unequal length in pair, ratio of minor to major more than 1:1.5.
30. Lateral nerves visible for 1/2 or less of the leaf length, the secondary nerves 6 pairs or fewer. **7. P. centradenoides**
30. Lateral nerves visible for 2/3 or more of the leaf length, the secondary nerves 6-17 pairs.
31. Bracts 2-4 mm; staminate tepal suapical appendage 0.8-1.3 mm; achenes 0.8-1 mm. **36. P. moragana**
31. Bracts 0.5-1 mm; staminate tepal suapical appendage 1.5-2 mm; achenes 1.3-2 mm. **11. P. cornmana**
32. Stipules cordiform or broadly ovate, auriculate at the base; lower leaf surface glabrous, occasionally sparsely pubescent; secondary nerves 3-5 pairs, 30-45° to the midrib. **11. P. cornmanae**
32. Stipules obovate, oblong or narrowly ovate, neither cordiform nor auriculate at the base; lower surface always pubescent; secondary nerves 6-17 pairs, 45-90° to the midrib. **7. P. centradenoides**
29. Leaves of equal or subequal length in pair, where subequal ratio of minor to major less than 1:1.5.
33. Lower surface of leaves glabrous. **5. P. auriculata**
33. Lower surface of leaves pubescent.
34. Leaves orbicular or sub-orbicular. **37. P. nummulariifolia**
34. Leaves ovate, elliptic, obovate, rhomboid or lanceolate but never orbicular or sub-orbicular.
35. Leaves obovate, rarely elliptic or ovate.
36. Plants to 10 cm; stem obscured by rosette of leaves. **52. P. rostulata**
36. Plants to 30 cm; stem clearly visible. **38. P. ovalis**
35. Leaves lanceolate, ovate, elliptic, rhomboid or, occasionally obovate, in which case elliptic and or ovate leaves also present.

37. Stipules as broad, or broader than long, broadly ovate or cordiform.
38. Leaf margins profoundly serrate; inflorescences unisexual; staminate bracts forming an involucre; staminate flowers 3-merous, borne in a compact head. **53. P. rugosissima**
38. Leaf margins crenate-serrate, not profoundly so; inflorescences bisexual; flowers borne in a loose panicle; bracteoles not forming an involucre; staminate flowers 4-merous. **47. P. pubescens**
37. Stipules longer than broad, oblong, obovate or narrowly ovate.
39. Secondary nerves less than 8 pairs on larger leaves; fruits 1-3 mm.
40. Leaf margins entire in the lower 1/10-1/4; fruits 0.8-1.4 mm.
41. Staminate pedicels 0.2-1.7 mm, subapical appendage of the tepals 0.8-1.5 mm; pistillate inflorescence 10-40 mm; achenes 0.8-1 mm. **3. P. alfaroana**
41. Staminate pedicels 2.5-4 mm, subapical appendage of the tepals 1.8-3.3 mm; pistillate inflorescence 3-10 mm; achenes 1-1.4 mm. **10. P. corona**
40. Leaf margins entire in the lower 1/4-1/2; fruits 2-3 mm.
42. Lateral nerves visible for over 3/4 of the leaf length; upper leaf surface sparsely pubescent, the hairs less than 1 mm; staminate flowers 3-merous. **59. P. tripartita**
42. Lateral nerves visible for 1/2-2/3 of the leaf length; upper leaf surface pubescent, the hairs more than 1 mm; staminate flowers 4-merous. **47. P. pubescens**
39. Secondary nerves more than 8 pairs on larger leaves; fruits less than 2 mm.
43. Staminate flowers borne in 1 or more compact heads.
44. Cystoliths of upper leaf surface fusiform; leaf base cordate or subcordate; leaf apex acuminate to acute; subapical appendage of staminate flowers glabrous. **42. P. pittieri**
44. Cystoliths of upper leaf surface fusiform, "V" and or "Y" shaped; leaf base never cordate; leaf apex obtuse or cuspidate; subapical appendage of staminate flowers pubescent.
45. Epiphytic or epipetric; leaves lanceolate, narrowly elliptic, occasionally elliptic. **10. P. corona**
45. Terrestrial; leaves broadly elliptic, obovate or rhomboid. **16. P. digitata**
43. Staminate flowers borne in a loose panicle, occasionally borne in clumps along panicle branches.
46. Stems pubescent, with hairs to 1.8 mm; cystoliths on stem fusiform, "V" and, or "Y" shaped; leaves oblanceolate, rhomboid or broadly elliptic; fruit more than 1 mm. **19. P. fasciata**
46. Stems pubescent, with hairs to c. 0.8 mm; cystoliths on stem fusiform; leaves ovate to ovate-lanceolate; fruits 0.5-1 mm.
47. Cystoliths of upper leaf surface fusiform; apices of leaves acuminate to subcaudate; stipules 7-20 mm; staminate inflorescence 30-90 mm; fruits 1 mm. **1. P. acuminata**
47. Cystoliths of upper leaf surface fusiform, "V" and or "Y" shaped; apices of leaves acute or subcuspidate; stipules 6-7 mm; staminate inflorescence 12-18 mm; fruit 0.7-0.8 mm. **23. P. gomeziana**

4. Stipules generally less than 2 mm, evident to obscure (not clearly visible to the naked eye), deltate or broadly ovate.
48. Upper surface of leaves pubescent.
49. Leaf margins serrate; staminate flowers 2-merous. **26. P. hyalina**
49. Leaf margins entire; staminate flowers 4-merous.
50. Leaves more than 10 mm, lower surface pubescent towards the base; leaves evenly spaced along the stem, occasionally clustered but never forming terminal rosettes. **41. P. parietaria**
50. Leaves less than 10 mm, lower surface glabrous; leaves clustered towards the apex forming terminal rosettes. **24. P. herniarioides**
48. Upper surface of leaves glabrous.
51. Leaves of equal or subequal length in pair, where subequal, ratio of minor to major less than 1:1.5.
52. Leaves pinnately veined.
53. Leaf margins entire. **35. P. microphylla**
53. Leaf margins crenate or crenate-serrate.
54. Leaves linear-lanceolate; staminate inflorescence borne at the base of an internode which is shorter than the adjacent leaves. **44. P. plumulosa**
54. Leaves oblanceolate, narrowly rhomboid or narrowly obovate; staminate inflorescence borne at base of an internode which is longer than, or rarely equal to, the adjacent leaves. **43. P. pleuroneura**
52. Leaves 3-veined.
55. Lateral primary nerves visible for less than 3/4 the leaf length.
56. Pistillate inflorescence bearing 6-20 flowers; major petiole in pair less than 14 mm. **15. P. dauciodora**
56. Pistillate inflorescences bearing 30-300 flowers; major petiole in pair more than 14 mm. **61. P. vulcanica**
55. Lateral primary nerves visible for 3/4 or more of the leaf length.
57. The majority of petioles equal or subequal at each node, where subequal ratio of shorter to longer less than 1.5.
58. Laminae 2.5-7 mm wide; petiole less than 4 mm; staminate inflorescence bearing fewer than 24 flowers. **29. P. killipiana**
58. Laminae more than 8 mm wide; petiole more than 4 mm; staminate inflorescence bearing more than 24 flowers.
59. Secondary nerves straight or weakly curved, 60-90° to the midrib; staminate inflorescences 8-25 mm; the staminate pedicels reaching 1 mm. **34. P. mexicana**
59. Secondary nerves strongly curved, 45-60° to the midrib; staminate inflorescences 15-75 mm; the staminate pedicels reaching 3 mm. **22. P. glabra**
57. The majority of petioles unequal at each node, the ratio of the shorter to longer more than 1.5.
60. Leaves ovate, frequently falcate; staminate flowers 1.3-1.5 mm. **18. P. falcata**
60. Leaves oblong, linear-lanceolate, lanceolate, oblong-lanceolate, rarely falcate; staminate flowers 1.5-2.8 mm.
61. Stems drying yellow-green, pale green or green; staminate peduncle 4/5-9/10 inflorescence-

- length, flowers borne in a compact head. **4. P. angustifolia**
61. Stems drying brown, dark brown or black; staminate peduncle 1/8-1/3 inflorescence-length, flowers borne in a loose panicle. **22. P. glabra**
51. Leaves of unequal length in pair, ratio of minor to major more than 1:1.5.
62. Major leaf in pair pinnately veined.
63. Leaves entire; staminate flowers 0.5-0.8 mm. **35. P. microphylla**
63. Leaves apically 3-5 dentate, rarely entire; staminate flowers 1-1.8 mm.
64. Minor leaf in pair not reflexed; major leaf in pair 10-63 mm; staminate flowers 1-1.5 mm. **27. P. imparifolia**
64. Minor leaf in pair generally reflexed, appearing proximate to major leaf; major leaf in pair 5-11.5 mm; staminate flowers 1.5-1.8 mm. **58. P. tridentata**
62. Major leaf in pair 3-veined or 3-pliveined.
65. Leaf margins of major leaf in pair entire. **25. P. herrerae**
65. Leaf margins of major leaf in pair crenate or serrate.
66. Stems prostrate.
67. Fruits more than 1.8 mm.
68. Larger leaf in pair 30 mm or less. **60. P. tutensis**
68. Larger leaf in pair more than 35 mm.
69. Stems angulate in cross-section, drying dark brown almost; staminate inflorescences solitary, bearing 11-50 flowers; pistillate inflorescences bearing 4-30 flowers. **33. P. magnicarpa**
69. Stems rounded or irregularly shaped in cross-section, not angulate, drying red-brown to dark brown; staminate inflorescences 1-4 per axil, bearing 15-200 flowers; pistillate inflorescences bearing 5-95(-450) flowers. **48. P. purulensis**
67. Fruit 1.5 mm or less.
70. Lateral nerves of leaves visible for 2/3 or less of the leaf length.
71. Smaller leaf in pair less than 4 mm wide; major petiole in pair 1-1.5 mm. **49. P. quadrata**
71. Smaller leaf in pair more than 4 mm wide; major petiole in pair 1.5-2.5 mm. **27. P. imparifolia**
70. Lateral nerves of leaves visible for 3/4 or more of the leaf length.
72. Lower surface of leaves pubescent, the hairs c. 0.5 mm in length. **14. P. daguensis**
72. Lower surface of leaves glabrous.
73. Stems with "V" or "Y" shaped cystoliths; minor leaves in pair 3-8 mm wide; pistillate inflorescences bearing 12-200 flowers. **40. P. pansamalana**
73. Stems lacking "V" or "Y" shaped cystoliths; minor leaves in pair 1.5-2.5 mm wide; pistillate inflorescences bearing 6-25 flowers. **17. P. ecboliophylla**
66. Stems erect.
74. Fruits more than 1.5 mm.
75. Smaller petioles in pair more than 3 mm. **9. P. conjugalis**
75. Smaller petioles in pair 1.5 mm to sessile.

76. Stems angulate in cross-section, drying dark brown almost; staminate inflorescences solitary, bearing 11-50 flowers; pistillate inflorescences bearing 4-30 flowers.

33. P. magnicarpa

76. Stems rounded or irregularly shaped in cross-section, not angulate, drying red-brown to dark brown; staminate inflorescences 1-4 per axil, bearing 15-200 flowers; pistillate inflorescences bearing 5-95(-450) flowers.

48. P. purulensis

74. Fruit 1.5 mm or less.

77. Smaller leaf in pair more than 10 mm wide.

55. P. skutchii

77. Smaller in pair less than 9 mm wide.

78. Upper surface of leaves lacking "V" or "Y" shaped cystoliths; secondary nerves inserted 45-60° to the midrib; Costa Rica and Panama.

13. P. costaricensis

78. Upper surface of leaves with some "V" or "Y" shaped cystoliths present; secondary nerves inserted 60-90° to the midrib; Tabasco, Chiapas, Guatemala and Belize.

79. Smaller leaf in pair 1-1.8 mm wide; staminate inflorescences 16-54 mm, flowers borne in a compact head.

51. P. riparia

79. Smaller leaf in pair more than 3 mm wide; staminate inflorescences less than 15 mm, flowers borne in a loose panicle.

80. Larger leaf in pair with 1/3 of the margin entire from the base; staminate inflorescences 10-14 mm; staminate tepal subapical appendage c. 0.1 mm, scale shaped.

40. P. pansamalana

80. Larger leaf in pair with 2/3 of the margin entire from the base; staminate inflorescence 4-9 mm; subapical appendage 0.5-1 mm, corniculate.

8. P. chiapensis

1. Pilea acuminata Liebm., *Kongel. Danske Vidensk. Selsk. Skr., Naturvidensk. Math. Afd., ser. 5*, 2: 302 (1851). Holotype: Mexico, Oaxaca, *Liebmann 14238'2'* (C!). Illustr.: Burger, *Fieldiana, Bot.* 40: 223, t. 26 (1977).
Pilea longipes Liebm.

Herbs, rarely small shrubs to 100 cm; terrestrial or epiphytic. Stems erect to prostrate with erect branches, drying green, usually pubescent, the hairs to c. 0.8 mm, erect, curved, straight or crisped; cystoliths fusiform; internodes (6-)35-70 × 1.5-6 mm, angulate in cross-section. Leaves equal at the same node, lamina 45-190 × 20-85 mm, ovate to elliptic, chartaceous, occasionally bullate, 3-nerved, the lateral nerves visible for 2/3 or more of the leaf length, never reaching the leaf apex, the secondary nerves 11-16(-20-23) pairs, 35-45° to the midrib, weakly curved; upper surface drying dark green, pubescent to sparsely pubescent, the hairs to 2 mm, appressed, straight or crisped, the cystoliths fusiform; lower surface drying grey-green, pubescent, more densely so on nerves, the hairs to c. 0.8 mm, appressed, straight, curved or crisped, glandular punctate; base symmetrical, acute, obtuse, subcordate or cordate; margins serrate, the basal 1/10 - 1/5 entire; apex acuminate; stipules 7-20 mm, oblong, oblanceolate to obovate, drying dark brown to yellow-brown; petioles at the same node equal or unequal by a ratio of 1:2-6, the major petioles 15-78 mm, usually pubescent, the hairs to c. 0.8 mm, erect or appressed, crisped or occasionally straight, the minor petioles 8-18 mm. Inflorescences 1-3 per stem, unisexual, rarely bisexual, where bisexual dominated by a single sex; peduncular bracts 0.5-1 mm; bracteoles 0.3-0.8 mm. Staminate inflorescences 1 or 2 per axil, 30-100 mm, bearing (15-25-)50-200 flowers in 5-30 compact heads in a loose to semi-compact panicle; peduncle (1/4-)1/3-1/2(-3/4) of the inflorescence length,

glabrous to sparsely pubescent, where pubescent the hairs to c. 0.5 mm, erect or appressed, crisped; pedicels 0.3-1 mm, glabrous. Staminate flowers 1.5-2 × c. 1.5 mm immediately prior to anthesis, white to pale green; tepals 4, 1.5-2.3 mm, glabrous, the subapical appendage 0.3-0.5 mm, corniculate, glabrous; stamens 4. Pistillate inflorescences 1 or 2 per axil, (10-15-)30-110 mm, bearing 30-90 flowers in a loose panicle; peduncle 1/4-2/3 of the inflorescence length, glabrous to sparsely pubescent, the hairs to c. 0.5 mm, erect or appressed, crisped; pedicels 0.3-0.5 mm, glabrous. Staminate flowers with the adaxial tepal 0.8-0.9 mm, oblong, the subapical appendage 0.3-0.4 mm, scale-shaped, the lateral tepals c. 0.5 mm, ovate. Infructescences (15-)30-110 mm; achenes c. 1 mm, compressed, asymmetrically ovoid to ellipsoid, the margin narrow. *Moist forests, wet forests.* Ch (*Botteri 539*, BM); CR (*Croat 36242*, MO); P (*Lent 3241*, NY). 400-1700 m. (Mexico [Guerrero, Oaxaca, Veracruz], Mesoamerica, Colombia.)

Mesoamerican material of *Pilea acuminata* falls into two groups, the first, from Oaxaca and Chiapas, is characterised by staminate inflorescences composed of 3-8 flowers, with the fascicles more or less evenly distributed along the branches of an open panicle. The second, from southern Mesoamerica and into Colombia, is characterised by staminate inflorescences which bear fewer, larger fascicles, each of 12-24 flowers, usually clustered towards the ends of the panicle branches. Amongst the Mesoamerican specimens examined, two atypical collections, both from Costa Rica, were encountered: *Hammel y Trainer 14013* (MO) which has narrowly ovate leaves; and *Burger et al. 9415* (F, MEXU) with very small (less than 15 mm) pistillate inflorescences.

2. *Pilea adamsiana* A.K. Monro, *Bull. Nat. Hist. Mus. Lond. (Bot.)* 30: 9 (2000). Holotype: Panama, *Hammel 4702* (MO!). Illustr.: Monro, *Bull. Nat. Hist. Mus. Lond. (Bot.)* 30: 10, t. 2A, B, C (2000).

Herbs to shrublets to 30 cm; epiphytic. Stems prostrate, drying dark brown to grey-brown, glabrous; cystoliths fusiform; internodes 6-34 × 1.8-4 mm, angulate in cross-section. Leaves at the same node equal to subequal; major lamina 23-115 × 8-27 mm, oblanceolate to obovate, chartaceous to subcoriaceous, 3-nerved, the lateral nerves visible for 3/4 or more of the leaf length, never reaching the leaf apex, the secondary nerves 7-33 pairs, 75-90° to the midrib, straight to weakly curved; upper surface drying dark brown, glabrous, the cystoliths fusiform, pustulate, rarely "V" shaped; lower surface drying red-brown or grey-brown, glabrous, glandular punctate; base symmetrical, cuneate, occasionally minutely subcordate; margins crenate, the basal 2/3-3/4 entire; apex cuspidate; stipules 1.5-3.5 mm, deltate, drying grey to brown; petioles at the same node equal or subequal, 7.5-25 mm, glabrous. Inflorescences 2-16 per stem, unisexual; peduncular bracts 1.3-2 mm; bracteoles 0.5-1 mm. Staminate inflorescences 1 or 2 per axil, 15-35 mm, bearing 60-200 flowers in a compact head; peduncle 1/2-2/3 of the inflorescence length, glabrous; pedicels 1-4 mm, glabrous. Staminate flowers 2.5-3.5 × 0.8-1.3 mm immediately prior to anthesis, brown; tepals 4, 3-4 mm, glabrous, the subapical appendage 1.5-2 mm, narrowly oblong to elliptic, frequently reflexed, glabrous; stamens 4. Pistillate inflorescences 1 or 2 per axil, 7 mm, bearing 24-40 flowers in a semi-compact head; peduncle 1/2-2/3 of the inflorescence length, glabrous; pedicels c. 0.8 mm, glabrous. Staminate flowers with the adaxial tepal 1 mm, oblong to spatulate, the subapical appendage absent, the lateral tepals c. 0.8 mm, oblong to spatulate. Infructescences 12-26 mm; achenes 1.8-2.3 mm, compressed, ellipsoid, the margin narrow, abaxially broad towards the apex. *Wet forests.* P (*Antonio 2010*, MO). 1300-1500 m. (Endémica.)

3. *Pilea alfaroana* Al. Rodr. & A.K. Monro, *J. Bot. Res. Inst. Texas* 2: 995 (2008). Holotype: Costa Rica, *Alfaro et al. 1200* (INB!). Illustr.: Rodríguez & Monro, *J. Bot. Res. Inst. Texas* 2: 996, t. 1 (2008).

Herbs to 35 cm, terrestrial. Stems erect to drying pale green to green-grey, densely pubescent, the hairs to 1 mm, erect, straight or curved; cystoliths fusiform; internodes 17-45 × 1.5-2 mm, angulate in cross-section. Leaves equal or subequal at each node, lamina 7-90 × 6-85 mm, ovate to ovate-orbicular, chartaceous, 3-5 nerved, the laterals visible for 1/2 or more of the leaf length, never reaching the leaf apex, the secondary nerves 4-6 pairs, 60-75° to the midrib, weakly curved; upper surface drying green to grey-green, densely pubescent becoming sparsely pubescent with age, the hairs to 1.5 mm, appressed or erect, straight to curved, sparsely glandular, the cystoliths fusiform or "V" shaped; lower surface drying pale green, sparsely to densely pubescent, the hairs to 1.8 mm, erect or appressed, straight or curved, sparsely glandular, the cystoliths fusiform or "V" shaped; base obtuse or cuneate; margins coarsely dentate, the basal 1/8-1/4 entire; apex acute; stipules 7-14 mm, obovate or ovate to ovate-orbicular, drying pale grey-brown; petioles at the same node equal or unequal by the ratio 1:1.5-1.7, 12-40 mm, sparsely pubescent, the hairs to 1 mm, sparsely glandular. Inflorescences 1-5 per stem, unisexual; peduncular bracts 1-2.3 mm, bracts 0.5-2 mm. Staminate inflorescences solitary, 15-40 mm, bearing 15-25 flowers in a semi-compact to compact panicle; peduncle 1/2-2/3 of the inflorescence length, densely pubescent, the hairs to 1 mm, erect, straight or curved, sparsely glandular; pedicels to 1.7 mm, sparsely pubescent to glabrous. Staminate flowers 1.5-2.50 × 0.5-0.8 mm immediately prior to anthesis, white to pale green; tepals 4, 0.5-1.1 mm, glabrous or sparsely pubescent, the subapical appendage 0.8-1.5 mm, lanceolate to obovate, glabrous or sparsely pubescent; stamens 4. Pistillate inflorescences solitary, 10-40 mm, bearing 20-50 flowers in a semi-compact panicle; peduncle 2/3-3/4 of the inflorescence length, glabrous to sparsely pubescent, the hairs to 2.5 mm, erect, straight or curved; pedicels to 0.5 mm, glabrous. Staminate flowers with adaxial tepals 0.8 mm, oblong, the subapical appendage c. 0.3 mm, scale-shaped, the lateral tepals c. 0.5 mm, ovate. Infructescences 10-40 mm; achenes 0.8-1 mm, compressed, ovoid, the margin narrow. *Wet forests. CR (Quesada 1017, INB). 1500-2500 m. (Endémica.)*

4. *Pilea angustifolia* Killip, *J. Wash. Acad. Sci.* 15: 295 (1925). Holotype: Costa Rica, *Cook y Doyle 181* (US!). Illustr.: Burger, *Fieldiana, Bot.* 40: 223, t. 26 (1977).

Herbs to 60 cm; terrestrial, epiphytic or epipetric. Stems erect, drying pale green, yellow-green or pale brown, glabrous; cystoliths fusiform; internodes 27-112 × 1-4 mm, angulate in cross-section. Leaves at the same node equal to subequal; major lamina 35-140 × 8-19 mm, lanceolate, linear-lanceolate or oblong lanceolate, subchartaceous to chartaceous; 3-nerved, the lateral nerves visible for 3/4 or more of the leaf length, never reaching the leaf apex, the secondary nerves 14-32 pairs, 60-90° to the midrib, weakly curved to straight; upper surface drying dark green or brown, glabrous, the cystoliths fusiform, "V" shaped and "Y" shaped; lower surface drying grey-green or grey-brown, glabrous, glandular punctate; base symmetrical or asymmetrical, subcordate or cordate; margins serrate, the basal 1/3-2/3 entire; apex attenuate, subcaudate or caudate; stipules 0.8-1.3 mm, deltate, drying cream, brown or green; petioles at the same node unequal by a ratio of 1:1.5-4, the major petioles 6-20 mm, glabrous, the minor petioles 1.5-6 mm. Inflorescences 4-48 per stem, unisexual; peduncular bracts 0.8-1 mm; bracteoles 0.3-0.5 mm. Staminate inflorescences solitary, 50-80 mm, bearing 12-40 flowers in a compact head; peduncle 4/5-9/10 of the inflorescence length, glabrous; pedicels 2-3.5 mm, glabrous. Staminate flowers 1.5-2.3 × 1.5-2 mm immediately prior to anthesis, cream to pale green; tepals 4, 2-2.3 mm, glabrous, the subapical appendage 0.2-0.3 mm, scale-shaped, glabrous; stamens 4. Pistillate inflorescences 1 or 2 per axil, 2.5-14 mm, bearing 14-300 flowers in a loose or semi-compact panicle; peduncle 1/3-3/4 of the inflorescence length, glabrous; pedicels 0.2-0.3 mm, glabrous. Pistillate flowers with the adaxial tepal 0.5-0.7 mm, ovate, the subapical appendage 0.1-0.2 mm, scale-shaped, thickened, the lateral tepals 0.4-0.7 mm, asymmetrically

ovate to elliptic. Infructescences 6-20 mm; achenes 1.3-1.5 mm, subcompressed, elliptic or ovoid, the margin narrow. *Wet forests, cloud forests*. CR (*Utley y Utley 2378*, NY). 1100-2300 m. (Endémica.)

5. *Pilea auriculata* Liebm., *Kongel. Danske Vidensk. Selsk. Skr., Naturvidensk. Math. Afd., ser. 5, 2: 299* (1851). Holotype: Costa Rica, *Oersted s.n.* (C!). Ilustr.: Burger, *Fieldiana, Bot.* 40: 224, t. 27 (1977).

Herbs to 35 cm; epipetric, epiphytic or terrestrial. Stems erect, occasionally prostrate, drying pale green to brown, glabrous; cystoliths fusiform; internodes 3.5-47 × 0.4-2 mm, square in cross-section. Leaves at the same node equal; lamina 6.5-47 × 4.5-23 mm, ovate, elliptic or rhomboid, membranous, 3-nerved, the lateral nerves visible for 1/2 of the leaf length, the secondary nerves 3-7 pairs, 30-45° to the midrib, weakly curved; upper surface drying green to brown-green, glabrous or pubescent, the hairs to c. 0.8 mm, appressed, straight, the cystoliths fusiform; lower surface drying grey-green, glandular punctate; base symmetrical or asymmetrical, cuneate, decurrent or cuneate-decurrent; margins serrate to crenate-serrate, the basal 1/4-1/3 entire; apex acute; stipules 3-5.5 mm, ovate to cordiform, drying brown to cream; petioles at the same node equal or unequal by a ratio of 1:1.5-2.5(-6), 2.5-32 mm, sparsely pubescent, rarely glabrous, the hairs to c. 0.8 mm, erect, crisped. Inflorescences 2-6 per stem, unisexual; peduncular bracts c. 1 mm; bracteoles c. 1 mm. Staminate inflorescences solitary, 3.5-30 mm, bearing 1-15 flowers in a compact head; peduncle 1/2-3/4 of the inflorescence length, glabrous; pedicels 0.8-2.5 mm, glabrous. Staminate flowers (1.5-)2.8-3 × c. 1 mm immediately prior to anthesis, cream, apically green; tepals 3, 1-1.3 mm, glabrous, the subapical appendage 1-1.5 mm, narrowly deltate, glabrous; stamens 3. Pistillate inflorescences solitary, 3-4.5 mm, bearing 5-17 flowers in a compact head; peduncle 1/2-2/3 of the inflorescence length, glabrous; pedicels 0.3-0.5 mm, glabrous. Pistillate flowers with the adaxial tepal 1.3-1.5 mm, caudate, apically reflexed, the subapical appendage 0.3-0.5 mm, corniculate, the lateral tepals 0.8-1 mm, obovate. Infructescences 5-30 mm; achenes 1.5-1.8 mm, compressed, ovoid, the margin narrow. *Wet forests, cloud forests, elfin forests*. Ch (*Matuda 2899*, MEXU); G (*Steyermark 36349*, F); ES (*Standley y Steyermark 1952: 412*); CR (*Skutch 3186*, MO); P (*Antonio 1605*, PMA). (500-)1400-3000 m. (Endémica.)

Burger (1977: 251) placed *Pilea cornmanae* in synonymy to *P. auriculata* on the basis of material intermediate for a number of diagnostic characters. However, upon examination of type and other material, determined as *P. auriculata* by Burger (and Killip), a number of differences in pistillate flower morphology have been observed and the two species are here maintained as distinct. The adaxial pistillate tepal of *P. auriculata* is longer than the ovary and pistil, caudate, almost corniculate at its apex and apically flexed. In contrast the adaxial pistillate tepal of *P. cornmanae* is shorter than the ovary, is neither caudate nor corniculate and is weakly reflexed at its apex. In addition the pistillate flowers of *P. auriculata* are consistently larger than those of *P. cornmanae*. A number of specimens from Chiriqui (Panama) are intermediate between the two species (e.g. *D'Arcy et al. 12910*, BM; *Hammel 2024*, NY) and it may be that Burger (1977) was correct in suggesting that *P. cornmanae* represents a combination of unusual extremes. However, it may also be that the two species hybridise over part of their range, or are part of a complex with a third species e.g. *P. rugosissima* Killip. In this treatment the two species are regarded as separate taxa, pending further study.

6. *Pilea cadierei* Gagnep. & Guillaum, *Bull. Mus. Natl. Hist., sér. 2*, 10(6): 629 (1938). Holotype: Cultivated in France from material collected in Vietnam by Cadière, *Anon. s.n.* (P!). Ilustr.: Graf, *Exotica* 1477 (1974). N.v.: Hoja de alumino, sandia, ES; hoja de alumino, CR.

Herbs to 60 cm; terrestrial. Stems erect, drying brown to green-brown, glabrous; cystoliths fusiform; internodes 10-63 × 0.8-3 mm, angulate in cross-section. Leaves at the same node equal; lamina 21-80 × 15-43 mm,

elliptic to obovate, chartaceous, 3-nerved, the lateral nerves visible for 3/4 or more of the leaf length, never reaching the leaf apex, the secondary nerves 6-10 pairs, 35-55° to the midrib, straight to weakly curved; upper surface drying dark green to grey, glabrous, the cystoliths fusiform and "V" shaped; lower surface drying grey-green, glabrous, eglandular; base symmetrical, obtuse or acute; margins crenate-serrate, the basal 1/4-1/3 entire; apex cuspidate; stipules 7.5-14 mm, caducous, narrowly obovate to oblong, drying brown; petioles at the same node equal, 6-23 mm, glabrous.

Inflorescences 6-16 per stem, unisexual; peduncular bracts 1.5 mm; bracteoles 2.5 mm. Staminate inflorescences 1 or 2 per axil, 7-68 mm, bearing 5-125 flowers in 1 or 2 compact heads; peduncle 1/2-7/8 of the inflorescence length, glabrous; pedicels 1-1.5 mm, glabrous. Staminate flowers 2.5-3 × 1.8-2 mm immediately prior to anthesis, yellow-green; tepals 4, 3 mm, glabrous, the subapical appendage 1-1.3 mm, corniculate, glabrous; stamens 4. Pistillate inflorescences and infructescences not seen. *An escaped ornamental, frequently cultivated in gardens.* Ch (Breedlove, 1986: 191); G (*Véliz 93.3230*, MO); H (*Molina R. 27479*, F); ES (*Transito P. 6*, ITIC); N (Guadamuz 913, MO); CR (*Khan et al. 311*, BM). 30-1400 m. (Native to SE Asia; cultivated in the tropics, Mesoamerica, Colombia, Haiti.)

7. *Pilea centradenioides* Seem., *Bot. Voy. Herald* 4: 194 (1854). Holotype: Panama, *Seemann 1099* (BM!).

Illustr.: not known.

Pilea seemannii Killip, *P. trianaeana* Wedd., *P. variegata* Wedd. non Seem.

Herbs to 45 cm; terrestrial, epiphytic or epipetric. Stems erect or prostrate, drying dark green to dark brown, densely pubescent, the hairs to 1.3 mm, appressed or upright, curved or straight; cystoliths oblong, elliptic or pustulate, occasionally absent; internodes 8-70 × 1.5-3.5 mm, angulate or square in cross-section. Leaves at the same node of unequal length by a ratio of 1:2-8; major lamina 32-160 × 13-60 mm, lanceolate, falcate, occasionally ovate or obovate, subchartaceous, 3-nerved, the lateral nerves visible for 2/3-3/4 of the leaf length, the secondary nerves 6-17 pairs, 45-90° to the midrib, straight or weakly curved; upper surface drying dark brown to dark green, glabrous or pubescent, the hairs to 2.3 mm, appressed, straight or weakly curved, the cystoliths fusiform or pustulate; lower surface drying brown or grey-green, pubescent on nerves, the hairs to 1.3 mm, appressed, curved or crisped, glandular punctate; base asymmetrical, cordate, cuneate, occasionally obtuse; margins profoundly serrate, the basal 1/4-1/3 entire; apex acute, obtuse or subcuspidate; minor lamina 8-30 × 5-15 mm, ovate or elliptic, the basal 1/3-1/2 entire, otherwise as major laminae; stipules 4-7 mm, narrowly ovate to oblong, drying orange-brown; petioles at the same node unequal by a ratio of 1:2-7, the major petioles 4-40 mm, pubescent, the hairs to 1 mm, appressed, curved, the minor petioles 2-9 mm. Inflorescences 1-8 per stem, unisexual; peduncular bracts 1.5-2 mm; bracteoles 0.8-1.5 mm. Staminate inflorescences 1 or 2 per axil, 15-40 mm, bearing 12-52 flowers in 1-3 compact or subcompact heads; peduncle 1/4-3/4 of the inflorescence length, glabrous, occasionally pubescent, the hairs to c. 0.8 mm, appressed, curved; pedicels 1.5-5 mm, glabrous. Staminate flowers 2-3.3 × 1-2 mm immediately prior to anthesis, pale brown; tepals 4, 1-1.5 mm, glabrous, the subapical appendage 1-2.5 mm, corniculate, sparsely pubescent, the hairs to c. 0.8 mm, upright, crisped; stamens 4. Pistillate inflorescences 1 or 2 per axil, 4-25 mm, bearing 18-32 flowers in a loose panicle; peduncle 1/3-2/3 of the inflorescence length, glabrous; pedicels 0.3-1.3 mm, glabrous. Pistillate flowers with the adaxial tepal 0.8-1 mm, ovate to oblong, the subapical appendage 0.3-0.5 mm, corniculate, reflexed, the lateral tepals 0.4-0.5 mm, asymmetrically ovate. Infructescences 25-110 mm; achenes 1.5-1.8 mm, compressed, ovoid, the margin narrow, broadly so towards the apex. *Wet forests.* P (*Sytsma 4080*, PMA). 0-1500 m. (Mesoamerica, Colombia, Ecuador.)

8. *Pilea chiapensis* Killip, *J. Wash. Acad. Sci.* 15: 295 (1925). Holotype: Mexico, Chiapas, *Rovirosa 938*

(PH!). Illustr.: not known.

Pilea caudata Killip non Winkler.

Herbs to 50 cm; terrestrial or epiphytic. Stems erect, drying dark brown, glabrous; cystoliths elliptic, fusiform; internodes 7.5-24 × 0.8-4 mm, angulate in cross-section. Leaves at the same node of unequal length by a ratio of 1:(2.5-4)-7.5; major lamina 32-126 × 11-28 mm, oblong, oblong-obovate to lanceolate, chartaceous to subchartaceous, 3-nerved, the lateral nerves visible for 3/4 or more of the leaf length, never reaching the leaf apex, the secondary nerves 18-36 pairs, 65-85° to the midrib, weakly curved; upper surface drying dark green, glabrous, the cystoliths elliptic, fusiform, "V" shaped and occasionally "Y" shaped; lower surface drying grey-green, glabrous, glandular punctate; base asymmetrical or symmetrical, cuneate-attenuate or cuneate; margins serrate, the basal 2/3 entire; apex shallowly acuminate to acute; minor lamina 12-19 × 6-7 mm, petiolate or sessile, ovate, the secondary nerves 5-9 pairs, otherwise as major laminae; stipules 0.8-1 mm, deltate, drying grey-green; petioles at the same node unequal by a ratio of 1:2-3, the major petioles 2-4 mm, glabrous, the minor petioles 1-2 mm. Inflorescences 14-32 per stem, unisexual; peduncular bracts 0.4-0.5 mm; bracteoles 0.3-0.4 mm. Staminate inflorescences 1-2, frequently cauliflorous per axil, 4-9 mm, bearing 25-45 flowers in a loose panicle; peduncle 1/8-1/3 of the inflorescence length, glabrous; pedicels 1.5-3 mm, glabrous. Staminate flowers 1.5-2 × 1.5-1.8 mm immediately prior to anthesis, cream; tepals 4, 1.8-2.3 mm, glabrous, the subapical appendage 0.5-1 mm, corniculate, glabrous; stamens 4. Pistillate inflorescences 1 or 2 per axil, 1-4 mm, bearing 12-40 flowers in a loose panicle; peduncle 1/8 of the inflorescence length, glabrous; pedicels 0.3-0.8 mm, glabrous. Pistillate flowers with the adaxial tepal 0.5-0.8 mm, oblong, the subapical appendage 0.1 mm, oblong, frequently adaxially thickened, the lateral tepals c. 0.5 mm, asymmetrically ovate. Infructescences 4-8 mm; achenes 0.8-1 mm, compressed, ovoid, the margin narrow towards the base, broad towards the apex. *Lowland and premontane wet forests, on cliffs or rocky outcrops.* T (*Magaña 334*, MEXU); Ch (*Breedlove 26070*, MO); B (*Whiteford 1786*, BM); G (*Steyermark 39517*, US). 600-1200 m. (Endémica.)

9. *Pilea conjugalis* A.K. Monro, *Bull. Nat. Hist. Mus. Lond. (Bot.)* 30: 7 (2000). Holotype: Panama, *Pittier*3230 (NY!). Illustr.: Monro, *Bull. Nat. Hist. Mus. Lond. (Bot.)* 30: 8, t. 1A, B, C (2000).

Herbs to 60 cm; terrestrial. Stems erect, drying dark brown to black, glabrous; cystoliths absent; internodes 9-55 × 0.8-4 mm, angulate in cross-section. Leaves at the same node of unequal length by a ratio of 1:1.5-3; major lamina 32-121 × 10-40 mm, elliptic or ovate, rarely oblong, subchartaceous to chartaceous, 3-nerved, the lateral nerves visible for 3/4 or more of the leaf length, never reaching the leaf apex, the secondary nerves 12-39 pairs, 75-90° to the midrib, straight to weakly curved; upper surface drying brown glabrous, the cystoliths fusiform or elliptic; lower surface drying brown to grey-brown, glabrous, glandular punctate; base asymmetrical or symmetrical, acute, obtuse or subcordate; margins serrate, the basal 1/8-1/5 entire; apex acuminate to subcaudate; minor lamina 16-52 × 8-20 mm, otherwise as major laminae; stipules 1-2.5 mm, **deltate**, drying brown; petioles at the same node unequal by a ratio of 1:2-8, the major petioles 12-40 mm, glabrous, the minor petioles 3.5-7.5 mm. Inflorescences 6-20 per stem, bisexual, but dominated by a single sex; peduncular bracts 1-1.5 mm; bracteoles 0.4-0.5 mm. Staminate inflorescences solitary, 12-68 mm, bearing 8-300 flowers in a loose panicle; peduncle 1/3-2/3 of the inflorescence length, glabrous; pedicels 0.5-0.8 mm, glabrous. Staminate flowers 1-1.8 × 0.8-1.5 mm immediately prior to anthesis, pale brown; tepals 4, 1.3-2 mm, glabrous, the subapical appendage 0.3-0.8 mm, scale-shaped, glabrous; stamens 4. Pistillate inflorescences solitary, 10-33 mm, bearing 44-100 flowers in a loose panicle; peduncle 1/3-2/3 of the inflorescence length, glabrous; pedicels 0.1-

0.5 mm, glabrous. Pistillate flowers with the adaxial tepal 0.5-0.8 mm, oblong to obovate, the subapical appendage 0.3-0.4 mm, scale-shaped, the lateral tepals 0.5-0.8 mm, asymmetrically ovate. Infructescences 24-70 mm; achenes 1.8-2 mm, compressed, ellipsoid to ovoid, the margin narrow, broad towards the apex. *Wet premontane forests, cloud forests*. CR (Gómez 19272, BM); P (Knapp et al. 4256, MO). 1400-2200 m. (Endémica.)

10. *Pilea corona* A.K. Monro *Bull. Nat. Hist. Mus. Lond. (Bot.)* 31: 5 (2001). Holotype: Panama, Antonio 2043 (PMA!). Ilustr.: Monro, *Bull. Nat. Hist. Mus. Lond. (Bot.)* 31: 7, t. 1A, B, C (2001).

Herbs to 30 cm; epiphytic or epipetric. Stems erect or prostrate, drying dark brown, pubescent, the hairs to 1 mm, appressed, curved; cystoliths fusiform; internodes 7-31 × 1-4 mm, angulate or circular in cross-section. Leaves at the same node equal to subequal; lamina 25-130 × 11-45 mm, elliptic, narrowly elliptic or lanceolate, chartaceous, 3-nerved, the lateral nerves visible for 1/3-2/3 of the leaf length, the secondary nerves (4)8-16 pairs, 45-60° to the midrib, straight; upper surface drying dark brown to dark green, pubescent, the hairs to c. 0.8 mm, appressed, weakly curved, the cystoliths fusiform, "V" shaped and "Y" shaped; lower surface drying grey-green to grey-brown, pubescent on nerves only, the hairs to 1 mm, upright, curved or occasionally straight, glandular punctate; base asymmetrical or symmetrical, cuneate, attenuate or decurrent; margins coarsely dentate, the basal 1/10-1/8 entire; apex acute; stipules 3-5 mm, obovate or oblong, drying grey-brown; petioles at the same node equal or unequal by a ratio of 1:1.5-4, major petiole 3-34 mm, pubescent, the hairs to 1 mm, appressed, curved or straight. Inflorescences 2-4 per stem, unisexual, occasionally bisexual, where bisexual dominated by a single sex; peduncular bracts 1-1.5 mm; bracteoles c. 0.5 mm. Staminate inflorescences solitary, 25-47 mm, bearing 15-50 flowers in a compact head; peduncle 2/3-3/4 of the inflorescence length, pubescent, the hairs to 1.5 mm, appressed, straight; pedicels 2.5-4 mm, glabrous or pubescent, the hairs to c. 0.5 mm, erect, crisped. Staminate flowers 3-3.5 × 1-1.3 mm immediately prior to anthesis, cream to brown; tepals 4, 1-1.3 mm, glabrous, occasionally pubescent, the hairs to c. 0.5 mm, erect, crisped, the subapical appendage 1.8-3.3 mm, linear, pubescent, the hairs to 1 mm, erect, crisped; stamens 4. Pistillate inflorescences solitary per axil, 3-10 mm, bearing 20-60 flowers in a compact head; peduncle 1/3-1/2 of the inflorescence length, glabrous or sparsely pubescent, the hairs to c. 0.8 mm, appressed, curved; pedicels 0.4-0.7 mm, glabrous. Pistillate flowers with the adaxial tepal 0.5-0.7 mm, oblong to obovate, the subapical appendage c. 0.3 mm, scale-shaped, the lateral tepals 0.5-0.7 mm, asymmetrically ovate. Infructescences 14-27 mm; achenes 1-1.4 mm, compressed, asymmetrically ellipsoid, the margin narrow. *Wet lowland forests*. P (Antonio 2984, PMA). 600-800 m. (Endémica.)

11. *Pilea cornmanae* Killip, *J. Wash. Acad. Sci.* 15: 292 (1925). Holotype: Panama, Cornman [Killip] 3543 (US!). Ilustr.: not known.

Herbs to 45 cm; epipetric, epiphytic or terrestrial. Stems erect, drying pale brown to pale green, glabrous; cystoliths elliptic or fusiform; internodes 5-75 × 1-2.5 mm, square in cross-section. Leaves at the same node of unequal length by a ratio of 1:1.5-2.5; major lamina 17-56 × 12-23 mm, ovate to broadly ovate, membranous to subchartaceous, 3-nerved, the lateral nerves visible for 1/2 of the leaf length, the secondary nerves 3-5 pairs, 30-45° to the midrib, straight to weakly curved; upper surface drying green to dark green, sparsely pubescent, the hairs to c. 0.8 mm, erect to weakly appressed, straight, the cystoliths fusiform; lower surface drying grey-green, glabrous, occasionally sparsely pubescent, the hairs to c. 0.8 mm, erect, crisped, glandular punctate; base asymmetrical, cuneate, decurrent, cuneate-obtuse, cuneate-acute, or decurrent-acute; margins serrate to crenate-serrate, the basal 1/4 entire; apex acute to attenuate; minor lamina 8-26 × 6-15.5 mm, broadly ovate, ovate-elliptic, ovate, otherwise as major laminae; stipules

2.5-4.5 mm, ovate to cordiform, auriculate at the base, drying pale cream to pale brown; petioles at the same node unequal by a ratio of 1:2-5, the major petioles 9-30 mm, sparsely pubescent or glabrous, the hairs to c. 0.8 mm, erect, crisped, the minor petioles 4-7 mm. Inflorescences 3-12 per stem, unisexual; peduncular bracts 0.5-1 mm; bracteoles 0.5-2 mm. Staminate inflorescences solitary, 12-35 mm, bearing 7-14 flowers in a compact head; peduncle 2/3-3/4 of the inflorescence length, glabrous; pedicels 1.5-3 mm, glabrous. Staminate flowers c. $3 \times 1-1.5$ mm immediately prior to anthesis, cream, apically green; tepals 3, 1-1.5 mm, glabrous, the subapical appendage 1.5-2 mm, narrowly deltate, glabrous; stamens 3. Pistillate inflorescences solitary, 2.5-4.5 mm, bearing 7-28 flowers in a compact head, rarely 2; peduncle 1/2-2/3 of the inflorescence length, glabrous; pedicels 0.3-0.8 mm, glabrous. Pistillate flowers with the adaxial tepal 0.5-1 mm, oblong, the subapical appendage 0.1-0.2 mm, scale-shaped, the lateral tepals 0.5-1 mm, elliptic to ovate. Infructescences 5-30 mm; achenes 1.3-2 mm, compressed, ellipsoid, the margin narrow. *Montane forests, tall oak forests, cloud forests*. CR (Killip, 1925: 293); P (*Hammel 6118*, BM). 1500-2000 m. (Endémica.)

See discussion of *Pilea auriculata*.

12. *Pilea cornuto-cucullata* Cufod., *Arch. Bot. Sist.* 10: 29 (1934). Holotype: Costa Rica, *Cufodontis 292* (W destroyed, foto F! ex W). Ilustr.: not known.

Herbs to 30 cm; terrestrial or epiphytic. Stems erect or prostrate, drying grey-green or brown, glabrous; cystoliths fusiform; internodes 10-50 \times 0.8-5 mm, angulate in cross-section. Leaves at the same node equal; lamina 12-60 \times 8-25 mm, ovate to lanceolate, chartaceous, 3-nerved, the lateral nerves visible for 1/2-2/3 of the leaf length, the secondary nerves 6-12 pairs, 60-80° to the midrib, weakly curved; upper surface drying dark green, or dark brown to almost black, glabrous, the cystoliths fusiform; lower surface drying grey-green to grey-green, glabrous, glandular punctate; base asymmetrical, cuneate to decurrent, occasionally subcordate; margins serrate, the basal 1/4-1/5 entire; apex acute, cuspidate or acuminate; stipules 3-6 mm, oblong, oblong-ovate, drying grey, grey-brown or brown; petioles at the same node equal, occasionally unequal by a ratio of 1:2-3, 5-45 mm, glabrous. Inflorescences 2-6 per stem, unisexual; peduncular bracts 1-1.5 mm; bracteoles 1-1.5 mm. Staminate inflorescences 1 or 2 per axil, 5-25 mm, bearing 36-100 flowers in 1 or 2 compact heads; peduncle 1/2-4/5 of the inflorescence length, glabrous; pedicels 1.5-3 mm, glabrous. Staminate flowers 2.5-4 \times 1.5-3 mm immediately prior to anthesis, white to purple; tepals 4, 1.5-2.5 mm, glabrous, the subapical appendage 0.5-1 mm, oblong, reflexed, glabrous; stamens 4. Pistillate inflorescences 1 or 2 per axil, 2.5-10 mm, bearing 20-90 flowers in a loose panicle; peduncle 1/3-1/2 of the inflorescence length, glabrous; pedicels 0.5-0.8 mm, glabrous. Pistillate flowers with the adaxial tepal 0.8-1 mm, ovate, the subapical appendage 0.3-0.5 mm, corniculate, the lateral tepals c. 0.5 mm, asymmetrically ovate. Infructescences 23-35 mm; achenes c. 1.5 mm, compressed, asymmetrically ellipsoid, the margin narrow. *Cloud forests, elfin forests, in shade, bordering tracks, on rocks and by streams*. CR (*Davidse y Pohl 1623*, US); P (*Croat 34865*, BM). 2900-3200 m. (Endémica.)

The collection cited by D'Arcy (1987: 483) as *Pilea cornuto-cucullata* for Panama corresponds to *Pilea vulcanica*.

13. *Pilea costaricensis* Donn. Sm., *Bot. Gaz.* 20: 294 (1895). Holotype: Costa Rica, *Cooper 5952* (US-799606!). Ilustr.: Burger, *Fieldiana, Bot.* 40: 222, t. 25 (1977).

Herbs to 100 cm; terrestrial, occasionally epiphytic. Stems erect, drying green to dark green, glabrous; cystoliths fusiform; internodes 14-118 \times 1.5-5 mm, angulate in cross-section. Leaves at the same node of unequal length by a ratio of 1:1.5-14; major lamina 61-227 \times 18-64 mm, elliptic, oblong-elliptic to ovate-elliptic, subchartaceous to

chartaceous, 3-nerved, rarely 3-nerved, the lateral nerves visible for 3/4 or more of the leaf length, never reaching the leaf apex, the secondary nerves 13-31 pairs, 45-65° to the midrib, curved to weakly curved; upper surface drying green, grey-green to green-brown, glabrous, the cystoliths fusiform; lower surface drying green to grey-green, glabrous, glandular punctate; base symmetrical, attenuate, occasionally subcordate; margins weakly serrate, rarely crenate, the basal 1/4-1/3 entire; apex acuminate to subcaudate; minor lamina 12-49 × 2-8 mm, narrowly elliptic, otherwise as major laminae; stipules 1.8-5 mm, narrowly deltate, drying green, yellow-green; petioles at the same node unequal by a ratio of 1:1.5-15.5, the major petioles 9-40 mm, glabrous, the minor petioles 1-8 mm. Inflorescences 12-32 per stem, unisexual, rarely bisexual, where bisexual dominated by a single sex; peduncular bracts 0.8-1 mm; bracteoles 0.5-0.8 mm. Staminate inflorescences 1 or 2 per axil, 6-36 mm, bearing 20-240 flowers in a semi-compact head; peduncle 1/8-1/3 of the inflorescence length, glabrous; pedicels 0.5-2.5 mm, glabrous. Staminate flowers 1.5-2 × 1.3-1.5 mm immediately prior to anthesis, cream, apically green; tepals 4, c. 2 mm, glabrous, the subapical appendage 0.5-1 mm, deltate, glabrous; stamens 4. Pistillate inflorescences 1 or 2 per axil, 2.5-3.5 mm, bearing 12-84 flowers in 1-3 loose panicles; peduncle 1/3 of the inflorescence length, glabrous; pedicels c. 0.5 mm, glabrous. Pistillate flowers with the adaxial tepal c. 0.5 mm, ovate, thickened towards the base, the subapical appendage 0.2 mm, scale-shaped, the lateral tepals c. 0.5 mm, asymmetrically elliptic. Infructescences 5-20 mm; achenes c. 1.3 mm, compressed, ellipsoid, the margin narrow, broader towards the base. *Cloud forests*. CR (*Burger y Burger 7598*, F); P (*Davidson 717*, US). 1000-1900 m. (Endémica.)

Material of this species falls into two groups, the first of erect, terrestrial plants with narrowly elliptic leaves characterised by *Burger y Burger 7598* (F); the second consists of epiphytic or terrestrial, prostrate or erect plants with oblong-elliptic leaves, characterised by *Utley y Utley 4833* (F). Jørgensen & León (1999: 932) report this species for Ecuador, citing *Dodson et al. 6747* (RPSC), the determination of this collection has not been verified.

Comment [SK4]: MO material pulled and will be sent to you for confirmation!! Material still not seen

14. *Pilea daguensis* Killip, *Contr. U.S. Natl. Herb.* 26: 382 (1936). Holotype: Colombia, *Triana 889* (P!).
Illustr.: not known.

Pilea dendrophila Miq. var. *major* Wedd.

Herbs to 50 cm; epiphytic or epipetric. Stems prostrate, appressed to rocks or branches, drying dark green to dark brown, minute tuberculate, the tuberculae to 1 mm, occasionally sparsely pubescent, the hairs to 0.2 mm, erect, straight; cystoliths elliptic, fusiform and pustulate; internodes 8-40 × 1.3-4 mm, angulate, frequently narrowly winged in cross-section. Leaves at the same node of unequal length by a ratio of 1:6-14; major lamina 48-120 × 15-35 mm, oblanceolate to obovate, subchartaceous, 3-nerved, the lateral nerves visible for the full length of the leaf, the secondary nerves 7-18 pairs, 45-75° to the midrib, straight; upper surface drying dark green to dark brown, glabrous, the cystoliths fusiform, "V" shaped and "Y" shaped; lower surface drying green or brown, pubescent, the hairs to c. 0.3 mm, erect, straight, eglandular or sparsely punctate glandular; base symmetrical or asymmetrical, obtuse-cuneate, cordate-cuneate or obtuse-decurrent; margins crenate to crenate-serrate, the basal 1/3-1/2 entire; apex cuspidate to acuminate; minor lamina 3-18 × 1.5-8 mm, subsessile, rarely petiolate, strongly asymmetrical, elliptic, ovate, the secondary nerves 1-3 pairs, the base strongly asymmetrical, cordate-cuneate, the margins entire, the apex acute, otherwise as major laminae; stipules 1.5-4.5 mm, cordiform to broadly ovate, drying grey-cream; petioles at the same node unequal by a ratio of 1:2.5-3.5, the major petioles 1.5-3.5 mm, pubescent, the hairs to 0.2 mm, erect, straight, the minor petioles 0.2-1 mm. Inflorescences 5-40 per stem, unisexual; peduncular bracts 0.5-1.3 mm; bracteoles c. 0.5 mm. Staminate inflorescences 1 or 2 per axil, 2-15 mm, bearing 7-50 flowers in a compact or semi-compact head; peduncle 1/8-1/3 of the

inflorescence length, glabrous; pedicels 0.5-2.5 mm, glabrous. Staminate flowers 1.5-2 × c. 1 mm immediately prior to anthesis, cream; tepals 4, 1.3-1.5 mm, glabrous, the subapical appendage 0.5-1 mm, narrowly ovate, glabrous; stamens 4. Pistillate inflorescences 1 or 2 per axil, 1.5-7 mm, bearing 7-50 flowers in a compact head; peduncle 1/3-1/2 of the inflorescence length, glabrous; pedicels 0.2-1.3 mm, glabrous. Pistillate flowers with the adaxial tepal 0.6-0.8 mm, oblong, the subapical appendage c. 0.3 mm, scale-shaped, adaxially thickened, the lateral tepals 0.4-0.5 mm, ovate. Infructescences 2.5-7 mm; achenes 1-1.5 mm, compressed, ellipsoid, the margin narrow. *Montane wet forests*. Ch (*Breedlove 26070*, MO); P (*Sytsma et al. 3911*, PMA). 120-1000 m. (Mesoamerica, Colombia.)

Pilea daguensis has an unusual disjunct distribution in Mesoamerica, material being collected only from Panama and Chiapas but not between. This species is very variable and three subforms, notably different from the type material, have been identified in Mesoamerica. The first is composed of unusually small-leaved plants from Colón (Panama) and characterised by *Correa y Dressler 884* (F, MO). The second is composed of plants also from Colón which are not appressed to their substrate, characterised by *Croat 36983* (MO) and the third is composed of plants from Chiapas with narrow major leaves and petiolate minor leaves, characterised by *Breedlove 26070* (MO, NY).

15. *Pilea dauciodora* Wedd. ex Pav., *Ann. Sci. Nat., Bot. sér. 3*, 18: 223 (1852). Holotype: Peru, *Pavón s.n.* (FI-W). Illustr.: Burger, *Feldiana, Bot.* 40: 224, t. 27 (1977).

Pilea dauciodora var. *uncidens* (Wedd.) Wedd., *P. uncidens* Wedd.

Herbs to 30 cm; terrestrial, epiphytic or epipetric. Stems prostrate, occasionally erect, drying grey-brown to orange-brown, glabrous; cystoliths fusiform, occasionally obscure; internodes 3-35 × 0.4-1 mm, angulate in cross-section. Leaves at the same node equal; lamina 5-38 × 4-25 mm, broadly ovate, ovate or cordiform, membranous to subchartaceous, 3-nerved, the lateral nerves visible for 1/2-2/3 of the leaf length, the secondary nerves 2-6 pairs, 45-60° to the midrib, weakly curved; upper surface drying green to brown-green, glabrous, the cystoliths fusiform, rarely "Y" shaped; lower surface drying grey-green, glabrous, glandular punctate; base symmetrical, obtuse, cuneate or subcordate, occasionally decurrent; margins crenate-serrate, the basal 1/4-1/3 entire; apex acute, occasionally obtuse; stipules 0.5-1.5 mm, deltate to ovate, drying brown; petioles at the same node equal, occasionally unequal by a ratio of 1:1.5-2.5, 3.5-13 mm, glabrous. Inflorescences 1-20 per stem, unisexual; peduncular bracts 0.8-1.5 mm; bracteoles 0.5-0.8 mm. Staminate inflorescences 1 or 2 per axil, 4.5-29 mm, bearing 2-20 flowers in 1 or 2 compact heads; peduncle 3/4 of the inflorescence length, glabrous; pedicels 0.8-3.5 mm, glabrous. Staminate flowers 1.8-2.5 × 1.3-1.8 mm immediately prior to anthesis, cream, apically green; tepals 4, 1.5-2 mm, glabrous, the subapical appendage 0.5-0.8 mm, corniculate, glabrous; stamens 4. Pistillate inflorescences 1 or 2 per axil, 1.5-7 mm, bearing 6-20 flowers in a loose panicle; peduncle 1/2-2/3 of the inflorescence length, glabrous; pedicels 0.3-0.5 mm, glabrous. Pistillate flowers with the adaxial tepal 0.5-0.8 mm, ovate to oblong, the subapical appendage 0.3-0.5 mm, oblong to corniculate, the lateral tepals 0.7-1 mm, asymmetrically ovate. Infructescences 3-17 mm; achenes 1-1.8 mm, subcompressed, ovoid, the margin narrow. *Cloud forests, montane mesophyllous forests*. Ch (*Matuda 4607*, MEXU); G (*Steyermark 32647*, F); H (*Williams y Williams 18589*, US); ES (*Croat 42434*, MO); CR (*Holm y Iltis 521*, GH); P (*Hammel 6507*, PMA). 1400-3300 m. (Mexico [Oaxaca], Mesoamerica, Colombia, Ecuador, Peru, Bolivia.)

Mesoamerican specimens of *Pilea dauciodora* can be divided into two forms and intermediate material is common. The first form, more common in South America, is characterised by pistillate flowers born on one, rarely two, compact head(s), large fruit and prostrate to erect form. The second form, unique to Mesoamerica, is characterised by plants with erect form, pistillate flowers borne in 3-6 compact heads, and fruit 1-1.5 mm in length.

16. *Pilea digitata* A.K. Monro, *Bull. Nat. Hist. Mus. Lond. (Bot.)* 31: 7 (2001). Holotype: Panama, *Hampshire y Whitefoord 189* (BM!). Illustr.: Monro, *Bull. Nat. Hist. Mus. Lond. (Bot.)* 31: 6, t. 1D, E, F (2001).

Herbs to 50 cm; terrestrial. Stems erect, prostrate at base, drying dark brown, densely pubescent, the hairs to 1.5 mm, erect or weakly appressed, curved; cystoliths fusiform; internodes 10-85 × 2.5-6 mm, angulate in cross-section. Leaves at the same node equal; lamina 40-130 × 17-70 mm, obovate to rhomboid to broadly elliptic, chartaceous, occasionally bullate, 3-nerved, the lateral nerves visible for 1/2-2/3 of the leaf length, the secondary nerves 8-26 pairs, 60-75° to the midrib, straight to weakly curved; upper surface drying dark brown to dark green, pubescent, the hairs to 2 mm, erect or appressed, weakly curved, the cystoliths fusiform and "V" shaped, occasionally "Y" shaped; lower surface drying grey-green, densely pubescent, on nerves only, the hairs to 1 mm, erect, curved or occasionally straight, glandular punctate; base asymmetrical or symmetrical, cuneate or obtuse, occasionally decurrent; margins serrate, the basal 1/10-1/5 entire; apex cuspidate; stipules 3-10.5 mm, obovate to oblong, drying dark brown; petioles at the same node unequal by a ratio of 1:1.5-3.5, the major petioles 6-30 mm, densely pubescent, the hairs to 1.3 mm, weakly appressed or erect, curved or straight, the minor petioles 5-20 mm. Inflorescences 2-6 per stem, unisexual; peduncular bracts 1.8-3 mm; bracteoles 1-1.5 mm. Staminate inflorescences solitary, 20-60 mm, bearing 30-200 flowers in a compact head; peduncle 1/2-3/4 of the inflorescence length, densely pubescent, the hairs to 1.5 mm, appressed or erect, curved or occasionally crisped; pedicels 2.5-7 mm, glabrous, occasionally pubescent, the hairs to c. 0.5 mm, erect, crisped. Staminate flowers 2.5-3.5 × 1-1.3 mm immediately prior to anthesis, cream and green; tepals 4, 1.3-1.8 mm, glabrous, occasionally pubescent, the hairs as pedicel, the subapical appendage 1-2 mm, linear, frequently reflexed, pubescent, the hairs to 1.5 mm, erect or appressed, curved, occasionally straight; stamens 4. Pistillate inflorescences solitary, 12-24 mm, bearing 45-100 flowers in a loose panicle; peduncle 1/2-2/3 of the inflorescence length, glabrous or pubescent, the hairs to c. 0.5 mm, erect, crisped or curved; pedicels c. 0.5 mm, glabrous. Pistillate flowers with the adaxial tepal 0.7-1 mm, oblong, the subapical appendage 0.4-0.5 mm, obovate to oblong, the lateral tepals 0.5-0.7 mm, asymmetrically ovate. Infructescences 13-35 mm; achenes 1.5 mm, compressed, asymmetrically ellipsoid, the margin narrow. *Lowland to montane wet forests. P (Valdespino et al. 636, PMA). 700-1500 m. (Endémica.)*

17. *Pilea ecboliophylla* Donn. Sm., *Bot. Gaz.* 46: 115 (1908). Isotype: Guatemala, *von Türkheim 7983* (MO!). Illustr.: Burger, *Fieldiana, Bot.* 40: 222, t. 25 (1977).

Pilea diversissima Killip.

Herbs to shrublets to 100 cm; epiphytic or epipetric, rarely terrestrial. Stems prostrate, rarely erect, drying dark brown to black, glabrous; cystoliths pusticulate, fusiform, and "V" shaped, occasionally "Y" shaped; internodes 3-25 × 0.8-5 mm, angulate in cross-section. Leaves at the same node of unequal length by a ratio of 1:5-13; major lamina 23-140 × 6-45 mm, ovate, lanceolate, oblanceolate, obovate or oblong, chartaceous, 3-nerved, the lateral nerves visible for 3/4 or more of the leaf length, never reaching the leaf apex, the secondary nerves 6-17 pairs, 60-85° to the midrib, straight to weakly curved; upper surface drying dark green to dark brown, glabrous, the cystoliths pusticulate, fusiform, "V" shaped and "Y" shaped; lower surface drying grey-brown, glabrous, glandular punctate; base asymmetrical, cuneate, attenuate, decurrent or acuminate; margins serrate to crenate, the basal 1/3-1/2 entire; apex cuneate, cuspidate or acuminate; minor lamina 3-12 × 1.5-2.5 mm, lanceolate, oblanceolate, the margins entire or apically serrate, the secondary nerves 3-5 pairs, otherwise as major laminae; stipules 0.5-1 mm, deltate to ovate, drying cream; petioles at the same node unequal by a ratio of 1:5-13, the major petioles 1-6(-15-20) mm, glabrous, the minor petioles 0.5-1.5 mm

to subsessile. Inflorescences 2-12 per stem, unisexual; peduncular bracts 0.5-1 mm; bracteoles 0.4-0.5 mm. Staminate inflorescences solitary, 6-25 mm, bearing 24-60 flowers in a loose panicle; peduncle 1/3-1/2 of the inflorescence length, glabrous; pedicels 1.5-3 mm, glabrous. Staminate flowers 1-1.5 × 1.5 mm immediately prior to anthesis, white to cream; tepals 4, c. 2 mm, glabrous, the subapical appendage 0.1-0.2(-0.5) mm, scale-shaped, glabrous; stamens 4. Pistillate inflorescences 1 or 2 per axil, 1-4 mm, bearing 12-200 flowers in a loose panicle; peduncle 1/4-1/3 of the inflorescence length, glabrous; pedicels 0.3-0.5 mm, glabrous. Pistillate flowers with the adaxial tepal 0.5-0.6 mm, ovate, the subapical appendage 0.1-0.3 mm, scale-shaped, the lateral tepals 0.3-0.5 mm, asymmetrically ovate. Infructescences 2.5-6 mm; achenes 0.8-1 mm, compressed, ovoid to broadly ellipsoid, the margin narrow. *Wet forests, cloud forests, swamp forests.* T (*Gilly y Hernández X. 283*, MEXU); Ch (*Breedlove 35301*, MEXU); G (*Steyermark 41994*, US); H (*Holmes 4356*, NY); N (*Moreno y Sandino 12963*, BM); CR (*Austin-Smith 990*, GH); P (*Correa et al. 2909*, PMA). 0-1500 m. (Mesoamerica, Brazil.)

Pilea diversissima has been placed as a synonym of *P. ecboliophylla* following examination of type material of both names. *Pilea ecboliophylla* closely resembles *Pilea rhizobola* Miq., a species described from Brazil, and further study may result in synonymy of *P. ecboliophylla* with the latter.

18. *Pilea falcata* Liebm., *Kongel. Danske Vidensk. Selsk. Skr., Naturvidensk. Math. Afd., ser. 5, 2: 304* (1851).

Holotype: Mexico, Oaxaca, *Liebmann 14241* (C!). Illustr.: not known.

Herbs to 40 cm; epipetric or terrestrial. Stems erect, drying dark green, glabrous; cystoliths fusiform, frequently absent; internodes 11-35 × 0.8-2 mm, angulate in cross-section. Leaves at the same node equal; lamina 30-115 × 10-28 mm, ovate, falcate, subchartaceous to membranous, 3-nerved, the lateral nerves visible for 3/4 or more of the leaf length, the secondary nerves 9-15 pairs, 45-65° to the midrib, curved to straight; upper surface drying green, glabrous, the cystoliths fusiform, "V" shaped and "Y" shaped; lower surface drying grey-green, glabrous, glandular punctate; base asymmetrical, subcordate; margins serrate, the basal 1/3-1/2 entire; apex cuspidate or acute; stipules c. 0.8 mm, broadly ovate, drying brown; petioles at the same node unequal by a ratio of 1:2-3, the major petioles 19-30 mm, glabrous, the minor petioles 6-12 mm. Inflorescences 8-32 per stem, unisexual; peduncular bracts c. 0.5 mm; bracteoles c. 0.4 mm. Staminate inflorescences solitary, 11-34 mm, bearing 30-80 flowers in a loose panicle; peduncle 1/8-1/6 of the inflorescence length, glabrous; pedicels 0.3-0.5 mm, glabrous. Staminate flowers 1.3-1.5 × 1.3 mm immediately prior to anthesis, cream, apically green; tepals 4, c. 1.5 mm, glabrous, the subapical appendage c. 0.5 mm, deltate, glabrous; stamens 4. Pistillate inflorescences solitary, 2 mm, bearing 20-50 flowers in a loose panicle; peduncle 1/8 of the inflorescence length, glabrous; pedicels c. 0.3 mm, glabrous. Pistillate flowers with the adaxial tepal c. 0.5 mm, oblong, the subapical appendage c. 0.3 mm, scale-shaped, adaxially thickened, the lateral tepals c. 0.3 mm, asymmetrically ovate. Infructescences 6-13 mm; achenes 0.8-1 mm, compressed, ovoid, the margin broad. *Damp shaded cliffs.* Altitude unknown. (Mexico [Oaxaca].)

Although not known from Mesoamerica, the type collection is from the neighbouring state of Oaxaca and it is expected to occur in Chiapas. Breedlove (1986: 191) records this species for Chiapas, however the collections cited are not of *Pilea falcata* as defined in this treatment.

19. *Pilea fasciata* Wedd. in A. DC., *Prodr.* 16(1): 149 (1869). Isotype: Colombia, *Triana s.n.* (BM!). Illustr.:

not known.

Herbs to 50 cm; terrestrial, epiphytic or epipetric. Stems erect to prostrate, drying brown to dark brown, pubescent, the hairs to 1.8 mm, erect, straight or curved; cystoliths fusiform, elliptic, "V" and "Y" shaped; internodes 20-75 × 1.5-3.5 mm, angulate in cross-section. Leaves at the same node equal; lamina 23.5-150 × 12-75 mm, elliptic, rhomboid or oblanceolate, chartaceous, frequently bullate, 3-nerved, the lateral nerves visible for 2/3-3/4 of the leaf length, the secondary nerves 6-24 pairs, 60-90° to the midrib, straight to weakly curved; upper surface drying dark green-brown, pubescent, the hairs to 2.5 mm, erect or appressed, straight, crisped or weakly curved, the cystoliths fusiform, elliptic and "V" shaped; lower surface drying grey-green to pale green, pubescent, the hairs to 1.3 mm, erect or appressed, straight or curved, glandular punctate; base symmetrical, attenuate or decurrent; margins serrate, the basal 1/10-1/4 entire; apex subcuspidate to cuspidate; stipules 5-8 mm, oblong to obovate, drying dark brown; petioles at the same node equal or unequal by a ratio of 1:1.5-3, 6-16 mm, pubescent, the hairs to 1.5 mm, erect or appressed, crisped or curved. Inflorescences 1-6 per stem, unisexual; peduncular bracts 0.8-1.8 mm; bracteoles 0.4-1 mm. Staminate inflorescences solitary, 26-65(-130) mm, bearing 20-250 flowers in a loose panicle; peduncle 2/3-3/4 of the inflorescence length, pubescent, the hairs to 1 mm, erect, crisped; pedicels 0.5-1.5 mm, glabrous. Staminate flowers 1.3-1.8 × 1-1.3 mm immediately prior to anthesis, cream to green; tepals 4, 0.8-1 mm, pubescent, the hairs to c. 0.8 mm, erect, crisped, the subapical appendage 0.5-0.8 mm, corniculate, pubescent, the hairs to 0.3(-0.8) mm, erect, crisped; stamens 4. Pistillate inflorescences solitary, 12-40 mm, bearing 100-280 flowers in a loose panicle; peduncle 1/3-2/3 of the inflorescence length, glabrous, occasionally pubescent, the hairs to c. 0.3 mm, erect, crisped; pedicels 0.4-0.8 mm, glabrous. Pistillate flowers with the adaxial tepal 0.7-1 mm, oblong to obovate, the subapical appendage c. 0.5 mm, obovate, the lateral tepals c. 0.5 mm, asymmetrically ovate. Infructescences 15-90 mm; achenes 1-1.3 mm, compressed, ellipsoid, the margin narrow. *Forests, in shade by streams and tracks, on boulders.* CR (Pittier 16032, BM); P (Correa *et al.* 9815, PMA). 0-1500 m. (Mesoamerica, Colombia, Ecuador.)

20. *Pilea forgeti* N.E. Br., *Bot. Mag.* 13: t. 8699 (1917). Lectotype (designated by Monro, 2001): Grown in England from seed collected by Forget in Venezuela, *Brown s.n. 'June 4, 1914'* (K!). Illustr.: N.E. Br., *Bot. Mag.* 13: t. 8699 (1917).

Herbs to 50 cm; terrestrial, epipetric or epiphytic. Stems prostrate, drying dark brown to black, pubescent, the hairs to c. 0.8 mm, appressed, strongly curved; cystoliths fusiform; internodes 9-53 × 2-3.5 mm, square to angulate in cross-section. Leaves at the same node equal; lamina 32-210 × 13-83 mm, obovate, chartaceous, 3-nerved, the lateral nerves visible for 3/4 or more of the leaf length, never reaching the leaf apex, the secondary nerves 7-12 pairs, 65-90° to the midrib, straight or weakly curved; upper surface drying green-brown to dark brown, glabrous, the cystoliths fusiform; lower surface drying green, grey-green or brown, pubescent, the hairs to c. 0.8 mm, appressed, curved, eglandular; base asymmetrical, attenuate, attenuate-subcordate, hastate; margins serrate or crenate-serrate, the basal 1/3-1/2 entire; apex weakly cuspidate, acute or obtuse; stipules 5-14 mm, obovate to oblong, drying brown to dark brown; petioles at the same node equal, 5-29 mm, pubescent, the hairs to c. 0.8 mm, appressed, curved. Inflorescences 1-3 per stem, unisexual; peduncular bracts 1.5-2 mm; bracteoles 0.5-1 mm. Staminate inflorescences solitary, 50-114 mm, bearing 30-125 flowers in a compact head; peduncle 1/2-3/4 of the inflorescence length, pubescent, the hairs to c. 0.8 mm, appressed, curved; pedicels 0.5-4.5 mm, pubescent, the hairs to c. 0.8 mm, appressed, curved. Staminate flowers 1.8-3 × 1.3-2 mm immediately prior to anthesis, cream, apically green; tepals 4, 2.5-3.5 mm, glabrous, the subapical appendage 0.8-1.5 mm, obovate, sparsely pubescent, the hairs to c. 0.8 mm, appressed, curved; stamens 4. Pistillate inflorescences solitary, 15-25 mm, bearing 250-450 flowers in a loose panicle; peduncle 1/3-2/3 of the inflorescence

length, glabrous or sparsely pubescent, the hairs to c. 0.5 mm, erect, crisped; pedicels 0.5-1 mm, glabrous. Pistillate flowers with the adaxial tepal 0.8-1 mm, obovate to oblong, the subapical appendage 0.2-0.3 mm, scale-shaped, thickened, the lateral tepals c. 0.8 mm, asymmetrically ovate. Infructescences 15-50 mm; achenes 1.3-1.5 mm, compressed, ovoid, the margin narrow. *Forests, in damp shade. P (Dressler 4217, PMA). 0-900 m. (Mesoamerica, Colombia, Venezuela.)*

Collections of *Pilea forgetii* have frequently been wrongly determined as *P. fasciata*.

21. *Pilea gamboana* Al. Rodr. & A.K. Monro, *J. Bot. Res. Inst. Texas* 2: 997 (2008). Holotype: Costa Rica, *Gamboa & Picado 639* (INB!). Illustr.: Rodríguez & Monro, *J. Bot. Res. Inst. Texas* 2: 998, t. 2 (2008).

Shrub to 50 cm; terrestrial or epiphytic. Stems erect to prostrate drying grey-green to green, glabrous; cystoliths fusiform; internodes 20-55 × 0.8-2 mm, angulate in cross-section. Leaves equal or subequal at the same node, lamina 10-150 × 10-40 mm, elliptic to ovate, chartaceous, 3, 5-nerved, the lateral nerves visible for 3/4 or more of the leaf length, reaching the leaf apex, the secondary nerves 7-13 pairs, 75-90° to the midrib, straight to weakly curved; upper surface drying grey-green, glabrous, the cystoliths fusiform or "V" shaped; lower surface drying grey-green, glabrous, glandular punctate; base subpeltate to peltate; margins minutely and sparsely serrate, the basal 1/8-1/5 entire; apex acuminate; stipules 3-4 mm, oblong to ovate, drying grey-green; petioles at the same node unequal by a ratio of 1:1.5-3, the major petioles 20-100 mm, glabrous, the minor petioles 4-25 mm. Inflorescences 2-8 per stem, unisexual; peduncular bracts 0.8-1.5 mm; bracteoles 0.3-0.8 mm. Staminate inflorescences solitary, 10-45 mm, bearing 12-50 flowers in a loose panicle; peduncle 1/3-1/2 of the inflorescence length, glabrous; pedicels 0.3-0.8 mm, glabrous. Staminate flowers 1-1.3 × 0.8-1.5 mm immediately prior to anthesis, pale green; tepals 4, 0.8-1 mm, glabrous, the subapical appendage 0.1-0.3 mm, scale-shaped, glabrous; stamens 4. Pistillate inflorescences solitary, 10-40 mm, bearing 40-100 flowers in a loose to semi-compact panicle; peduncle 1/2-2/3 of the inflorescence length, glabrous; pedicels 0.1-1 mm, glabrous. Pistillate flowers with the adaxial tepal 0.5-0.8 mm, oblong to obovate, the subapical appendage 0.1-0.3 mm, scale-shaped, the lateral tepals 0.3-0.4 mm, asymmetrically ovate. Infructescences 10-40 mm; achenes 0.8-1 mm, subcompressed, ellipsoid to ovoid, the margin narrow. *Wet forests. CR (Hammel & Kennedy 21094, MO). 1400-1800 m. (Endémica.)*

22. *Pilea glabra* S. Watson, *Proc. Amer. Acad. Arts* 26: 152 (1891). Holotype: Mexico, San Luis Potosí, *Pringle 3550* (GH!). Illustr.: not known.

Pilea tuerckheimii Donn. Sm.

Herbs to 200 cm; terrestrial. Stems erect, drying dark brown to black, glabrous; cystoliths fusiform, or absent; internodes 10-75 × 1.5-5 mm, angulate in cross-section. Leaves at the same node equal, lamina 57-270 × 16-66 mm, lanceolate to oblong, membranous to subchartaceous, 3-nerved, the lateral nerves visible for 3/4 of the leaf length, the secondary nerves 20-52 pairs, 45-60° to the midrib, weakly curved towards the base, strongly curved towards the apex; upper surface drying dark green to dark brown-green to black, glabrous, the cystoliths fusiform, "V" shaped, occasionally absent; lower surface drying dark brown or green to grey-green, glabrous, glandular punctate; base symmetrical, acute, obtuse or subcordate; margins entire or serrate, where serrate, the basal 1/3-2/3 entire; apex subcaudate to caudate or attenuate; stipules 0.8-2 mm, deltate, drying cream to dark brown; petioles at the same node equal, occasionally unequal by a ratio of 1:1.5-2, 16-50 mm, glabrous. Inflorescences 6-24 per stem, unisexual or bisexual, where bisexual one sex dominating; peduncular bracts 0.5-1.3 mm; bracteoles 0.3-0.5 mm. Staminate

inflorescences solitary, 15-75 mm, bearing 24-200 flowers in a loose panicle; peduncle 1/8-1/3 of the inflorescence length, glabrous; pedicels 0.3-3 mm, glabrous. Staminate flowers 1.5-2.8 × 1.3-2 mm immediately prior to anthesis, cream; tepals 4, 1.5-3 mm, glabrous, the subapical appendage 0.3-0.5 mm, corniculate, glabrous; stamens 4. Pistillate inflorescences 2 per axil, 4-57 mm, bearing 30-700 flowers in a loose panicle; peduncle 1/8-1/4 of the inflorescence length, glabrous; pedicels 0.3-0.5 mm, glabrous. Pistillate flowers with the adaxial tepal 0.4-0.7 mm, oblong, the subapical appendage 0.1-0.3 mm, scale-shaped, the lateral tepals 0.3-0.5 mm, asymmetrically ovate. Infructescences 3-90 mm; achenes 0.8-1.3 mm, subcompressed, asymmetrically ovoid, the margin narrow. *Forests, fields, rock ledges*. Ch (*Botteri 541*, BM); B (*Davidse 35823*, BM); G (*Standley 70353*, F); H (*Tróchez 36*, MEXU); N (*Neill 4297*, MO); CR (*Herrera y Robles 812*, BM). 100-1900 m. (Mexico, Mesoamerica.)

Pilea tuerckheimii is included as a synonym of *P. glabra* following examination of type material for both species. *Pilea glabra* forms part of a group of closely related species which includes *P. mexicana* and *P. killipiana*. Of the material seen, two collections from southern Mexico: *Rosas R. 349* (BM) from Veracruz, and *Botteri 541* (BM) from Chiapas, represent a distinct form characterised by large, entire, lanceolate leaves.

23. *Pilea gomeziana* W.C. Burger, *Phytologia* 31: 269 (1975). Holotype: Costa Rica, *Gómez P. 3304* (F!).
Illustr.: Burger, *Fieldiana, Bot.* 40: 223, t. 26 (1977).

Herbs to 50 cm; terrestrial. Stems erect, drying dark brown to dark green, pubescent, becoming glabrous, the hairs to c. 0.7 mm, erect, crisped; cystoliths elliptic; internodes 11-61 × 1.5-5 mm, angulate in cross-section. Leaves at the same node equal; lamina 65-141 × 38-62 mm, ovate, subchartaceous, 3-nerved, the lateral nerves visible for 2/3 of the leaf length, the secondary nerves 9-13 pairs, 45-60° to the midrib, weakly curved to straight; upper surface drying dark brown or dark green, sparsely pubescent, the hairs to 1.5 mm, weakly appressed, weakly curved, the cystoliths elliptic, fusiform and "V" shaped; lower surface drying grey-brown or grey-green, sparsely pubescent, the hairs to c. 0.8 mm, weakly appressed, straight, glandular punctate; base symmetrical or asymmetrical, cuneate-acute, decurrent, or cuneate-decurrent; margins crenate-serrate or serrate, the basal 1/5 entire; apex acute to subcuspidate; stipules 6-7 mm, obovate, drying cream; petioles at the same node equal or unequal by a ratio of 1:1.5-2.5, the major petioles 8-52 mm, pubescent, the hairs to c. 0.5 mm, erect, crisped, the minor petioles as major. Inflorescences 4-8 per stem, unisexual; peduncular bracts 2-2.5 mm; bracteoles 0.5-1.3 mm. Staminate inflorescences solitary, 12-18 mm, bearing 12-36 flowers in a loose panicle, the flowers in clumps along panicle branches; peduncle 1/3-1/2 of the inflorescence length, glabrous; pedicels 1-1.5 mm, sparsely pubescent, the hairs to c. 0.5 mm, erect, crisped. Staminate flowers 2-2.3 × 1.3 mm immediately prior to anthesis, cream or pale green; tepals 4, 1-1.3 mm, sparsely pubescent, the hairs to c. 0.5 mm, erect, crisped, the subapical appendage 1 mm, oblong, glabrous; stamens 4. Pistillate inflorescences solitary, 13-36 mm, bearing 170-300 flowers in a loose panicle; peduncle 1/8-1/4 of the inflorescence length, glabrous; pedicels 0.3-0.5 mm, glabrous. Pistillate flowers with the adaxial tepal 0.4-0.5 mm, oblong to obovate, the subapical appendage 0.2 mm, scale-shaped, adaxially thickened, the lateral tepals 0.3-0.5 mm, ovate. Infructescences 37-53 mm; achenes 0.7-0.8 mm, subcompressed, ellipsoid, the margin narrow. *Forests, growing singly in shade*. CR (*Dressler 4469*, F). 0-300 m. (Endémica.)

This species is only known from Cocos Island.

24. *Pilea herniarioides* (Sw.) Lindl., *Coll. Bot.* t. 4 (1826). *Urtica herniarioides* Sw., *Kongl. Vetensk. Acad. Nya Handl.* 8: 64 (1787). Isotype: "Hispaniola", Swartz s.n. (BM!). Illustr.: Burger, *Fieldiana, Bot.* 40: 224, t. 27 (1977). N.v.: Hierba-berrillo (ES).

Pilea brittoniae Urb., *P. deltoidea* Liebm., *P. microphylla* var. *peregrina* Griseb., *P. peregrina* (Griseb.) Grudz. & P. Herrera.

Herbs to 10 cm; terrestrial or epipetric. Stems prostrate, drying brown to green-brown, glabrous; cystoliths absent; internodes 4.5-22 × 0.3-0.5 mm, angulate in cross-section. Leaves at the same node equal; lamina 2.5-8 2-7 mm, spatulate to obovate, subchartaceous, 3-nerved, the lateral nerves visible for 2/3 or more of the leaf length, never reaching the leaf apex, the secondary nerves 3-4 pairs, 45° to the midrib, weakly curved; upper surface drying green, sparsely pubescent, the hairs to 1 mm, weakly appressed, straight or curved, the cystoliths fusiform; lower surface drying pale green, glabrous, eglandular; base symmetrical, decurrent; margins entire; apex rounded, obtuse, subcuspidate; stipules 0.5-0.8 mm, elliptic or obovate, drying cream, brown or pale green; petioles at the same node equal, 1-5 mm, glabrous. Inflorescences 2-12 per stem, unisexual; peduncular bracts c. 0.5 mm; bracteoles c. 0.3 mm. Staminate inflorescences 1 or 2 per axil, 1.3-1.5 mm, bearing 1-4 flowers in a loose panicle, frequently appearing fasciculate; peduncle less than 1/8 of the inflorescence length, glabrous; pedicels 0.8-1.3 mm, glabrous. Staminate flowers 0.4-0.5 × 0.4-0.5 mm immediately prior to anthesis, cream, apically green; tepals 4, 0.5-0.8 mm, glabrous, the subapical appendage absent; stamens 4. Pistillate inflorescences 1 or 2 per axil, 1 mm, bearing 5-15 flowers in 1-3 semi-compact heads; peduncle 1/3 of the inflorescence length, glabrous; pedicels c. 0.3 mm, glabrous. Pistillate flowers with the adaxial tepal c. 0.3 mm, oblong, the subapical appendage absent, the lateral tepals c. 0.3 mm, narrowly ovate. Infructescences 1-2.5 mm; achenes 0.5-0.7 mm, subcompressed, ovoid, the margin narrow. *Wet forests, commonly used as an ornamental in gardens.* G (Standley y Steyermark, 1952: 414); H (*Martínez 26*, MO); ES (*Montalvo 5039*, ITIC); N (Standley y Steyermark, 1952: 414); CR (*Oersted 14240*, C); P (*Gentry y Mori 13576*, MO). 300-1500 m. (USA, Mesoamerica, Greater Antilles.)

Records for this species from the USA (Wunderlin, 1997: 266; Long & Lakela, 1971: 365), Guatemala and Nicaragua could not be confirmed from herbarium specimens. Sousa (1983: 23) records this species for Quintana Roo, however the specimen cited was incorrectly identified.

25. *Pilea herrerae* Al. Rodr. & A.K. Monro, *J. Bot. Res. Inst. Texas* 2: 1000 (2008). Holotype. Costa Rica, *Herrera 3851* (INB). Illustr.: Rodríguez y Monro, *J. Bot. Res. Inst. Texas* 2: 1001, t. 3 (2008)

Herbs to 100 cm; terrestrial. Stems erect or prostrate, drying dark grey to grey, glabrous; cystoliths punctiform to oblong; internodes 5-55 × 0.8-4 mm, angulate in cross-section. Leaves at the same node of unequal length by a ratio of 1:5-23; major lamina 30-90 × 10-55 mm, lanceolate, elliptic-lanceolate, falcate-lanceolate, chartaceous, 3-nerved, the lateral nerves visible for 3/4 or more of the leaf length, never reaching the leaf apex, the secondary nerves 12-32 pairs, 75-90° to the midrib, straight to weakly curved; upper surface drying grey or grey-green, glabrous, the cystoliths fusiform or "V" shaped; lower surface drying grey, glabrous, glandular punctate; base symmetrical, obtuse, oblique or subpeltate; margins entire, rarely minutely and sparsely serrate, where minutely and sparsely serrate basal 3/4 entire; apex acuminate; minor lamina 3-17 × 5-10 mm, occasionally absent (caducous), otherwise as major laminae; stipules 1-2 mm, lanceolate, drying grey; petioles at the same node unequal by a ratio of 1:10-20, the major petioles 5-15 mm, glabrous, the minor petioles 1-3 mm. Inflorescences 4-10 per stem, unisexual; peduncular bracts 0.3-0.5 mm; bracteoles 0.5-1 mm. Staminate inflorescences 1 or 2 per axil, 5-50 mm, bearing 12-30 flowers in a compact head; peduncle 2/3-

3/4 of the inflorescence length, glabrous; pedicels 0.3-1.8 mm, glabrous. Staminate flowers 1.5-2.3 × 0.8-1.5 mm immediately prior to anthesis, pale green; tepals 4, 0.8-2 mm, glabrous, the subapical appendage 0.5-0.8 mm, corniculate, glabrous; stamens 4. Pistillate inflorescences solitary, 10-30 mm, bearing 40-100 flowers in a compact panicle; peduncle 1/2-3/4 of the inflorescence length, glabrous; pedicels 0.1-2 mm, glabrous. Pistillate flowers with the adaxial tepal 1.5-3 mm, oblong to obovate, the subapical appendage 0.3-0.4 mm, scale-shaped, the lateral tepals 1-1.3 mm, asymmetrically ovate. Infructescences 10-30 mm; achenes 2-2.5 mm, subcompressed, ellipsoid to ovoid, the margin narrow, broad towards the apex. *Wet forest*. CR (*Bittner 1456*, MO). 700-1700 m. (Endémica.)

26. *Pilea hyalina* Fenzl, *Nov. Gen. Sp. Pl.* 4 (1849) [preprint from *Akad. Wiss., Math.-Naturwiss. Kl., Denkschr.* 1: 256 (1850)]. Syntype: sin loc., *Diaz s.n.* (C!). Ilustr.: Burger, *Fieldiana, Bot.* 40: 224, t. 27 (1977). N.v.: Vidrillo (CR).

Pilea lundii Liebm., *Pilea scrobiculata* Liebm.

Annual herbs to 25(-60) cm; terrestrial or epipetric. Stems erect, drying orange-brown, glabrous; cystoliths elliptic, frequently obscure; internodes 3-76 × 0.8-5 mm, angulate in cross-section. Leaves at the same node equal; lamina 8-56 × 3.5-35 mm, ovate, occasionally almost rhomboid, membranous to subchartaceous, 3-nerved, the lateral nerves visible for 3/4 or more of the leaf length, never reaching the leaf apex, the secondary nerves 7-17 pairs, 45-60° to the midrib, curved; upper surface drying green, brown-green or yellow-green, sparsely pubescent, the hairs to 1 mm, weakly appressed, straight or weakly curved, the cystoliths fusiform, "U" shaped and pusticulate; lower surface drying grey-green, glabrous, glandular punctate; base symmetrical or asymmetrical, obtuse, cuneate, obtuse-cuneate, occasionally subcordate; margins serrate, the basal 1/4-1/3 entire; apex acute to weakly cuspidate; stipules 0.5-1.5 mm, deltate or ovate, drying pale green to brown-green; petioles at the same node equal, 4-55 mm, pubescent or glabrous, the hairs to c. 0.5 mm, erect, crisped. Inflorescences 16-80 per stem, bisexual; peduncular bracts 0.5-0.8 mm; bracteoles 0.2-0.4 mm; inflorescences 1 or 2 per axil, 1.5-26 mm, bearing 1-7 staminate and 30-330 pistillate flowers in 2-5 loose panicles; peduncle 1/8-1/2 of the inflorescence length, glabrous; staminate pedicels 0.3-1 mm, glabrous; pistillate pedicels 0.3-0.8 mm, glabrous. Staminate flowers 0.5-0.8(-1) × 0.4-0.5(-0.8) mm immediately prior to anthesis, cream, apically green; tepals 2, 0.5-0.8 mm, glabrous, the subapical appendage c. 0.1 mm, tumescent, glabrous; stamens 2. Pistillate flowers with the adaxial tepal c. 0.4 mm, ovate, the subapical appendage c. 0.2 mm, oblong, thickened, the lateral tepals c. 0.2 mm, asymmetrically ovate. Infructescences 1.5-26 mm; achenes 0.5-0.7 mm, subcompressed, ovoid, the margin narrow. *Moist forests, often in disturbed areas*. Ch (*Matuda 17178*, MEXU); B (*Monro 759*, BM); G (*Standley 88713*, F); H (*Molina R. 10862*, F); ES (*Tucker 715*, GH); N (*Stevens y Krukoff 4352*, BM); CR (*Skutch 3847*, MO); P (*Galdames et al. 1790*, SCZ). 0-1600 m. (Mexico [Oaxaca, Veracruz], Mesoamerica, Colombia, Venezuela, Ecuador, Peru, Bolivia, Brazil, Chile, Argentina.)

The occurrence of this species in Argentina (Hollowell, 1999: 1128) could not be confirmed directly from specimens.

27. *Pilea imparifolia* Wedd., *Ann. Sci. Nat., Bot, sér.* 3, 18: 212 (1852). Lectotype (designated by Monro, 2000): French Guiana, *Mélinon 123* (P!). Ilustr.: Burger, *Fieldiana, Bot.* 40: 222, t. 25 (1977).

Pilea dendrophila Miq.

Herbs to 20 cm; epiphytic or epipetric. Stems prostrate, drying dark green, glabrous; cystoliths elliptic to fusiform; internodes 5-14 × 0.5-2.5 mm, angulate in cross-section. Leaves at the same node of unequal length by a ratio

of 1:1.5-5; major lamina 10-63 × 4.5-25 mm, ovate, elliptic or obovate, membranous to subchartaceous, pinnately nerved, occasionally appearing 3-nerved, the lateral nerves less than 2/3 of the leaf length, the secondary nerves 3-15 pairs, 45-65° to the midrib, curved; upper surface drying dark green, glabrous, the cystoliths elliptic, fusiform and "V" shaped, rarely "Y" shaped; lower surface drying pale green, glabrous, glandular punctate; base asymmetrical, decurrent, acute, cuneate or obtuse; margins crenate-serrate, frequently appearing sinuate, the basal 1/3-1/2 entire; apex obtuse or acute; minor lamina 4-14 × 4-11 mm, ovate to suborbicular, 3-nerved, the secondary nerves 1-3 pairs, the base cordate-decurrent, otherwise as major laminae; stipules 0.5-1 mm, deltate, drying brown to red-brown; petioles at the same node unequal by a ratio of 1:2-3, the major petioles 1-1.5 mm, glabrous, the minor petioles 0.2-0.5 mm. Inflorescences 8-30 per stem, unisexual; peduncular bracts c. 0.5 mm; bracteoles 0.3-0.4 mm. Staminate inflorescences 1 or 2 per axil, 2-3 mm, bearing 2-8 flowers in a loose panicle; peduncle 1/10-1/4 of the inflorescence length, glabrous; pedicels 0.5-2.5 mm, glabrous. Staminate flowers 1-1.5 × 1.3-1.5 mm immediately prior to anthesis, cream; tepals 4, 1.5 mm, glabrous, the subapical appendage c. 0.5 mm, scale-shaped, reflexed, glabrous or pubescent, the hairs to 0.2 mm, erect, crisped; stamens 4. Pistillate inflorescences 1 or 2 per axil, 1-3 mm, bearing 2-24 flowers in a compact head; peduncle 1/4-1/2 of the inflorescence length, glabrous; pedicels 0.1-0.3 mm, glabrous. Pistillate flowers with the adaxial tepal c. 0.5 mm, obovate, the subapical appendage c. 0.3 mm, scale-shaped, occasionally absent, the lateral tepals c. 0.3 mm, asymmetrically ovate. Infructescences 2.5-4 mm; achenes 1-1.3 mm, compressed, ellipsoid, the margin narrow. *Wet forests, premontane forests*. CR (*Lent 434*, F); P (*Galdames et al. 3905*, SCZ). 0-1600 m. (Mesoamerica, Colombia, Venezuela, Guayanas, Ecuador, Peru, Brazil.)

28. *Pilea irrorata* Donn. Sm., *Bot. Gaz.* 19: 11 (1894). Holotype: Guatemala, *Donnell Smith 2751* (US!).

Illustr.: not known.

Herbs to 120 cm; terrestrial. Stems erect or prostrate, drying dark green to black, glabrous; cystoliths elliptic, pusticulate and fusiform; internodes 12-72 × 2-8 mm, angulate in cross-section. Leaves at the same node equal; lamina 32-265 × 19-127 mm, obovate, elliptic, oblong or lanceolate, membranous to subchartaceous, 3-nerved, the lateral nerves visible for 3/4 or more of the leaf length, never reaching the leaf apex, the secondary nerves 16-36 pairs, 75-90° to the midrib, straight to weakly curved; upper surface drying green or brown glabrous, the cystoliths fusiform, "V" shaped and "Y" shaped; lower surface drying grey-green or pale brown, glabrous, glandular punctate; base symmetrical, decurrent, attenuate or cordate; margins weakly serrate, the basal 1/2-2/3 entire; apex cuspidate to subcaudate; stipules 2-6 mm, caducous, narrowly ovate, drying brown to green; petioles at the same node equal, 7-82 mm, glabrous, occasionally narrowly winged. Inflorescences 4-10 per stem, unisexual; peduncular bracts 0.5-1.3 mm; bracteoles 0.3-1 mm. Staminate inflorescences solitary, 4-20(-180) mm, bearing 20-500 flowers in a compact head; peduncle 1/10-1/5(-3/4) of the inflorescence length, glabrous; pedicels 1-5 mm, glabrous. Staminate flowers 1.3-2.5 × 1-1.8 mm immediately prior to anthesis, cream; tepals 4, 1.3-2.3 mm, glabrous, the subapical appendage 0.3-0.8 mm, obovate, glabrous; stamens 4. Pistillate inflorescences 1 or 2 per axil, 2.5-13 mm, bearing 10-360 flowers in 1-4 semi-compact heads; peduncle 1/3-1/2 of the inflorescence length, glabrous; pedicels 0.3-0.5 mm, glabrous. Pistillate flowers with the adaxial tepal 0.5-1.3 mm, oblong to obovate, the subapical appendage 0.2-0.3 mm, oblong, thickened, the lateral tepals 0.4-1 mm, asymmetrically ovate to elliptic. Infructescences 6-12 mm; achenes 1.3-1.5 mm, subcompressed, ellipsoid, the margin narrow. *Selva altas perennifolias, swamps*. Ch (*Breedlove 6991*, GH); G (*Skutch 1354*, US). 0-2000 m. (Mexico [Oaxaca, Veracruz, Chiapas], Guatemala.)

29. *Pilea killipiana* Standl. & Steyerl., *Fieldiana, Bot.* 24(3): 415 (1952). Holotype: Guatemala, *Steyermark 44757* (F!). Illustr.: not known.

Herbs to 30 cm; terrestrial or epipetric. Stems erect, drying grey-green to pale green, glabrous; cystoliths fusiform; internodes 5-25 × 1-1.5 mm, angulate in cross-section. Leaves at the same node equal; lamina 21-67 × 2.5-7 mm, narrowly lanceolate, narrowly elliptic to narrowly rhomboid, chartaceous, 3-nerved, the lateral nerves visible for the full length of the leaf, the secondary nerves 7-40 pairs, 60-90° to the midrib, straight to weakly curved; upper surface drying brown-green, glabrous, the cystoliths elliptic, fusiform, "V" shaped and "Y" shaped; lower surface drying pale brown-green, glabrous, glandular punctate; base symmetrical, cuneate to decurrent; margins crenate-serrate, the basal 1/3-2/3 entire; apex shallow acuminate or acute; stipules 0.5-1.3 mm, deltate to ovate, drying grey-cream; petioles at the same node equal, 1.5-3.5 mm, glabrous. Inflorescences 2-12 per stem, unisexual; peduncular bracts 0.8-1 mm; bracteoles 0.5-0.8 mm. Staminate inflorescences 1 or 2 per axil, 4-9 mm, bearing 3-12 flowers in a compact or semi-compact head; peduncle 1/4-1/2 of the inflorescence length, glabrous; pedicels 1.5-3 mm, glabrous. Staminate flowers 1.8-2 × 1.5-2 mm immediately prior to anthesis, cream; tepals 4, 2 mm, glabrous, the subapical appendage c. 0.3 mm, scale-shaped, glabrous; stamens 4. Pistillate inflorescences 2 per axil, 0.8-5.5 mm, bearing 3-60 flowers in a loose panicle or semi-compact head; peduncle 1/-1/2 of the inflorescence length, glabrous; pedicels 0.2-0.3 mm, glabrous. Pistillate flowers with the adaxial tepal 0.6-0.8 mm, ovate, the subapical appendage c. 0.3 mm, scale-shaped, the lateral tepals c. 0.5 mm, asymmetrically ovate. Infructescences 1.5-5.5 mm; achenes c. 0.8 mm, compressed, asymmetrically ovoid to ellipsoid, the margin abaxially broad, adaxially obscure. *Evergreen forests. Ch (Breedlove 35384, MEXU); G (Steyermark 44757, F). 300-500 m. (Endémica.)*

Pilea killipiana forms part of a group of closely related species which includes *P. mexicana* and *P. glabra*.

30. *Pilea latifolia* Wedd., *Arch. Mus. Hist. Nat.* 9: 249 (1856). Lectotype (designated by Monro, 2001): Colombia, *Schlim 701* ["3000 m, juin"] (P!). Illustr.: not known.

Herbs to 25 cm; terrestrial or epipetric. Stems erect, drying dark brown to black, pubescent, the hairs to c. 0.8 mm, erect, strongly curved; cystoliths elliptic; internodes 4-78 × 1.3-2.8 mm, angulate in cross-section. Leaves at the same node equal; lamina 23.5-106 × 11-52 mm, elliptic, oblanceolate to rhomboid, subchartaceous, 3-nerved, the lateral nerves visible for 2/3 of the leaf length, the secondary nerves 6-16 pairs, 60-90° to the midrib, straight to weakly curved; upper surface drying dark green to dark green-brown, glabrous, the cystoliths elliptic, fusiform and "V" shaped; lower surface drying grey-brown to grey-green, pubescent, the hairs to c. 0.5 mm, erect, strongly curved, glandular punctate; base asymmetrical, cuneate, cuneate-decurrent or obtuse; margins crenate-serrate, the basal 1/5-1/3 entire; apex acute or acuminate; stipules 3-6 mm, obovate, drying brown; petioles at the same node equal, 2-22 mm, pubescent, the hairs to c. 0.5 mm, erect, strongly curved. Inflorescences 1-8 per stem, unisexual; peduncular bracts 0.8-1.3 mm; bracteoles 0.4-0.8 mm. Staminate inflorescences solitary, 29-67 mm, bearing 20-60 flowers in a loose panicle; peduncle 3/4-4/5 of the inflorescence length, sparsely pubescent, the hairs to c. 0.5 mm, erect, strongly curved; pedicels 0.4-1.5 mm, glabrous. Staminate flowers 1.8-2 × 1.3-1.5 mm immediately prior to anthesis, green; tepals 4, 2.3-2.5 mm, glabrous, the subapical appendage 1.3-1.5 mm, corniculate, glabrous; stamens 4. Pistillate inflorescences solitary, 3-5 mm, bearing 30-80 flowers in 2-3 semi-compact heads; peduncle 1/3 of the inflorescence length, glabrous; pedicels 0.4-0.8 mm, glabrous. Pistillate flowers with the adaxial tepal 0.7-0.8 mm, oblong, the subapical appendage 0.2-0.4 mm, oblong, thickened, the lateral tepals c. 0.5 mm, ovate. Infructescences 8-25 mm; achenes 1.3-1.5 mm, subcompressed, ellipsoid,

the margin narrow. *Wet forests, premontane forests.* P (Correa et al. 9849, PMA). 400-1700 m. (Mesoamerica, Colombia.)

31. *Pilea lindeniana* Wedd., *Ann. Sci. Nat., Bot., sér. 3*, 18: 210 (1852). Lectotype (designated by Monro, 2000): Colombia, *Linden 799* (P!). Illustr.: not known.

Herbs to shrublets to 80 cm; terrestrial. Stems erect, drying pale grey, sparsely pubescent, the hairs to c. 0.7 mm, erect, crisped; cystoliths fusiform; internodes 11-45 × 1.8-5 mm, angulate in cross-section. Leaves at the same node equal; lamina 30-46 × 16-21 mm, ovate, subchartaceous, 3-nerved, the lateral nerves visible for 1/2-2/3 of the leaf length, the secondary nerves 5-7 pairs, 45-60° to the midrib, weakly curved to straight; upper surface drying dark green, densely pubescent, the hairs to 1.3 mm, weakly appressed, curved, the cystoliths elliptic; lower surface drying brown to brown-green, densely pubescent, the hairs to 1 mm, weakly appressed, crisped to weakly curved, glandular punctate; base symmetrical, subcordate; margins entire; apex subcuspidate; stipules 4-6 mm, oblong or ovate, drying golden brown; petioles at the same node equal, 3.5-9 mm, densely pubescent, the hairs to c. 0.8 mm, weakly appressed, crisped or weakly curved. Inflorescences 4-10 per stem, unisexual; peduncular bracts 1.5-2 mm; bracteoles 1.5-2 mm. Staminate inflorescences solitary, 45-62 mm, bearing 45-210 flowers in a loose panicle, the flowers in clumps along panicle branches; peduncle 1/3-1/2 of the inflorescence length, pubescent, the hairs to c. 0.5 mm, erect, crisped; pedicels 0.5-0.8 mm, glabrous. Staminate flowers 1-1.3 × c. 1 mm immediately prior to anthesis, cream; tepals 4, 1-1.3 mm, glabrous, the subapical appendage c. 0.5 mm, deltate to corniculate, glabrous; stamens not seen. Pistillate inflorescences solitary, 7-65 mm, bearing 50-800 flowers in a loose panicle, the flowers in clumps along panicle branches; peduncle 1/3-1/2 of the inflorescence length, glabrous; pedicels 0.3-0.8 mm, glabrous. Pistillate flowers with the adaxial tepal 0.7-0.8 mm, ovate, the subapical appendage 0.1-0.2 mm, scale-shaped, thickened, the lateral tepals c. 0.7 mm, ovate. Infructescences 57-84 mm; achenes c. 0.8 mm, subcompressed, ovoid, the margin narrow. *Habitat unknown.* P (Hayes 877, NY). 2000-2800 m. (Mesoamerica, Colombia.)

Comment [SK5]: Is this Sutton Hayes?? Yes

32. *Pilea longibracteolata* Al. Rodr., A.K. Monro & L. Acosta, *J. Bot. Res. Inst. Texas* 2: 1002 (2008).

Holotype: Costa Rica, *Acosta & Vargas 3200* (INB!). Illustr.: Rodríguez & Monro, *J. Bot. Res. Inst. Texas* 2: 1003, t. 4 (2008).

Herbs or subshrubs to 100 cm; terrestrial or epipetric. Stems erect, drying dark brown, sparsely pubescent, the hairs to 1.8 mm, appressed, crisped; cystoliths absent; internodes 15-60 × 2-6 mm, angulate in cross-section. Leaves equal at the same node, lamina 25-230 × 10-140 mm, ovate to elliptic-ovate, chartaceous, 3-nerved, the lateral nerves visible for 3/4 or more of the leaf length, never reaching the leaf apex, the secondary nerves 10-20 pairs, 75-90° to the midrib, straight to weakly curved; upper surface drying brown, red-brown to dark brown, glabrous, the cystoliths fusiform and "V" shaped; lower surface drying brown to red-brown, sparsely to densely pubescent, the hairs to 1.8 mm, appressed, crisped, glandular punctate; base symmetrical, obtuse or subcordate to cuneate; margins dentate to base; apex acuminate; stipules 6-15 mm, ovate-lanceolate, forked, drying brown; petioles equal or subequal at the same node, 3-130 mm, sparsely to densely pubescent, the hairs to 1.8 mm, appressed, crisped. Inflorescences 2-12 per stem, unisexual; peduncular bracts 2.5-7 mm; bracteoles 0.8-12 mm. Staminate inflorescences solitary, 10-40 mm, bearing 20-50 flowers in a few-branched panicle; peduncle 1/3-1/2 of the inflorescence length, glabrous; pedicels 0.1-5 mm, glabrous. Staminate flowers 1.5-2 × 1.5-1.8 mm immediately prior to anthesis, pale brown; tepals 4, 1-1.5 mm, glabrous, the subapical appendage absent or rarely present, where present less than 0.3 mm, scale-shaped, glabrous;

stamens 4. Pistillate inflorescences solitary, 10-70 mm, bearing 36-100 flowers in a loose panicle; peduncle 1/3-2/3 of the inflorescence length, glabrous; pedicels 0.1-0.5 mm, glabrous. Pistillate flowers with the adaxial tepal 0.8-1.3 mm, oblong to obovate, the subapical appendage 0.3-0.4 mm, scale-shaped, the lateral tepals 0.6-0.8 mm, asymmetrically ovate. Infructescences 10-70 mm; achenes 0.8-1.3 mm, compressed, ellipsoid to ovoid, the margin narrow. *Wet forests*. CR (Herrera 6097, CR). 1600-1700 m. (Endémica.)

33. *Pilea magnicarpa* A.K. Monro, *Novon* 9: 398 (1999). Holotype: Panama, *Hammel 2424* (MO!). Illustr.: Monro, *Novon* 9: 398, t. 4A, B (1999).

Herbs to 60 cm; terrestrial, epiphytic or epipetric. Stems erect or prostrate, drying dark brown to almost black, glabrous; cystoliths pustulate; internodes 7-30 × 1.5-3 mm, angulate in cross-section. Leaves at the same node of unequal length by a ratio of 1:4-10; major lamina 32-170 × 7-65 mm, obovate, oblong or elliptic, chartaceous, 3-nerved, the lateral nerves visible for 3/4 or more of the leaf length, never reaching the leaf apex, the secondary nerves 8-25 pairs, 80-90° to the midrib, straight to weakly curved; upper surface drying green, dark green to dark brown, glabrous, the cystoliths fusiform; lower surface drying brown to pale green, glabrous, eglandular, occasionally punctate glandular; base asymmetrical, acute, cuneate, decurrent or subcordate; margins serrate, the basal 1/3-2/3 entire; apex acuminate; minor lamina 7-23 × 4.5-7 mm, petiolate or sessile, ovate, elliptic or obovate, the margins entire or apically serrate, the leaf apex acute, otherwise as major laminae; stipules 0.5-1.5 mm, deltate, drying brown to grey-brown; petioles at the same node unequal by a ratio of 1:4-10, the major petioles 2-10 mm, glabrous, the minor petioles 0.3-1 mm. Inflorescences 3-18 per stem, unisexual; peduncular bracts 0.5-1.5 mm; bracteoles 0.5-0.8 mm. Staminate inflorescences solitary, 5-35 mm, bearing 11-50 flowers in a loose panicle; peduncle 1/3-1/2 of the inflorescence length, glabrous; pedicels 1-2 mm, glabrous. Staminate flowers 1.5-2 × 1-1.5 mm immediately prior to anthesis, cream, apically green; tepals 4, 2-2.5 mm, glabrous, the subapical appendage 0.5-1 mm, corniculate, glabrous; stamens 4. Pistillate inflorescences 1 or 2 per axil, 7-30 mm, bearing 4-30 flowers in a semi-compact head; peduncle 2/3 of the inflorescence length, glabrous; pedicels 0.5-0.8 mm, glabrous. Pistillate flowers with the adaxial tepal 1-2 mm, oblong, the subapical appendage 0.3-0.8 mm, the lateral tepals 0.8-1.5 mm, asymmetrically ovate. Infructescences 15-30 mm; achenes 2-2.5 mm, compressed, ovoid, the margin abaxially broad towards the apex. *Wet forests, premontane forests*. P (Antonio 2550, PMA). 400-1400 m. (Endémica.)

34. *Pilea mexicana* Wedd., *Ann. Sci. Nat., Bot., sér. 3*, 18: 214 (1852). Holotype: Mexico, Chiapas, *Linden 651* (P!). Illustr.: not known.

Pilea quichensis Donn. Sm.

Herbs to 100 cm; terrestrial or epipetric. Stems erect, drying green-brown, glabrous; cystoliths absent; internodes 18-60 × 1.3-4.5 mm, angulate in cross-section. Leaves at the same node equal; lamina 38-120 × 9-35 mm, oblanceolate, oblong or oblong-ovate, subchartaceous, 3-nerved, the lateral nerves visible for 3/4 or more of the leaf length, never reaching the leaf apex, the secondary nerves 11-25 pairs, 60-90° to the midrib, straight to weakly curved; upper surface drying dark brown to dark green, glabrous, the cystoliths elliptic, fusiform, "V" shaped and occasionally "Y" shaped; lower surface drying brown, grey-brown or grey-green, glabrous, glandular punctate; base symmetrical or asymmetrical, subcordate to narrowly cordate; margins crenate-serrate, the basal 1/2-3/4 entire; apex shallowly acuminate to attenuate; stipules 0.8-1.5 mm, deltate to ovate, drying grey-brown to brown; petioles at the same node equal, 3-35 mm, glabrous. Inflorescences 12-24 per stem, unisexual; peduncular bracts 0.8-1.3 mm; bracteoles 0.3-0.7

mm. Staminate inflorescences 1 or 2 per axil, 8-25 mm, bearing 26-200 flowers in a loose panicle, rarely appearing fasciculate; peduncle 1/4-1/2 of the inflorescence length, glabrous; pedicels 0.5-1 mm, glabrous. Staminate flowers 1.8-2 × 1.5-2 mm immediately prior to anthesis, cream; tepals 4, 1.8-2.3 mm, glabrous, the subapical appendage 0.3-0.5 mm, corniculate, glabrous; stamens 4. Pistillate inflorescences 1 or 2 per axil, 4.5-6 mm, bearing 22-60 flowers in a loose panicle; peduncle 1/4-1/3 of the inflorescence length, glabrous; pedicels 0.3-0.5 mm, glabrous. Pistillate flowers with the adaxial tepal c. 0.5 mm, oblong, apically reflexed, the subapical appendage c. 0.2 mm, scale-shaped, the lateral tepals 0.4-0.5 mm, asymmetrically elliptic. Infructescences 3.5-20 mm; achenes 1-1.5 mm, compressed, asymmetrically ellipsoid, the margin narrow. *Cloud forests, wet forests.* Ch (*Gómez-Pompa 2529*, MEXU); G (*Steyermark 43782*, F). 1200-2100 m. (Mexico, Mesoamerica.)

Pilea mexicana appears to form part of a complex of closely related species which includes *P. killipiana* and *P. glabra*.

35. *Pilea microphylla* (L.) Liebm., *Kongel. Danske Vidensk. Selsk. Skr., Naturvidensk. Math. Afd., ser. 5*, 2: 296 (1851). *Parietaria microphylla* L., *Syst. Nat.* ed. 10, 1308 (1759). Lectotype (designated by de Rooij, 1975: 314): probably Jamaica, *Brown s.n.* (LINN-1220.8!). Ilustr.: Burger, *Fieldiana, Bot.* 40: 222, t. 25 (1977). N.v.: Yomha, zizalxiu, Y, C, QR; banixu G; mariposa, H; palma del norte, berrillo, berrillo de bajillo, verdolaguilla, ES; lace plant, P.

Pilea muscosa Lindl., *P. portula* Liebm., *P. serpyllacea* (Kunth) Liebm., *Urtica serpyllacea* Kunth.

Herbs to 50 cm; terrestrial or epipetric. Stems prostrate or erect, drying pale to dark green, green-brown, glabrous; cystoliths fusiform, occasionally absent; internodes 2-45 × 0.4-3.5 mm, angulate in cross-section. Leaves at the same node of equal or unequal length, where unequal by a ratio of 1:1.5-4; major lamina 0.8-12 × 0.8-4.5 mm, obovate, oblanceolate, oblong, elliptic or reniform, subchartaceous, pinnately nerved, the secondary nerves 3-4 pairs, 45° to the midrib, weakly curved; upper surface drying green to green-brown, glabrous, the cystoliths fusiform, aligned perpendicularly to the midrib; lower surface drying pale green, glabrous, submarginally glandular punctate; base asymmetrical, occasionally symmetrical, cuneate, decurrent or cuneate-decurrent; margins entire; apex rounded, obtuse or acute; minor laminae as major laminae; stipules 0.3-0.4 mm, narrowly ovate to narrowly elliptic, drying cream, pale green to dark brown; petioles at the same node equal or unequal by ratio 1:1.5-5, the major petioles 0.3-5 mm, glabrous. Inflorescences 20-500 per stem, unisexual, occasionally appearing bisexual because of close proximity of staminate and pistillate inflorescences; peduncular bracts 0.3-0.4 mm; bracteoles 0.3-0.5 mm. Staminate inflorescences 1 or 2 per axil, 1-3.5 mm, bearing 1-11 flowers in a loose panicle; peduncle 1/4-1/2 of the inflorescence length, glabrous; pedicels 0.3-1.3 mm, glabrous. Staminate flowers 0.5-1.3 × 0.3-1 mm immediately prior to anthesis, cream, apically purple or green; tepals 4, rarely 3, 0.7-1.5 mm, glabrous, the subapical appendage 0.1-0.3 mm, scale-shaped, glabrous; stamens 4. Pistillate inflorescences 1 or 2 per axil, 0.5-7 mm, bearing 4-24 flowers in 1-3 compact heads; peduncle 1/4-2/3 of the inflorescence length, glabrous; pedicels 0.3-0.4 mm, glabrous. Pistillate flowers with the adaxial tepal 0.3-0.5 mm, oblong, ovate or obovate, the subapical appendage 0.1-0.2 mm, scale-shaped, frequently reflexed, the lateral tepals 0.3-0.5 mm, asymmetrically ovate. Infructescences 1-7 mm; achenes 0.5-0.7 mm, subcompressed, ovoid, the margin narrow. *Damp or dry, shaded or open areas.* T (*Rovirosa 326*, NY); Ch (*Ton M. 6531*, BM); Y (*Flores 8075*, MEXU); C (*Stewart 9*, GH); QR (*Lewis 6888*, MEXU); B (*Schipp 977*, F); G (*von Türckheim II/312*, BM); H (*Standley 53101*, US); ES (*Standley 22409*, MO); N (*Croat 43019*, MO); CR (*Pittier 12693*, US); P (*Lazor et al. 2405*, PMA). 0-2400 m. (Estados Unidos, Mexico, Mesoamerica, Colombia, Venezuela, Guyanas, Ecuador, Peru, Bolivia, Brazil, Greater Antilles, Leeward Islands, Windward Islands.)

Pilea microphylla is a very variable species with respect to habit. A number of collections of *P. microphylla* have been identified as *P. serpyllifolia* Wedd., which is known only from the Dominican Republic.

36. *Pilea moragana* Al. Rodr. & A.K. Monro, *J. Bot. Res. Inst. Texas* 2: 1004 (2008). Holotype: Costa Rica, *Aguilar 1881* (INB). Illustr.: Rodríguez & Monro, *J. Bot. Res. Inst. Texas* 2: 1005, t. 5 (2008).

Herbs to 20 cm; terrestrial. Stems erect or prostrate, drying brown, pubescent, the hairs to 0.3 mm, weakly appressed, curved; cystoliths fusiform; internodes 5-20 × 0.8-1.5 mm, angulate in cross-section. Leaves at the same node of unequal length by a ratio of 1:1.5-2.5; major lamina 30-45 × 10-16 mm, lanceolate to elliptic-lanceolate, subchartaceous, 3-nerved, the lateral nerves visible for 1/3-1/2 the leaf length, the secondary nerves 3-6 pairs, 60-75° to the midrib, weakly curved; upper surface drying brown or green-brown, glabrous or pubescent, where pubescent the hairs to 0.8 mm, weakly appressed, curved, the cystoliths fusiform or "V" shaped; lower surface drying brown to green-brown, or pubescent, where pubescent the hairs to 0.4 mm, weakly appressed, curved, glandular punctate; base asymmetrical, cuneate to oblique; margins dentate, the basal 1/4-1/3 entire; apex acuminate to attenuate; minor lamina 20-36 × 1.5-10 mm, otherwise as major laminae; stipules 1-3 mm, ovate or oblong-ovate to oblong obovate, drying brown; petioles equal or subequal at the same node, where subequal by a ratio of 1:1.5-3.4, the major petioles 8-16 mm, pubescent, the hairs to 0.4 mm, weakly appressed, curved, the minor petioles 1-5 mm. Inflorescences 4-6 per stem, unisexual; peduncular bracts 2-4 mm; bracteoles 0.4-1 mm. Staminate inflorescences solitary, 5-25 mm, bearing 12-36 flowers in a compact head; peduncle 3/4 or more of the inflorescence length, glabrous; pedicels 0.1-0.8 mm, glabrous. Staminate flowers 1-1.8 × 0.8-1 mm immediately prior to anthesis, pale brown; tepals 4, 0.8 mm, glabrous, the subapical appendage 0.8-1.3 mm, narrowly triangulate, glabrous; stamens 4. Pistillate inflorescences solitary, c. 15 mm, bearing c. 20 flowers in a few-branched panicle or compact head; peduncle 3/4 or more of the inflorescence length, glabrous; pedicels 0.8-1 mm, glabrous. Pistillate flowers with the adaxial tepal 0.5-0.8 mm, oblong to obovate, the subapical appendage 0.2-0.3 mm, scale-shaped, the lateral tepals 0.4-0.5 mm, asymmetrically ovate. Infructescences c. 15 mm; achenes 0.8-1 mm, subcompressed, ellipsoid to ovoid, the margin narrow, broad towards the apex. *Humid forests. CR (Moraga 227, INB). 100-700 m. (Endémica.)*

37. *Pilea nummulariifolia* (Sw.) Wedd., *Ann. Sci. Nat., Bot., sér. 3*, 18: 225 (1852). *Urtica nummulariifolia* Sw., *Kongl. Vetensk. Acad. Nya Handl.* 8: 63 (1787). Syntype: Swartz, *Kongl. Vetensk. Acad. Nya Handl.* 8: t.1, f. 2 (1787). Epitype (designated by Monro, 2000: 15): Jamaica, Swartz s.n. [Herb. Alströmer] (S). Illustr.: Burger, *Fieldiana, Bot.* 40: 224, t. 27 (1977).

Herbs to 10 cm; terrestrial or epipetric. Stems prostrate, drying grey-green, occasionally brown, pubescent, the hairs to 1 mm, erect or appressed, crisped or straight; cystoliths fusiform; internodes 5.5-48 × 0.5-1.5 mm, angulate in cross-section. Leaves at the same node equal; lamina 4-21 × 0.5-1.5 mm, orbicular to suborbicular, subchartaceous, occasionally membranous, 3-nerved, the lateral nerves visible for 2/3 of the leaf length, the secondary nerves 4-6 pairs, 45-60° to the midrib, weakly curved; upper surface drying green, brown-green, pubescent, the hairs to 2 mm, weakly appressed, straight, the cystoliths fusiform and "V" shaped; lower surface drying grey-green to brown-green, pubescent, the hairs to 1.3 mm, weakly appressed, straight, glandular punctate; base symmetrical, obtuse, decurrent, cordate or truncate; margins crenate, the basal 1/8-1/4 entire; apex obtuse and rounded; stipules 1.5-3.5 mm, suborbicular to broadly ovate, drying grey; petioles at the same node equal, 2.5-19 mm, pubescent, the hairs to 1 mm, erect, crisped. Inflorescences 4-6 per stem, unisexual; peduncular bracts 0.8-1 mm; bracteoles c. 0.8 mm. Staminate inflorescences 1

or 2 per axil, 4-9 mm, bearing 3-21 flowers in a loose panicle, frequently appearing fasciculate; peduncle less than 1/8 of the inflorescence length, pubescent, the hairs to c. 0.5 mm, crisped; pedicels 1-6 mm, pubescent, the hairs to c. 0.5 mm, crisped or straight. Staminate flowers 1.5-2.5 × 1-1.8 mm immediately prior to anthesis, cream, apically green; tepals 4, 0.8-1.3 mm, glabrous, the subapical appendage 0.5-1 mm, corniculate, pubescent, the hairs to 1 mm, erect, crisped; stamens 4. Pistillate inflorescences 1 or 2 per axil, 1.5-4 mm, bearing 12-60 flowers in 1-3 semi-compact heads; peduncle 1/2-2/3 of the inflorescence length, glabrous; pedicels 0.2-0.5 mm, glabrous. Pistillate flowers with the adaxial tepal 0.4-0.5 mm, ovate to elliptic, the subapical appendage 0.2 mm, scale-shaped, the lateral tepals 0.4-0.5 mm, asymmetrically ovate. Infructescences 3-8 mm; achenes 0.5(-0.8) mm, subcompressed, ellipsoid or ovoid, the margin narrow. *Pinus and broadleaf forests, commonly used as an ornamental in gardens.* G (Salas 1423, F); H (Standley y Chacón P.7203, F); ES (Renderos y Villacorta 285, LAGU); CR (Valerio R. 1291, F); P (Standley 28555, US). 0-1500 m. (Mesoamerica, Peru, Greater Antilles.)

A single collection from Darién (Panama), *Duke 14193* (GH, MO) differs somewhat from all other material in having crenate-serrate, broadly ovate leaves and pubescence of curved hairs.

38. *Pilea ovalis* Griseb., *Fl. Brit. W. I.*: 159 (1859). Lectotype (designated by Monro, 2000): Trinidad, *Crueger s.n.* (K!). Illustr.: Sims, *Bot. Mag.* 51: t. 2481 (1824), as *Urtica involucrata*.

Pilea chryso splenoides Wedd., *Pilea involucrata* (Sims) Urb., *Urtica involucrata* Sims

Herbs to 30 cm; terrestrial. Stems erect, drying green-brown to cream, pubescent, the hairs to c. 0.8 mm, appressed, curved or crisped; cystoliths fusiform; internodes 20-50 × 1.5-2 mm, angulate in cross-section. Leaves at the same node equal; lamina 25-62 × 16-38 mm, obovate, subchartaceous, 3-nerved, the lateral nerves visible for 3/4 or more of the leaf length, never reaching the leaf apex, the secondary nerves 5-9 pairs, 30-65° to the midrib, curved; upper surface drying green or dark brown, glabrous, occasionally pubescent, the hairs to c. 0.8 mm, appressed, curved, the cystoliths fusiform and "V" shaped; lower surface drying grey-green or brown, pubescent, the hairs to c. 0.8 mm, appressed, curved, glandular punctate; base asymmetrical or symmetrical, obtuse, attenuate, decurrent or decurrent-attenuate; margins crenate, the basal 1/3-1/2 entire; apex rounded; stipules 2.5-5 mm, obovate, drying pale green to cream; petioles at the same node equal, 3.5-9 mm, pubescent, the hairs to c. 0.8 mm, appressed, curved. Inflorescences 1-3 per stem, unisexual; peduncular bracts c. 1 mm; bracteoles c. 0.3 mm. Staminate inflorescences solitary, c. 4 mm, bearing c. 12 flowers in a semi-compact head; peduncle 1/4 of the inflorescence length, sparsely pubescent, the hairs to c. 0.5 mm, erect, crisped; pedicels 1.5 mm, sparsely pubescent, the hairs to c. 0.3 mm, erect, crisped. Staminate flowers c. 0.8 × 0.8 mm immediately prior to anthesis, cream, apically green; tepals 4, c. 1 mm, glabrous, the subapical appendage c. 0.3 mm, ovate, glabrous; stamens 4. Pistillate inflorescences solitary, 13-18 mm, bearing 140-200 flowers in a loose panicle; peduncle 1/4-1/3 of the inflorescence length, sparsely pubescent, the hairs to c. 0.5 mm, erect, crisped; pedicels less than 0.2 mm. Pistillate flowers with the adaxial tepal c. 0.4 mm, obovate, the subapical appendage 0.2-0.3 mm, obovate, thickened, the lateral tepals c. 0.3 mm, asymmetrically ovate. Infructescences 17-36 mm; achenes 0.5-0.8 mm, subcompressed, ovoid, the margin narrow. *Wet forests.* CR (*Lent 2007*, MEXU); P (*Hammel 5024*, PMA). 100-1300 m. (Mesoamerica, Colombia, Venezuela, Ecuador (Jørgensen & León, 1999: 932, determination not confirmed), Windward Islands.)

39. *Pilea pallida* Killip, *J. Wash. Acad. Sci.* 15: 295 (1925). Holotype: Panama, *Rowlee y Rowlee 376* (US!). Illustr.: Burger, *Fieldiana, Bot.* 40: 223, t. 26 (1977).

Herbs to 100 cm; terrestrial. Stems erect, drying pale yellow to dark brown, pubescent or glabrous, the hairs to c. 0.5 mm, appressed, curved; cystoliths fusiform; internodes 18-84 × 1.5-6 mm, round to angulate in cross-section. Leaves at the same node equal; lamina 63-235 × 14-81 mm, narrowly ovate, lanceolate, falcate or narrowly elliptic, chartaceous, 3-nerved, the lateral nerves visible for 3/4 or more of the leaf length, never reaching the leaf apex, the secondary nerves 13-28 pairs, 65-80° to the midrib, straight to weakly curved; upper surface drying green-brown or grey-brown, glabrous, the cystoliths fusiform, "V" shaped and "Y" shaped; lower surface drying green-brown or grey-brown glabrous or pubescent, the hairs to c. 0.5 mm, appressed, curved, glandular punctate; base symmetrical, shortly attenuate or decurrent; margins serrate, the basal 1/8-1/4 entire; apex acuminate to subcaudate; stipules 3.5-7 mm, narrowly ovate, drying grey-yellow to brown; petioles at the same node equal or unequal by a ratio of 1:2-4.5, the major petioles 7-78 mm, pubescent, the hairs to c. 0.5 mm, appressed, curved, the minor petioles 4-8 mm. Inflorescences 8-14 per stem, unisexual, rarely bisexual, where bisexual dominated by a single sex; peduncular bracts 0.8-1.3 mm; bracteoles 0.3-0.5 mm. Staminate inflorescences solitary, 6-11 mm, bearing 24-75 flowers in a compact head; peduncle 1/8 of the inflorescence length, glabrous; pedicels 0.5-2(-3.5) mm, glabrous. Staminate flowers (1.3-)2-2.5 × 0.8-1.3 mm immediately prior to anthesis, cream, apically green or purple; tepals 4, 1-1.3 mm, glabrous, the subapical appendage (0.3-)1-1.5 mm, narrowly deltate, glabrous or pubescent, the hairs to c. 0.3 mm, erect, crisped; stamens 4. Pistillate inflorescences solitary, 1.5-5.5 mm, bearing 22-250 flowers in a loose panicle or semi-compact head; peduncle 1/4 of the inflorescence length, glabrous; pedicels 0.2-0.5 mm, glabrous. Pistillate flowers with the adaxial tepal 0.4-0.8 mm, ovate, the subapical appendage 0.3-0.5 mm, oblong to scale-shaped, the lateral tepals 0.3-0.5 mm, asymmetrically ovate. Infructescences 5-16 mm; achenes 0.8-1 mm, subcompressed, ellipsoid, the margin narrow, irregular. *Tropical wet forests*. CR (*Chacón 247*, BM); P (*Huft 1940*, PMA). 0-1200 m. (Endémica.)

40. *Pilea pansamalana* Donn. Sm., *Bot. Gaz.* 19: 10 (1894). Isotype: Guatemala, *von Türckheim 939* (NY!).

Illustr.: not known.

Herbs to 35 cm; epiphytic or epipetric, occasionally terrestrial. Stems prostrate or erect, drying dark green to dark brown, glabrous; cystoliths fusiform, elliptic or pusticulate; internodes 3.5-21 × 0.8-3 mm, angulate in cross-section. Leaves at the same node of unequal length by a ratio of 1:2.5-8; major lamina 19-140 × 4-22 mm, narrowly lanceolate, narrowly oblong, elliptic to obovate, membranous to subchartaceous; upper surface drying dark green; lower surface drying grey-green; 3-nerved, the lateral nerves visible for the full length of the leaf, the secondary nerves 5-35 pairs, 65-90° to the midrib, straight or weakly curved; upper surface glabrous, the cystoliths pusticulate, elliptic, "V" shaped and "Y" shaped; lower surface glabrous, glandular punctate; base asymmetrical or symmetrical, cuneate, decurrent or acute; margins serrate becoming dentate, the basal 1/3 entire; apex acute to weakly acuminate; minor lamina 5-18 × 3-8 mm, ovate, broadly ovate, elliptic, rhomboid or suborbicular, the apex obtuse or acute, the secondary nerves 2-5 pairs, otherwise as major laminae; stipules 0.8-1.3 mm, deltate to ovate, drying cream; petioles at the same node unequal by a ratio of 1:1.5-4, the major petioles 2-6 mm, glabrous, the minor petioles 1-3 mm. Inflorescences 2-30 per stem, unisexual; peduncular bracts 0.5-0.8 mm; bracteoles 0.3-0.5 mm. Staminate inflorescences solitary, 10-14 mm, bearing 12-24 flowers in a loose panicle; peduncle 1/8-1/3 of the inflorescence length, glabrous; pedicels 2-3 mm, glabrous. Staminate flowers 1.3-1.5 × 1.3-1.5 mm immediately prior to anthesis, cream; tepals 4, c. 1.5 mm, glabrous, the subapical appendage c. 0.1 mm, scale-shaped, glabrous; stamens 4. Pistillate inflorescences 1 or 2 per axil, 1.5-2 mm, bearing 6-25 flowers in a semi-compact head; peduncle 1/4 of the inflorescence length, glabrous; pedicels 0.3-0.8 mm, glabrous. Pistillate flowers with the adaxial tepal 0.4-0.5 mm, obovate, the subapical appendage c. 0.3 mm, scale-

shaped, the lateral tepals 0.3-0.5 mm, asymmetrically ovate. Infructescences 2.5-10 mm; achenes 1-1.3 mm, compressed, asymmetrically ovoid, the margin narrow. *Mixed wet forests, in or by streams.* Ch (Ton 7731, BM); G (von Türckheim II -1296, MO). 800-2600 m. (Endémica.)

Pilea pansamalana is very variable in leaf size and form, ranging from small epiphytic scramblers to relatively large erect plants.

41. *Pilea parietaria* (L.) Blume, *Mus. Bot.* 2: 48 (1856). *Urtica parietaria* L., *Sp. Pl.* 985 (1753). Lectotype (designated by Kellogg in Howard, 1988): Sloane, *Voy. Jamaica* 20: t. 93, f. 1 (1707). Illustr.: Burger, *Fieldiana, Bot.* 40: 224, t. 27 (1977).

Pilea ciliaris (L.) Wedd., *P. integrifolia* Liebm., *P. rhombea* L. f., *P. rubiifolia* Blume, *Urtica ciliaris* L., *U. rhombea* L. f.

Herbs to 80 cm; epipetric, epiphytic or terrestrial. Stems erect, drying brown, glabrous; cystoliths absent; internodes 8.5-70 × 0.5-3.5 mm, angulate in cross-section. Leaves at the same node of equal or unequal length, where unequal by a ratio of 1:1.5-4; major lamina 14-92 × 8-30 mm, elliptic, oblong, obovate, ovate or lanceolate, subchartaceous, 3-nerved, the lateral nerves visible for 3/4 or more of the leaf length, never reaching the leaf apex, the secondary nerves 4-23 pairs, 45-75° to the midrib, curved to weakly curved; upper surface drying green, sparsely pubescent, the hairs to 2.3 mm, weakly appressed, straight or crisped, the cystoliths fusiform and pustulate, occasionally elliptic, rarely "U" shaped; lower surface drying grey-green, pubescent towards the base, the hairs to c. 0.8 mm, appressed, straight or curved, glandular punctate; base asymmetrical, cordate, subcordate, occasionally attenuate; margins entire; apex cuspidate to acute; minor lamina as major laminae; stipules 1.3-4 mm, ovate, drying pale green or cream; petioles at the same node equal or unequal by a ratio of 1:1.5-5.5, the major petioles 2-49 mm, sparsely pubescent, the hairs to c. 0.5 mm, weakly appressed, crisped. Inflorescences 4-24 per stem, bisexual, but dominated by a single sex; peduncular bracts 0.8-1.5 mm; bracteoles 0.3-0.5 mm. Staminate inflorescences 1 or 2 per axil, 9-73 mm, bearing 18-400 flowers in a loose panicle, the flowers clumped along the panicle branches; peduncle 1/3-1/2 of the inflorescence length, glabrous; pedicels 0.5-1.5 mm, glabrous. Staminate flowers 0.8-1.5 × 0.8-1.3 mm immediately prior to anthesis, cream, apically green; tepals 4, 0.8-1.3 mm, glabrous, the subapical appendage 0.4-0.5 mm, deltate to corniculate, glabrous; stamens 4. Pistillate inflorescences 1 or 2 per axil, 9-65 mm, bearing 140-500 flowers in a loose panicle, the flowers clumped along the panicle branches; peduncle 1/3-1/2 of the inflorescence length, glabrous; pistillate pedicels 0.2-0.5 mm, glabrous. Pistillate flowers with the adaxial tepal 0.4-0.5 mm, obovate to elliptic, the subapical appendage 0.1-0.2 mm, scale-shaped, thickened, the lateral tepals 0.2-0.5 mm, ovate. Infructescences 14-75 mm; achenes 0.4-0.7 mm, subcompressed, ovoid, the margin narrow. *Lowland, montane and cloud forests.* Ch (Breedlove 10737, F); Y (Gaumer et al. 1433, GH); G (von Türckheim 1270, NY); H (Molina R. 11048, F); ES (Standley & Steyermark, 1952: 418); N (Stevens y Krukoff 11667, MO); CR (Austin-Smith 1540, NY); P (Antonio 1344, PMA). 300-2000 m. (Mexico, Mesoamerica, Greater Antilles, Leeward Islands.)

42. *Pilea pittieri* Killip, *J. Wash. Acad. Sci.* 15: 298 (1925). Holotype: Costa Rica, *Pittier 14149 [1080422]* (US!). Illustr.: Burger, *Fieldiana, Bot.* 40: 223, t. 26 (1977).

Pilea phenacoides Killip.

Herbs to 120 cm; terrestrial, epiphytic or epipetric. Stems erect or prostrate, drying dark green to dark brown, pubescent, the hairs to c. 0.5 mm, appressed, curved; cystoliths elliptic; internodes 18-110 × 1.3-4 mm, angulate in

cross-section. Leaves at the same node equal; lamina 22-170 × 11-96 mm, ovate, suborbicular or elliptic, occasionally obovate, subchartaceous to chartaceous, 3-nerved, the lateral nerves visible for 2/3 of the leaf length, the secondary nerves 10-18 pairs, 45-65° to the midrib, weakly curved; upper surface drying dark green, green or brown, glabrous, occasionally pubescent, the hairs to 1.5 mm, erect, crisped, the cystoliths fusiform; lower surface drying pale green to grey-green, pubescent on the main nerves, the hairs to c. 0.5 mm, appressed, curved, glandular punctate; base symmetrical or asymmetrical, cordate, occasionally subcordate; margins serrate or crenate-serrate, the basal 1/8-1/4 entire; apex acuminate, subcaudate to acute; stipules 2-18 mm, caducous, oblong or narrowly ovate, drying pale brown; petioles at the same node equal, 12-110 mm, pubescent, the hairs to c. 0.5 mm, appressed, curved. Inflorescences 2-5(-10) per stem, unisexual; peduncular bracts 0.8-1.5 mm; bracteoles 0.5-1.5 mm. Staminate inflorescences solitary, 7.5-80 mm, bearing 30-85 flowers in 1-3 compact heads; peduncle 1/4-3/4 of the inflorescence length, glabrous or pubescent, the hairs to c. 0.5 mm, appressed, curved; pedicels 1-6.5 mm, glabrous. Staminate flowers 2-3 × 1-1.5 mm immediately prior to anthesis, cream; tepals 4, 1.5-2 mm, glabrous, the subapical appendage 0.5-2 mm, obovate, glabrous or pubescent, the hairs to c. 0.3 mm, erect, crisped; stamens 4. Pistillate inflorescences solitary, 17-144 mm, bearing 40-250 flowers in a loose panicle; peduncle 1/3-1/2 of the inflorescence length, glabrous or pubescent, the hairs to c. 0.5 mm, appressed, curved; pedicels 0.5-5 mm, glabrous. Pistillate flowers with the adaxial tepal 0.5-1.5 mm, obovate, the subapical appendage 0.3-0.5 mm, oblong, frequently reflexed, the lateral tepals 0.4-0.8 mm, asymmetrically ovate. Infructescences 19-44 mm; achenes 0.8-1.5 mm, compressed, ovoid to ellipsoid, the margin narrow. *Wet lowland, montane and cloud forests.* CR (Davidse y Pohl 1682, MO). 600-2300 m. (Endémica.)

Pilea pittieri closely resembles *P. ulei* Killip, described from Venezuela, and further study may place *P. ulei* as another synonym of *P. pittieri*. D'Arcy (1987: 484) reports this species for Panama; however, the herbarium specimen cited was misidentified

43. *Pilea pleuroneura* Donn. Sm., *Bot. Gaz.* 19: 12 (1894). Isotype: Guatemala, *von Türckheim 754* (NY!).
Illustr.: not known.

Herbs to 25 cm; terrestrial. Stems erect, drying grey, grey-brown or black, glabrous; cystoliths fusiform, obscure; internodes 2-21 × 2 mm, square to angulate in cross-section. Leaves at the same node equal to subequal; lamina 5-23 × 1.5-3 mm, lanceolate, narrowly rhomboid to narrowly obovate, subchartaceous, pinnately nerved, the secondary nerves 4-8 pairs, 45-60° to the midrib, weakly curved to straight; upper surface drying dark green or green-brown, glabrous, the cystoliths elliptic or pusticulate; lower surface drying grey-green, glabrous, glandular punctate; base symmetrical, cuneate to attenuate; margins crenate-serrate, the basal 1/3-1/2 entire; apex obtuse; stipules 0.5-0.8 mm, ovate, drying pale green; petioles at the same node equal to subequal, 0.8-1.5 mm, glabrous. Inflorescences 8-36 per stem, unisexual; peduncular bracts c. 0.5 mm; bracteoles c. 0.4 mm. Staminate inflorescences solitary, 7-19 mm, bearing 8-20 flowers in a compact head; peduncle 2/3-4/5 of the inflorescence length, glabrous; pedicels 1-1.3 mm, glabrous. Staminate flowers 1-1.8 × 1.3-1.5 mm immediately prior to anthesis, cream, apically green; tepals 4, 2 mm, glabrous, the subapical appendage 0.3-0.4 mm, corniculate or deltate, glabrous; stamens 4. Pistillate inflorescences solitary, 1-2 mm, bearing 6-8 flowers in a loose panicle; peduncle 1/3-1/2 of the inflorescence length, glabrous; pedicels 0.2-0.3 mm, glabrous. Pistillate flowers with the adaxial tepal c. 0.5 mm, oblong to ovate, the subapical appendage 0.1-0.2 mm, scale-shaped, thickened, the lateral tepals c. 0.4 mm, ovate. Infructescences 1.5-4 mm; achenes c. 1 mm, subcompressed, suborbicular to ovoid, the margin narrow. *Habitat unknown.* Ch (Carlson 2130, F); G (Forsther 754, F). (300-)1200-4000 m. (Endémica.)

44. *Pilea plumulosa* A.K. Monro, *Novon* 9: 392 (1999). Holotype: Panama, *Kirkbride y Duke 944* (MO!).

Illustr.: Monro, *Novon* 9: 391 t. 1C, D (1999).

Herbs to shrublets to 25 cm; epipetric. Stems erect, drying grey-brown, glabrous; cystoliths elliptic; internodes 3-10.5 × 1-2 mm, rounded to angulate in cross-section. Leaves at the same node equal; lamina 12-38 × 1.5-4 mm, linear-lanceolate, chartaceous, pinnately nerved, occasionally appearing 3-nerved, the secondary nerves 4-13 pairs, 30-45° to the midrib, curved; upper surface drying dark brown-green, glabrous, the cystoliths fusiform; lower surface drying yellow-green, glabrous, glandular punctate; base asymmetrical, subcordate-cuneate, acute; margins crenate, the basal 1/4-1/3 entire; apex acute; stipules 0.5-0.8 mm, ovate, drying brown; petioles at the same node unequal by a ratio of 1:2.3-4.5, the major petioles 2.3-4.5 mm, glabrous, the minor petioles 1-1.8 mm. Inflorescences 6-28 per stem, unisexual; peduncular bracts c. 0.5 mm; bracteoles 0.4-0.8 mm. Staminate inflorescences 1 or 2 per axil, 3.5-7 mm, bearing 6-10 flowers in a compact head; peduncle 1/2-2/3 of the inflorescence length, glabrous; pedicels 0.8-1.3 mm, glabrous. Staminate flowers 1-1.3 × 1-1.3 mm immediately prior to anthesis, cream; tepals 4, 1.5 mm, glabrous, the subapical appendage c. 0.3 mm, deltate, glabrous; stamens 4. Pistillate inflorescences 1 or 2 per axil, 3 mm, bearing 5-8 flowers in a compact head; peduncle 1/3 of the inflorescence length, glabrous; pedicels 0.3-0.5 mm, glabrous. Pistillate flowers with the adaxial tepal c. 0.8 mm, oblong to obovate, the subapical appendage 0.1-0.2 mm, scale-shaped, thickened, the lateral tepals c. 0.7 mm, ovate. Infructescences 3-4.5 mm; achenes c. 1.5 mm, subcompressed, ellipsoid, the margin narrow. *Cloud forests*. P (*Kirkbride y Duke 944*, NY). c. 2500 m. (Endémica.)

A sterile collection, *Dwyer y Lallathin 8768* (MO) from Chiriquí, closely resembles and may represent this species.

45. *Pilea pteridophylla* A.K. Monro, *Novon* 9: 390 (1999). Holotype: Mexico, Tabasco, *Hanan A. 438*

(MEXU!). Illustr.: Monro, *Novon* 9: 391 t. 1A, B (1999).

Herbs to 35 cm; epipetric. Stems erect, drying dark green, glabrous; cystoliths absent; internodes 2-8 × 1.5-2.5 mm, square to angulate, in cross-section. Leaves at the same node equal; lamina 45-90 × 7-12 mm, linear-lanceolate, pectinate, chartaceous, pinnately nerved, the secondary nerves 19-28 pairs, 75-90° to the midrib, weakly curved; upper surface drying dark green, glabrous, the cystoliths fusiform, "V", "Y" and "X" shaped; lower surface drying dark grey-green, glabrous, glandular punctate; base asymmetrical, decurrent, attenuate or rounded; margins pectinate, the basal 1/8-1/6 entire; apex weakly cuspidate; stipules 0.8-1 mm, deltate, drying grey; petioles at the same node equal, 0.8-1.3 mm, glabrous. Inflorescences 7-24 per stem, unisexual; peduncular bracts 0.5-0.8 mm; bracteoles c. 0.4 mm; intact staminate inflorescences not seen. Staminate flowers 1-1.3 × 0.8-1.3 mm immediately prior to anthesis, cream, apically green; tepals 4, 1.3 mm, glabrous, the subapical appendage c. 0.3 mm, scale-shaped, glabrous; stamens 4. Pistillate inflorescences 1 or 2 per axil, 1.5-2 mm, bearing 5-35 flowers in a loose panicle; peduncle 1/4-1/3 of the inflorescence length, glabrous; pedicels 0.2-0.3 mm, glabrous. Pistillate flowers with the adaxial tepal c. 0.5 mm, oblong, the subapical appendage c. 0.1 mm, scale-shaped, the lateral tepals c. 0.5 mm, ovate. Infructescences 2-3 mm; achenes 0.7-0.8 mm, subcompressed, ovoid, the margin narrow, broad towards the apex. *Wet forests, in damp shade*. T (*Hanan A. 438*, MEXU). c. 600 m. (Endémica.)

Known only from the type collection.

46. *Pilea pteropodon* Wedd. in A.DC., *Prodr.* 16(1): 144 (1869). Holotype: Colombia, *Triana s.n.* (P!). Illustr.: Burger, *Fieldiana, Bot.* 40: 223, t. 26 (1977).

Pilea ptericlada Donn. Sm.

Herbs to shrubs to 150 cm; terrestrial or epipetric. Stems erect, drying brown to black, glabrous or pubescent, the hairs to 1.3 mm, appressed, crisped; cystoliths elliptic, frequently obscure; internodes 17-144 × 2-14 mm, angulate in cross-section. Leaves at the same node equal; lamina (22-)95-310 × (9.5-)28-131 mm, obovate, lanceolate or rhomboid, subchartaceous to chartaceous, 3-nerved, the lateral nerves visible for 3/4 or more of the leaf length, never reaching the leaf apex, the secondary nerves 13-22 pairs, 60-90° to the midrib, curved to weakly curved; upper surface drying green-brown to dark brown, glabrous, the cystoliths fusiform; lower surface drying pale brown, glabrous or pubescent, the hairs to 1.3 mm, erect, crisped, glandular punctate; base symmetrical, long attenuate; margins crenate-serrate, the basal 1/3-2/3 entire; apex cuspidate or acute; stipules (2.5-)6-23 mm, oblong, obovate, drying dark brown; petioles at the same node equal, 7-62 mm, glabrous, winged. Inflorescences 2-25 per stem, unisexual; peduncular bracts 1.5 mm; bracteoles 0.5-1 mm. Staminate inflorescences 1 or 2 per axil, 18-140 mm, bearing 100-350 flowers in 1-3 loose panicles; peduncle 1/4-3/4 of the inflorescence length, glabrous; pedicels 1-5 mm, glabrous. Staminate flowers 1.8-2.5 × 1.5-1.8 mm immediately prior to anthesis, cream, apically green; tepals 4, 2.5 mm, glabrous or pubescent, the hairs to c. 0.3 mm, erect, crisped, the subapical appendage 0.8-1.3 mm, narrowly deltate, glabrous; stamens 4. Pistillate inflorescences solitary, 13-43 mm, bearing 160-350 flowers in a loose panicle; peduncle 1/4-2/3 of the inflorescence length, glabrous; pedicels 0.3-1 mm, glabrous. Pistillate flowers with the adaxial tepal 0.8-1 mm, ovate to elliptic, the subapical appendage 0.2 mm, scale-shaped, the lateral tepals 0.5-0.8 mm, asymmetrically ovate. Infructescences 42-85 mm; achenes 1.3-1.8 mm, compressed, ellipsoid to ovoid, the margin narrow. *Lowland, montane and cloud forests.* CR (Endres 199, BM); P (*Galdames et al.* 3149, SCZ). 0-2000 m. (Mesoamerica, Colombia, Ecuador)

Material from Costa Rica is generally more pubescent than material from Panama and Colombia. *Pilea pteropodon* closely resembles *P. verbascifolia* (Poir.) Wedd., a species endemic to Mauritius. The report of this species from Ecuador, Jørgensen & León, 1999: 933, has not been confirmed by me.

47. *Pilea pubescens* Liebm., *Kongel. Danske Vidensk. Selsk. Skr., Naturvidensk. Math. Afd., ser. 5*, 2: 303 (1851). Lectotype (designated by Monro, 2000): Brazil, *Lund s.n.* 'I' (C!). Illustr.: Burger, *Fieldiana, Bot.* 40: 224, t. 27 (1977).

Pilea fuscata Liebm., *P. rupicola* Wedd.

Herbs to 40 cm; terrestrial, occasionally epipetric or epiphytic. Stems erect, occasionally prostrate, drying pale brown to green brown, pubescent, the hairs to 0.5(-2) mm, erect to weakly appressed, straight or curved; cystoliths fusiform; internodes 5-111 × 0.8-2 mm, angulate in cross-section. Leaves at the same node equal; lamina 11-112 × 7-80 mm, ovate, broadly ovate, occasionally obovate, membranous to subchartaceous, 3-nerved, the lateral nerves visible for 1/2-2/3 of the leaf length, the secondary nerves 3-7 pairs, 45-60° to the midrib, weakly curved; upper surface drying brown-green to dark green, pubescent, the hairs to 2-3 mm, weakly appressed, straight, the cystoliths fusiform, and occasionally "V" shaped or pustulate; lower surface drying grey-green, pubescent, the hairs to 1 mm, erect and curved or appressed and straight, glandular punctate; base symmetrical, obtuse, subcordate, cordate or cuneate; margins crenate-serrate, the basal 1/4-1/2 entire; apex acute; stipules 2-5 mm, ovate, elliptic, rarely cordiform, drying pale grey-brown; petioles at the same node equal, 1.5-48 mm, pubescent, the hairs to 0.5(-2) mm, erect, curved. Inflorescences 3-8 per stem, bisexual; peduncular bracts 1-1.5 mm; bracteoles 0.3-0.5 mm; inflorescences 1-2 per axil, 10-120 mm,

bearing 1-19 staminate and 25-900 pistillate flowers in 1-3 loose panicles; peduncle 1/8-3/4 of the inflorescence length, glabrous, occasionally sparsely pubescent, the hairs to c. 0.5 mm, erect, straight; staminate pedicels 0.3-1.5 mm, glabrous, occasionally pubescent, the hairs to c. 0.5 mm, erect, straight. Staminate flowers 1.3-2(-3.5) × 0.8-1 mm immediately prior to anthesis, cream, apically green; tepals 4, 0.8-1.5 mm, glabrous, occasionally pubescent, the hairs to c. 0.5 mm, erect, straight or curved, the subapical appendage 0.8-2 mm, narrowly deltate to corniculate, glabrous; stamens 4; pistillate pedicels 0.2-0.5 mm, glabrous. Pistillate flowers with the adaxial tepal 0.3-0.5 mm, ovate, elliptic or oblong, the subapical appendage 0.2-0.4 mm, oblong, thickened, the lateral tepals 0.2-0.5 mm, asymmetrically ovate. Infructescences 10-120 mm; achenes 0.7-0.8 mm, subcompressed, ellipsoid, the margin narrow. *Wet lowland and montane forests, commonly used as a garden ornamental.* T (*Matuda 3462*, F); Ch (*Breedlove 11999*, US); B (*Schipp 518*, BM); G (*Croat 41323*, MO); H (*Molina R. 12945*, NY); ES (*Villacorta 95*, LAGU); N (*Martínez y Grijalba 1880*, MEXU); CR (*Brenes 14459*, BM); P (*Correa A. et al. 2627*, PMA). 100-2000 m. (Mesoamerica, Ecuador, Peru, Brazil, Argentina, Greater Antilles, Leeward Islands.)

Within Mesoamerican *Pilea pubescens*, a number of subgroups may be distinguished. Throughout Belize, Guatemala and Nicaragua exists a form with obovate leaves, characterised by *Sandino 3470* (MO). Within Costa Rica and Panama exists a form with perfectly ovate, almost cordiform leaves, represented by *Austin-Smith A17* (F).

48. *Pilea purulensis* Donn. Sm., *Bot. Gaz.* 46(2): 115 (1908). Isotype: Guatemala, *von Türckheim 1707* (BM!).
Illustr.: Burger, *Fieldiana, Bot.* 222, t. 25 (1977).

Pilea chiriquina Killip, *P. donnell-smithiana* Killip.

Herbs to shrubs to 300 cm; terrestrial, occasionally epiphytic or epipetric. Stems erect, occasionally prostrate, drying red-brown to dark brown, glabrous; cystoliths elliptic and pustulate, occasionally absent; internodes 8.5-85 × 0.8-6 mm, angulate in cross-section. Leaves at the same node of unequal length by a ratio of 1:2.5-14; major lamina 24-220 × 7-80 mm, obovate, lanceolate to oblong, subchartaceous to chartaceous, 3-nerved, the lateral nerves visible for 3/4 or more of the leaf length, occasionally reaching the leaf apex, the secondary nerves 7-34 pairs, 60-90° to the midrib, straight to weakly curved; upper surface drying dark brown to green, glabrous, the cystoliths fusiform, pustulate and rarely "V" shaped; lower surface drying red-brown to pale brown, glabrous, glandular punctate; base strongly asymmetrical, cordate-obtuse, subcordate-obtuse or subcordate-cuneate; margins crenate-serrate, the basal 1/8-1/3 entire; apex acuminate to cuspidate; minor lamina 7-50 × 2.5-21 mm, occasionally sessile, ovate, the secondary nerves 4-10 pairs, the basal 1/4-2/3 entire, otherwise as larger laminae; stipules 0.5-3 mm, deltate, drying brown to green-brown; petioles at the same node unequal by a ratio of 1:3-20, the major petioles 1.5-37 mm, glabrous, the minor petioles 0.5-1.5 mm. Inflorescences 2-40 per stem, unisexual; peduncular bracts 0.5-1.5 mm; bracteoles 0.5-2.5 mm. Staminate inflorescences 1-4 per axil, 8-60 mm, bearing 15-200 flowers in 1-4 compact heads; peduncle 1/3-3/4 of the inflorescence length, glabrous; pedicels 0.5-4 mm, glabrous. Staminate flowers 1.3-1.8 × 1-1.5 mm immediately prior to anthesis, cream, apically green; tepals 4, 1.5-2 mm, glabrous, the subapical appendage 0.2-1 mm, corniculate, glabrous; stamens 4. Pistillate inflorescences 1 or 2 per axil, 2-8.5 mm, bearing 5-95(-450) flowers in 1-5(-20) compact heads; peduncle 1/4-1/2 of the inflorescence length, glabrous; pedicels 0.2-1.5 mm, glabrous. Pistillate flowers with the adaxial tepal 0.5-1 mm, oblong, the subapical appendage 0.2-0.3 mm, scale-shaped to oblong, frequently thickened, the lateral tepals 0.5-1.5 mm, asymmetrically ovate. Infructescences 5-45 mm; achenes 1.8-2.5 mm, compressed, ovoid-ellipsoid, the margin narrow towards the base, broad towards the apex. *Wet lowland, montane and cloud forests.* Ch (Breedlove,

1986: 191); G (*Standley 71079*, F); CR (*Lent 3817*, F); P (*Davidse et al. 25061*, PMA). 1000-2100 m. (Mexico [Oaxaca], Mesoamerica, Colombia.)

49. *Pilea quadrata* A.K. Monro, *Novon* 9: 395 (1999). Holotype: Panama, *Antonio 1345* (MO!). Illustr.: Monro, *Novon* 9: 396 t. 3A, B, C (1999).

Herbs to 25 cm; terrestrial, epiphytic or epipetric. Stems prostrate, drying grey-green, glabrous; cystoliths elliptic; internodes 7-15 × 0.5-0.8 mm, square in cross-section. Leaves at the same node of unequal length by a ratio of 1:4.5-13; major lamina 23-51 × 11-18 mm, ovate, elliptic or rhomboid, subchartaceous, 3-nerved, the lateral nerves visible for 1/2-2/3 of the leaf length, the secondary nerves 6-9 pairs, 65-80° to the midrib, straight; upper surface drying dark grey-green, glabrous, the cystoliths fusiform, "V" shaped and occasionally "Y" shaped; lower surface drying pale green-brown or grey-green, glabrous, glandular punctate; base asymmetrical, decurrent-obtuse or decurrent-acute; margins serrate, the basal 1/2-2/3 entire; apex acute to weakly acuminate; minor lamina 4-5 × 2 mm, subsessile to sessile, elliptic, ovate or obovate, otherwise as major laminae; stipules 0.5-0.8 mm, ovate, drying brown; petioles at the same node unequal a ratio of 1:7-13, the major petioles 1.5-2.5 mm, glabrous, the minor petioles less than 0.2 mm. Inflorescences 2-30 per stem, unisexual; peduncular bracts 0.3-0.5 mm; bracteoles 0.3-0.5 mm. Staminate inflorescences solitary, 1.5-2 mm, bearing 5-12 flowers in a compact head; peduncle 1/4 of the inflorescence length, glabrous; pedicels 0.8-1.5 mm, glabrous. Staminate flowers 0.8-1 × 0.8-1 mm immediately prior to anthesis, cream; tepals 4, c. 1 mm, glabrous, the subapical appendage 0.3-0.5 mm, corniculate, glabrous; stamens 4. Pistillate inflorescences solitary, 1-2.5 mm, bearing 5-8 flowers in a compact head; peduncle 1/4-1/2 of the inflorescence length, glabrous; pedicels c. 0.3 mm, glabrous. Pistillate flowers with the adaxial tepal c. 0.5 mm, ovate to oblong, the subapical appendage 0.2-0.3 mm, scale-shaped, the lateral tepals 0.3-0.5 mm, asymmetrically ovate. Infructescences c. 2.5 mm; achenes c. 1 mm, compressed, ellipsoid, the margin narrow. *Lowland wet forests*. P (*Galdames et al. 1269*, SCZ). 200-500 m. (Endémica.)

50. *Pilea quercifolia* Killip, *Phytologia* 1: 146 (1935). Holotype: Guatemala, *Skutch 559* (US!). Illustr.: not known.

Herbs to 35 cm; terrestrial. Stems erect, drying green, glabrous; cystoliths absent; internodes 20-70 × 0.5-2.5 mm, angulate in cross-section. Leaves at the same node equal; lamina 25-140 × 16-70 mm, elliptic to broadly ovate, membranous, 3-nerved, the lateral nerves visible for 1/2-2/3 of the leaf length, the secondary nerves 4-15 pairs, 45-70° to the midrib, curved to weakly curved; upper surface drying bright green to yellow green, occasionally pale brown, glabrous, the cystoliths fusiform; lower surface drying pale green, glabrous, glandular punctate; base symmetrical or asymmetrical, subcordate; margins serrate, the basal 1/10-1/5 entire; apex shallowly cuspidate to acuminate; stipules 1.8-5 mm, narrowly ovate, drying brown; petioles at the same node unequal by a ratio of 1:1.5-4.5, the major petiole 6-28 mm, glabrous, the minor petiole 2-17 mm. Inflorescences 2-7 per stem, unisexual; peduncular bracts 1-1.8 mm; bracteoles 0.5-0.8 mm. Staminate inflorescences solitary per axil, 30-73 mm, bearing 9-40 flowers in a compact head; peduncle 4/5-9/10 of the inflorescence length, glabrous; pedicels 0.5-1.5 mm, glabrous. Staminate flowers 1.8-2 × c. 1.8 mm immediately prior to anthesis, cream, apically green; tepals 4, 2-2.5 mm, glabrous, the subapical appendage 0.3-0.4 mm, suborbicular, glabrous; stamens 4. Pistillate inflorescences 1 or 2 per axil, 10-30 mm, bearing 30-180 flowers in a loose panicle; peduncle 1/2-2/3 of the inflorescence length, glabrous; pedicels 0.3-0.8 mm, glabrous. Pistillate flowers with the adaxial tepal c. 0.5 mm, oblong, the subapical appendage 0.2-0.3 mm, suborbicular, the lateral tepals 0.3-0.4

mm, asymmetrically ovate. Infructescences 12-55 mm; achenes 1.3-1.8 mm, compressed, asymmetrically ovoid, the margin narrow. *Wet montane and cloud forests*. Ch (*Matuda 4797*, MO); G (*Williams 25774*, NY). 1200-2400 m. (Endémica.)

Pilea quercifolia appears to form part of a complex of closely related species, consisting of *P. vulcanica*, *P. killipiana* and *P. mexicana*.

51. *Pilea riparia* Donn. Sm., *Bot. Gaz.* 19: 11 (1894). Isotype: Guatemala, *von Türckheim 1040* (NY!). Illustr.: not known.

Herbs to 75 cm; epipetric or terrestrial. Stems erect, drying pale green-brown to dark brown, glabrous; cystoliths elliptic; internodes 12-127 × 2-6 mm, angulate in cross-section. Leaves at the same node of unequal length by a ratio of 1:3.5-34.5, rarely equal; major lamina 52-120 × 29-47 mm, obovate or elliptic, chartaceous to subcoriaceous, 3-nerved, the lateral nerves visible for 3/4 or more of the leaf length, never reaching the leaf apex, the secondary nerves 4-15 pairs, 60-75° to the midrib, weakly curved to straight; upper surface drying dark grey-green to dark green, glabrous, the cystoliths fusiform, elliptic, "V" shaped, "Y" shaped and pustulate; lower surface drying grey-brown to grey-green, glabrous, glandular punctate; base asymmetrical, decurrent, decurrent-acute, or cuneate-decurrent; margins irregularly crenate-serrate, the basal 2/3 entire; apex acute, cuspidate or occasionally subacuminate; minor lamina 2.3-5(-19) × 1-1.8(-5.5) mm, frequently caducous, ovate, the secondary nerves obscure, otherwise as major laminae; stipules 1-1.5 mm, deltate, drying dark brown; petioles at the same node unequal, the major petioles 5-38 mm, glabrous, the minor petioles less than 0.2 mm. Inflorescences 4-16 per stem, unisexual; peduncular bracts 1-1.5 mm; bracteoles 0.5-0.8 mm. Staminate inflorescences 1 or 2 per axil, 16-64 mm, bearing 60-100 flowers in 1-4 compact heads; peduncle 1/4-2/3 of the inflorescence length, glabrous; pedicels 2.5-6 mm, glabrous. Staminate flowers 2.5-3 × 1.8-2 mm immediately prior to anthesis, cream; tepals 4, c. 3 mm, glabrous, the subapical appendage 1 mm, corniculate, glabrous; stamens 4. Pistillate inflorescences 1 or 2 per axil, 4 mm, bearing 60-240 flowers in a loose panicle; peduncle 1/8-1/4 of the inflorescence length, glabrous; pedicels 0.2- c. 0.5 mm, glabrous. Pistillate flowers with the adaxial tepal c. 0.8 mm, oblong-ovate, the subapical appendage 0.2-0.3 mm, oblong, thickened, the lateral tepals c. 0.5 mm, ovate. Infructescences 7-13 mm; achenes c. 1.3 mm, subcompressed, ellipsoid, the margin narrow. *Wet forests on limestone*. G (*Standley 91718*, F). c. 1000 m. (Endémica.)

Pilea riparia is unique amongst Mesoamerican species in appearing alternate-leaved because of the early deciduous minor leaf at each node. Breedlove (1986: 192) reports this species for Chiapas; however, the herbarium material cited has been misidentified.

52. *Pilea rostulata* A.K. Monro, *Novon* 9: 395 (1999). Holotype: Panama, *Antonio 1237* (BM!). Illustr.: Monro, *Novon* 9: 394, t. 2C, D, E (1999).

Herbs to 10 cm; epipetric or epiphytic. Stems erect, stolons prostrate, drying dark brown, pubescent, the hairs to 1 mm, appressed, straight to weakly curved; cystoliths elliptic; internodes 2-7 × 1-1.5 mm, angulate in cross-section. Leaves at the same node equal; lamina 17-81 × 10-35 mm, obovate to suborbicular, subchartaceous to chartaceous, 3-nerved, the lateral nerves visible for 3/4 or more of the leaf length, never reaching the leaf apex, the secondary nerves 6-10 pairs, 45-65° to the midrib, weakly curved to curved; upper surface drying dark green to green-brown, pubescent, the hairs to 1.5 mm, erect, weakly curved to straight, the cystoliths fusiform and "V" shaped; lower surface drying grey-green, pubescent, the hairs to 1.5 mm, erect, weakly curved to straight, glandular punctate; base asymmetrical, cordate;

margins serrate, the basal 1/4 entire; apex obtuse or acute; stipules 4-9 mm, ovate-oblong to obovate, drying pale to dark brown; petioles at the same node equal, 2-5 mm, pubescent, the hairs to 1.5 mm, erect, weakly curved or straight. Inflorescences 1 or 2 per stem, bisexual, but dominated by a single sex; peduncular bracts 1 mm; bracteoles 0.5-0.8 mm. Staminate inflorescences solitary per axil, 37-55 mm, bearing 12-20 flowers in a compact head; peduncle 3/4-7/8 of the inflorescence length, glabrous; pedicels 0.8-2 mm, glabrous. Staminate flowers 2.8-3 × 1.3-1.5 mm immediately prior to anthesis, pale green; tepals 2(-4), 2-2.8 mm, glabrous, the subapical appendage 1-1.5 mm, narrowly ovate, glabrous; stamens 2(-4). Pistillate inflorescences 1 or 2 per axil, 12-45 mm, bearing 100-250 flowers in a loose panicle or 1-3 compact heads; peduncle 2/3-3/4 of the inflorescence length, glabrous; pedicels c. 0.5 mm, 1. Pistillate flowers with the adaxial tepal 0.8-1 mm, glabrous, the subapical appendage 0.5-1, the lateral tepals c. 0.8 mm, asymmetrically ovate. Infructescences 23-60 mm; achenes c. 1.3 mm, compressed, ellipsoid, the margin narrow, crenulate. *Lowland wet forests*. P (Dressler 4056, PMA). 0-400 m. (Endemica.)

53. *Pilea rugosissima* Killip, *Proc. Biol. Soc. Wash.* 52: 28 (1939). Holotype: Panama, Davidson 335 (F!).

Illustr.: not known.

Herbs to 75 cm; terrestrial. Stems erect, drying green to brown, pubescent, the hairs to 1.5 mm, appressed, curved; cystoliths absent; internodes 25-100 × 1.5-4 mm, angulate in cross-section. Leaves at the same node equal to subequal; lamina 30-120 × 17-40 mm, ovate to elliptic, chartaceous, occasionally bullate, 3-nerved, the lateral nerves visible for 1/3-1/2 of the leaf length, the secondary nerves 4-7 pairs, 15-60° to the midrib, curved; upper surface drying dark green, pubescent, the hairs to 2.5 mm, appressed, weakly curved, the cystoliths fusiform; lower surface drying grey-green, pubescent, the hairs to 1.5 mm, appressed, weakly curved, eglandular, rarely glandular punctate; base symmetrical, cuneate, obtuse or subcordate; margins profoundly serrate, the basal 1/5-1/4 entire; apex shallowly acuminate, acute or obtuse; stipules 2.5-9 mm, cordiform to ovate, drying yellow-green to pale brown; petioles at the same node unequal by a ratio of 1:2-4, the major petiole 10-70 mm, pubescent, the hairs to 1.3 mm, appressed, weakly curved, the minor petiole 4-20 mm. Inflorescences 1-5 per stem, unisexual; peduncular bracts 3-9 mm; bracteoles 3-9 mm. Staminate inflorescences solitary per axil, 25-50 mm, bearing 5-40 flowers in a compact head; peduncle 2/3-4/5 of the inflorescence length, glabrous; pedicels 0.5-4 mm, glabrous. Staminate flowers 5-6 × 2-2.5 mm immediately prior to anthesis, pale green; tepals 3, 2-2.5 mm, glabrous, the subapical appendage 2.5-4 mm, narrowly deltate, glabrous; stamens 3. Pistillate inflorescences solitary per axil, 5-7 mm, bearing 12-30 flowers in a compact head; peduncle 1/2 of the inflorescence length, glabrous; pedicels 0.5-1 mm, glabrous. Pistillate flowers with the adaxial tepal 0.8-1 mm, obovate, the subapical appendage 0.3-5 mm, corniculate, the lateral tepals 0.3-0.5 mm, asymmetrically ovate. Infructescences 10-40 mm; achenes 2-2.3 mm, compressed, ellipsoid, the margin narrow. *Montane, cloud and elfin forest*. P (Knapp 2105, PMA). 1800-2500 m. (Endémica.)

A collection from Chiriqui (Panama), Knapp 1622 (MO), is unusual in its small stature and epiphytic habit.

54. *Pilea senarifolia* Donn. Sm., *Bot. Gaz.* 19: 12 (1894). Isotype: Guatemala, Heyde y Lux 3145 (MO!).

Illustr.: not known.

Herbs to 20 cm; epiphytic. Stems erect, drying pale brown, glabrous; cystoliths elliptic; internodes 3-33 × 2.3-6 mm, square or angulate in cross-section. Leaves at each node 4-6, verticillate, equal or subequal; major lamina 4-17 × 2-6 mm, narrowly obovate to spatulate, subchartaceous, pinnately nerved, the secondary nerves 2-4 pairs, 45° to the midrib, weakly curved; upper surface drying dark green to dark brown-green, glabrous, the cystoliths fusiform; lower

surface drying grey-green, glabrous, glandular punctate; base symmetrical, attenuate; margins crenate-serrate, the basal 1/3-1/2 entire; apex acute; stipules c. 0.5 mm, ovate, drying pale brown; petioles at the same node subequal in whorl, the major petioles 0.7-2 mm, glabrous. Inflorescences 12-50 per stem, unisexual; peduncular bracts 0.5-0.8 mm; bracteoles 0.5-0.8 mm. Staminate inflorescences solitary, 3-4 mm, bearing 2-3 flowers in a loose panicle; peduncle 1/4-1/3 of the inflorescence length, glabrous; pedicels 0.8-1.5 mm, glabrous. Staminate flowers 1.8-2.3 × 1.5-2 mm immediately prior to anthesis, cream, apically green; tepals 4, c. 2.3 mm, glabrous, the subapical appendage 0.2 mm, scale-shaped, glabrous; stamens 4. Pistillate inflorescences solitary, 1-1.5 mm, bearing 1-3 flowers in a loose panicle; peduncle 1/5 of the inflorescence length, glabrous; pedicels 0.2-0.3 mm, glabrous. Pistillate flowers with the adaxial tepal 0.5-0.7 mm, oblong, the subapical appendage 0.2-0.3 mm, scale-shaped, thickened, the lateral tepals c. 0.7 mm, ovate. Infructescences not seen. *Cloud forests, on tree trunks*. Ch (*Liebmann 14256 '1', C*); G (*Aguilar s.n., F*). c. 2400 m. (Endémica.)

55. *Pilea skutchii* Killip, *Fieldiana, Bot.* 24(3): 421 (1952). Holotype: Guatemala, *Skutch 974* (US!). Illustr.: not known. N.v.: Hierba de masamora, G.

Herbs to 100 cm; terrestrial. Stems erect, drying pale brown, brown to green-brown, glabrous; cystoliths absent; internodes 20-55 × 1.5-4.5 mm, angulate in cross-section. Leaves at the same node of unequal length by a ratio of 1:2-3, occasionally subequal; major lamina 40-160 × 17-65 mm, narrowly ovate to broadly ovate or oblong, subchartaceous, 3-nerved, the lateral nerves visible for 2/3-3/4 of the leaf length, the secondary nerves 13-25 pairs, 75-90° to the midrib, straight to weakly curved; upper surface drying green or dark brown, glabrous, the cystoliths fusiform; lower surface drying grey-green, glabrous, glandular punctate; base symmetrical or asymmetrical, cordate; margins serrate-crenate, the basal 1/3 entire; apex acuminate to caudate; minor lamina 13-75 × 10-30 mm, ovate to elliptic, the base obtuse or cordate, otherwise as major laminae; stipules 0.5-1 mm, deltate, drying cream; petioles at the same node unequal by a ratio of 1:2-3, the major petiole 20-70 mm, glabrous, the minor petiole 8-25 mm. Inflorescences 6-10 per stem, unisexual; peduncular bracts 0.5-1 mm; bracteoles 0.5-0.8 mm. Staminate inflorescences solitary per axil, 15-45 mm, bearing 30-55 flowers in 1-5 compact heads; peduncle 1/2-3/4 of the inflorescence length, glabrous; pedicels 1-2 mm, glabrous. Staminate flowers 2 × 1.5 mm immediately prior to anthesis, cream, apically green; tepals 4, c. 2 mm, glabrous, the subapical appendage 0.3-0.5 mm, scale-shaped, glabrous; stamens 4. Pistillate inflorescences solitary per axil, 3-10 mm, bearing 26-60 flowers in a loose panicle; peduncle 1/4 of the inflorescence length, glabrous; pedicels c. 0.5 mm, glabrous. Pistillate flowers with the adaxial tepal c. 0.6 mm, oblong to obovate, the subapical appendage 0.3-0.4 mm, oblong, thickened, the lateral tepals c. 0.5 mm, asymmetrically ovate. Infructescences 6-70 mm; achenes c. 1.5 mm, compressed, ovoid, the margin narrow. *Montane, cloud and elfin forests*. G (*Standley 68147, F*). 1400-2700 m. (Endémica.)

56. *Pilea tilarana* (missing in key) W.C.Burger, *Phytologia* 31: 270 (1975). Holotype: Costa Rica, *Standley y Valerio 44753* (US!). Illustr.: Burger, *Fieldiana, Bot.* 40: 222, t. 25 (1977).

Herbs to 40 cm; terrestrial. Stems erect to prostrate, drying dark green to dark brown, glabrous; cystoliths fusiform; internodes 4-13 × 1-1.5 mm, angulate in cross-section. Leaves at the same node of unequal length by a ratio of 1:4-8; major lamina 20-45 × 10-12.5 mm, obovate or elliptic, chartaceous, 3-nerved, the lateral nerves visible for 2/3 of the leaf length, the secondary nerves 5-9 pairs, 50-75° to the midrib, straight; upper surface drying dark green, variegated, glabrous, the cystoliths fusiform; lower surface drying dark green, glabrous, glandular punctate; base

asymmetrical, subcordate-cuneate; margins crenate, the basal 1/4-1/2 entire; apex acute to shallowly acuminate; minor lamina 20-45 × 2-4.5 mm, subsessile, ovate to elliptic, otherwise as major laminae; stipules 0.5-1.3 mm, deltate or ovate, drying brown to cream; petioles at the same node unequal, the major petiole 3-6 mm, glabrous, the minor petiole less than 0.2 mm. Inflorescences 2-10 per stem, unisexual; peduncular bracts 1.3-1.5 mm; bracteoles 1.5-2 mm. Staminate inflorescences solitary per axil, c. 30 mm, bearing 15 flowers in a semi-compact head; peduncle 3/4 of the inflorescence length, glabrous; pedicels 1.3-1.5 mm, glabrous. Staminate flowers 2-2.3 × 1.8-2 mm immediately prior to anthesis, cream, apically green; tepals 4, c. 2 mm, glabrous, the subapical appendage c. 0.5 mm, corniculate, glabrous; stamens 4. Pistillate inflorescences solitary per axil, 1-8 mm, bearing 4-20 flowers in 1 or 2 compact heads; peduncle 1/4-2/3 of the inflorescence length, glabrous; pedicels less than 0.2 mm. Pistillate flowers with the adaxial tepal 1.3 mm, oblong, the subapical appendage 0.3-0.5 mm, oblong to scale-shaped, frequently reflexed, the lateral tepals c. 0.8 mm, asymmetrically ovate. Infructescences 4.5-13.5 mm; achenes 2.5-2.8 mm, compressed, ovoid, the margin narrow. *Wet montane forests, cloud forests, secondary woods*. CR (Brenes 4527, F). 600-1000 m. (Endémica.)

57. *Pilea trichomanophylla* A.K. Monro, *Bull. Nat. Hist. Mus. Lond. (Bot.)* 30: 9 (2000). Holotype: Panama, *Hammel et al. 14646* (MO!). Illustr.: Monro, *Bull. Nat. Hist. Mus. Lond. (Bot.)* 30: 10, t. 2D, E, F (2000).

Herbs to 5 cm; epipetric. Stems prostrate, drying dark brown to black, sparsely pubescent, the hairs to c. 0.8 mm, weakly appressed, crisped or curved; cystoliths fusiform; internodes 4.5-12 × 0.4-0.8 mm, angulate in cross-section. Leaves at the same node equal to subequal; major lamina 5-13.5 × 2.5-7 mm, ovate, pinnately lobed, membranous, pinnately nerved, the secondary nerves 3-5 pairs, 60° to the midrib, straight; upper surface drying green to brown-green, sparsely pubescent, the hairs to c. 0.5 mm, appressed, curved, the cystoliths fusiform; lower surface drying grey-green, sparsely pubescent, the hairs to c. 0.5 mm, appressed, straight or curved, eglandular; base symmetrical or asymmetrical, decurrent and or cuneate; margins sinuate, the basal 1/4 entire; apex obtuse; stipules 0.8-1.5 mm, auriculate, drying dark brown; petioles at the same node unequal by a ratio of 1:1.5-3, the major petioles 2.5-4 mm, sparsely pubescent, the hairs to c. 0.5 mm, erect, crisped, the minor petioles 1-2.5 mm. Inflorescences and intact infructescences not seen. Achenes 0.8-1 mm, subcompressed, ellipsoid, the margin broad. *Wet montane forests*. P (*Hammel et al. 14646*, MO). c. 1300 m. (Endémica.)

58. *Pilea tridentata* Killip, *J. Wash. Acad. Sci.* 15: 290 (1925). Isotype: Guatemala, *von Türckheim II 2011* (MO!). Illustr.: not known.

Herbs to 35 cm; terrestrial or epipetric. Stems erect or prostrate, drying dark brown to black, glabrous; cystoliths elliptic or pusticulate; internodes 1.5-36 × 0.3-2.5 mm, square in cross-section. Leaves at the same node of unequal length by a ratio of 1:1.5-2.5(-5), the minor leaf in pair reflexed and appearing adjacent to major leaf; major lamina 5-11.5 × 2-5 mm, obovate or rhomboid, membranous to subchartaceous, pinnately nerved, the secondary nerves 3-5 pairs, 45-60° to the midrib, curved to weakly curved; upper surface drying green or brown-green, glabrous, the cystoliths fusiform and "V" shaped; lower surface drying pale green or grey-green, glabrous, glandular punctate; base symmetrical or asymmetrical, cuneate, decurrent-acute; margins crenate, the basal 1/2-2/3 entire; apex obtuse; minor lamina 1.3(-3.5-5) × (1-)2-4.5 mm, the base cordate-cuneate or obtuse-decurrent, the margins entire, the apex acute or obtuse, otherwise as major laminae; stipules 0.4-0.8 mm, deltate, drying brown; petioles at the same node unequal by a ratio of 1:2-2.5, the major petioles 0.8-1.8 mm, glabrous, the minor petioles 0.5-1.3 mm. Inflorescences (8-)60-120 per stem, unisexual; peduncular bracts 0.4-0.5 mm; bracteoles 0.3-0.5 mm. Staminate inflorescences solitary, 3-4 mm,

bearing 1-3 flowers in a semi-compact head; peduncle 1/4-1/3 of the inflorescence length, glabrous; pedicels 0.8-1.3 mm, glabrous. Staminate flowers 1.5-1.8 × 1.5 mm immediately prior to anthesis, cream; tepals 4, c. 1.5 mm, glabrous, the subapical appendage 0.5-0.8 mm, corniculate, glabrous; stamens 4. Pistillate inflorescences solitary, 1-1.5 mm, bearing 2-4 flowers in a semi-compact head; peduncle 1/5-1/4 of the inflorescence length, glabrous; pedicels 0.3-0.8 mm, glabrous. Pistillate flowers with the adaxial tepal c. 0.5 mm, oblong, the subapical appendage 0.1-0.2 mm, scale-shaped, thickened, the lateral tepals c. 0.5 mm, narrowly ovate. Infructescences not seen; achenes c. 1 mm, subcompressed, ellipsoid, the margin narrow. *Wet forests, montane wet forests.* G (*Carlson 2130*, F). (300-)1200-1600 m. (Endémica.)

59. *Pilea tripartita* A.K. Monro, *Novon* 9: 393 (1999). Holotype: Costa Rica, *Burger y Liesner 6330* (MO!).

Illustr.: A.K. Monro, *Novon* 9: 394 t. 2A, B (1999).

Herbs to 25 cm; terrestrial, epiphytic or epipetric. Stems erect or prostrate, drying green to pale brown, pubescent, the hairs to c. 0.8 mm, erect to weakly appressed, curved; cystoliths fusiform; internodes 12-60 × 1.5-2 mm, angulate in cross-section. Leaves at the same node equal; lamina 12-40 × 10-20 mm, elliptic to ovate, chartaceous, 3-nerved, the lateral nerves visible for 3/4 or more of the leaf length, never reaching the leaf apex, the secondary nerves 4-6 pairs, 30-45° to the midrib, curved; upper surface drying dark green, glabrous or sparsely pubescent, the hairs to c. 0.8 mm, appressed, curved, the cystoliths fusiform or pustulate; lower surface drying grey-green, glabrous or sparsely pubescent, the hairs to c. 0.8 mm, appressed, curved, eglandular; base asymmetrical, weakly decurrent to cuneate; margins serrate, the basal 1/4-1/3 entire; apex acute; stipules 4-6 mm, oblong to obovate, drying red-brown; petioles at the same node equal or unequal by a ratio of 1:1.5-3, 10-40 mm, pubescent, the hairs to c. 0.8 mm, weakly appressed, weakly curved. Inflorescences 1-6 per stem, unisexual; peduncular bracts 1-1.3 mm; bracteoles 0.8-1.3 mm. Staminate inflorescences solitary, 5-45 mm, bearing 5-9 flowers in a compact head; peduncle 2/3-3/4 of the inflorescence length, glabrous; pedicels 1-2 mm, glabrous. Staminate flowers 2.5-3.5 × 1.5-2 mm immediately prior to anthesis, cream, apically green; tepals 3, 1-1.5 mm, glabrous, the subapical appendage 1.5-3 mm, narrowly ovate, glabrous; stamens 3. Pistillate inflorescences 1 or 2 per axil, 10-25 mm, bearing 8-20 flowers in a compact head; peduncle 2/3-3/4 of the inflorescence length, glabrous; pedicels 0.5-0.8 mm, glabrous. Pistillate flowers with the adaxial tepal 1-1.5 mm, ovate, the subapical appendage 0.3-0.5 mm, narrowly deltate, the lateral tepals c. 0.8 mm, lanceolate. Infructescences 12-50 mm; achenes 2-3 mm, compressed, ovoid, the margin narrow. *Montane forests, cloud forests, elfin forests.* CR (*Burger y Liesner 6509*, MEXU). 2500-3200 m. (Endémica.)

60. *Pilea tutensis* A.K. Monro, *Novon* 9: 397 (1999). Holotype: Panama, *Antonio 1845* (MEXU!). Illustr.: A.K.

Monro, *Novon* 9: 396 t. 3D, E, F, G (1999).

Herbs to 35 cm; terrestrial or epiphytic. Stems prostrate, drying dark brown, glabrous; cystoliths elliptic; internodes 6-17 × 0.8-1 mm, angulate in cross-section. Leaves at the same node of unequal length by a ratio of 1:2-4; major lamina 19-30 × 11-18 mm, elliptic or obovate, chartaceous, 3-nerved, the lateral nerves visible for 2/3 of the leaf length, the secondary nerves 4-10 pairs, 65-90° to the midrib, straight to weakly curved; upper surface drying dark brown to green-brown, glabrous, the cystoliths fusiform; lower surface drying brown, glabrous, glandular punctate; base asymmetrical or symmetrical, cuneate, acute or weakly decurrent; margins crenate, the basal 1/4-1/3 entire; apex obtuse to weakly acuminate; minor lamina 6-9.5 × 3-7 mm, suborbicular to broadly elliptic, otherwise as major laminae; stipules 0.5-0.8 mm, broadly ovate to deltate, drying brown; petioles at the same node unequal by a ratio of 1:3.5-6, the

major petioles 4-12 mm, glabrous, the minor petioles 1-2 mm. Inflorescences 6-18 per stem, unisexual; peduncular bracts 0.3-0.8 mm; bracteoles c. 0.5 mm. Staminate inflorescences solitary, 17-22 mm, bearing 50-80 flowers in a compact head; peduncle 3/4 of the inflorescence length, glabrous; pedicels 0.5-1 mm, glabrous. Staminate flowers 1.8-2 × c. 1 mm immediately prior to anthesis, cream, apically green; tepals 4, c. 2 mm, glabrous, the subapical appendage c. 0.8 mm, corniculate, glabrous, the stamens 4. Pistillate inflorescences solitary, 2-4 mm, bearing 4-14 flowers in a semi-compact to compact head; peduncle 1/3-1/2 of the inflorescence length, glabrous; pedicels 0.5-0.8 mm, glabrous. Pistillate flowers with the adaxial tepal 0.8-1 mm, oblong, the subapical appendage c. 0.3 mm, corniculate, thickened, the lateral tepals 0.5-0.8 mm, asymmetrically ovate. Infructescences 4-15 mm; achenes 1.8-2.5 mm, compressed, ovoid, the margin narrow, abaxially broad. *Wet premontane forests, montane forests*. P (*Knapp y Sytsma 2600*, PMA). 900-1600 m. (Endémica.)

61. *Pilea vulcanica* Liebm., *Kongel. Danske Vidensk. Selsk. Skr., Naturvidensk. Math. Afd., ser. 5*, 2: 303 (1851). Lectotype (designated by Monro, 2000): Mexico, Veracruz, *Liebmann 14256 - '2' (C!)*. Ilustr.: Burger, *Fieldiana, Bot.* 40: 224, t. 27 (1977). N.v.: š-wa k'anti' Re Kehel C' loc, Ch.

Pilea gracilipes Killip, *P. standleyi* Killip.

Herbs to 50 cm; terrestrial, occasionally epiphytic or epipetric. Stems erect, occasionally prostrate, drying greyish green, glabrous; cystoliths fusiform; internodes 6-55 × 1-5 mm, angulate in cross-section. Leaves at the same node equal; lamina 18-90 × 10-25 mm, ovate, ovate-lanceolate, subchartaceous, 3-nerved, the lateral nerves visible for less than 2/3 of the leaf length, the secondary nerves 4-16 pairs, 45-60° to the midrib, weakly curved; upper surface drying green, occasionally brown, glabrous, the cystoliths fusiform, crescent shaped and "V" shaped; lower surface drying grey-green, occasionally pale brown, glabrous, glandular punctate; base symmetrical or asymmetrical, obtuse, occasionally subcordate; margins serrate, the basal 1/5-1/4 entire; apex acute, cuspidate or acuminate; stipules 1-2(-3) mm, narrowly deltate, drying pale green or grey; petioles at the same node unequal by a ratio of 1:2-4, the major petioles 14-45 mm, glabrous, the minor petioles 2.5-15 mm. Inflorescences 1-15 per stem, unisexual; peduncular bracts 1.3-2 mm; bracteoles 0.5-0.8 mm. Staminate inflorescences solitary, 12-55 mm, bearing 9-25 flowers in a compact head; peduncle 3/4-4/5 of the inflorescence length, glabrous; pedicels 0.5-3.5 mm, glabrous. Staminate flowers 1.5-2 × 1.5-2 mm immediately prior to anthesis, pale yellow; tepals 4, 1-2.5 mm, glabrous, the subapical appendage 0.3-0.7 mm, oblong to corniculate, glabrous; stamens 4. Pistillate inflorescences solitary, 5-70 mm, bearing 30-300 flowers in a loose panicle; peduncle 1/2-3/4 of the inflorescence length, glabrous; pedicels 0.3-0.5 mm, glabrous; adaxial tepal 0.5-1 mm, ovate, the subapical appendage 0.3-0.4 mm, oblong or corniculate; lateral tepals c. 0.3 mm, asymmetrically ovate. Infructescences 16-70 mm; achenes 1.3-1.5 mm, compressed, asymmetrically ovoid to ellipsoid, the margin narrow, broad towards the apex. *Wet montane forests, elfin forests, secondary forests*. Ch (*Breedlove 34839*, MEXU); G (*Steyrmark 30017*, F); H (*Molina R. y Molina 14057*, NY); ES (*Seiler 766*, F); CR (*Maas y McAlpin 1482*, MO); P (*Lazor y Correa 2733*, SCZ). 1300-3000(-4500) m. (Mexico, Mesoamerica, Colombia.)

Pilea vulcanica probably forms part of a complex of closely related species, including *P. quercifolia*, *P. cornuto-cucullata*, *P. dauciodora* and *P. jamesonia* Wedd. from Ecuador.

10. *Pouzolzia* Gaud

Leucococcus Liebm., *Goethartia* Herzog.

By C.M. Wilmot-Dear, I. Friis & A.K. Monro.

Comment [SK6]: It would be good to put what language this is in here (Tzeltal? Tzoltit?). Unfortunately I did not record this.

Herbs, shrubs, small trees or climbers, perennial; monoecious or dioecious. Stems with spreading hairs. Leaves alternate, never in dimorphic pairs, petiolate, rarely sessile; lamina 3-nerved from the base, with or without secondary nerves, the margins entire, rarely crenate, serrate or dentate; cystoliths punctiform; stipules interpetiolar, free. Inflorescences bisexual or unisexual, borne on terminal or axillary branches, these often modified by partial reduction of the leaves, the flowers sessile or short-pedicellate, borne in densely congested glomerule-like panicles in the axils of normal leaves or bract-like structures. Flowers unisexual, subtended by a deltate red-brown bract. Staminate flowers 3-4-merous; tepals without a subapical appendage although the tepal apices frequently form an apiculus in bud; pistillode present. Pistillate flowers with the tepals fused to form a tube that completely encloses the ovary, the tube apically toothed or entire, persistent in fruit; stigma filiform and laterally papillose, persistent or caducous. Fruit with the perianth tube dehiscent; achene ovoid, more or less dorsiventrally compressed, shiny, brown or black, frequently longitudinally ribbed, the margin frequently winged. 34 spp. Worldwide.

1. Leaf margins coarsely dentate.

4.P. parasitica

1. Leaf margins entire.

2. Leaves discolorous, lower surface white or light grey due to dense, matted pubescence soft to the touch, obscuring the surface, coarse hairs absent or present, where present only visible if nerves not obscured by pubescence.

3. Lower leaf surface light grey, matted pubescence absent from coarser nerves; herb; leaves at least 2 1/2 times as long as wide, (8-)10-18 cm.

1a. P. guatemalana var. guatemalana

3. Lower leaf surface white, matted pubescence present on all nerves; shrub; leaves up to 2 times as long as wide, majority of leaves less than 11.5 cm.

4. Leaves (3-)6-12 × 2-6 cm, abruptly acuminate, acumen 0.5-2 cm; lateral nerves (3)4 pairs, the basal pair not or little extending into the apical third of the lamina; tertiary venation only partially obscured by matted pubescence.

1b. P. guatemalana var. nivea

4. Leaves only 2-4(-5) × 1.2-2.5 cm, apex obtuse or acute, never acuminate; lateral nerves 2(-3) pairs, basal pair extending well into apical third of lamina; tertiary venation completely or almost completely obscured by tomentum.

5. P. pringlei

2. Leaves not discolorous, lower surface green or pale green, matted pubescence absent or present, where matted pubescence present the lower leaf surface pale green and the matted hairs are very sparse and less visible than the coarser hairs, or present only on very young leaves and soon shed.

5. Leaf base obliquely rounded to subcordate, lamina distinctly asymmetrical, apex acuminate and curved sideways; petiole 0.5-0.7(-1) cm, or absent; leaves arranged distichously, drying brown. **2. P. obliqua**

5. Leaf weakly asymmetrical or symmetrical, if asymmetrical the base cuneate and apex not curved sideways; petiole 3 cm or longer; leaves not distichous, drying green.

6. Leaves chartaceous to coriaceous, those on the apical part of stem decreasing gradually in size towards the apex, those at the apex 1/4-1/8 as long as those towards the base, almost sessile, long-acuminate or long-acute (basal leaves petiolate and distinctly short-acuminate); fruiting perianth with broad, leaf-like lateral wings, lateral wings (0.6-)0.8-1.3 mm wide, clearly visible even in flower. **6. P. purpusii**

6. Leaves subchartaceous, of similar form and size throughout the plant; fruiting perianth winged or not winged, where winged, the wings 0.4 mm or less wide and not visible in flower.

7. Pistillate flowers c. 0.8 mm, staminate flower buds shorter than pistillate flowers; fruits ribbed to winged; leaves with one pair of secondary nerves; petiole to 2 cm, rarely over 1/4 of the lamina length in the lower part of the stem; a lax herb or subshrub with erect and prostrate branches, some rooting at the nodes.

7. *P. zeylanica*

7. Pistillate flowers 1.5-2 mm, staminate flower buds of same length or longer than pistillate flowers; fruits winged or not; leaves with 2-5 pairs of secondary nerves arising from apical half of the lamina; petiole (1-)3-8(-12) cm, c. 1/2 of the lamina length in the lower part of the stem; an erect shrub or subshrub.

8. Leaves (5.5-)10-12(-19) cm, twice as long as wide, lower surface without a shiny coating; fruiting perianth indistinctly winged.

3a. *P. occidentalis* var. *occidentalis*

8. Leaves 5-7 cm, less than twice as long as wide, lower surface frequently with a yellow-white shiny coating; fruiting perianth distinctly winged.

3b. *P. occidentalis* var. *palmeri*

1. *Pouzolzia guatemalana* (Blume) Wedd., *Prodr.* 16(1): 233 (1869). *Boehmeria guatemalana* Blume, *Mus. Bot.* 2: 206 (1857). Holotype: Costa Rica, *Friedrichsthal 1272* (L!). Illustr.: See varieties.

Shrubs, subshrubs or suffrutescent herbs, 0.5-2.5 m; stems 1.3-2.5 mm diameter at their apex, sparsely or densely pubescent, the hairs soft to the touch. Leaves not distichous, lamina (3-)6-15(-18) × 2-6(-8.5) cm, ratio of length-width 1:2-3, ovate or elliptic; subchartaceous; lateral primary nerves visible for 1/3-1/2 of the lamina length, the secondary nerves 2-4 pairs; upper surface sparsely to densely pubescent, the hairs erect, rough to the touch; lower surface densely the hairs soft to the touch, entirely obscuring the surface with a white densely matted covering or nerves visible, nerves with additional coarse hairs rough to the touch, spreading base cuneate or rounded (rarely subcordate); margins entire; apex acuminate; stipules 4-8 mm, triangular, the apex acute; petiole 0.5-10 cm. Inflorescences unisexual or bisexual, 4-5 mm in diameter, those on basal part of the inflorescence-bearing axis unisexual and staminate, those on the apical part unisexual and pistillate, those intermediate in position bisexual, bearing 20 or fewer flowers (staminate or pistillate); all bracts inconspicuous. Staminate flowers 4-merous, 1-2 × 1-3 mm immediately prior to anthesis, strongly or weakly apiculate, sparsely or densely pubescent; subsessile or pedicellate, pedicels 1 mm or less at anthesis. Pistillate flowers 1-1.5 mm; obovoid, not winged, sparsely pubescent; sessile. Fruiting perianth tube 1.5-2 × 1-1.5 mm, tapering abruptly to form a beak, weakly dorsiventrally compressed, conspicuously or inconspicuously ribbed, ribs never forming wings; achenes 1.5-2 × 1-1.5 mm, pale yellow-brown. 20-1500 m. G, CR-P.

Two varieties are recognized which overlap and intergrade only in Guatemala, one extending northwest into Central Mexico, the other southeast to Costa Rica and Ecuador. In Guatemala most collections appear intermediate between the two.

1a. *Pouzolzia guatemalana* (Blume) Wedd. var. *guatemalana*. Illustr.: Burger, *Fieldiana, Bot.* 40: 225, t. 28 (1977).

Herb, frequently suffrutescent, 1-2 m; stems 1.3-2.5 cm diameter at their apex. Leaves (8-)10-15(-18) × 3-6.5(-8.5) cm, ratio of width to length 1:2.5-3.5, elliptic to elliptic-ovate; secondary nerves 2(-3) pairs, secondary and tertiary nerves strongly impressed above; upper surface drying dark green, sparsely pubescent; lower surface densely pubescent, the hairs off-white, giving the surface a greenish-white colour, not concealing the nerves; base cuneate; stipules 4-8 ×

1.5-2 mm, the apex acute; petioles 4-10 cm. Staminate flowers 1.5-2 × 2-3 mm immediately prior to anthesis, distinctly apiculate, subsessile or pedicellate, pedicels 1 mm or less at anthesis. Stigma 1.5-4 mm, frequently caducous. Pistillate flowers 1 mm. Fruiting perianth conspicuously 4-6 ribbed. *Dry forests, deciduous forests, thickets, forest edges, disturbed wet forests.* G (*Steyermark 51021*, F); CR (*Stevens 13620*, MO); P (*Correa et al. 3539*, US). 20-550 m. (Mesoamerica, Ecuador.)

1b. *Pouzolzia guatemalana* (Blume) Wedd. var. *nivea* (Wedd.) Friis & Wilmot-Dear, *Kew Bull.* 57: 1005 (2002). *P. nivea* S. Watson, *Proc. Amer. Acad. Arts* 22: 453 (1887). Holotype: Mexico, Jalisco, *Palmer 117* (GH). Illustr.: Wilmot-Dear & Friis, *Opera Bot.* 129: 85, f. 45, F - G (1996).

Pouzolzia latifolia Wedd.

Shrubs 0.5-2.5 m; stems to 1.5 mm diameter at their apex. Leaves (3-)6-11.5(-18.5) × 2-6(-10) cm, ratio of width to length 1:2, ovate or elliptic, the secondary nerves (2-)3-4 pairs, secondary and tertiary nerves weakly impressed above; upper surface mid-green, sparsely or densely pubescent; lower surface densely pubescent, the hairs bright white, giving the surface a white to pale grey colour; concealing the nerves, base broadly cuneate to rounded or occasionally subcordate; apex acuminate; stipules 4-8 × 1-1.5 mm, the apex acute; petiole 0.5-3.5 cm. Staminate flowers immediately prior to anthesis 1-1.5 × 1-1.5 mm, weakly apiculate; subsessile or pedicellate, pedicels 1 mm or less at anthesis. Stigma c. 3 mm, persistent. Pistillate flowers c. 1.5 mm. Fruiting perianth weakly to conspicuously 4-ribbed. *Secondary, semi-deciduous forests, rocky outcrops.* G (*Standley 74708*, F). 50-1500 m. (Mexico [Durango, Jalisco, Oaxaca, Sinaloa, Veracruz, Zacatecas], Mesoamerica)

This species most closely resembles *Pouzolzia pringlei* from which it can be distinguished on leaf morphology. It also closely resembles *P. occidentalis* from which it can be distinguished on white matted leaf pubescence, and staminate and pistillate flower morphology. Material intermediate between *P. guatemalana* var. *nivea* and *P. occidentalis* has been collected in Mexico.

2. *Pouzolzia obliqua* (Wedd.) Wedd. *Arch. Mus. Hist. Nat.* 9: 405 (1857). *Margarocarpus obliquus* Wedd., *Ann. Sci. Nat., Bot., sér. 4*, 1: 204. (1854) Holotype: Peru, *Poeppig 2032* (P!). Illustr.: Burger, *Feldiana, Bot.* 40: 225, t. 28 (1977).

Shrub, erect or scandent, 1-7 m, some branches decumbent and rooting at nodes thereby acting as runners; stems frequently growing in a 'zigzag' manner, 1-3 mm diameter at their apex, with many fine longitudinal ridges, sparsely to densely pubescent, the hairs coarse. Leaves strongly distichous, lamina 3.5-12 × 1.5-4.5 cm, ratio of width to length 1:2.5-3.5, ovate to elliptic-ovate, strongly asymmetrical; subchartaceous; lateral primary nerves visible for 1/3 of the lamina length or less, the secondary nerves (2)3(4) pairs, 2 pairs arising in the lower 1/3 of the lamina often close to the base, at least one of the third pair arising near the middle; upper surface sparsely to densely pubescent, the hairs appressed, 0.5-1 mm, not soft to the touch, the cystoliths densely distributed; lower surface sparsely to densely pubescent the hairs never entirely obscuring surface, more or less uniform, not matted or white, soft to the touch, giving the leaf a silky appearance; base obliquely rounded to subcordate; margins entire; apex long acuminate, usually curving to one side; stipules narrow triangular, 5-10 mm, long acuminate; sessile or petiolate, petioles 0.5-0.7(-1) cm. Inflorescences unisexual, variable in size, those towards the base of the inflorescence-bearing axes 4-5 mm in diameter, bearing 20-30 staminate flowers, grading into those towards the apex of the inflorescence-bearing axes, 2-3 mm in diameter, bearing 5 or fewer pistillate flowers; all bracts 0.5 mm or less, inconspicuous. Staminate flowers 4-merous,

immediately prior to anthesis c. $1 \times 1.5-2$ mm, distinctly apiculate, pubescent; subsessile in bud, pedicellate at anthesis, pedicel 1 mm or less; pubescent. Pistillate flowers c. 1.5×1 mm; perianth tube narrowly ovoid, pubescent; stigma c. 8 mm, caducous; sessile; Fruiting perianth tube c. 2×1 mm, not dorsiventrally compressed or ribbed; achenes c. 1.8×1 mm, light yellow-brown. *Evergreen riverine forests, forest margins, thickets, areas subject to flooding, roadsides.* T (Matuda 3475, A); G (Standley 23719, US); B (Croat 24159, US); H (Barkley et al. 40020, GH); ES (Standley & Steyermark, 1952: 23) N (Neill 2366, MO); CR (Croat 43167, MO); P (Dunlap 370, US). 40-1100 m. (Mesoamerica, Colombia, Venezuela, Ecuador, Peru, Puerto Rico.)

This species is unique in Mesoamerica in having phyllomorphic shoots (which give the plant a fern-like appearance) and in the conspicuously asymmetrical, often cordate leaves with secondary nerves arising below midrib midpoint.

3. *Pouzolzia occidentalis* (Liebm.) Wedd., *Arch. Mus. Hist. Nat.* 9: 410. (1856). *Leucococcus occidentalis* Liebm., *Kongel. Danske Vidensk. Selsk. Skr., Naturvidensk. Math. Afd., ser. 5, 2:* c 311 (1851). Syntype: Nicaragua, Oersted 14258 (C!). Illustr.: See varieties.

Shrubs, 1-3 m, erect or decumbent; stems 3 mm or less indiameter at their apex, sparsely to densely pubescent becoming glabrous, the hairs soft to the touch. Leaves not distichous, lamina 5.5-19 \times 2.5-13 cm, ratio of width to length 1:1.3-2, ovate; subchartaceous or membranous; lateral primary nerves visible for 2/3 of the lamina length, the secondary nerves 2-5 pairs; upper surface glabrous or sparsely pubescent, where pubescent the hairs soft to the touch, appressed; lower surface densely pubescent or glabrous, where pubescent the hairs the never white or entirely obscuring surface, \pm uniform, not matted, soft to the touch, spreading; base broadly cuneate to rounded; margins entire; apex acuminate; stipules 4-10 mm, narrowly triangular, the apex long acuminate; petioles (2-)3-8(-12) cm. Inflorescences unisexual, variable in size, those towards the base of the inflorescence-bearing axes 4-7 mm in diameter bearing 15-30 staminate flowers, grading into those towards the apex of the inflorescence-bearing axes 3-55 mm in diameter bearing 2-10 pistillate flowers; all bracts c. 0.5 mm. Staminate flowers 4-merous, immediately prior to anthesis $1.5-2 \times 2-3$ mm, apiculate or not, sparsely to densely pubescent; subsessile or pedicellate, pedicels 1 mm or less at anthesis. Pistillate flowers c. 1.5×1 mm, perianth tube ovoid, weakly dorsiventrally compressed, not winged, sparsely to densely pubescent; stigma (1.5-)3-5 mm, caducous; sessile. Fruiting perianth tube 1.5-2 (-2.5) mm, frequently winged, with 3-5 shallow or deep longitudina ribs; achenes $1.5-2 \times 1-1.5$ mm, pale yellow brown. Ch, G-N, P. 0-1500 m. (México, Mesoamérica, Colombia, Venezuela, Ecuador, West Indies.)

3a. *Pouzolzia occidentalis* (Liebm.) Wedd. var. **occidentalis**. Illustr.: Burger, *Fieldiana, Bot.* 40: 225, t. 28 (1977).

Margarocarpus ovatus Wedd., *Pouzolzia glabrata* Wedd., *P. ovata* (Wedd.) Wedd.

Leaf lamina (5.5-)10-12(-19) \times (2.5-)4-5.5(-13) cm, ratio of width to length 1:(1.5-)2. Staminate flower buds distinctly apiculate. Fruiting perianth tube $1.8-2(-2.5) \times 1-1.5(-3)$ mm, weakly dorsiventrally compressed, rarely strongly compressed, where strongly compressed indistinct partial lateral wingspresent. *Thickets, swamps, riversides, semi-deciduous forests, moist forests, limestone outcrops, roadsides.* Ch (Breedlove 38138, MO); G (Harmon et al. 3708, F); H (Standley 44651, F); ES (Calderón 859, GH); N (Moreno 10191, BM); P (Dwyer 7516, NY). 0-1500 m. (Mexico [Guerrero, Michoacán, Oaxaca, Sinaloa, Queretaro, Puebla], Mesoamerica, Colombia, Venezuela, Ecuador, Puerto Rico, Trinidad [cultivated?].)

The unusual distribution of this taxon may be due to under-collection.

3b. *Pouzolzia occidentalis* (Liebm.) Wedd. var. **palmeri** (S. Watson) Friis & Wilmot-Dear, *Opera Bot.* 129: 83 (1996). *Pouzolzia palmeri* Watson, *Proc. Amer. Acad. Arts* 22: 453 (1887). Holotype: Mexico, Jalisco, *Palmer* 116 (GH!). Illustr.: Wilmot-Dear & Friis, *Opera Bot.* 129: 81, t. 42 (1996).

Leaf lamina 5-7 cm, ratio of width to length 1:1.3-1.75(-2). Staminate flower buds not or weakly apiculate. Fruiting perianth tube 1.5-2.2 × 1-2 mm, usually strongly dorsiventrally compressed, the lateral wings distinct 0.2-0.4 mm, several-toothed. *Ravines, deciduous forests, rocky outcrops.* 1000-1500 m. (Mexico [Jalisco, Michoacán, Morelos, Querétaro]).

This variety is not known from Mesoamerica but has been collected in Jalisco (*Jones* 37, F) and so may be expected in the Mesoamerican states of Mexico. The species is most similar to *P. guatemalana*, differing in indumentum of the leaf underside and often a winged fruit.

4. *Pouzolzia parasitica* (Forssk.) Schweinf., *Bull. Herb. Boissier* 4 (appendix 2): 145 (1896). *Urtica parasitica* Forssk., *Fl. Aegypt.-Arab.* 160 (1775). Holotype: Yemen, *Forsskål* 770 (C). Illustr.: Burger, *Fieldiana, Bot.* 40: 225, t. 28 (1977), as *P. phenacoides*.

Margarocarpus procridioides Wedd., *P. phenacoides* Killip, *P. procridioides* (Wedd.) Wedd., *P. procridioides* var. *hirsuta* Wedd.

Herbs, subshrubs or shrubs, often scrambling, to 3 m; stems c. 3 mm diameter at their apex, densely pubescent, soon or eventually glabrescent, the hairs soft to the touch. Leaves not distichous, lamina (4-)8-12 × (2-)4-7 cm, ratio of width to length 1:2, ovate or elliptic-ovate, symmetrical; thickly chartaceous (rarely membranous); lateral primary nerves visible for 1/2 or more of the lamina length, the secondary nerves 2(-3) pairs; upper surface glabrescent or sparsely pubescent, the hairs appressed, the cystoliths not densely distributed; lower surface sparsely to densely pubescent, the hairs never entirely obscuring surface, ± uniform, not white or matted, soft to the touch, spreading; base broadly cuneate to rounded or truncate; margins serrate or crenate-serrate, 8-20 teeth on each side, the basal 1/3 entire; apex acute to long acuminate; stipules 5-8(-10) mm, broadly triangular, the apex acute; petioles 0.5-6(-8) cm. Inflorescences unisexual, variable in size, those towards the base of the inflorescence-bearing part of the stem 5-7 mm in diameter, bearing 20-50 staminate flowers, grading into those towards the apex of the inflorescence-bearing axes c. 2 mm in diameter, bearing c. 1-5 pistillate flowers; staminate bracts less than 0.2 mm, inconspicuous. Staminate flowers 4-merous, immediately prior to anthesis (1-)1.5-2 × 2-2.5 mm, not or weakly apiculate, sparsely to densely pubescent; subsessile or pedicellate, pedicels 1 mm or less at anthesis. Pistillate flowers c. 1.5 × 1 mm; perianth tube ovoid, not winged, densely pubescent; stigma (2-)5-6 mm, caducous; sessile. Fruiting perianth tube 1.5-2(-2.5) × c. 1 mm, sometimes weakly dorsiventrally compressed, with 4-8 weak longitudinal ribs; achenes 1.5-2 mm, white to brown. *Forests, thickets, riversides, forested gorges, often in wet places.* G (*Steyermark* 34362, US); N (*Stevens et al.* 16258, MO); CR (*Standley* 34679, US). 1800-2800 m. (Mesoamerica, Colombia, Peru, Bolivia, Africa, Arabia, Yemen.)

Pouzolzia parasitica is unique amongst Mesoamerican species in having toothed leaves.

5. *Pouzolzia pringlei* Greenm., *Proc. Amer. Acad. Arts* 33: 476 (1898). Holotype: Mexico, Oaxaca, *Pringle* 6736 (F!). Illustr.: Wilmot-Dear & Friis, *Opera Bot.* 129: 85, f. 45, H, J (1996).

Shrubs to 3 m; stems pubescent, c. 0.75 mm at their apex, the hairs soft to the touch. Leaves not distichous, lamina 2-4(-5) × 1.2-2.5 cm, ratio of width to length 1:less than 2, ovate to elliptic, symmetrical; subchartaceous, lateral nerves visible more than 1/3 of the lamina length, the secondary nerves 1(-2) pairs; upper surface upper surface sparsely to densely pubescent, the hairs erect rough to the touch; lower surface densely pubescent, the hairs to the touch, entirely obscuring the surface with a white densely matted covering, ± uniform; base broadly cuneate to rounded, occasionally subcordate; apex obtuse or broadly acute; stipules 3 × 1-1.5 mm, narrowly triangular, the apex acute; petiole 0.3-1 cm, or leaves sessile. Inflorescences unisexual or bisexual, c. 3 mm in diameter, bearing -20 flowers, those on basal part of the inflorescence-bearing axis unisexual staminate, those on the apical part unisexual pistillate, those intermediate in position bisexual; all bracts 1 mm or less. Staminate flowers 4-merous, c. 1 × 1 mm immediately prior to anthesis, weakly apiculate in bud, densely pubescent; subsessile. Pistillate flowers c. 1 × 0.3 mm; perianth tube ovoid, tapering abruptly to form a beak, pubescent; stigma c. 3 mm; sessile. Fruiting perianth tube 1.5-2 × 1-1.5 mm, weakly dorsiventrally compressed, with 4 weak or strong longitudinal ribs, never winged; achenes 1.5-2 × 1-1.5 mm, colour unknown. *Ravines and rocky slopes*. 1300-1700 m. (Mexico [Oaxaca, Puebla].)

Although this species has not been recorded within Mesoamerica, it is included here as it occurs in the neighbouring state of Oaxaca (*Pringle 6736*, F). *Pouzolzia pringlei* most closely resembles *P. guatemalana* var. *latifolia*, from which it can be distinguished on leaf size, leaf venation, pubescence and morphology and stipule morphology.

6. *Pouzolzia purpusii* Brandegee, *Univ. Calif. Publ. Bot.* 10: 404 (1924). Holotype: Mexico, Chiapas, *Purpus 9206* (UC!). Illustr.: Wilmot-Dear & Friis, *Opera Bot.* 129: 77, t. 40 (1996).

Shrubs to sub-shrubs (0.6-)1-3 m, much branched or branched only at the base producing several unbranched thick and juicy stems; stems to 1.5 mm diameter at their apex, densely to sparsely pubescent, rarely glabrous, the hairs soft to the touch. Leaves not distichous, lamina 5.5-9(-15) × 3-4(-6) cm, ratio of width to length 1:2-3 (towards the base of the stem), leaf size decreasing regularly towards apex of stem such that apical leaves are 1/4-1/8 the length of basal ones and relatively narrower, lower ones broadly ovate, elliptic or narrowly ovate, chartaceous to subcoriaceous; lateral primary nerves visible more than 1/2 of the lamina length, the secondary nerves 2-3 pairs, the basal pair arising close to midrib midpoint; upper surface sparsely or densely pubescent, the hairs soft to the touch, more or less spreading, cystoliths densely distributed; lower surface (sparsely) or densely pubescent, the hairs never entirely obscuring surface, ± uniform, not matted or white, soft to the touch, spreading; base narrowly to broadly cuneate to rounded, weakly asymmetrical; margins entire; apex short to long acuminate or acute; stipules 2.5-3.5(-5) mm, triangular, the apex long-acuminate; petioles 1-4(-7) cm, reduced apical leaves sessile or subsessile. Inflorescences unisexual, variable in size, those towards the base of the inflorescence-bearing axes 5-7 mm in diameter, bearing c. 3-20(-40) staminate flowers, grading into those towards the apex of the inflorescence-bearing axes, 3-4 mm in diameter, bearing c. 2-5 pistillate flowers; staminate bracts 1 mm or less, conspicuous. Staminate flowers 4-merous, immediately prior to anthesis c. 1 × 1.2 mm, not or weakly apiculate, densely, rarely sparsely, pubescent; sessile at anthesis. Pistillate flowers 1.5-2 × c. 2 mm; perianth tube strongly dorsiventrally compressed ovoid, with winged margin, the wing leaf-like, as broad as the ovary, subentire or irregularly toothed terminating in a pair of conspicuous teeth, pubescent; stigma (3-)5-7 mm, persistent; sessile. Fruiting perianth tube 2.5-3.5 × 2-3.5 mm, winged, the wings as wide as the achene, with 2 or 3 shallow to deep ribs; achenes c. 2 × 1 mm, yellow-brown. *Seasonal evergreen forests, deciduous forests, Quercus-Pinus forests, riversides, ravines and thickets*. CH (*Breedlove 19863*, MO). 700-1300 m. (Endémica.)

This species is most similar to *Pouzolzia occidentalis* var. *palmeri*, from which it can be distinguished by fruiting perianth wing morphology and leaf texture. Two collections, *Breedlove 10652* (F) and *Laughlin 1614* (MO) appear intermediate with *P. occidentalis*.

7. *Pouzolzia zeylanica* (L.) Benn. & R. Br., *Pl. Jav. Rar.*: 67 (1838). *Parietaria zeylanica* L., *Sp. Pl.*: 1052 (1753). Lectotype (designated by Wadhwa, 1999): Sri Lanka, Herb. Hermann 3: 5, no. 371 (BM). Illustr: Wedd., *Archiv. Mus. Hist. Nat.* 9: t. 13 B, t. 7-16 (1857).

Weak-stemmed herbs to erect or prostrate shrubs, 30 cm or shorter; stems 0.75 mm or less in diameter at their apex, sparsely or densely pubescent, the hairs soft to the touch. Leaves not distichous, alternate on apical part of the plant, frequently some opposite towards the base of the plant, (1-)3-5 × 0.6-2.5 cm, ratio of width to length 1:(1.5-)2-4, leaf size decreasing towards the apical part of the plant, ovate, elliptic-ovate, ovate-lanceolate or linear-lanceolate, ± symmetrical; membranous to subchartaceous; lateral primary nerves visible more than 1/3 of the lamina length; secondary nerves 1 pair; upper surface pubescent, the hairs appressed, rarely glabrous; lower surface densely pubescent, the hairs never entirely obscuring surface, ± uniform, not matted or white, soft to the touch, spreading; base broadly cuneate to rounded (to cordate); margins entire; apex acute, acuminate or rounded (in smaller leaves); stipules 1-5(-8) mm, triangular-ovate to narrowly triangular, the apex acute; petioles to 2 cm. Inflorescences bisexual, 5-7 mm in diameter, bearing few 10 flowers, bracts inconspicuous. Staminate flowers 4-merous, 0.5-1 × c. 1 mm immediately prior to anthesis, minutely apiculate; sessile, rarely pedicellate, where pedicellate, the pedicels c. 1(-3) mm. Pistillate flowers sessile, 0.8-1 × 0.25-0.50 mm, perianth tube ovoid, with 3-4 longitudinal ribs; stigma 1.3 mm or less, caducous; sessile. Fruiting perianth tube 1.5-2 × c. 1 mm, weakly dorsiventrally compressed ovoid tapering abruptly to form a beak, with c. 10 narrow longitudinal ribs, 1 or 2 pairs of wings often present, wings 1 mm or less wide; achenes 1-1.3 × 0.6-0.8 mm, black. *Ruderal*. ES (*Rohweder 3615*, MO). c. 400 m. (Native to Asia, Malesia, Australia; introduced to El Salvador.)

Comment [a7]: ribbed?

This species is distinguished by its combination of lax semi-prostrate habit, small strongly asymmetrical non-distichously arranged leaves with one pair of upper veins, very small flowers (usually winged) and large winged fruit.

11. *Rousselia* Gaudich.

By A.K. Monro.

Herbs, annual or perennial. Stems without stinging hairs, not releasing a watery latex when cut? Leaves alternate, entire; cystoliths punctiform; stipules borne on either side of the petiole, simple, persistent. Inflorescences unisexual, axillary, few flowered, surrounded by a pair of prominent bracts. Staminate inflorescences cymose. Staminate flowers 4-merous; pedicel with an adjacent bract at its base. Pistillate inflorescence a truncated 2-flowered cyme, enveloped by a pair of prominent bracts at its base; peduncle/ pedicels fused and swollen to form a vertical receptacle, this bearing the flowers horizontally in opposing directions. Pistillate flowers with the tepals fused to form a perianth tube, tubular, contracted and dentate at the apex; stigma filiform or penicillate. Fruits enveloped by persistent bracts; achene compressed, broad ovoid to sub-elliptic. 3 or 4 spp. Neotropics,

This is a rarely collected genus that is distributed in southern North America, Mesoamerica, northern South America and the Greater Antilles.

Weddell, H.A. *Rousselia*. *Arch. Mus. Hist. Nat.* 9: 527-528 (1857).

1. Plant erect, the stems unbranched or branched, where branched with fewer than 5 branches per stem.

R. erratica

1. Plant repent, the stems never unbranched, with more than 5 branches per stem.

R. humilis

1. *Rousselia erratica* Standl. & Steyerl., *Ceiba* 3: 43 (1952). Holotype: Nicaragua, *Standley 11263*

(F). Illustr. not known. N.v.: not known.

Monoecious annuals, to 20 cm. Stems erect, pubescent, the hairs 0.25-0.50 mm, weakly appressed, weakly curved. Leaf lamina 8-55 × 4-18 mm, asymmetrically narrow ovate, upper surface pubescent, the hairs 1.50-1.75 mm, appressed, weakly curved or crooked, the cystoliths punctiform, densely scattered; lower surface pubescent, the hairs 0.75-1 mm, erect, weakly curved or crooked, occasionally broad based; cystoliths absent; base asymmetrically obtuse/acute; apex acuminate; petioles 1-8 × 0.375-0.50 mm, pubescent as leaves; stipules 15-25 mm, pubescent as leaves. Staminate inflorescences bearing 1-3 flowers, the flowers 0.75 × 0.75 mm; pedicels 1-1.25 mm, bract 0.675, linear. Pistillate inflorescence with the bracts 1.5-2.5 × 1.3-1.5 mm; stigma filiform. Infructescence as inflorescence, the bracts c. 5 × 5 mm; achenes c. 2 × 1.75 mm. *Gallery forests*. N (*Standley 11582*, US). c. 100 m. (Mesoamerica, Colombia.)

2. *Rousselia humilis* (Sw.) Urb., *Symb. Antill.* 4(2): 205 (1905). *Urtica humilis* Sw. *Kongl. Vetensk. Acad. Nya Handl.* 6: 34 (1785). Illustr. not known. Holotype: Jamaica, *Swartz s.n.* (S). Illustr. not known.

Rousselia lappulacea (Sw.) Gaudich., *Urtica lappulacea* Sw.

Monoecious perennials, annuals?, spreading to 30 cm. Stems repent, pubescent, the hairs 0.125-0.250 mm, erect, crooked. Leaf lamina 4-28 × 4-20 mm, broad ovate, almost cordiform; upper surface pubescent, the hairs 0.75-1 mm, appressed, curved; the cystoliths punctiform, densely scattered; lower surface sparsely pubescent on the primary veins, the hairs 0.50-0.675 mm, appressed, curved; the cystoliths punctiform, densely scattered; base decurrent or hastate; apex obtuse; petioles 3-12 × 0.375-0.50 mm, pubescent as stem; stipules 1-1.25 mm, pubescent as stem. Staminate inflorescences bearing c. 3 flowers, c. 0.75 × 1 mm, the bract 0.75 mm, ovate. Pistillate inflorescences with the bracts c. c. 3 × 2.5 mm; stigma penicillate. Infructescence as inflorescence, the bracts 2-3 × 2.5-3 mm. Achenes c. 1.75 × 1.5 mm. *Rocky areas such as ruins, stone walls or dried dry river beds*. Y (*Gaumer 844*, BM); C (*Standley & Steyerl.*, 1952: 424); B (*Standley & Steyerl.*, 1952: 424); G (*Standley & Steyerl.*, 1952: 424). 0-100 m. (Mesoamerica, Greater Antilles [Jamaica, Haiti, Dominican Republic, Puerto Rico].)

12. *Urera* Gaudich.

By A.K. Monro.

Shrubs, trees or lianas, perennial. Stems with or without stinging hairs, occasionally releasing watery latex when cut. Leaves alternate, simple, 3-5 veined from the base, the margins toothed, entire or lobed; cystoliths present on both surfaces; stipules borne in the axils of the leaves, fused for their entirety (appearing as a single stipule) or free at their apex (appearing forked). Inflorescences unisexual, paniculate; pedicels subtended by inconspicuous bracteoles. Staminate flowers 4 or 5-merous; tepals equal. Pistillate flowers with the tepals 4, unequal, the adaxial tepal with a subapical thickening; stigma penicillate. Fruits with persistent tepals, frequently inflated and fleshy, bright orange, pink

or red in colour, forming a fruit-like assemblage; achene compressed, asymmetrically ellipsoid or ovoid. 35-75 spp. Neotropics, Africa and Asia.

Two classes of hair are present in *Urera*, 'bulbed' hairs similar to the urticating hairs of *Urtica*, where the base is inflated and 'non-bulbed' hairs where the base is not inflated.

Bibliography: Monro, A.K. *Ann. Missouri Bot. Gard.* xx: xx-xx (2009); Weddell, H.A. *Arch. Mus. Hist. Nat.* 9: 143-162 (1856).

1. Leaves lobed; stem releasing white latex when cut.

7. U. laciniata

1. Leaves not lobed; stem never releasing white latex; stigma penicillate or linear, recurved or erect.

2. Stem and leaves with spines; leaves coarsely dentate, the teeth spaced every c. 0.5-1 cm; achenes 2-3.2 mm; tepals covering the basal 1/4 or less of achene prior to the inflation of tepals.

1. U. baccifera

2. Stem and leaves lacking spines; leaves dentate, crenate or entire, when toothed the teeth spaced less than 0.5 cm apart; achenes 0.8-2 mm; tepals covering 3/4 or more of the achene prior to the inflation of the tepals.

3. Upper surface of leaves sparsely pubescent or glabrous.

4. Leaf margins shallowly crenate, crenate-serrate, sinuate or entire; hairs never urticating.

5. Shrub or small tree; leaf-bearing section of stem never hollow.

6. Ratio of leaf length to width less than 4:1; lower leaf surface without domatia in the axils of the secondary veins; mature fleshy fruiting perianth pink, orange to orange-red.

4. U. glabriuscula

6. Ratio of leaf length to width greater than 4:1; lower leaf surface with domatia in the axils of the secondary veins; mature fleshy fruiting perianth red.

5. U. guanacastensis

5. Shrub, lax shrub or vine; leaf-bearing section of stem hollow at ca.

5-10 mm in diameter.

7. Young shoots pubescent to densely pubescent, the hairs 0.3-1 mm; leaf blades narrowly ovate, elliptic, obovate, oblanceolate; staminate flowers 1.3 × 1.3 mm immediately prior to anthesis.

8. U. lianoides

7. Young shoots sparsely pubescent or glabrous, the hairs when present 0.13-0.3 mm; leaf blades narrowly ovate, elliptic, obovate,

oblanceolate; staminate flowers c. 2 × 2.5 mm immediately prior to anthesis.

3. U. fenestrata

4. Leaf margins prominently serrate, crenate or dentate; hairs urticating or not urticating.

8. Young stem glabrous or sparsely pubescent, the hairs less than or equal to 0.3 mm; stem coarsely sulcate, frequently fenestrate; stems, leaves and petioles lacking bulbous hairs; staminate inflorescence to 110 mm; mature fleshy fruiting perianth red-pink.

3. U. fenestrata

8. Young stem sparsely to densely pubescent, the hairs greater than 0.5 mm; stem coarsely sulcate but never fenestrate; stems, leaves and petioles with or without bulbous hairs; staminate inflorescence to 80 mm; mature fleshy fruiting perianth orange to orange-pink.

9. Tertiary venation of lower leaf surface cream to pale green, noticeably paler than lamina; stipules forked or not forked; stem sparsely pubescent.

6. U. killipiana

9. Tertiary venation of lower leaf surface darker or rarely paler than the lamina, where paler than the lamina pale brown to orange-brown in colour; stipules not forked; stem densely pubescent.

10. Leaves ovate or cordiform, never obovate or lanceolate; hairs strongly urticating.

2. U. caracasana

10. Leaves obovate, lanceolate, elliptic or ovate, never cordiform; hairs strongly urticating or not. **9. U. simplex**

3. Upper surface of leaves pubescent to densely pubescent.

11. Leaves bullate; where leaf-bearing stems greater than or equal to 15 mm diameter irregularly circular to sub-lobed in cross-section; staminate flowers (4- or)5-merous; staminate inflorescence 50-210 mm; pistillate inflorescence 25-230 mm.

10. U. verrucosa

11. Leaves rarely bullate; where leaf-bearing stems greater than or equal to 15 mm 4 or 5 lobed to sub-lobed and sulcate in cross-section; staminate flowers 4-merous; staminate inflorescence 10-70 mm; pistillate inflorescence 10-84 mm.

12. Leaves ovate or cordiform, never obovate or lanceolate; hairs strongly urticating.

2. U. caracasana

Comment [A8]: the species here have individuals with or without urticating hairs. For obvious reasons the presence of urticating hairs is often recorded on labels. Given that somebody using the key will have only the presence of these hairs noted I am not sure that including the frequency of urticaceous individuals within these species will be of any help when using the key.

12. Leaves obovate, lanceolate, elliptic or ovate, never cordiform; hairs strongly urticating or non-urticating. **9. U. simplex**

1. *Urera baccifera* (L.) Gaudich. ex Wedd., *Ann. Sci. Nat., Bot., sér. 3*, 18: 199 (1852). *Urtica baccifera* L., *Sp. Pl., ed. 2*, 2: 1398 (1763). Lectotype (designated by de Rooij, 1975): Plumier, *Pl. amer.*: tab. 260 (1760). Ilustr.: Burger, *Fieldiana Bot.* 40: 227, t. 30 (1977). N.v.: Chichicaste, G, H, N; chichicaste cuyanigua, ES; chichicaste nigra, ES; chichicaste nigua, ES; cow itch, B; ortiga, CR, P; ñenge gua'yami, P; nigua, ES; niguilla, ES; rascate bien, H; ortiga de los Caballos, Y.

Urtica grandidentata Liebm.

Herbs, shrubs or rarely trees, 1.5-5 m. Young shoots pubescent to densely pubescent, two or three (where bulbed hairs present) classes of hair present; bulbed hairs 2-4 mm, erect, straight, weakly curved, becoming spines with age; larger non-bulbed hairs 0.8-1 mm, erect, weakly appressed, straight, weakly curved or curved; smaller non-bulbed hairs 0.3-0.5 mm, erect, weakly appressed, straight, weakly curved or curved; internodes 20-42 × 5-27 mm, red-brown, grey-brown, brown or pale brown, hollow at c. 10 mm diameter, with a dark stain on the cut portion of the stem in dry material. Leaf lamina 90-380 × 65-250 mm, ovate, broadly ovate, elliptic, obovate or rhombic, 3-veined from the base, the lateral nerves visible for less than 1/2 the leaf length, the tertiary to quaternary nerves visible to naked eye; domatia not present in the axils of the secondary nerves beneath; upper surface sparsely pubescent, rarely glabrous, the bulbed hairs frequent, 1.8-2 mm, appressed, occasionally erect, weakly curved or occasionally straight, the larger non-bulbed hairs 0.5-0.8 mm, appressed, weakly appressed, erect, straight or weakly curved, broad based, the smaller non-bulbed hairs 0.3-0.5 mm, appressed, weakly appressed or erect, straight, the cystoliths punctiform and oblong, aligned radially around hair bases and perpendicular to nerves; lower surface pubescent, the bulbed hairs frequent, (0.5-)-2-3 mm, appressed, weakly appressed, erect, weakly curved or straight, the larger non-bulbed hairs 0.5-1.3 mm, weakly appressed or erect, straight, weakly curved or crooked, the smaller smaller hairs 0.13-0.3 mm, erect, straight or weakly curved, the cystoliths oblong, occasionally punctiform, parallel to nerves; base cordate; margins coarsely dentate, occasionally minutely and sparsely dentate; apex cuspidate to subcuspidate; stipules 9-15 mm, lanceolate, occasionally deltate; petioles 55-160 × 0.8-4.5 mm, densely to sparsely pubescent, the hairs 0.13-0.8 mm. Peduncular bracts 2-8 mm; bracteoles 0.3-0.5 mm. Staminate inflorescences 1-2 per stem, 25-70 mm, bearing 69-260 flowers, panicle with (2-)-3 orders of dichotomous branching, asymmetrical or symmetrical; peduncle 2.5-4 mm, pubescent, with one or two (where bulbed hairs present) classes of hair, the bulbed hairs 1-1.3 mm; non-bulbed hairs 0.3 mm; flowers 1.5-2.5 × 1.5-2 mm immediately prior to anthesis, in clusters of 3 or 4, pedicellate, the tepals 5, 2.8-3 mm; stamens 4-5 mm; pistillode 0.5-0.8 mm in diameter; pedicels 0.5-0.8 × 0.5 mm. Pistillate inflorescences 2-9 per stem, 12-70 mm, longer than broad to broader than long, bearing 30-480 flowers, panicle with (3-)-4 orders of dichotomous (rarely trichotomous) branching, asymmetrical; peduncle 2-19 mm, densely to sparsely pubescent, with one or two (where bulbed hairs present) classes of hairs, the bulbed hairs 1-1.3 mm, the non-bulbed hairs 0.13-0.30 mm, erect, weakly curved or straight; flowers 1-1.5 × 0.4-0.80 mm, in clusters of 3 or 5, dark red or green when fresh, pedicellate; lateral tepals 0.5-0.8 mm; adaxial tepals 0.5 mm, adaxially thickened; abaxial tepals 0.4-0.5 mm; pedicels 0.5-1 × 0.4-0.8 mm, pubescent, the hairs 0.13-0.30 mm. Infructescence 35-100 mm; fruiting perianth prior to inflation of tepals 2.5-4.3 × 2.5-3.3 mm, the basal 1/3 of achene obscured by tepals; the lateral tepals 1.5-2.3 mm, the adaxial tepals 1.3-2.3 mm, the abaxial tepals 0.8-1.3 mm; once tepals inflated fruiting perianth 2.5-4 mm, berry-like, white; achenes 3.3-4 × 2.5-3.5 mm, compressed, asymmetrically ovoid, the surface verrucate. *Evergreen or seasonal forests, riparian vegetation.* Y (Gaumer 936, MO);

B (*Whitefoord 1613*, BM); G (*Harmon y Fuentes 4728*, MO); ES (*Monro et al. 3685*, LAGU); N (*Sandino 570*, MO); CR (*Burger et al. 10563*, MO); P (*Burger 4161*, PMA). 0-1400 m. (México [Nayarit, Oaxaca, Sonora, Veracruz], Mesoamerica, Colombia, Venezuela, Surinam, French Guiana, Ecuador, Perú, Bolivia, Brasil, Paraguay, Argentina, Greater Antilles, Leeward Islands.)

2. *Urera caracasana* (Jacq.) Griseb., *Fl. Brit. W. I.* 154. 1859. *Urtica caracasana* Jacq., *Pl. Hort. Schoenbr.* 3: 71 (1798). Type: Jacquin, *Pl. Hort. Schoenbr.* 3: t. 386 (1798). Illustr.: Jacquin, *Pl. Hort. Schoenbr.* 3: t. 386 (1798). N.v.: Chichicaste, ES, H, N; chichicaste blanco picante, ES; chichicaste cujanigua de altura, ES; chichicaste liso, H; chichicaste rojo picapica, ES; cow itch, B; pan caliente, ES; migirillo, CR; miguito, CR; ortiga, CR.

Urera alceifolia (Poir.) Gaudich., *U. capitata* Wedd., *U. corallina* (Liebm.) Wedd., *U. jacquinii* Wedd., *U. jacquinii* var. *ulmifolia* (Kunth) Wedd., *Urtica alceifolia* Poir., *U. corallina* Liebm., *U. tiliaefolia* Kunth, *U. ulmifolia* Kunth.

Shrubs, trees, occasionally vines, 2-12 m. Young shoots densely pubescent, non-bulbed hairs 0.5-2 mm, erect, weakly appressed, curved to weakly curved, occasionally straight; internodes 20-105 × 3-10 mm, red-brown, green-brown or grey-brown, hollow at c. 5 mm diameter, frequently with a dark stain on the cut portion of the stem in dry material. Leaf lamina 51-645 × 47-300 mm, ovate or cordiform, 3-veined from the base, the lateral nerves visible for 1/3-1/2(-2/3) of the leaf length, the secondary nerves frequently with domatia (flap-like or tufts of hairs) in their axils beneath, the quarternary to hexternary nerves visible to the naked eye; upper surface pubescent, densely pubescent or glabrous, where pubescent two (where bulbed or broad-based hairs present) classes of hair present, the bulbed hairs 0.8-2 mm, appressed, straight or weakly curved, the broad-based hairs 0.5-1.5 mm, appressed to weakly appressed, occasionally erect, weakly curved to curved, occasionally crooked, the non-bulbed hairs 0.8-2 mm, appressed, curved, weakly curved or crooked, the cystoliths fusiform, punctiform, oblong, not inflated, randomly scattered and aligned radially around hair bases; lower surface pubescent, occasionally densely or sparsely so, two (where bulbed hairs present) classes of hair present, the bulbed hairs 1-1.3 mm, appressed or weakly appressed, straight, occasionally weakly curved, the non bulbed hairs 0.3-1.5 mm, erect, occasionally weakly appressed, weakly curved to curved, occasionally crooked or straight, the cystoliths fusiform, oblong or punctiform, not inflated, randomly scattered and or parallel to nerves; base cordate, occasionally obtuse or hastate; margins serrate, serrate-dentate or crenate-serrate to dentate; apex subcuspidate, asymmetrically subcuspidate-obtuse or acute; stipules 4.5-16 mm, lanceolate, not forked, pubescent; petioles 28-275 × 1-3 mm, pubescent with two (where bulbed hairs present) classes of hair, the bulbed hairs 1.3-1.5 mm, the non-bulbed hairs 0.3-1.8 mm. Peduncular bracts 2-5 mm; bracteoles 0.3-1 mm, occasionally staminate and pistillate inflorescences on the same stem. Staminate inflorescences 1-15 per stem, 14-70 mm, bearing 60-864 flowers, panicle with 3-7 orders of dichotomous branching, symmetrical or weakly asymmetrical; peduncle 2-13 mm, pubescent, the hairs 0.3-0.5 mm; flowers 1-1.8 × 1.8-2.3 mm immediately prior to anthesis in clusters of 8-27, pedicellate, the tepals 4, 1.8-2.8 mm; stamens 2.5-3 mm; pistillode 0.5-0.8 mm in diameter; pedicels 0.5-2.5 × 0.13-0.4 mm. Pistillate inflorescences 1-14 per stem, 10-84 mm, broader than long, bearing 384-2300 flowers, panicle with 5-8 orders of dichotomous branching, symmetrical; peduncle 2-20 mm, pubescent, one or two (where bulbed hairs present) classes of hair, the bulbed hairs 0.8-1 mm, appressed or straight, straight, the non bulbed hairs 0.3-1, erect, straight; flowers 0.5-1 × 0.4-0.7 mm, in clusters of 3 or occasionally 4, white, pedicellate; lateral tepals 0.5-0.8 mm; adaxial tepals 0.4-0.7 mm, adaxially thickened; abaxial tepals 0.3-0.5 mm; pedicels 0.3-1.5 × 0.13-0.4 mm, sparsely pubescent or glabrous, where pubescent the non-bulbed hairs 0.13-0.30 mm. Infructescence 12-84 mm; fruiting perianth prior to

inflation of tepals 1.285-1.8 × 1-1.5 mm; basal 4/8-7/8 of achene obscured by tepals, the lateral tepals 1-1.5, the adaxial tepals 0.5-1.3 mm, the abaxial tepals 0.5-1 mm; once tepals inflated fruiting perianth 2-3.75 × 1-3 mm, berry-like, orange or pink when fresh; achenes 1-1.5 × 0.8-1 mm, asymmetrically ellipsoid, keeled, the surface smooth, occasionally verrucate. *Cloud forests, shade coffee farm forests, Pinus forests, Quercus-Liquidamber-Pinus forests.* Ch (Méndez T. 4512, MEXU); B (Lundell 6475, NY); G (Dunn et al. 23234, MO); H (Nelson y Romero 4735, MO); ES (Montalvo 3850, MO); N (Stevens y Krukoff 9284, MO); CR (Croat 36151, MO); P (Allen 911, MO). 0-1700 m. (Mexico [Veracruz], Mesoamerica, Colombia, Venezuela, Ecuador, Peru, Bolivia.)

Jacquin's original description is based solely on staminate material. Original material for the name has not been located at BM, LINN or W. Based on the type illustration it is not possible to distinguish between *Urera caracasana* and *U. corallina* (Liebm.) Wedd. on sterile characters. Material examined that had been determined as *U. corallina* (including the holotype) by Weddell and *U. caracasana* (Jacq.) Griseb. yielded no significant differences (in the context of all of the material examined for this treatment). A more detailed study may result in *U. corallina* being resurrected as a distinct species.

3. *Urera fenestrata* A.K. Monro, *Ann. Missouri Bot. Gard.* xx: xx (2009). Holotype: Costa Rica, *Burger y Gentry 8639* (F!). Illustr.: Monro, *Ann. Missouri Bot. Gard.* xx: xx, t. (2009)

Shrubs, lax shrubs or trees, 4-8 m. Young shoots glabrous or pubescent, where pubescent the non-bulbed hairs 0.13-0.30 mm, erect, straight to weakly curved; internodes 9-30 × 4-8 mm, pale brown, red-brown, sulcate, fenestrated, hollow at c. 5 mm, lacking a dark stain on the cut portion of the stem. Leaf lamina 103-186 × 64-160 mm, ovate, broad ovate, broad elliptic; upper surface sparsely pubescent or glabrous, where pubescent the non-bulbed hairs 0.4-0.7 mm, weakly appressed, weakly curved, crooked; the cystoliths punctiform, oblong, radially arranged; lower surface sparsely to pubescent, non-bulbed hairs 0.3-0.5 mm, appressed, weakly curved; the cystoliths oblong, parallel to nerves; quaternary to hexternary nerves visible to the naked eye, primary venation 3-veined, the lateral nerves visible for 2/3 of the leaf length, domatia not present in the axils of the secondary nerves; base cordate or obtuse; margins entire or weakly crenate-serrate; apex subcuspidate to cuspidate; stipules c. 9 mm, lanceolate, not forked, pubescent; petioles 52-193 × 1.5-1.8 mm, glabrous or sparsely pubescent, where pubescent the non-bulbed hairs 0.3-0.5 mm. Peduncular bracts 2-3 mm; bracteoles 0.4-0.5 mm. Staminate inflorescences 1-16 per stem, 30-75 mm, bearing 160-350 flowers in a symmetrical panicle with 3 or 4 orders of dichotomously branching; peduncle 2-21 mm, pubescent, the non-bulbed hairs 0.13 mm; flowers borne in clusters of 10-14, pedicellate to subsessile, pedicels 0.5 × 0.13 mm; flowers 2-2.5 × 1.3-1.5 mm immediately prior to anthesis, the tepals 4, c. 3 mm; stamens 2.5-3 mm; pistillode 0.5 mm in diameter. Pistillate inflorescences 1-4 per stem, 19-35 mm, broader than long (or as long), bearing 224-448 flowers in a symmetrical panicle with 5 orders of dichotomous branching; peduncle branched to base or unbranched at base for 2-26 mm, pubescent, non-bulbed hairs 0.13 mm, erect, straight; flowers borne in clusters of 3 or 4, pedicellate, pedicels subsessile to 0.3 × 0.13 mm, glabrous; flowers 1 × 0.5 mm, lateral tepals 0.5-0.7 mm; adaxial tepals 0.5-0.7 mm, adaxially thickened; abaxial tepals 0.4 mm. Infructescence 47-56 mm; fruiting perianth prior to inflation of tepals 1.3 × 1 mm; basal 3/4 of achene obscured by tepals, the lateral tepals 1, the adaxial tepals 0.7-0.8 mm, the abaxial tepals 0.5 mm; once tepals inflated fruiting perianth 1.5 × 1 mm, berry-like, red, orange or pink when fresh; achenes c. 0.8 × 0.8 mm, asymmetrically ellipsoid, keeled, surface smooth. *Cloud forests.* CR (*Burger y Gentry 8639*, F); P (*Kirkbride y Duke 770*, NY). 1400-1800 m. (Endemica.)

Material of *Urera fenestrata* is most frequently determined as *U. elata* (Sw.) Griseb. or *U. caracasana*. *Urera fenestrata* may be distinguished from *U. elata* by the absence of small spines on the petioles and young stems, in addition *U. elata* is only known from the West Indies and Mexico (Oaxaca). *Urera fenestrata* may be distinguished from *U. caracasana* by the presence of lateral basal nerves visible for 1/2 or more of the leaf length and by the presence of 4-merous staminate flowers.

4. *Urera glabriuscula* V.W. Steinm., *Acta Bot. Mex.* 71: 22 (2005). Holotype: Mexico, Veracruz, *Cedillo T. 3175* (IEB). Illustr.: not known. N.v.: Berenjenilla, coyallillo, hueva de cangrejo, huevo de peje, palo verde, Veracruz (Mexico); huevo de cangrejo, palo de agua, panza de toro, T; yashanal zulsinte, Ch.

Trees or shrubs, 1-10 m. Young shoots pubescent or glabrous, where pubescent the non-bulbed hairs 0.3-0.5 mm, appressed, weakly curved; internodes 11-16 × 1.5-8 mm, dark green, tan, olive-green, pale yellow-grey, not hollow at c. 5 mm, without a dark stain on the cut portion of the stem. Leaf lamina 40-220 × 16-80 mm, narrowly ovate, lanceolate, elliptic, occasionally ovate or oblong-elliptic, occasionally bullate; upper surface sparsely pubescent or glabrous, where pubescent the non-bulbed hairs 0.4-0.7 mm, appressed, weakly curved; the cystoliths punctiform to oblong, inflated, randomly scattered; lower surface sparsely pubescent or glabrous, where pubescent the non-bulbed hairs 0.3-0.5 mm, appressed, weakly curved; the cystoliths punctiform, oblong or fusiform, inflated, parallel to nerves or randomly scattered; secondary to quarternary nerves visible to the naked eye, primary venation 3-veined, the lateral nerves visible for 2/3-3/4 of the leaf length, domatia not present in the axils of the secondary nerves; base obtuse, occasionally cordate or acute; margins entire, minutely and sparsely dentate, minutely and sparsely serrate, or irregularly crenate; apex acuminate, caudate, occasionally attenuate or cuspidate; stipules 4-12 mm, narrowly ovate or lanceolate, apex minutely forked, pubescent; petioles 16-76 × 0.8-1.5 mm, glabrous or sparsely pubescent, where pubescent, the non-bulbed hairs 0.30-0.7 mm, appressed, straight or weakly curved. Peduncular bracts 1-1.8 mm; bracteoles 0.4-0.5 mm. Staminate inflorescences 6-39 per stem, 7-20 mm, bearing 84-168 flowers in an asymmetrical panicle with 4 orders of dichotomous branching peduncle 1-8 mm, pubescent, the non-bulbed hairs 0.13-0.30 mm; flowers borne in clusters of 6-7, flowers pedicellate, pedicels 0.4-1.5 mm × 0.13 mm; flowers 0.8-1 × 1.3-1.5 mm immediately prior to anthesis; tepals 4, 1-1.8 mm; stamens 2 mm; pistillode 0.8 mm in diameter. Pistillate inflorescences 7-27 per stem, 15-40 mm, broader than long, bearing 96-512 flowers in an symmetrical panicle, with 4-6 orders of dichotomous branching peduncle 2-17 mm, glabrous or pubescent, where pubescent the non-bulbed hairs 0.13 mm, weakly appressed, straight; flowers borne in clusters of 3 or 4, sessile to pedicellate, where pedicellate the pedicels 0.3 × 0.3 mm, glabrous; flowers 0.8 × 0.5 mm, whitish; lateral tepals 0.4 mm; adaxial tepals 0.13 mm, adaxially thickened; abaxial tepals 0.13 mm. Infructescence 15-40 mm; fruiting perianth prior to inflation of tepals not seen; once tepals inflated fruiting perianth 1.3-1.8 × 1-1.5 mm, berry-like, orange, pink, red or orange-red when fresh, the basal 1/2 of achene obscured by tepals; achenes c. 1 × 0.8-1.3 mm, asymmetrically ellipsoid or ovoid, keeled, surface verrucate. *Montane forests, deciduous forests, evergreen forests, Liquidambar-Taxodium forests.* T (*Ventura A. 20686*, MEXU); Ch (*Breedlove 23388*, MO). 100-2400 m. (Mexico [Veracruz], Mesoamerica.)

5. *Urera guanacastensis* A.K. Monro, *Ann. Missouri Bot. Gard.* xx: xx (2009). Holotype: Costa Rica, *Delgado 24* (CR!). Illustr.: Monro, *Ann. Missouri Bot. Gard.* xx: xx, t.xx (2009).

Shrubs to 4 m. Young shoots glabrous; internodes 3-7 × 2 mm, pale grey-brown, not hollow at 2 mm diameter, lacking a dark stain on the cut portion of the stem. Leaf lamina 55-137 × 8-38 mm, narrowly lanceolate, chartaceous;

upper surface very sparsely pubescent to glabrous, where pubescent the non-bulbed hairs most frequent towards the leaf base, non-bulbed hairs 0.4-0.5 mm, weakly appressed, straight; the cystoliths punctiform, inflated, densely scattered; lower surface glabrous; the cystoliths punctiform to oblong, inflated, scattered and parallel to nerves; tertiary, occasionally quaternary nerves visible to the naked eye, primary venation 3-veined, the lateral nerves finer than the midrib and visible for 1/3 of the leaf length, domatia not present in the axils of the secondary nerves; base obtuse; margins minutely and sparsely asymmetrically crenate; apex pungent to subacuminate; stipules 7-10 mm, narrowly lanceolate, apex not forked, sparsely pubescent; petioles 6-33 × 0.5 mm, glabrous to sparsely pubescent towards the leaf base, the non-bulbed hairs 0.30-0.4 mm, strongly appressed, straight. Peduncular bracts 1-2 mm; bracteoles 0.3-0.5 mm. Staminate inflorescences c. 15 per stem, c. 20 mm, bearing c. 110 flowers in a weakly asymmetrical to symmetrical panicle with 4 or 5 orders of dichotomous branching; peduncle 6-9 mm, pubescent, the non-bulbed hairs 0.3 mm; flowers borne in clusters of 5-7, flowers subsessile, 1-1.3 × 1.5-1.8 mm immediately prior to anthesis; tepals 4, 2 mm; stamens and pistillode not seen. Pistillate inflorescences not seen. Infructescences 23-30 mm; fruiting perianth prior to inflation of tepals 0.8-1 × 1.8-2 mm, achene obscured by tepals, the lateral tepals 1.8 mm, the adaxial tepals c. 1 mm, the abaxial tepals 0.7 mm; once tepals inflated fruiting perianth 1-1.3 × c. 2 mm, berry-like, red; achenes 1-1.4 × 0.8-1.3 mm, ellipsoid, surface smooth. *Disturbed and undisturbed forests*. CR (*Gamboa 45*, MO). c. 1100 m. (Endemica.)

This species is known only from **Guanacaste** in Costa Rica.

Comment [SK9]: Is it only known from the Guanacaste Conservation Area? If so it would be good to say so.

6. *Urera killipiana* Standl. et Steyerl., *Fieldiana, Bot.* 24(3): 427 (1952). Holotype: Guatemala, *Skutch 982* (F!). Illustr.: not known. N.v.: Chichicaste, G; Chichicaste común, G; la-té, G; Nigüita, G.

Shrubs or lianas, 2-4 m. Young shoots sparsely pubescent, one or two (where bulbed hairs present) classes of hair, bulbed (stinging) hairs, 0.7-1 mm, appressed, curved; non-bulbed hairs 0.3-0.8 mm, appressed to weakly appressed or erect, weakly curved; internodes 14-30 × 2.5-7 mm, pale tan, yellow-brown, green-brown, hollow at c. 6 mm, occasionally with a dark stain on the cut portion of the stem. Leaf lamina 75-216 × 30-122 mm, oblanceolate, obovate, rhombic, oblong, ovate-elliptic, lanceolate, longer than broad; upper surface sparsely pubescent or glabrous, one or two (where non-bulbed hairs present) classes of hair; bulbed hairs 0.7-1 mm, appressed, straight; non-bulbed hairs 0.5-1 mm, appressed, straight; the cystoliths punctiform, occasionally oblong, inflated, randomly scattered; lower surface pubescent or glabrous, where pubescent with one or two (where bulbed hairs present) classes of hairs, bulbed hairs 0.7-1.30 mm, erect, straight, weakly curved; non-bulbed hairs 0.3-0.8 mm, appressed or erect, straight to weakly curved; the cystoliths oblong and or punctiform, inflated, parallel to nerves; quaternary to hexternary nerves visible to the naked eye, primary venation 3-veined, the lateral nerves visible for 1/2-2/3 of the leaf length, domatia not present in the axils of the secondary nerves; base acute, attenuate, obtuse, frequently minutely cordate; margins serrate or dentate, frequently coarsely so; apex attenuate to subcuspidate; stipules 3-16 mm, lanceolate, apex forked or not forked, pubescent; petioles 30-110 × 1-2.3 mm, pubescent, two classes of hair, bulbed hairs 0.8 mm, appressed, curved; non-bulbed hairs 0.4 mm, appressed, weakly curved to straight. Peduncular bracts 2-2.5 mm; bracteoles 0.5-1 mm. Staminate inflorescences 1-3 per stem, 45-78 mm, bearing 144-600 flowers in a symmetrical panicle, panicle with 5 or 6 orders of dichotomously and trichotomously branching; peduncle 2-34 mm, pubescent, one or two (where bulbed hairs present) classes of hair, bulbed hairs 0.8 mm, appressed, curved; non-bulbed hairs 0.13-0.30 mm; flowers borne in clusters of 5-9, pedicellate, pedicels 0.5-0.8 × 0.130.30 mm; flowers 1.3-1.8 × 1-1.8 mm immediately prior to anthesis; tepals 4, 1-2 mm; stamens 2.5 mm; pistillode 0.4 mm in diameter. Pistillate inflorescences 1-8 per stem, length in flower not known, broader than long, bearing 182-768 flowers in a symmetrical panicle, panicle with 5-7 orders of

dichotomous branching; peduncle 2-30 mm, pubescent, non-bulbed hairs 0.13-0.5 mm, appressed or erect, weakly curved; flowers borne in clusters of 3-5 which are arranged into sub-capitate heads, pedicels of flowers 0.3×0.3 mm; flowers not seen. Infructescence 15-72 mm; fruiting perianth prior to inflation of tepals $1-2 \times 0.8-1$ mm; basal 7/8 of achene obscured by tepals, the lateral tepals 1-2 mm, the adaxial tepals 0.5-1.5 mm, the abaxial tepals 0.4-1.30 mm; once tepals inflated fruiting perianth 1.5×0.8 mm, berry-like, red, orange or orange-red when fresh; achenes $1-1.5 \times 0.8-1$ mm, asymmetrically ellipsoid, keeled, surface smooth. *Disturbed vegetation, montane forest, riversides.* Ch (*Breedlove 51467*, MEXU); G (*Skutch 982*, F). 900-3000 m. (Mexico [Oaxaca, Veracruz], Mesoamerica.)

7. *Urera laciniata* Goudot. ex Wedd., *Ann. Sci. Nat., Bot., sér. 4*, 18: 203 (1854). Lectotype (designated by de Rooij, 1975: 308): Colombia, *Goudot s.n.* (P-00281783!). Illustr.: Burger, *Fieldiana, Bot.* 40: 227, t. 30 (1977). N.v.: Pringamoza, P.

Urtica girardinoides Seem.

Herbs or shrubs, 1.5-5 m. Young shoots pubescent, one or two (where bulbed hairs present) classes of hair, bulbed hairs 3-5 mm, strongly appressed, straight; non-bulbed hairs 0.4-0.5 mm, appressed or erect, straight, weakly curved or crooked; internodes $20-40 \times 6-9$ mm, dark brown, green-brown, hollow at c. 5 mm, with a dark stain on the cut portion of the stem. Leaf lamina $150-300 \times 150-320$ mm, broad ovate, ovate, cordiform, deeply lobed or lacinate; upper surface sparsely pubescent or glabrous, one or two (where smaller hairs present) classes of hair; larger hairs 1 mm, appressed, straight, broad based; smaller hairs 0.3-0.5 mm, appressed, erect, curved or crooked; the cystoliths punctiform, randomly scattered; lower surface pubescent, with one or two (where bulbed hairs present) classes of hair, bulbed hairs (becoming spines) 3-5 mm, appressed, straight; non-bulbed hairs 0.5 mm, appressed to weakly appressed straight, weakly curved, curved or crooked; the cystoliths oblong and or punctiform, randomly scattered and parallel to nerves; tertiary to hexternary nerves visible to the naked eye, primary venation 3-veined, the lateral nerves visible for 1/3-1/2 of the leaf length, domatia not present in the axils of the secondary nerves; base cordate or hastate; margins lobed, the lobes lobulate; apex acute or subcuspidate; stipules 6-9 mm, deltate to triangular, not forked, pubescent or glabrous; petioles $70-165 \times 2.5-3$ mm, pubescent, two classes of hair, bulbed (stinging) 3-6 mm, appressed, straight or curved; non-bulbed hairs 0.13-0.5 mm. Peduncular bracts 4-8 mm; bracteoles 0.5-1 mm. Staminate inflorescences 1-2 per stem, 80-90 mm, bearing 128-390 flowers in an asymmetrical panicle, panicle with 3 or 4 orders of dichotomously branching; peduncle 2-15 mm, pubescent, the non-bulbed hairs 0.13-0.3; flowers borne in clusters of 4 or 5, pedicellate to sessile, pedicels 0.3×0.5 mm; flowers $1.5-2 \times 1.3-2$ mm immediately prior to anthesis; tepals 5, c. 2.3 mm; stamens 2.5 mm; pistillode 0.8 mm in diameter. Pistillate inflorescences c. 3 per stem, 40-150 mm, longer than broad, bearing 1200-2300 flowers in a symmetrical panicle, panicle with 5 orders of dichotomous branching; peduncle 4-35 mm, pubescent, non-bulbed hairs 0.13-0.30 mm, erect or appressed, straight or crooked; flowers borne in clusters of 3 or 4, pedicellate, pedicels $0.30-0.4 \times 0.3-0.4$ mm, glabrous or pubescent, where pubescent the non-bulbed hairs 0.13-0.3 mm; flowers $0.8-1.5 \times 0.4-0.7$ mm, white fresh; lateral tepals 0.5-1 mm; adaxial tepals 0.4-0.7 mm, adaxially thickened; abaxial tepals 0.4-0.80 mm. Infructescence 105-205 mm; fruiting perianth prior to inflation of tepals 2×1.8 mm; basal 1/3-1/2 of achene obscured by tepals, the lateral tepals 1.5 mm, the adaxial tepals 0.8-1.5 mm, the abaxial tepals 0.8-1.3 mm; tepals do not inflate; achenes $2-2.5 \times 1.8-2$ mm, asymmetrically ellipsoid, surface verrucate. *Riverside scrub.* H (*Saunders 1204*, NY); N (*Stevens et al. 166550*, MO); CR (*Burger y Gentry 9092*, F); P (*Carrasquilla y Mendoza 1106*, PMA). 0-600 m. (Mesoamerica, Colombia, Venezuela, Ecuador, Peru.)

8. *Urera lianoides* A.K. Monro, *Ann. Missouri Bot. Gard.* xx: xx (2009). Holotype: Costa Rica, *Shank & Molina R. 4405* (F!). Illustr.: Monro, *Ann. Missouri Bot. Gard.* xx: xx, t. xx (2009).

Vines or scrambling shrubs, 2-4 m. Young shoots pubescent to densely pubescent, non-bulbed hairs 0.3-1 mm, erect or weakly appressed, weakly curved or crooked, occasionally straight; internodes 21-84 × 3.5-10 mm, red-brown, occasionally yellow-green, hollow from 2-6 mm diameter, lacking a dark stain on the cut portion of the stem. Leaf lamina 72-185 × 29-104 mm, narrowly ovate, obovate, elliptic, or oblanceolate, always longer than wide, occasionally bullate; upper surface sparsely pubescent, non-bulbed hairs 0.5-0.8 mm, appressed, weakly curved or crooked; the cystoliths punctiform, oblong or occasionally fusiform, occasionally inflated, randomly scattered and occasionally parallel to nerves; lower surface pubescent, non-bulbed hairs 0.13-0.5(-1) mm, appressed or erect, weakly curved, occasionally straight; the cystoliths fusiform, occasionally oblong, parallel to nerves, occasionally randomly scattered; tertiary to quinternary nerves visible to the naked eye, primary venation 3-veined, occasionally 5 nerved, the lateral nerves visible for 1/2-2/3 of the leaf length, domatia not present in the axils of the secondary nerves; base cordate or obtuse, occasionally cuneate; margins crenate-dentate or nearly entire; apex cuspidate; stipules 4-9 mm, narrowly ovate or lanceolate, apex not forked, sparsely pubescent to pubescent; petioles 11-80 × 0.8-1.5 mm, sparsely pubescent to pubescent, non-bulbed hairs 0.13-1 mm, appressed, occasionally erect, curved, occasionally crooked or straight. Peduncular bracts 1.3-2 mm; bracteoles 0.3-0.5 mm. Staminate inflorescences 1-12 per stem, 19-56 mm, bearing 192-384 flowers in an asymmetrical panicle with 4 or 5 orders of dichotomous branching; peduncle 4.5-9 mm, densely pubescent, the non-bulbed hairs 0.3 mm; flowers borne in clusters of 6-12, flowers sessile, 1.3 × 1.3 mm immediately prior to anthesis; tepals 4, 1.5 mm; stamens 1.8 mm; pistillode 0.4 mm in diameter. Pistillate inflorescences c. 6 per stem, 12-25 mm, broader than long, bearing 112-448 flowers in an asymmetrical panicle, with 4-6 orders of dichotomous branching; peduncle 7-13 mm, densely pubescent, the non-bulbed hairs 0.13-0.3 mm, erect, straight; flowers borne in clusters of 3, pedicellate, pedicels 0.5-0.7 mm × 0.13-0.30 mm, glabrous; flowers 0.5-1 × 0.4-0.5 mm, white to yellow-green; lateral tepals 0.4-0.80 mm; adaxial tepals 0.3-0.8 mm, adaxially thickened; abaxial tepals 0.3-0.8 mm. Infructescence 12-45 mm; fruiting perianth prior to inflation of tepals 1.5 × 0.8 mm; basal 3/4 of achene obscured by tepals, the lateral tepals 1 mm, the adaxial tepals 0.8 mm, the abaxial tepals 0.5 mm; once tepals inflated fruiting perianth 1.5-2.3 × 1.3-1.8 mm, berry-like, orange when fresh; achenes 1.3-1.5 × 1-1.3 mm, asymmetrically ellipsoid, keeled, surface smooth. *Disturbed and undisturbed forests.* Ch (*Croat 40192*, MEXU); G (*Ortiz 1323*, F); N (*Nee y Miller 27963*, MO); CR (*Raven 21623*, MO); P (*Allen 855*, NY). 0-1200 m. (Mesoamerica, Perú, Bolivia.)

Material from Chiapas differs from other collections of this species in having densely pubescent young stems and lower leaf surface, the non-bulbed hairs being very short (0.5 mm or less). *Urera lianoides* closely resembles *U. elata* (Sw.) Griseb. and *U. expansa* (Sw.) Griseb. (both from the West Indies) from which it can be distinguished by the liana habit and valvate staminate flowers. In contrast *Urera elata* and *U. expansa* have an arborescent or shrubby habit and imbricate staminate flowers.

9. *Urera simplex* Wedd., *Prodr.* 16(1): 90 (1869). Isotype: Colombia, *Triana s.n.* 'marzo 1856', barcode P00281785 (P!). Illustr.: not known. N.v.: Chichicaste, Ch, H, N; chichicaste huevo de cangrejo, ES; cow itch, B; palo Ortiga, P; säk souojlaj, G.

Urera eggersii Hieron, *U. rzedowskii* V.W. Steinm., *U. tuerckheimii* Donn. Sm.

Shrubs to small trees, 4-5 m. Young shoots densely pubescent with one or two (where bulbed hairs present) classes of hair, bulbed hairs 2-2.8 mm, appressed to weakly appressed, straight; non-bulbed hairs 1.5-2 mm, appressed

or erect, curved or crooked; internodes 15-29 × 2.5-4 mm, dark brown, green-brown, hollow at c. 5 mm diameter, without a dark stain on the cut portion of the stem. Leaf lamina 87-295 × 37-152 mm, obovate, narrow obovate, oblanceolate, rhombic, elliptic or ovate, occasionally bullate; upper surface pubescent with one or two (where bulbed hairs present) classes of hair, bulbed hairs 1.5-2 mm, weakly appressed, straight; non-bulbed hairs 2 mm, weakly appressed, curved, broad based; the cystoliths oblong or fusiform, aligned radially around hair bases and randomly scattered; lower surface densely pubescent with one or two (where bulbed hairs present) classes of hair, bulbed hairs 1.5-2 mm, weakly appressed, straight; non-bulbed hairs 1.5-2 mm, erect to weakly appressed, weakly curved to curved; the cystoliths oblong or fusiform, parallel to nerves; quaternary to hexternary nerves visible to the naked eye, primary venation 3-veined, the lateral nerves visible for less than 1/2 of the leaf length, domatia not present in the axils of the secondary nerves; base acute or obtuse, frequently minutely cordate; margins coarsely serrate or dentate; apex acute or subcuspidate; stipules 10-16 mm, lanceolate, not forked, densely pubescent; petioles 42-135 × 1.5-2 mm, densely pubescent with one or two (where bulbed hairs present) classes of hair, bulbed hairs 2-2.8 mm, appressed, straight, non-bulbed hairs 1-2 mm. Peduncular bracts 4-8 mm; bracteoles 0.4-0.80 mm, inflorescences of both sexes frequently found on the same herbarium specimen. Staminate inflorescences 2-4 per stem, 13-37 mm, bearing 36-150 flowers in 1-3 compact heads, peduncle 6-16 mm, pubescent, the non-bulbed hairs 1-1.5 mm; flowers borne in clusters of 36-70, pedicellate, pedicels 1.5-2 × c. 0.13 mm; flowers 1.5-2 × 1.8-2.5 mm immediately prior to anthesis; tepals 5, 1.8-2.3 mm; stamens 2.5-3.3 mm; pistillode 0.7 mm in diameter. Pistillate inflorescences 1-5 per stem, 18-32 mm, broader than long, bearing 224-1280 flowers in a symmetrical panicle, panicle with 5-7 orders of frequently irregular dichotomous branching; peduncle 0-10 mm, pubescent, non-bulbed hairs 0.5-1.3 mm, erect to weakly appressed, crooked; flowers borne in clusters of 3-6, pedicellate, pedicels 0.13-0.5 × 0.13-0.30 mm, glabrous; flowers 0.7-0.80 × 0.5-0.7 mm, white; lateral tepals 0.5-0.7 mm; adaxial tepals 0.4-0.5 mm, adaxially thickened; abaxial tepals 0.30-0.4 mm. Infructescence 25-37 mm; fruiting perianth prior to inflation of tepals 1.3-1.8 × 1-1.3 mm; basal 7/8 of achene obscured by tepals, tepals unequal, the lateral tepals 1-1.3 mm, the adaxial tepals 0.5-1 mm, the abaxial tepals 0.4-0.5 mm; once tepals inflated fruiting perianth 1.8 × 1.8 mm, berry-like, colour when fresh unknown; achenes c. 1.3 × 1 mm, asymmetrically ellipsoid, keeled, surface smooth or verrucate. *Quercus-Liquidambar forests, cloud forests, swamps, premontane forests, humid scrub, ravines, shade coffee farms.* T (Cowan 3109, NY); Ch (Purpus 7356, NY); B (Schipp 400, F); G (Tun O. 2689, F); H (Molina R. 5520, F); N (Moreno 17265, MO); CR (Skutch 3750, NY); P (Folsom *et al.* 5571, PMA). 0-2500 m. (Mexico, Colombia, Venezuela, Ecuador, Peru, Bolivia.)

Material of this species has frequently been determined and referred to (*Flora of Guatemala, Flora of Panama* and *Flora Costaricensis*) as *Urera elata* (Sw.) Griseb., *U. eggersii* Hieron or *U. tuerckheimii* Donn. Sm. Examination of type material of these species indicates that *Urera elata* is a species endemic to Jamaica and Mexico (Oaxaca), whilst *U. eggersii* and *U. tuerckheimii* are conspecific to *U. simplex*. Pool (2001) indicates *U. tuerckheimii* may correspond to *U. aurantiaca* Wedd., however comparison of the holotypes suggests that the two species are distinct. Some collections from Costa Rica and Panama, exemplified by *Kennedy 1939* (GH) and *Folsom y Page 5984* (PMA) are unusual in the possession of narrowly oblanceolate pubescent leaves; whilst some material from Chiapas, exemplified by *Purpus 7039* (NY) is characterised by densely pubescent leaves. Material from Belize, exemplified by *Whitefoord 1081* (BM) and *Gentry 8427* (MO) may represent a distinct taxon.

Comment [a10]: need to combine these two descriptions

10. *Urera verrucosa* (Liebm.) V.W. Steinm. *Acta Bot. Mex.* 71: 39 (2005). *Urtica verrucosa* Liebm., *Kongel. Danske Vidensk. Selsk. Skr., Naturvidensk. Math. Afd., ser. 5* 2: 295 (1851). Holotype: Costa Rica, *Oersted 14282* (C!). Illustr.: not known. N.v.: Chichicaste ES, G, H; pan caliente, H.

Trees, shrubs or occasionally herbs, 2-10(-20-30) m. Young shoots densely pubescent, occasionally appearing velutinous, two classes (where bulbed hairs present) of hair, bulbed hairs 1-1.3 mm, appressed, straight; non-bulbed hairs 0.4-0.80 mm, erect, occasionally weakly appressed, curved or crooked; internodes 12-45 × 5-11 mm, red-brown, pale red-brown, green-brown, grey-brown, hollow at c. 10 mm, occasionally with a dark stain on the cut portion of the stem. Leaf lamina 106-410 × 75-380 mm, cordiform, frequently bullate; upper surface pubescent, occasionally appearing velutinous, two classes (where bulbed hairs present) of hair; bulbed hairs 0.8-1.5 mm, appressed, occasionally erect, curved to weakly curved; non-broad-based hairs 0.4-0.80 mm, appressed, occasionally erect, weakly curved or crooked; the cystoliths punctiform, not inflated, randomly scattered; lower surface pubescent, two classes (where bulbed hairs present) classes of hair, bulbed hairs 1.8 mm, appressed, straight; non bulbed hairs 0.4-0.80 mm, appressed, occasionally erect, weakly curved or crooked; the cystoliths punctiform, oblong, rarely fusiform, not inflated, parallel to nerves, occasionally randomly scattered; tertiary to quaternary nerves visible to the naked eye, primary venation 3-veined, occasionally 5-nerved, the lateral nerves visible for 1/2-2/3 of the leaf length, domatia not present in the axils of the secondary nerves; base cordate; margins dentate, occasionally serrate; apex subcuspidate to cuspidate; stipules 10-32 mm, ovate, lanceolate, not forked, pubescent; petioles 34-290 × 1.3-5 mm, densely pubescent, two classes (where bulbed hairs present) classes of hair, bulbed hairs 0.5 mm, appressed, straight; non-bulbed hairs 0.5-1 mm. Peduncular bracts 3.5-7 mm; bracteoles 0.5 mm. Staminate inflorescences 1-8 per stem, 129-210 mm, bearing 500-2700 flowers in a symmetrical panicle with 8-9 orders of dichotomous branching; peduncle 40-80 mm, densely pubescent, two classes (where broad based hairs present) of hair, the broad based hairs 0.8-1 mm, the non broad based hairs 0.3-0.5 mm; flowers borne in clusters of 24-70, flowers pedicellate, pedicels 1-2 × 0.30-0.4 mm; flowers 1.5-2 × c. 2 mm immediately prior to anthesis; tepals 5, 2.3 mm; stamens 3-3.5 mm; pistillode 0.7 mm in diameter. Pistillate inflorescences 1-3 per stem, 85-225 mm, broader than long, bearing c. 1500 flowers in a symmetrical or weakly asymmetrical panicle, with 8-10 orders of dichotomous branching; peduncle 27-98 mm, pubescent, one or two (where bulbed hairs present) classes of hair, bulbed hairs 1-1.3 mm, appressed, straight; non bulbed hairs 1-1.5 mm, erect, crooked or straight; flowers borne in clusters of 3, pedicellate, pedicels 0.3 × 0.3 mm, glabrous; flowers c. 1 × 0.5 mm, white; lateral tepals 0.5-0.8 mm; adaxial tepals 0.4 mm, adaxially thickened; abaxial tepals 0.3-0.5 mm. Infructescence 50-150 mm; fruiting perianth prior to inflation of tepals 1.3-1.5 × 0.8-1 mm; basal 7/8 of achene obscured by tepals, lateral tepals 1 mm, adaxial tepals 0.7-0.80 mm, abaxial tepals 0.5 mm; once tepals inflated fruiting perianth 1.5-2 × 1.3-1.5 mm, berry-like, orange, occasionally orange-red or pink when fresh; achenes c. 1.3 × 0.8-1 mm, asymmetrically ellipsoid-ovoid, weakly keeled, surface verrucate. *Montane forests, shade coffee farms, Pinus-Quercus-Liquidambar forests.* Ch (*Breedlove 21726*, MEXU); G (*Molina R. y Molina 26673*, F); H (*Nelson et al. 3955*, MO); ES (*Molina R. y Montalvo 21603*, MO); CR (*Weston 3782*, MO); P (*Hammel 1578*, MO). 500-2800 m. (Endémica.)

13. *Urtica* L.

By A.K. Monro.

Herbs, annual or perennial. Stems with stinging hairs, not releasing watery latex when cut. Leaves opposite, the margins toothed; cystoliths punctiform or oblong; stipules borne either side of the petiole, simple, persistent. Inflorescences

unisexual or bisexual, paniculate; pedicels subtended by inconspicuous bracts. Staminate flowers 4-merous. Pistillate tepals 4, subequal in flower, strongly unequal in fruit. Achene strongly compressed, broadly ovoid. Aprox. 30 spp. Cosmopolitan.

Bibliography: Weddell, H.A. *Arch. Mus. Hist. Nat.* 9: 55-105 (1856).

Urtica has its greatest species diversity in Central Europe and Asia. The worldwide taxonomy of *Urtica*, including the Mesoamerican species is complex and unresolved. The names used in this treatment appear to be relatively stable, a future revision, however will likely result in a large number of nomenclatural changes (Weigend, pers. comm., 2009) that may affect the names used here.

1. Leaves narrowly ovate, never cordiform; upper leaf surface sparsely pubescent, bulbed-hairs absent; cystoliths of the lower leaf surface not visible.

1. *U. aquatica*

1. Leaves ovate, occasionally cordiform; upper leaf surface pubescent, bulbed-hairs present; cystoliths of the lower leaf surface visible.

2. *U. leptophylla*

1. *Urtica aquatica* Liebm., Kongel. *Danske Vidensk. Selsk. Skr., Naturvidensk. Math. Afd.*, ser. 5 2: 291 (1851). Holotype: Mexico, Puebla, *Liebmann s.n.* 'Chinautla, paa 7000', blomstrer i Mai' (C). Illustr.: not known.

Erect or straggling herbs, height unknown. Stems pubescent with two classes of hair; bulbed hairs 1-1.3 mm, erect or weakly appressed, straight, appearing stalked when dried; non-bulbed hairs 0.4-0.5 mm, appressed to weakly appressed, weakly curved. Leaf lamina 96-195 × 20-72 mm, narrowly ovate, 5-nerved from the base; upper surface sparsely pubescent, bulbed hairs absent, the non-bulbed hairs 0.4-0.5 mm, appressed, weakly curved; cystoliths punctiform, randomly scattered; lower surface pubescent as stem with the bulbed hairs appressed; cystoliths not visible; base cordate; margins coarsely dentate; apex acute to attenuate; stipules fused at their base less than 1/2 their length, 3-4.5 mm; petioles 20-40 × 0.8-1 mm, pubescent as stem. Inflorescences unisexual, 12-31 mm, branched, pistillate inflorescence with a mixture of flowers and fruiting perianths at all stages of development. Staminate flowers not seen. Pistillate flowers 0.7-0.80 × 0.3-0.7 mm, sparsely pubescent. Infructescence 12-31 mm. Achenes 1.3 × 1.2 mm, ellipsoid-ovoid. *Riverbeds and roadsides.* G (Weigend 7478, BM). 2500-2900 m. (Mexico [Distrito Federal, Puebla, Veracruz], Mesoamerica.)

Rarely collected, presumably due to stinging hairs or weedy habit.

2. *Urtica leptophylla* Kunth in Humb., Bonpl. & Kunth, *Nov. Gen. Sp.* 2: 39 (1817). Holotype: Colombia, *Humboldt y Bonpland s.n.* (P). Illustr.: not known.

Urtica copeyana Killip, *U. nicaraguensis* Liebm.

Erect or straggling herbs to 1 m. Stems pubescent with two classes of hair; bulbed hairs 2-2.5 mm, erect or weakly appressed, straight, appearing stalked when dried; non-bulbed hairs 0.3-0.8 mm, appressed, weakly curved. Leaf lamina 23-105 × 16-80 mm, ovate or occasionally cordiform, 3-5 nerved from the base; upper surface pubescent as stem, frequently with bulbed hairs in addition, the bulbed hairs 0.5-0.8 mm, appressed, straight or curved; cystoliths punctiform or oblong, randomly scattered; lower surface pubescent as stem with the bulbed hairs appressed; the cystoliths randomly scattered; base hastate or cordate; margins coarsely dentate; apex acute to weakly cuspidate; stipules fused at their base more than 1/2 their length, 3.5-6 mm; petioles 15-52 × 0.5-1.3 mm, pubescent as stem. Inflorescences bisexual, 6-30 mm, with no or few branches. Staminate flowers borne towards the base of the

inflorescence; flowers $0.8-1 \times 1.3-2$ mm, pubescent; pistillode prominent, c. 0.8 mm in diameter; pedicels articulated, 0.8-1 mm. Pistillate flowers $0.7-0.80 \times 0.4-0.5$ mm, pubescent. Infructescence 15-40 mm. Achenes c. 1.3×1 mm, ellipsoid-ovoid. *Disturbed or undisturbed vegetation, in treefall gaps, landslides, fields, etc.* G (Véliz y Rosito 7133, BM); CR (Davidse et al. 25762, MO); P (Klitgaard et al. 796, PMA). 2500-3300 m. (Mesoamerica, Colombia, Venezuela, Ecuador, Peru.)

Rarely collected, presumably due to stinging hairs or weedy habit.