Shrubs or herbs. Leaves simple, alternate or opposite, rarely whorled, usually without, but sometimes with stipules; hairs simple or clustered as to seem stellate. Inflorescences cymose-paniculate or cymose-racemose, or solitary flowers. Flowers almost regular, bisexual, hypogynous: sepals 3 or 5, when 5 the outer 2 often narrower and sometimes adnate to the inner 3; petals 3 (Lechea) or 5, often contorted in bud and evanescent; stamens numerous, inserted on a disk-like receptacle, the anthers opening with longitudinal slits. Fruit a many-seeded loculicidal capsule. 8 gen., North America, Mesoamerica, Caribbean, southern South America, Europe, northern Africa, Middle East to central Asia.

The family is most diverse in the Mediterranean. Neotropical Cistaceae are mostly found in Mexico and Mesoamerica at high elevations in exposed areas, dry rocky slopes on alkaline or sandy soils and in mixed pine and oak forests.

Traditionally the Cistaceae were placed in the Violales, but molecular analysis support a placement near the Bixaceae in the Malvales (APG3).

Flowers of Cistaceae are ephemeral and open only a few hours in full sunlight. The brightly colored petals and numerous stamens attract bees, flies and beetles. Self-pollination occurs frequently (Fisher 2004).


1. Petals 5, contorted in bud; leaves pinnately veined, obovate-elliptic to lanceolate; lamina hairy on both sides, the hairs stellate-puberulent and/or with simple villose hairs. 1. *Helianthemum*
1. Petals 3, imbricate in bud; leaves with a single central vein, usually linear; lamina glabrous above, the hairs below and along the margin pilose with simple hairs only. 2. *Lechea*

*Crocanthemum* Spach, *Heteromeris* Spach

By M.J.M. Christenhusz.

Shrubs or suffruticose herbs. Stems prostrate or ascending. Leaves opposite, obovate-elliptic to lanceolate, pinnately veined, the hairs variable, pilose-spreading or stellate-puberulent. Inflorescences compound or simple cincinni, lax racemes or dense thyrses or glomerules, sometimes subumbelliform. Flowers of 2 types (Mesoamerica), often occurring on the same plant: chasmogamous flowers with conspicuous petals and cleistogamous flowers with inconspicuous petals or often without petals; sepals 5; petals 5, usually yellow, sometimes white, orange or red, contorted in bud, evanescent; stamens numerous, sensitive; styles clavate. Capsules 3-valvate, 30- to many-seeded. Approx. 110 spp. North America, Mesoamerica, southern South America, Europe, and northern Africa to central Asia.
All of the Mesoamerican species were previously placed in the genus *Halimium* (Dunal) Spach (Grosser, 1903), but this genus is now considered to be exclusively Mediterranean. *Crocanthemum* was described based on the presence of the cleistogamous flowers, but this does not appear to be a useful character for generic delimitation.

In some species the stamens are sensitive, moving outwards when touched by insects, powdering them with pollen. Because of the common occurrence of cleistogamous flowers, self-pollination is frequent (Fisher, 2004).


1. Leaf surfaces with mixed stellate and simple villous hairs on both sides; leaves often with small fasciculate leaves in their axils.
2. Secondary veins prominent below; chasmogamous and cleistogamous flowers on different branches; petals always yellow.  
   **1. H. chihuahuense**
3. Flowers all pedicellate, chasmogamous and cleistogamous flowers mixed in loose racemose or congested cymes; calyx sometimes intermixed with glandular hairs and occasionally with simple villous hairs.
   **2. H. coulteri**
4. Secondary veins obscure; chasmogamous and cleistogamous flowers in mixed inflorescences; petals yellow or with a purple spot.  
   **4. H. pringlei**
1. Leaf surfaces stellate-tomentose, without simple villous hairs on the lower surface, and only rarely on the upper surface; leaves usually without fasciculate axillary leaves in their axils.
2. Flowers unequally pedicellate, the chasmogamous flowers pedicellate, the cleistogamous subsessile, often in glomerate clusters, overtopped by the chasmogamous flowers (note both type of flowers not always present); calyx stellate-tomentulose, never with glandular or simple hairs.  
   **3. H. glomeratum**

   Isotype: Mexico, Chihuahua, *Pringle 1187* (BM!). Illust.: not found.  

Suffruticose perennial herbs, 10-30(-45) cm. Stems arising from a woody caudex or woody rootstock, covered with mixed stellate and simple villous hairs, the simple hairs 1-1.5 mm. Leaves subsessile or with a petiole up to 1 mm; blades 7-22 × 2-7.5 mm, elliptic to oblanceolate, both surfaces covered with stellate and simple villous hairs, the simple hairs 0.5-1.5 mm, the midvein and secondary veins prominent below, the base cuneate to obtuse, the margins entire, the apex acute, often with small fasciculate leaves in the axils. Flowers dimorphic, chasmogamous and cleistogamous flowers on different branches, usually in few-flowered glomerate clusters. Chasmogamous flowers: pedicels 4-5(-10) mm; outer sepals 1.6-3 × 0.3-0.4 mm, linear; inner sepals 5.5-8 × 2.4-4 mm, ovate; petals 7-10 × 5-6 mm, yellow; stamens numerous; ovary c. 1 mm. Cleistogamous flowers: pedicels 1.6-5.0 mm; outer sepals 1.2-3.6 × 0.2-0.4, linear; inner sepals 3.6-5.6 × 2.4-3.2 mm, ovate; stamens 5-6. Capsules 2-6 × 1.6-4 mm, ovate to ovoid-triquetrous, glabrous, 3-valvate; seeds 4-11 or numerous, smooth. Flowering June-November. *Mixed* Pinus-Quercus forests, *wooded* hillsides, *grassy* slopes, páramos. G (*Standley 82067*, F); H (*Standley 20597*, F); CR (*Wilbur 26260*, F). 800-2500 m. (Mexico [Chihuahua to Hidalgo and Guerro], Mesoamerica.)
The chasmogamous flowers of *Helianthemum chihuahuense* are borne at the end of the main stem and sometimes the major branches, while its cleistogamous flowers are solitary or glomerate at the end of branches.


*Helianthemum coulteri* S. Watson,

Perennial somewhat suffruticose herbs to 40 cm. Stems arising from a caudex or subterraneous rootstock, decumbent to erect, shortly stellate-pubescent, occasionally appearing villous with simple and branched trichomes up to 1 mm. Leaves petiolate; blades 7-45 × 2-15 mm, obovate-elliptic to elliptic, the upper side stellate pubescent, densely stellate below, the midvein and secondary veins conspicuous and elevated below, the base attenuate to cuneate, the margins entire, the apex obtuse to acute; petioles 0.6-2 mm; usually without fasciculate leaves in the axils. Flowers dimorphic: chasmogamous and cleistogamous flowers mixed in loose racemose or congested cymes, all pedicellate; calyx often with villous and sometimes with glandular hairs. Chasmogamous flowers: pedicels 2-12 mm; outer sepals 2-5 × 0.4-1 mm, linear-lanceolate; inner sepals 4-12 × 3-7 mm, ovate; petals 3.4-10 × 3.2-9 mm obovate, bright yellow; stamens 15-30; ovary ovoid. Cleistogamous flowers: pedicels 1-6 mm; outer sepals 1.2-4.2 × 0.3-0.7 mm, linear; inner sepals 3-7 × 2.3-4 mm ovate; stamens usually 5; ovary ovoid. Capsules 3.5-7.5 × 2.8-6 mm, ovoid-triquetrous, glabrous, 3-valved; seeds 8-numerous, papillate. Flowering March-December. *Grassy open areas in Pinus or Pinus-Quercus forests, rocky banks, open forested hilltops, thickets*. G (*Grant 699, F*); H (*Tróchez 98, MO*); N (*Standley 10076, F*). 1000-2100 m. (Mexico [Nuevo León to Veracruz], Mesoamerica.)


Suffruticose shrubs to 55 cm, rarely larger; branches arising from a woody branched caudex. Stems stellate-tomentose. Leaves sessile or petiolate to 2 mm; blades 1-3.5 × 2-14 mm, oblanceolate to obovate, both surfaces stellate-tomentose, the upper surface rarely with a few simple villous hairs, the midvein prominent, the secondary veins obscure or prominently elevated, the base attenuate, the margins entire, the apex obtuse to acute; usually without fasciculate leaves in the axils. Flowers dimorphic, unequally pedicellate, the chasmogamous flowers long-pedicellate and overtopping the densely glomerate clusters of subsessile cleistogamous flowers (note both type of flowers not always present); calyx without simple or glandular hairs. Chasmogamous flowers: pedicels 10-20 mm; outer sepals 0.6-4 × 0.2-0.4 mm, linear; inner sepals 3-7 × 1.8-3.2 mm, ovate to lanceolate; petals 4-9 × 3.5-6 mm, obovate, pale yellow with a slight orange blush at the base; stamens numerous; ovary 0.6-1.6 × 0.5-0.9 mm, ovoid, glabrous. Cleistogamous flowers: subsessile or the pedicels to 3.6 mm in fruit; outer sepals 0.6-3 × 0.2-0.4 mm, linear; inner sepals 2.4-5 × 1.2-3.6 mm, ovate-lanceolate to ovate.
stamens 3-6. Capsules 1.6-4.5 × 1.2-3 mm, ovoid-triquetrous, 3-valved, glabrous; seeds few to numerous, ovoid, slightly uneven. Flowering April-February. In grasslands with scattered, open Quercus or Pinus forests, on dry rocky hills and disturbed ridges and hillsides, locally common. Ch (Breedlove 9051, BM); G (Skutch 1119, BM); H (Molina R. 11078, F); CR (Gamboa R. et al. 839, MO). 1400-2600(-3460) m. (United States [Texas], Mexico, Mesoamerica.)

The chasmogamous flowers are solitary at the end of branches and overtop the glomerate cleistogamous flowers that are borne lower on the branch. This easily distinguished this species from the others.


Perennial herbs to 45 cm, sometimes suffruticose at the base. Stems few, arising from an upright caudex, stellate-pubescent, sometimes intermixed with simple hairs. Leaves often somewhat appressed to the stem, sessile or the petiole to 1 mm; blades 4.5-25 × 2-7 mm, elliptic or oblanceolate-elliptic, greyish stellate-tomentose on both surfaces, occasionally intermixed with villous simple hairs, the midvein prominent below, the secondary veins obscure, the base cuneate, the margins entire, the apex acute; often with small fasciculate leaves in the axils. Flowers dimorphic, chasmogamous and cleistogamous 2-5 in mixed terminal racemose cymes. Chasmogamous flowers: pedicels 2-12 mm; outer sepals 1.2-3.2 × 0.2-0.4 mm, linear; inner sepals 4-6.5 × 2-3.2 mm, ovate; petals 5-10 × 3.6-8.5 mm, yellow, sometimes with a purple spot; stamens numerous; ovary 1-1.4 × 0.8-1 mm, ovoid. Cleistogamous flowers: pedicels 1-4.2 mm; outer sepals 1.2-3 × 0.2-0.4 mm, linear; inner sepals 3.2-4.5 × 2.2-2.8 mm, ovate; petals not seen; stamens 4-5. Capsules 2.4-6 × 2.4-4.5 mm, ovoid triquetrous, glabrous, 3-valved; seeds 4-24, ovoid and laterally compressed, smooth. Flowering June-October. *Dry hills, mixed Pinus-Quercus forests, moist meadows and mountain summits.* G (Standley & Williams, 1961: 63); H (Molina R. 400, MO); N (Stevens & Montiel 17961, MO). 1000-1700 m. (Mexico [Sonora to Guanajuato], Mesoamerica.)

2. **Lechea** L.

By M.J.M. Christenhusz.

Perennial, sometimes suffruticose herbs. Leaves alternate, sessile, ovate to linear, without stipules. Inflorescences panicles or racemes. Flowers small, usually numerous; sepals 5, the 2 outer ones narrow, the 3 inner ones broader; petals 3, dark red, usually shorter than the sepals, caducous; stamens 3-25; ovary short stipitate, the 3 stigmas (nearly) sessile, fimbriate-plumose, dark red. Capsules 3-valvate. Approx. 20 spp. North America, extending into Mesoamerica and the Caribbean.

The anthers are pressed to the stigma when the flowers close, frequently causing self-pollination (Fisher, 2004). Herbarium specimens are usually fruiting, and because the petals and stamens are caducous, these are seldom preserved. This is why little detail on these structures can be provided here.

1. The 2 exterior sepals ovate-elliptic, much shorter than the 3 interior sepals.  
1. The 2 exterior sepals linear, equal to or longer than the 3 interior sepals.


   Suffruticose herbs to 40 cm. Stems long-pilose, simple or finely branched. Leaves 2-11(-20) × 0.1-1(-1.5) mm, linear-lanceolate, the base acute, the margins entire, the apex acute to acuminate, the upper surface glabrous, the lower surface densely pilose, especially along the vein. Inflorescences paniculate, dense; pedicels 1-3 mm. Flowers numerous; outer sepals 0.2-0.4 mm, ovate-elliptic, densely pilose; inner sepals 10-13(-19) mm, ovate, densely pilose; petals caducous, shorter than the sepals, not seen. Capsules to 2 mm; seeds 3. Fruiting November. *Bunch-grass Pinus savanna on sand.* B (*Hunt 233, BM*). 500-1100 m. (United States [North Carolina to Florida and Mississippi], Mesoamerica.)

   In Mesoamerica this species is only known from Belize, The material from Belize is isolated from the populations in the eastern United States and was referred to *Lechea torreyi* var. *congesta* by Hodgdon (1938). The species is, however, variable in pubescence and clustering of the inflorescence, on the basis of which this variety was separated. Wilbur & Daoud (1961) did not accept it because both varieties are found abundantly in Florida. Further population studies will be necessary to be certain if this variety merits recognition.


   *Lechea depressa* M.E. Jones, *L. skinneri* Benth.

   Suffruticose herbs 7-30 cm. Stems long-pilose, simple or finely branched. Leaves 3-10(-18) × 0.3-1(-1.2) mm, linear-lanceolate, short-petiolate, the base acute, the margins entire, the apex sharply acute, the upper surface glabrous, the lower surface densely pilose, especially along the midvein. Inflorescences paniculate, lax; pedicels 1-3 mm. Flowers with the outer sepals 21-30 mm, linear, densely pilose; inner sepals 20-23(-28) mm, ovate, densely pilose; petals caducous, shorter than the sepals, not seen. Capsules to 3 mm; seeds 3. Fruiting August-February. *Pinus and Quercus forests, on open banks and in grassy patches.* Ch (*Breedlove 23091, MO*); G (*Molina R. et al. 16276, BM*); H (*Martínez 276, MO*). 1200-2500 m. (United States [Oklahoma], Mexico, Mesoamerica.)