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227. OROBANCHACEAE

Family description and key by M.J.M. Christenhusz.

Parasitic herbs, many turning black on drying, rarely suffruticose or shrubs, the leaf stomata do not close. Rarely autotrophic (*Lindenbergia*). Leaves normally developed and green or achlorophyllous and scale like, opposite to spiral alternate, usually toothed to deeply lobed, sometimes entire. Inflorescence usually racemose or spicate. Calyx 4-5-lobed or -toothed. Corolla 5 lobed, galeate or not, salverform or campanulate, the abaxial lateral lobes outside in bud. Stamens 4, didynamous or subequal; staminode absent or present (*Lamourouxia*). Ovary with parietal placentation. Stigma clavate to capitate. Fruit a loculicidal to septicidal capsule. In the flower, the abaxial lobes of the corolla are outside the others in bud. (description partly based on Stevens, P.F. (2001, onwards). Angiosperm Phylogeny Website Version 9, June 2008. <http://www.mobot.org/MOBOT/research/APweb/>)

In Mesoamerica this family traditionally only included the genus *Conopholis*. Chase & Reveal (2009) have shown that the parasitic herbs previously placed in the Scrophulariaceae, are actually closer related to the Orobanchaceae (see also Tank *et al.* 2006). An overview of the disintegration of Scrophulariaceae in relation to parasitic plants is provided by Fay *et al.* (2009).

Bibliography: APG-III. *Bot. J. Linn. Soc.* 161: 105-121 (2009). Chase & Reveal. *Bot. J. Linn. Soc.* 161: 122-127 (2009). Fay, M.F. et al., *Curtis's Bot. Mag.* 26 (4): 286-313 (2010). Tank et al. *Australian Syst. Bot.* 19: 289-307 (2006). Young, N. D. et al., *Ann. Missouri Bot. Gard.* 86(4): 876-893 (1999).

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| 1. Plants lacking chlorophyll, the leaves reduced to scales | 5. Conopholis |
| 1. Plants with normally developed chlorophyllous leaves | 2 |
| 2. All leaves, also those of the inflorescence (bracts) opposite | 3 |
| 3. Upper corolla lobes forming a galea enclosing the anthers, anthers woolly | 7. Lamourouxia |
| 3. Upper corolla lobes not forming a galea enclosing the anthers | 4 |
| 4. Corolla salverform, the tube 8 cm or more long, calyx tubular | 6. Escobedia |

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| 4. Corolla campanulate or subcampanulate | 5 |
| 5. Leaves linear or subulate, corolla purple pink or white | 1. Agalinis |
| 5. Leaves lanceolate or broader, corolla white or yellow | 6 |
| 6. Corolla yellow, nearly or quite included in the calyx, calyx 6-8 mm | |
| | 2. Alectra |
| 6. Corolla white, exserted from calyx, calyx c 2 cm long, inflated. | 8. Melasma |
| 2. At least the upper leaves, those of the inflorescence (bracts) alternate, the basal leaves may be opposite or alternate | 7 |
| 7. Upper corolla lobes not forming a galea enclosing the anthers, corolla salverform | |
| | 3. Buchnera |
| 7. Upper corolla lobes forming a galea enclosing the anthers | 8 |
| 8. Floral bracts red yellow or white. Leaves distributed along the stem, not in a basal rosette, entire or incised | 4. Castilleja |
| 8. Floral bracts green. Leaves mostly all in a rosette, some along the central flowering stalks, deeply dissected | 9. Pedicularis |

1. Agalinis Raf.

Anisantherina Penn., *Gerardia* Benth.

By M.J.M. Christenhusz.

Annual or perennial, erect, branched, caulescent herbs, blackening when drying. Leaves opposite, sessile, the upper ones sometimes alternate, entire or rarely lobed at base, scabrous above or glabrous throughout. Inflorescence of solitary flowers in leaf axils, ebracteolate or with minute bractlets. Flowers showy, pedicellate to subsessile. Calyx campanulate, 5-lobed, the lobes entire to denticulate. Calyx tube broad, short or elongate, dilated above into a broad throat, the 5 rounded lobes spreading, the 2 posterior lobes often somewhat reduced in size. Stamens 4, with glabrous or hairy anthers, equal or unequal (didynamous). Style clavate, stigmatose at the apex. Fruit a loculicidally dehiscent capsule, the valves entire or bifid, the apex obtuse or short-acute. Seeds irregular, reticulate, numerous, not winged. *Parasitic on the roots of herbs, rarely on shrubs and one species thrives on Pinus.* C. 40 spp. Canada, United States, Mexico, Mesoamerica, Peru, Bolivia, Brazil, Paraguay, Argentina, Greater Antilles, Trinidad.

Bibliography: Pennell, F.W. *Proc. Acad. Sci. Philadelphia* 81: 111-249 (1929).

1. Pedicel with 2 bracteoles, placed about the middle of the pedicel; anther cells unequal, one cell somewhat reduced **1. A. hispidula**
1. Pedicel without bracteoles; anther cells equal 2.
2. Flowers subsessile, the pedicel < 12 mm; corolla usually smaller, ca. 1-2 cm, pink, rarely white **2. A. maritima**
2. Flowers long-pedicellate, the pedicel >19 mm; corolla large, ca. 2 cm, pink or purple **3. A. peduncularis**

1. Agalinis hispidula (Mart.) D'Arcy, *Ann. Missouri Bot. Gard.* 65: 770 (1978). *Gerardia hispidula* Mart., *Nov. Gen. Sp. Pl.* 3: 13, t. 207 (1829). Holotype: Brazil, *Martius s.n.* (M).

Anisantherina hispidula (Mart.) Penn., *Gerardia schippii* Standl.

Annual, green to purplish herb to 50 cm. Stems slender, quadrangular, hirsute. Leaves 4-6.5 × 1.5-2 cm, linear, the bases acute, the margins entire, revolute, the apices acute, scabrously pubescent above. Inflorescences many-flowered racemes. Pedicels 1.5-2.5(-4.5) cm, with two linear bracteoles, these 2-5 mm, placed about the middle of the pedicel and (sub-)opposite. Calyx tube 4.5-5.5 mm, round-campanulate, venation obscure, glabrous, the lobes 2-2.5 mm, ovate, the apex acute. Corolla 1.2-1.4 cm, bluish-purple, the tube 9-10 mm, narrowly campanulate, distally inflated anteriorly, slightly upcurved, the lobes 3-4 mm, shorter than the tube, distinct, spreading, the apices rounded, externally sparsely glandular-pubescent. Stamens didynamous, glabrous, the anther cells unequal, one somewhat reduced. Style 7-8 mm. Capsule 7-9 mm, globose, glabrous. Flowering and fruiting September to January. *Moist savannas, borders of lagunas, and in Pinus forest. Mostly parasitic on grasses.* T (*Sousa S. 13475*, MO); Ch (*Breedlove 46846*, MO); B (*Whitefoord 8317*, BM); G (*Molina R. 15724*, BM); H (*Clewell 3636*, MO); CR (*Gómez 18951*, MO); P (*d'Arcy & Antonio 13531*, MO). 0-500 m. (Mesoamerica, Venezuela, Guyana, Brazil, Cuba.)

2. Agalinis maritima (Raf.) Raf., *New Fl.* 2: 62 (1836). *Gerardia maritima* Rafin., *Med. Repos.* 5: 361 (1808). Type: United States, New Jersey, none designated. An original plate in NY is mentioned by Pennell (1929). Illustr.: Britton & Brown, *Illustr. Fl. N. U.S.* 3: 211 (1913).

Agalinis purpurea (L.) Penn. var. *chiapasana* Penn., *A. spiciflora* (Engelm.) Penn., *Gerardia cereifera* Millsp., *G. maritima* Rafin. var. *major* Chapm., *G. purpurea* L. var. *crassifolia* Pursh, *G. spiciflora* Engelm., *G. maritima* Rafin. var. *grandiflora* Benth. in Hook.

Annual, usually succulent, green or purplish herb to 80 cm. Stems terete to weakly angular, glabrous. Leaves 1-4 × 0.1-0.3 cm, narrowly to broadly linear, the bases attenuate, the margins entire, the apices obtuse to acute, more or less scabrous above, often somewhat succulent. Inflorescences solitary, in the axils of the upper leaves, forming 4-10 flowered racemes; pedicels 2-10(-12) mm. Calyx 3-4 mm long, campanulate, the lobes 0.5-1.5 mm, lanceolate-triangular, obtuse to acute, scabrous-ciliate. Corolla (12-)15-23 mm, pink, sometimes white, with two yellow lines and small purple-red spots within throat, the tube (8-)10-12 mm, pubescent externally, the lobes 4-6 mm, rounded to truncate or scarcely emarginate, ciliate, pubescent or glabrous. Stamens didynamous, glabrous, anther cells all well-developed. Style 4-14 mm. Capsule 4-7 mm, globose to globose-ovoid, glabrous. Flowering March to September. Fruiting April to October. *Savannas, wet prairies, salt flats and pine barrens near the sea. Parasite on Spartina and other salt marsh plants.* T (Cowan 3349, MO); Ch (*Breedlove* 35421, MO); B (*Whitefoord* 2483, BM); H (*Nelson* 760, MO); N (*Seymour* 5743, BM). 0-175 m. (eastern and southern United States, Mesoamerica, Antilles.)

This species complex is poorly understood and needs further study. The keys provided by Pennell (1929) are inconsistent and his species concept is therefore difficult to follow. *Agalinis purpurea* (L.) Penn. is a predominantly North American species and does not appear to occur in Mesoamerica. *Agalinis albida* Britton & Penn. is endemic to Cuba and Jamaica, but white flowered specimens of *A. maritima* have been found and these have therefore often been misidentified. *Agalinis maritima* is also often misidentified as the small-flowered *A. harperi* Penn. ex Small, a species from Georgia, Florida and the Bahamas. These very similar taxa remain confusing and it is possible that future molecular study proves some of these species to be conspecific.

3. *Agalinis peduncularis* (Benth.) Penn., *Rhodora* 20: 135 (1918). *Gerardia peduncularis* Benth., *Comp. Bot. Mag.* 1: 209 (1835). Holotype: Mexico, *Tate* 30 (K) *Gerardia peduncularis* var. *guatemalensis* Benth.

Annual (or perennial) green or purplish herb to 70 cm. Stems quadrangular, striate, glabrous to sparsely scabrellous. Leaves 3-4 × 0.05-0.15 cm, narrowly linear, scabrous above, the bases attenuate, the margins entire, the apices acuminate. Inflorescences elongate, 6-12 flowered racemes; pedicels glabrous, 2-5(-7) cm. Calyx tube 4-6 mm, broadly campanulate, the lobes 1-2.5 mm, triangular-lanceolate or filiform, acuminate, pubescent within. Corolla 2-3.2 cm, purplish pink, with two yellow lines and purplish dots in the throat, pubescent to glabrous outside, the tube 18-23 mm, strongly upcurved, the lobes 7-9 mm, truncate to emarginate, ciliate, externally pubescent to nearly glabrous. Stamens equal, densely lanose, anther cells all well-developed. Style 13-15 mm, pubescent to glabrous. Capsule 6-8 mm, globose-ovoid, glabrous. Flowering and fruiting May to December. *Open Quercus-Pinus forest on sandy soil, parasitic on grasses and possibly on oak.* Ch (*Breedlove 46366*, MO); B (*Davidse & Brant 33090*, MO); G (*Hartweg 607*, K); H (Nelson, 2008). N (Standley & Williams, 1973) 900-2700 m. (Mexico, Mesoamerica.)

2. *Alectra* Thunb.

By J.J. Morawetz.

Erect annual herbs. Stems simple or branched, hispid. Leaves opposite, sub-opposite or alternate, lanceolate, the margins dentate to serrate, the upper and lower surfaces hispid. Inflorescences dense to loose spikes, bracts leaf-like, flowers opposite, bracteoles linear to lanceolate, hispid. Calyces campanulate, actinomorphic, 5-lobed, ciliate; corollas campanulate, weakly zygomorphic, 5-lobed, yellow; stamens 4, didynamous, included, the filaments of the longer pair pubescent, the filaments of the shorter pair glabrous to slightly pubescent, the base of the thecae rounded; ovary globose, the style strongly recurved, the stigma bifid (in Mesoamerican specimens). Capsules globose to ellipsoid. 12 spp. Africa extending through the Arabian Peninsula into Southeast Asia; two species in the Americas, one in Mesoamerica.

Most *Alectra* species are photosynthetic parasites, but one of the African species is holoparasitic with leaves reduced to scales, lacking green pigmentation in vegetative structures. Host records are often lacking, but typical hosts include grasses and sedges.

Bibliography: Hampshire, R & Sutton, D. *Ann. Miss. Bot. Gard.* 71:1184 (1984). Morawetz, J.J. & Wolfe, A.D. *Syst. Bot.* 34: 561-569 (2009). Morawetz, J.J. *Syst. Bot. Monographs* (2010, in review).

1. *Alectra aspera* (Cham. & Schltld.) L.O.Williams, *Fieldiana, Bot.* 34(8): 118. 1972. *Glossostylis aspera* Cham. & Schltld. *Linnaea* 3: 23. 1828. Holotype: Brazil, *Beyrich s.n.* (B).

Alectra brasiliensis Benth. *A. fluminensis* (Vell.) Stearn, *A. melampyroides* (Rich.) Kuntze [non *A. melampyroides* Benth.], *Melasma brasiliense* (Benth.) Chodat & Hassler, *M. melampyroides* (Rich.) Pennell, *Nigrina melampyroides* (Rich.) Kuntze, *Pedicularis melampyroides* Rich., *Scrophularia fluminensis* Vell.

Plants to (23-)29-83 cm. Stems simple or branched, papillose-hispid. Leaves 2.8-5.6(-6.5) × 0.82-1.4(-1.5) cm, petiolate, narrowly lanceolate, the upper and lower surfaces sparsely to densely papillose-hispid, the base truncate to shortly attenuate, the margins dentate to serrate, the apex acute to acuminate, rarely rounded; petioles to 1-2 mm. Inflorescences spicate, dense to loose; floral bracts 1.2-2.1(-3.4) × 0.4-0.7(-1.2) cm, leaf-like; pedicels 3-4 mm; bracteoles 4-6(-9.5) × 0.5-0.7 mm, linear to lanceolate, papillose-hispid. Flowers numerous; calyces 7-8 mm, the lobes triangular, ciliate along the margins and nerves; corollas 9-11 mm, yellow, the lobes rounded, glabrous. Ovary 2-3 mm in diameter, globose; style 3.5-4 mm. Capsules to 6-9 mm, globose to ellipsoid; seeds numerous. Flowering and fruiting December-April. *In damp grasslands and old fields.* Ch (*Martínez S. 11047*, MEXU); B (*Gentle 7518*, MO); G (*Standley & Williams, 1973*); H (*Blackmore & Heath 2160*, BM); N (*Proctor et al. 27375*, MICH); CR (*Herrera 1820*, MO); P (*Maas & Dressler 714*, MO). Elevation 30-150 m. (Mesoamerica, Venezuela, Guayanas, Bolivia, Brasil, Paraguay, Argentina, West Indies).

Alectra aspera is widely distributed in the Caribbean, Mesoamerica and northeastern South America to northern Argentina, commonly occurring in grasslands and disturbed habitats.

3. *Buchnera* L.

Piripea Aublet

By J.J. Morawetz & M.J.M. Christenhusz.

Erect or ascending annual or perennial parasitic herbs, sometimes woody at base. Stem simple or branched, glabrous to hispid, the hairs often bulbous-based and

geniculate. Leaves alternate to opposite, hispid. Inflorescences dense to loose spicate racemes; bracts leaf-like; flowers alternate to subopposite, bracteoles linear to lanceolate. Calyx tubular, actinomorphic to slightly oblique, 5-lobed. Corolla white, blue, pink or purple, tubular, weakly zygomorphic, salverform, 5-lobed, the lobes flaring, the palate pubescent. Stamens 4, didynamous, included; anthers monothealous. Ovary ovoid, style straight, stigma clavate. Capsule ovoid to cylindrical. Seeds numerous, minute. c 120 spp. North America, Mesoamerica, South America, Asia, Africa. The majority of *Buchnera* species occur in Africa (approx. 100 spp.). Philcox (1965) recognized 16 species in the New World, four of which occur in Mesoamerica.

Recently *Buchnera* was demonstrated to be monophyletic (Morawetz *et al.* in press), including at least one New World member (Morawetz, unpubl. data).

Bibliography: Philcox, D. *Kew Bulletin* 18: 275-315 (1965). Thieret, J.W. *Ceiba* 8: 92-101 (1960), Morawetz, J.J. *et al. Taxon* 59(2). 2010. In press.

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| 1. Calyx glabrous, corolla externally glabrous | 3. B. palustris |
| 1. Calyx hairy, corolla externally glabrous or hairy | 2. |
| 2. Corolla externally glabrous or with a few isolated hairs only | 4. B. pusilla |
| 2. Corolla externally pubescent-tomentose | 3. |
| 3. Calyx 10-veined with prominent parallel, eventually reticulating veins between | 5. B. rosea |
| 3. Calyx 10-nerved without veins between | 4. |
| 4. Capsule exceeding the calyx | 1. B. floridana |
| 4. Capsule equal to or shorter than the calyx | 2. B. obliqua |

1. *Buchnera floridana* Gand., *Bull. Soc. Bot. France* 66: 217 (1919). Isotype: United States, Florida, *Ohlinger 463* (BM).

Buchnera angustifolia Raf., *B. breviflora* Penn. in Small

Herbs to 60 cm. Stems slender, scabrous-hispid to glabrescent, usually simple. Leaves 1.4-5 × 0.2-1.5 cm, linear-lanceolate, the lower leaves broader lanceolate, the base attenuate, the margins entire or occasionally irregularly dentate on lower leaves, the apex acute to rounded, the upper and lower surfaces sparsely to densely scabrous-hispid, the veins palmate-parallel, secondary venation reticulate. Inflorescences spicate, lax; floral bracts 0.4-1 × c 0.1 cm, narrowly lanceolate to lanceolate, the margins entire, the upper and lower surfaces hispid; bracteoles 1-3 × 0.1-0.3 mm,

lanceolate, the margins entire, ciliate, the upper and lower surfaces hispid. Calyx 4-6 mm, hispid pubescent throughout, lobes narrowly triangular, prominent veins 10, hispid. Corolla 1-1.3 cm, pale lavender or violet, the tube tomentose outside, the lobes hispid along the margin,. Capsules to 7 mm, exceeding the calyx. Flowering & fruiting April-August. *Lowland savannas*. T (*Matuda 3514*, F); C (*Cabrera C. 11879*, MO); B (*Spellman 1541*, MO); G (*Tún Ortíz 918*, BM). 0-300 m. (Southern United States, Mesoamerica, Antilles, Trinidad.)

2. *Buchnera obliqua* Benth. in DC., *Prodr.* 10: 498 (1846). Lectotype (designated by Philcox, 1965): Mexico, *Alaman s.n.* (K).

Buchnera arizonica (A.Gray) Penn., *B. pilosa* Benth. var. *arizonica* A.Gray
Herbs to 50(-100) cm. Stems scabrid-pilose, simple or branched, spreading-ascending. Leaves 2-7 × 0.3-1.4 cm, linear to narrowly lanceolate, the lowest leaves sometimes obovate, the base attenuate, the margins entire or irregularly coarse-dentate, the apex acute to obtuse, the upper and lower surfaces scabrous-pubescent. Inflorescences spicate, dense to loose; floral bracts leaf-like, linear-lanceolate, the margins entire, the upper and lower surfaces scabrid; bracteoles 2.3-5 × 0.1-0.5 mm, linear, the margins entire, ciliate, the upper and lower surfaces hispid. Calyx 6-9 mm, pubescent throughout, the tube somewhat obliquely constricted above in fruit, the lobes narrowly triangular, prominent veins 10. Corolla 0.8-1.65 cm, pubescent. Capsules c 5 mm. Flowering & fruiting July-March. *Lowland savannas and montane grassy slopes*. Ch (*Laughlin 1240*, F); C (*Cabrera 8454*, MO); G (*Williams et al. 40521*, F); ES (*Villacorta 2901*, MO); P (*Ebinger 1077*, MO). 10-2500 m. (Arizona, Mexico, Mesoamerica, Ecuador.)

3. *Buchnera palustris* (Aublet) Spreng., *Syst. Veg., ed. dec. sexta* 2: 805 (1825). *Piripea palustris* Aublet, *Hist. pl. Guiane* 2: 628, t. 253 (1775). Holotype: French Guiana, *Aublet s.n.* (BM). N.v.: Flor del cielo. Illustr.: not found.

Buchnera leiantha Standl., *B. weberbaueri* Diels

Delicate herbs to 60 cm, usually smaller. Stems slender, glabrous-glabrescent, not branched. Leaves 0.5-5 × 0.08-0.3 cm, linear-lanceolate, the base attenuate, the margins entire, the apex acute to rounded, the upper and lower glabrous-glabrescent. Inflorescences loosely spicate; bracteoles 0.3-0.4 × 0.1-0.18 cm, narrowly lanceolate to lanceolate, the margins entire, glabrous or minutely ciliate. Calyx 6-8 mm,

glabrous, the lobes narrowly triangular, prominent veins 10. Corolla 0.7-1.2 cm, white, pink-purplish or lavender, glabrous. Capsules 5-6 mm. Flowering & fruiting September-January. *Open grassy slopes and in fields*. B (Wiley 365, MO); CR (Weston 2080, MO); P (Terry 1273, F). 800-1500 m. (Mesoamerica, Colombia, Venezuela, Guianas, Ecuador, Peru, Brazil).

4. *Buchnera pusilla* Kunth, *Nov. Gen. Sp. (quarto ed.)* 2: 340. 1817 [1818].

Isotype: Colombia, *Humboldt s.n.*; (B destroyed, photo F!; original material may be present at P but has not been located). N.v.: Cabalchichibe, xcabal-xaan (Y). Illustr.: Standley & Williams (1973), *Fieldiana, Bot.* 24, part 9, no 4: 337, Fig. 68).

Buchnera lithospermifolia Benth., *B. major* Polak., *B. mexicana* Hemsl., *B. mexicana* var. *minor* Hemsl., *B. minor* (Hemsl.) L.Riley, *B. pilosa* Benth., *B. tinctoria* Bertol.

Herbs to 50 cm. Stems slender, hispid, simple or branched. Leaves 1.2-6.5 × 0.1-0.45 cm, linear or lower leaves occasionally narrowly lanceolate, the base attenuate, the margins entire or occasionally dentate on lower leaves, the apex acute to rounded, the upper and lower surfaces sparsely to densely hispid. Inflorescences spicate, dense to loose. Bracts 0.4-1 × 0.1-0.15 cm, narrowly lanceolate to lanceolate, the margins entire, the upper and lower surfaces hispid; bracteoles 4-5 × 0.2-0.5 mm, linear, the margins entire, the upper and lower surfaces hispid. Calyx 6-8 mm, pubescent on the veins only, lobes narrowly triangular, prominent veins 10. Corollas 1.2-1.65 cm, white to bluish white, glabrous (or sometimes with a few hairs only) outside, pubescent in the throat. Capsules to 6 mm. Flowering & fruiting August-March. *Grasslands and rocky hillsides*. T (Matuda 3514, MICH); Ch (Breedlove 28027, RSA); Y (Steere 1368, MICH); C (Cabrera 13312, RSA); QR (Gómez-Pompa 47/94, MICH); B (Bartlett 11246, MICH); G (Standley 60885, MICH); H (Standley 18482, F); ES (Monterrosa 744, F); N (Narvaez 1715, MICH); CR (Jiménez M. 1438, F); P (Hunter 33, MO). Elevation 25-1750(-2200) m. (Mexico, Mesoamerica, Colombia, Venezuela, Ecuador, Peru).

As noted by Philcox (1965), *B. pusilla* is variable in appearance, more than the other New World species, ranging from small to large, and with stems being simple or much branched. Leaf shape varies from linear and entire to lanceolate and toothed (the lower leaves), and leaf length varies considerably as well.

5. *Buchnera rosea* Kunth, *Nov. Gen. Sp.* 2: 342 (1818). Holotype: Venezuela, *Humboldt & Bonpland* 585 (P).

Buchnera rosea var. *congesta* Schmidt

Herbs to c 140 cm. Stems slender, hispid, simple or branched. Leaves 2-8.5 × 0.3-1.5 cm, the lower leaves lanceolate, entire or irregularly lobed, the upper leaves linear-lanceolate, the base attenuate, the margins entire or irregularly dentate to lobate, especially in the lower leaves, the apex acute to obtuse, the upper and lower surfaces densely scabrous-hispid. Inflorescences spicate, quite dense, floral bracts 0.2-1 × c 0.1-0.3 cm, narrowly lanceolate, the margins entire, the upper and lower surfaces hispid; bracteoles 3-4 × 0.5-1.5 mm, ovate-lanceolate, the margins entire, ciliate, the upper and lower surfaces hispid-pubescent. Calyx 5-7 mm, with many prominent veins, most parallel-reticulate between the main veins, appearing as if the calyx has many ribs, the lobes narrowly triangular. Corolla 1.2-1.7 cm, white to pale rose-purple or mauve, pubescent outside. Capsules 4-6 mm. Flowering & fruiting December-February. *Fields and meadows*. P (*Barclay* 983, BM). 0-300 m. (Panama [especially Isla Taboga], Colombia, Venezuela, Ecuador.)

4. *Castilleja*

By J.M. Egger.

1. *Castilleja arvensis* Schldl. & Cham. *Illustr.*: Steyermark & Huber, 1978. *Flora del Avila* fig. 277.

2. *Castilleja ctenodonta* Eastw. var. ***altorum*** (Standl. & Steyer.) J.M.Egger

3. *Castilleja filiflora* G.L.Nesom

4. *Castilleja integrifolia* L.f.

4.a. var. *chiapensis* (Brandege) J.M.Egger

Castilleja chiapensis Brandege

Ch (Stafford et al. 342, BM),

4.b. var. *integrifolia*

H (Pilz 1367, BM), Ch (Ghiesbreght 655, BM), N (Moreno 14363, BM), G (Hartweg 530, BM), ES (Croat 42326, BM),

4.c. var. longibracteata (M.Martens & Galeotti) J.M.Egger

5. Castilleja irasuensis Oerst.

5.a. var. irasuensis

CR (Pittier 7536, BM)

5.b. var. quirosii (Standl.) J.M.Egger, ined.

Castilleja quirosii Standl.

CR (Martin 3823, BM)

5.c. var. talamancensis (N.H.Holmgren) J.M.Egger, ined.

Castilleja talamancensis N.H.Holmgren

CR (Chacon 558, BM)

6. Castilleja lentii N.H.Holmgren

7. Castilleja pectinata M.Martens & Galeotti

8. Castilleja tapeinoclada Loes., Bulletin de l'Herbier Boissier, sér. 2, 3(4): 285-286.

1903. Type: Guatemala, in dept. eodem in pratis alpinis ad Ziha in 2840 m alt, Seler 2933 (B, destroyed). A neotype needs to be selected.

(needs to be neotypified, as all type material was apparently destroyed at B. I've worked hard (unsuccessfully) to locate any trace of the types.)

Castilleja katakyptusa Loes.

G (Lehmann 1516, BM)

9. Castilleja tayloriorum N.H.Holmgren

5. Conopholis Wallr.

By M.J.M. Christenhusz.

Achlorophyllous, fleshy herbs, becoming brittle with age. Stems simple or sparsely branched, glabrous to densely glandular-pubescent, arising from a dark brown to black gall. Leaves scale-like, sessile, alternate, venation clearly visible or evanescent, the lower leaves tightly imbricate, the upper larger, scattered to slightly imbricate. Inflorescence a compact or loose raceme, the flowers axillary to a sessile scale-like bract; pedicels very short to elongate; bracts longer than calyx. Calyx tubular, bilabiate, 2- or 4-5-toothed or -lobed, the divisions broadly to narrowly acute or rounded; bracteoles absent or present, the pair subulate, just below the calyx. Corolla tubular, creamy white, sometimes apically reflexed, bilabiate; upper lip rounded, notched, rarely 3- or 4-lobed; lower lip 3-lobed, rarely 1- or 2-lobed, the lobes rounded to acute; corolla somewhat persistent in fruit, ruptured and dislodged by the expanding capsule. Stamens 4, the lateral 2 sometimes connate, epipetalous; filaments elongate; anthers free, exserted. Style apically reflexed, included or exserted, persistent or deciduous in fruit; stigma capitate. Fruit a bivalved, irregularly dehiscent, brown to black capsule. Seeds oval, triangular, quadrangular or rhomboidal, usually with rounded angles, reticulately black-marked. *Obligate parasites on oaks, in moist mixed or deciduous forests, oak woodlands and mixed montane forests, rarely parasitizing other hosts like Acer, Carya, Cornus, Cupressus, Fagus, Juglans, Juniperus, Liquidambar, Pinus or Ulmus. 2 spp. Southeast Canada, southwestern and eastern United States, Mexico, Mesoamerica.*

Bibliography: Haynes, R.R. A monograph of the genus *Conopholis* (Orobanchaceae). *Sida* 4(3): 246-264 (1971).

1. *Conopholis alpina* Liebm., *Förh. Skand. Naturf. Möte* 4: 184 (1844).

Lectotype (designated by Haynes, *Sida* 4(3): 254, 1971): Mexico, Puebla, *Liebmann 3719* (C).

C. panamensis Woodson, *C. sylvatica* Liebm. N.v.: squawroot (English)

Achlorophyllous herbs growing from swollen galls. Leaves (0.7-)1.2-2.1 × 0.3-0.7(-1.1) cm, lanceolate to narrowly elongate-triangular, widest at or just above the base, glabrous, the margins entire, the apices sharply acute; venation usually prominent. Inflorescence compact, (20-)28-40 mm thick; bracts 2-2 × 0.4-0.6 cm, lanceolate to narrowly elongate triangular, glabrous, often concealing the calyx. Calyx irregularly 2-, 4- or 5-toothed or -lobed, the tube 3.3-4.5 mm, cylindrical, split

anteriorly, or not, the teeth or lobes acute to rounded, 0.3-1.6 mm; bracteoles 0-2, 2-4.5 mm. Corolla 7.5-15.5 mm. Stamens with filament 9-12.5 mm, glabrous. Style and stigma 5.5-8 mm, not persistent in fruit. Capsule 0.8-1.6 × 0.5-1.1 cm. Seeds 0.4-1.7 × 0.3-1.2 × 0.3-0.8 mm. Flowering December to April. *Under oaks in moist deciduous or mixed montane forests.* Ch (*Hampshire et al.* 481, BM); G (Gibson, 1974); H (Nelson, 2008); CR (*Burger & Liesner* 7506, BM); P (Knapp & Monro 10076, BM) c. 2000-3000 m. (southwestern United States, Mexico, Mesoamerica).

In Mesoamerica this species is only represented by var. *alpina*. *Conopholis alpina* var. *mexicana* (A.Gray ex S.Wats.) R.R.Haynes is restricted to northern Mexico and the western United States and differs in having a densely glandular pubescence, firmer scales and longer corollas (Haynes, 1971).

6. *Escobedia* Ruiz & Pav.

Micalia Rafin., *Silvia* Vell.

By M.J.M. Christenhusz.

Perennial hemiparasitic herbs. Roots orange (sometimes used for dyeing). Stems simple or branched, striate or angulate. Leaves sessile, opposite, reticulately veined. Inflorescences racemose. Flowers axillary, singly, very large. Peduncles naked or with 2 bracts. Calyx tubular or funnel-shaped, conspicuously veined, the 5 lobes much shorter than the tube. Corolla white, salverform, 5-lobate, the tube slender, glandular puberulent or glabrous, the lobes pilose within. Stamens 4, equal, anthers narrow, glabrous. Style with 2 stigmatic lines at the apex. Fruit an ellipsoid glabrous capsule, surrounded by enlarged persistent calyx, with numerous seeds. c. 6 spp. (Mexico, Mesoamerica, Peru, Colombia, Bolivia, Brazil, Paraguay).

Bibliography: Pennell, F.W. *Proc. Acad. Nat. Sci. Philadelphia* 83: 411-426 (1931). Thieret, J.W. *Ceiba* 8: 92-101 (1961).

1. Leaves oblong or elliptic-oval, usually wider than 1.5 cm; bracteoles inserted at the base of the calyx **1. *E. grandiflora***

1. Leaves linear-lanceolate to narrowly lanceolate, usually narrower than 1 cm; bracteoles near middle of peduncle **2**

2. Calyx lobes triangular-ovate or broader, broader than long **2. *E. guatemalensis***

2. Calyx lobes linear to lanceolate or ovate lanceolate, longer than broad

3. *E. laevis*

1. *Escobedia grandiflora* (L.f.) Kuntze, *Rev. Gen. Pl.* 3: 231 (1898).

Buchnera grandiflora L.f., *Suppl. Pl.* 287 (1781). Lectotype (designated by D'Arcy, *Ann. Missouri Bot. Gard.* 66: 218 (1979): Colombia, *Mutis s.n.* (LINN-790.2). Illustr.: Holmgren & Molau, 1984. *Fl. Ecuador* 21: 149, fig. 25 A-C. N.v.: Campanula (G).

Escobedia brevipes Penn., *E. curialis* (Vell.) Penn., *E. foliolosa* Penn., *E. longiflora* Penn., *E. parimensis* Penn., *E. reticulata* Penn., *E. scabrifolia* Ruiz & Pav., *Micalia grandiflora* (L.f.) Rafin., *Silvia curialis* Vell.

Erect stout herbs to 1 m. Stems simple, ridged, flattened, scabrously hairy. Leaves sessile, 3-12 × 1.5-5 cm, oblong to ovate-elliptic, the bases rounded-cordate, the margins coarsely serrate (to subentire), the apices acute to obtuse, the primary veins palmately parallel, the secondary veins reticulate, scaberulous adaxially, scabrous abaxially on the veins. Inflorescences racemose, flowers axillary the pedicel + peduncle 2-6 cm, bracteoles 5-15 × 0.5-2 mm, usually just below the calyx. Calyx tube 3.5-6 cm, the lobes 4-5 × 5-6 mm, broadly triangular, acute or acuminate, primary venation prominent, parallel, secondary venation obscure and reticulate, scabrously hairy. Corolla tube 10-14 cm, slightly hairy within, the lobes c. 2 × 2.5 cm, the apex rounded. Capsule c. 3 cm. *Open bushy or rocky slopes and in Pinus forest.* Ch (*Gomez Santiz 331*, MO); G (*Véliz et al. 94.3827*, MO); CR (*Moraga 524*, MO); P (*Woodson et al. 1163*, MO). 1000-2500 m. (Mexico, Mesoamerica, Colombia, Venezuela, Ecuador, Peru, Bolivia, Brazil, Argentina.)

2. *Escobedia guatemalensis* Loes., *Verh. Bot. Vereins Prov. Brandenburg*

53(1): 83 (1911). Lectotype (designated by Williams, *Fieldiana, Bot.* 34: 120 (1972): Guatemala, *Seler & Seler 2663* (GH). Illustr.: not found. N.v.: Campana, campana blanca, azucena silvestre (G).

Erect herb. Stems simple, angular and somewhat flattened. Leaves sessile, 2.5-12 × 0.6-0.8 cm, linear-lanceolate, the bases rounded to slightly cordate, the margins widely dentate, the apices acute, the primary veins parallel, the secondary veins reticulate, scabrously hairy abaxially and along the margins. Inflorescences racemose, flowers axillary, the pedicel + peduncle 2-4.5 cm, the bracteoles 3-11 × 0.3-1 mm. Calyx tubular, the tube 6-7 cm, the lobes 6-7 × 5-7 mm, broadly triangular, acute, primary venation prominent, parallel, secondary venation obscure and reticulate,

scabrously hairy. Corolla tube 12-15 cm, pubescent within, the lobes c. 3×2.7 cm, the apex rounded. Capsule c. 2-3.2 cm, obovate. *Open meadows and on cliff faces and limestone bluffs*. Ch (*Breedlove 27263*, MO); G (*Véliz 94.3827*, MO). (800-)1000-1350(-1500) m. (Endemic.)

3. *Escobedia laevis* Schltld. & Cham., *Linnaea* 5: 108 (1830). Holotype: Mexico, *Schiede 181* (HAL-98534). Illustr.: Standley & Williams 1973: 353, fig. 73. N.v.: Azafrán (T, Ch).

Buchnera longifolia Sessé & Moc., *Escobedia linearis* Schltld.

Erect, glabrous herbs to 1 m. Stems simple. Leaves 4-20 \times 0.4-0.7 cm, linear, often incurved, the bases attenuate to rounded, the margins widely denticulate to (sub-)entire, the apices acuminate, the primary veins parallel, the secondary veins reticulate but obscure, often scabrously hairy above, glabrous beneath. Inflorescences racemose, flowers axillary, the pedicel + peduncle 4-7 cm, the bracteoles absent or 6-25 \times 0.5-1.3 mm, linear, inserted near the middle of the peduncle. Calyx tube 4-5.5 cm, the lobes 10-18 \times 3-4 mm, lanceolate, acuminate. Corolla tube 9-12 cm, glandular-puberulent outside, pubescent within, the lobes c. 1.5-2.2 \times c. 2-2.5 cm, the apex rounded. Capsule c. 1.5-2.5 cm. Open marshes and bogs. T (*Cowan 2291*, MO); Ch (); B (*Hunt 115*, BM); G (*Proctor 25203*, MO); H (*Nelson et al. 5980*, MO); CR (*Grayum et al. 5993*, BM). (500-)1500-1800 m. (Mexico, Mesoamerica.)

The orange-yellow roots give a yellow dye similar in colour to saffron and are sometimes used to colour food.

7. *Lamourouxia* Kunth, *nom. cons.*

By M.J.M. Christenhusz.

Shrubs or perennial herbs, sometimes woody at base. Stems brittle, erect or scandent, glabrous or pubescent. Leaves opposite, simple or dissected. Inflorescences appearing racemose, paniculate or corymbose, flowers in the axils of upper leaves (foliose bracts). Calyx campanulate, 4-lobate, the lobes more or less equal, or the calyx cleft abaxially nearly to the base, enlarged and persistent in fruit. Corolla bilabiate, red or orange, large and showy, the tube more or less ventricose, the upper lip erect, usually galeate, entire to bilobate, the lower lip normally shorter, narrow, trilobate, biplicate at the sinuses within. Stamens 4, didynamous, lanate, included in the galea, all fertile

or 2 fertile and 2 sterile staminodial and much reduced. Style usually exerted, persistent in fruit, apical stigma. Fruit an ovoid loculicidal capsule, valves entire. Seeds numerous, reticulate or reticulate-bullate. 28 spp. (Mexico, Mesoamerica, Colombia, Ecuador, Peru, Bolivia)

Bibliography: Robinson, B.L. and Greenman, J.M. *Am. J. Sci.* 50: 169-174 (1895). Ernst, W.R. *Smithsonian Contr. Bot.* 6: 1-63 (1972).

- | | |
|--|--------------------------|
| 1. Leaves deeply once or twice pinnatifid | 4. L. multifida |
| 1. Leaves simple, entire or dentate | 2. |
| 2. Stamens more or less equal | 3. |
| 2. Stamens strongly didynamous | 5. |
| 3. Calyx glabrous to glandular pubescent, the lobes never dentate. Leaves mostly glabrous or glabrate | 6. L. xalapensis |
| 3. Calyx copiously (glandular) pubescent, the lobed usually dentate. Leaves mostly pubescent | 1. L. dependens |
| 5. Calyx and leaves glabrous or glabrescent, not glandular. Leaves usually lanceolate to narrowly elliptic or narrowly lanceolate, rarely narrowly ovate | 3. L. lanceolata |
| 5. Calyx and leaves pubescent, sometimes glandular. Leaves ovate to rounded ovate, often broadly so | 6. |
| 6. Leaves petiolate, ovate, tapered to the base, usually small. Calyx not glandular | 2. L. gutierrezii |
| 6. Leaves sessile, rounded, cordate and clasping at base, usually large. Calyx glandular | 5. L. viscosa |

1. Lamourouxia dependens Benth. in DC., *Prodr.* 10: 539 (1846). Holotype: Guatemala, *Skinner s.n.* (K). N.v.: Salviasija de monte (G).

Lamourouxia dependens var. *apiculata* Hunnewell & L.B.Sm., *L. montana* Hunnewell & L.B.Sm.

Terrestrial or epiphytic weak shrubs or herbs. Stems scandent or reclining, to 3 m. Leaves 2.8-5.6 × 1-2.5 cm, ovate or broadly elliptic, mostly pubescent, sometimes glabrate, the bases truncate or obtuse, the margins doubly serrate or irregularly dentate, the apices acute or rounded; petioles 3-7 mm, distinct. Inflorescence racemose, arching; pedicels 6-17 mm, usually reflexed, the flowers inverted. Calyx 8-16 × 5-10 mm, mostly pubescent and glandular, frequently one-third or one-fourth the

length of the corolla, the lobes 5-13 mm long, broadly acute, usually coarsely dentate near the apex. Corolla 20-44 × 8-11 mm, scarlet red or red-orange, the upper lip 11-15 mm long, minutely apiculate or emarginate distally, the lobes obtuse; the lower lip with lobes 2-5 × 3 mm, apices mostly obtuse. Stamens subequal, sparsely pubescent, all fertile, the lobes slightly or not acuminate at base, becoming exerted and spreading. Capsules 10 × 6 mm, broad spheroidal to ellipsoidal. Flowering October to March. *Moist or wet thickets, dense cloud forest, ravines, Juniperus scrub, or on open banks.* Ch (Mendez Larios & Villaseñor Ríos, 2001); G (*Christenhusz 5304*, BM). 2400-3000 m. (Mexico, Guatemala).

2. *Lamourouxia gutierrezii* Oerst. in Benth. & Oerst., *Vidensk. Meddel. Dansk Naturhist. Foren. Kjøbenhavn* 1853(1-2): 29 (1854). Holotype: Costa Rica, Ørsted 9398 (C, isotype K).

Lamourouxia scabra Benth. ex Seem.

Stems erect to 2 m. Leaves 0.8-2.5 × 0.4-1 cm, elliptic to ovate, scabrous-pubescent, the bases acute to tapered, the margins crenate, sometimes serrate, the apices acute; petioles to 2 mm. Inflorescences racemose erect; pedicels 2-3(-4) mm. Calyx 6-10 × 4-5 mm, pubescent, the lobes 2-4 mm, broadly triangular, occasionally incised. Corolla red, sometimes orange, yellowish, or white, 32-44 mm × 4-8 mm, the upper lip 12-18 mm, the lower lip with lobes 1-2 mm. Stamens didynamous, the upper pair rudimentary, the lower pair with thickened filaments and shaggy anthers with mucronate lobes. Capsules 9-13 × 7-8 mm, ovoid to spherical. Flowering from September to February. CR (*Gómez et al. 23245*, BM); P (*Wilbur 13526*, MO). 750-3250 m. (Endemic).

3. *Lamourouxia lanceolata* Benth. in DC., *Prod.* 10: 542 (1846). Holotype: Mexico, Chiapas, *Linden 198* (K, isotype G).

Lamourouxia integerrima Donn.Sm., *L. longiflora* var. *integerrima* (Donn.Sm.) L.O. Williams, *L. longiflora* var. *lanceolata* (Benth.) Benth.

Scrambling shrubs. Branches to 3 m. Leaves 1.9-5.7 × 3-14 mm, lanceolate to narrowly elliptic or narrowly lanceolate, rarely ovate, occasionally somewhat falcate, glabrous or glabrate, or with a few hairs along major veins, the bases attenuate, margins entire, sinuate or serrate, the apices acute. Inflorescences depressed or ascending; pedicels 1-14 mm. Calyx 7-18 × 3-6 mm, glabrous or glabrate, the lobes 2-

15 mm, entire or serrate. Corolla 32-51 × 5-11 mm, scarlet red or red-orange, rarely yellow, the upper lip 8-20 mm, the lobes reflexed, the lower lip with lobes of 2-4 mm. Stamens didynamous, the upper pair short and rudimentary, the lower pair with expanded filaments and shaggy anthers. Capsules 10-14 × 7-8 mm, ovoid. Flowering October to June. *Moist pine-oak and montane cloud forest, often in disturbed secondary forests, along roadsides, pasture edges, clearings and savannas.* Ch (Breedlove 31095, MO); G (Christenhusz 5486, BM); H (Daniel & Araque 9852, MO); ES (Monro et al. 2233, MO); CR (Almeda 4222, MO). 1200-3200 m. (Mexico, Mesoamerica.)

Lamourouxia lanceolata and *L. integerrima* deeply intergrade, forming hybrid swarms that are difficult to tease apart. It is often impossible to identify specimens to the species level, and for this reason they were often treated as varieties of *L. longiflora* Benth., which is a different species that has little to do with the *L. lanceolata* complex. Three varieties were treated by Standley & Williams (1973) differing in the shape of the calyx lobes and the leaf margins. Ernst (1972), who also noted that this was a complex group, distinguishes between the two species, but there are many specimens that do not fit the following key:

Inflorescence tips ascending; calyx lobes to 6 mm	<i>L. integerrima</i>
Inflorescence tips recurved; calyx lobes 6-25 mm	<i>L. lanceolata</i>

4. *Lamourouxia multifida* Kunth, *Nov. Gen. Sp. (quarto ed.)* 2: 338 (1817).

Holotype: Mexico, *Humboldt & Bonpland* 4273 (P-Bonpl.). N.v.: Tzitzim wamal, tzajal pimienta wamal, tzitzim tzajal, tzotzil wamal (Ch); guacamaya, flor de carpintero, julia, tramieta (G);

Lamourouxia grandiflora Benth. ex. J.J.Linden, *L. multifida* Kunth var. *grandiflora* Benth., *L. laciniata* M.Mart. & Gal., *L. laciniata* var. *pilosa* M.Mart. & Gal., *L. tepicana* (M.E.Jones) Penn. in C.V.Morton, *Pedicularis tepicana* M.E.Jones

Stems erect to 2 m. Leaves 21-57 × 10-33 mm, glabrous to pubescent, deeply once or twice pinnatifid, 2-5-lobed on a side, divisions 1-4 mm broad, linear, mucronulate, the margins entire, the apices acute; petiole 6-23 mm. Inflorescence spicate, erect; pedicels 2-6 mm long. Calyx 6-11 × 4-7 mm, pubescent to glabrate, the lobes 2-7 mm, broadly triangular to subulate, entire or rarely toothed. Corolla 22-55 × 7-17 mm, usually red sometimes reddish orange or pinkish, ventricose, the upper lip

4-16 mm, little or not lobed, the lobes of the lower lip 4-6 mm. Stamens subequal, shaggy, all fertile, the anther lobes prominently mucronate below. Capsules 9-11 × 5-6 mm, ovoid. Flowering throughout the year with a peak from August to December. *Bushy hillsides, rocky places, in evergreen cloud forests and in Pinus/Quercus or mixed montane forests.* Ch (*Breedlove 40297*, MO); G (*Davidson 3299*, MO). 1000-3300 m. (Mexico, Guatemala).

5. *Lamourouxia viscosa* Kunth, *Nov. Gen. Sp. (quarto ed.)* 2: 338 (1817).

Holotype: Mexico, *Humboldt & Bonpland s.n.* (P-Bonpl.). N.v.: Tzajal nich wamal, ch'aal wamal (Ch), hierba de ronrón, guacamayo, canelón tinto (G), cola de gallo (H).

Galvezia sessilis M.E.Jones, *Lamourouxia coccinea* A.Gray, *L. cordata* Cham. ex Schltldl., *L. viejensis* Oerst.

Shrubs 50-1.5(-3) m. Leaves 2.7-11.2 × 1-5.3 mm, the larger ones broadly or narrowly ovate to elliptical or lanceolate, sessile, coriaceous, mostly glandular pubescent, the bases truncate to cordate, often clasping the stem, the margins coarsely serrate to doubly serrate or nearly dentate, the teeth often mucronulate, the apices acute, mucronate. Inflorescences racemose, erect; pedicels 2-6 mm long. Calyx 5-8 × 4-7 mm, cup-shaped, mostly glandular pubescent, the lobes 2-4 mm, triangular, about as long as the tube. Corolla 30-60 × 4-12 mm, usually scarlet red, sometimes tinted orange, salmon or pink, the upper lip 12-27 mm, the margins rounded, the lobes of the lower lip 1-3 × 1-2 mm. Capsules 8-12 × 6-7 mm, ellipsoidal to broadly spherical. Flowering June to January. *Bushy rocky hillsides or in open meadows, savannas and other grassy places, often in Pinus forests and open patches in mixed montane forests.* Ch (*Cabrera 5973*, MO); B (*Whitefoord 2810*, BM); G (*Tún Ortíz 582*, BM); H (*Davidse et al. 35458*, MO); ES (*Sandoval 623*, MO); N (*Neill 964*, MO); CR (*Wilbur 21647*, MO); P (*Allen 2235*, MO). 325-1700 m. (Mexico, Mesoamerica.)

6. *Lamourouxia xalapensis* Kunth, *Nov. Gen. Sp. (quarto ed.)* 2: 338 (1817).

Holotype: Mexico, Veracruz, *Humboldt & Bonpland s.n.* (P-Bonpl., 2 sheets).

Lamourouxia exserta B.L.Rob. & Greenm., *L. parviflora* Benth. ex Hemsl., *L. spathacea* Benth., *L. stenoglossa* Hunnewell & L.B.Sm.

Scrambling shrub. Stems 1-4 m long, weak or reclining. Leaves 27-63 × 6-20 mm, narrowly lanceolate to ovate, glabrous or glabrate, infrequently pubescent along major veins and along margins, the bases broadly acute to tapered, the margins mostly

finely serrate, the apices acute-acuminate; petiole 1-6 mm. Inflorescences arching downward, or ascending; pedicels 2-12 mm, filiform, usually reflexed away from growing tip, the flowers inverted. Calyx 8-14 × 4-9 mm, mostly glabrous, the lobes 3-7 mm, entire and usually triangular, or calyx sometimes 8-18 mm, appearing spathiform, deeply cleft on the lower side with about 4 narrowly elongate lobes on the upper side. Corolla 28-48 × 8-12 mm, the tube often appearing slightly arched, red or red-orange, the upper lip 9-16 mm, often emarginate, the forward margins broadly rounded and reflexed, 4 mm broad, the lobes of the lower lip to 4 mm. Stamens subequally developed, becoming didynamous, the anthers shaggy, not mucronate, exserted and spreading. Capsules 9-11 × 7-9 mm, broad spheroidal to ellipsoidal. Flowering September to February. *In damp thickets or mixed forests, or in forest clearings.* Ch (*Breedlove 40500*, MO); G (*Véliz MV10640*, MO). 1800-3100 m. (Mexico, Guatemala.)

8. *Melasma* P.J.Bergius

By J.J. Morawetz.

Suffruticose herbs. Stems branched, hispid. Leaves opposite, lanceolate, margins dentate to serrulate, the upper and lower surfaces hispid. Inflorescences loose racemes; bracts leaf-like, hispid; flowers opposite, pedicellate; bracteoles linear to narrowly lanceolate, hispid. Calyces campanulate, actinomorphic, 5-lobed, ciliate; corollas campanulate, weakly zygomorphic, 5-lobed, white; stamens 4, didynamous, included; ovary globose, style weakly curved, stigma clavate. Capsule globose to ellipsoid. 5 species. Three species occur in Africa, and two in the Americas, one in the flora region.

Historically *Melasma* was thought to comprise a natural taxon. In recent studies the monophyly of *Melasma* is not supported, revealing separate African and American lineages, with the American lineage being more closely related to the American genus *Escobedia* (Morawetz *et al.*, in press). Further work is underway to clarify the relationships among these taxa (Morawetz *et al.*, in prep). Host records are often lacking, but typical hosts include grasses.

Bibliography: Melchior, H. *Notizbl. Bot. Gart. Berlin-Dahlem* 15:119-127 (1940). Morawetz, J.J. & Wolfe, A.D. *Syst. Bot.* 34: 561-569 (2009). Morawetz, J.J. *et al.* *Taxon* (2010; in press).

1. *Melasma physalodes* (D.Don) Melch., *Notizbl. Bot. Gart. Berlin-Dahlem* 5(1): 122-123. 1940. *Lophospermum physalodes* D.Don, *Trans. Linn. Soc. London* 15: 353. 1827. Holotype: Mexico, *Sessé y Mociño* (in Herb. Lamb.). N.v.: Asafrán (Mexico).

Cacabus hondurensis Donn.Sm., *Eutheta hondurensis* (Donn.Sm.) Standl., *Lyncia hispida* Schltld. & Cham., *Melasma hispidum* (Schltld. & Cham.) Benth.

Plants to 2 m. Stems hispid, branched. Leaves subsessile to petiolate, blades 5-15 × 2-6 cm, lanceolate, the upper surface sparsely pubescent, the lower surface pubescent on veins, the base attenuate to cuneate, the margins dentate to minutely serrulate, fimbriate, the apex acute to acuminate; petioles to 0.5(-1) cm.

Inflorescences racemose, loose; floral bracts 1.2-7 × 1-2.3 cm, leaf-like, the margins serrate to entire; pedicels 1.2-2.7 cm; bracteoles 4-7 × 0.5-1 mm, linear. Flowers numerous; calyces 1.8-3 cm, lobes triangular, ciliate along the margins and nerves; corolla 3.3-4.3 cm, lobes rounded, white, glabrous. Ovary 3-4 × 1.5-2 mm, globose; style 7-8 mm. Capsules 1.3-1.6 × 1-1.8 cm, globose to ellipsoid; seeds numerous. Flowering and fruiting September-December. *Rocky hillsides*. Ch (*Breedlove 13917*, F); G (*Standley 60641*, F); H (*Pittier 1828*, US). Elevation 700-1500 m. (Mexico [Sinaloa and San Luis Potosi to Chiapas], Mesoamerica).

As noted by Standley & Williams (1973), in fruit the calyx of *M. physalodes* strongly resembles that of *Physalis* (Solanaceae), and specimens of *M. physalodes* have in the past erroneously been described as taxa of Solanaceae (see Nelson Sutherland, 2001).

9. *Pedicularis* L.

Pediculariopsis Á.Löve & D.Löve

By M.J.M.Christenhusz.

Usually perennial, rarely annual or biennial, hemiparasitic herbs. Leaves alternate, subopposite, or verticillate, pinnatifid to 1-2-pinnatisect, very rarely entire and dentate, the lower leaves usually long petiolate, the upper (floral) leaves usually more or less sessile, smaller and often bract-like. Inflorescences terminal or flowers axillary, the bracts usually leaf-like. Calyx tubular to campanulate, usually deeply cleft on the anterior side, usually 5-lobed. Corolla strongly bilabiate, purple, red, yellow, or white; upper lip hooded, laterally compressed, enclosing the anthers, the

apex rounded or truncate, or toothed or beaked; lower lip 3-lobed, usually spreading. Stamens 4, didynamous; filaments glabrous or pubescent; anthers mucronate or not. Stigma (sub-)capitate. Fruit a loculicidal capsule, not or moderately compressed, ovate to lanceolate, often rostrate. Seeds numerous. About 600 spp., the majority in the mountains of Central and East Asia; a single species occurs in Mesoamerica. (widely distributed in temperate and arctic regions, few in high mountains in the tropics; Canada, United States, Mexico, Mesoamerica, Ecuador, Chile, Europe, N. Africa, Middle East, Russia, Siberia, Central Asia, Himalayas, China, Vietnam.)

1. *Pedicularis orizabae*. Schltld. & Cham., *Linnaea* 5: 103 (1830). Holotype: Mexico, Orizaba, *Schiede s.n. [Schiede & Deppe 160]* (HAL-56871). Illustr.: Standley & Williams (1973): 384, fig. 87. N.v.: Jazmín (G).

Rhizomatous herb forming leaf-rosettes. Flowering branches erect, to 60 cm, glabrous. Rosette leaves numerous, 7-17 × 0.5-1.5(-2) cm, pinnatisect, the numerous lobes lanceolate, dentately incised, the pinnae gradually reduced towards base and apex, the apices acuminate; cauline leaves similar but smaller, 3-4 × 0.2-0.3 cm. Inflorescence a dense, many-flowered terminal spike. Bracts 1.5-3 × 0.6-1 cm, ovate-pinnatisect, with lanceolate basal lobes and acuminate apices. Pedicels c. 3 mm. Calyx 7-12 mm, campanulate, the teeth acute, entire or serrulate, pale green infused with lavender. Corolla 14-22 mm. pink or rose purple; upper lip strongly incurved and rostrulate; lower lip broad, 3 lobed, c. 8 mm. Capsule 1.2-1.6 × 0.5-0.7 cm, shortly rostrate. *Mountain summits on dry open rocky slopes, sometimes on limestone and in Juniperus standleyi forests; not recently collected in Mesoamerica.* G (Steyrmark 50316, F). 3700-3800 m. (Central and Southern Mexico, Guatemala.)

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