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47. ANNONACEAE (in part)

By G.E. Schatz.

1. Anaxagorea A. St. Hil.

By G.E. Schatz.

Shrubs to medium trees. Stems terete, usually initially densely ferruginous to brown puberulous, often glabrescent. Leaves narrowly elliptic to elliptic to rarely obovate, membranous to chartaceous to slightly coriaceous, upper surface glabrous, lower surface initially puberulous and then glabrescent, the primary vein flat to slightly impressed above, raised below, the secondary venation brochidodromous, flat, slightly raised, or slightly impressed above, raised below, the base acute to rounded and sometimes decurrent, the apex acute to acuminate and sometimes cuspidate. Petioles canaliculate, densely puberulous. Inflorescences axillary or often ramiflorous, 1-several flowered rhipidia, distinctly pedunculate or not; pedicels usually thickening toward the apex, borne in the axil of a minute triangular bract and bearing a larger, usually ampexicaul, broadly ovate bract just below the calyx to midway between the base of the pedicel and calyx, persistent or caducous, densely puberulous. Flowers buds globose, ovoid, or conical. Sepals 3, free, or fused initially and then splitting to their base, valvate to slightly imbricate, ovate to broadly ovate, chartaceous, densely puberulous, erect to often reflexed, rarely caducous prior to anthesis. Petals 6, free, in two valvate, subequal whorls, fleshy, densely puberulous outside, sparsely puberulous inside, inner side with basal cavity surrounding stamens, keeled apically; outer petals scarcely to markedly longer than the inner petals. Floral receptacle convex. Stamens 25-90, free, elliptic to narrowly obovate, the apical prolongation of the connective quadrangular, truncate, the anthers extrorse; innermost stamens staminodial, the staminodia 5-50. Gynoecium apocarpous,

carpels 5-22; stigma capitate to horseshoe-shaped; ovules 2, basal. Fruit a cluster of free monocarps, clavate to dolabriform, with the stipe-like basal portion thickening toward the subglobose apical head, usually with a distinct, persistent apical beak, explosively dehiscent along the ventral suture and sometimes part of the dorsal suture. Seeds 2, lying side by side along their flat inner surface, the outer side convex, glossy black. 22 neotropical spp. from Mexico to Bolivia, and 3 paleotropical spp.

Bibliografía: Maas, P.J.M. & Westra, L.Y.Th., *Bot. Jahrb. Syst.* 105: 73-134 (1984), 145-204 (1985).

1. Largest leaves less than 18×7 cm; shrubs to 3.5 m; secondary veins 7-9; inflorescences axillary, usually single-flowered. **5. A. panamensis**
1. Largest leaves greater than 18×7 cm; shrubs to more often trees, 2.5-20 m; secondary veins 8-18; inflorescences axillary or more often ramiflorous, usually several-flowered.
 2. Flower buds ovoid or globose; sepals fused initially; inflorescences mostly ramiflorous, rarely axillary.
 3. Flower buds globose to broadly ovoid; sepals deciduous; carpels 5-11; monocarps 20-25 mm, apical beak 0.5-2 mm. **3. A. dolichocarpa**
 3. Flower buds ovoid; sepals caducous prior to anthesis; carpels 7-22; monocarps 25-42 mm, apical beak less than 1 mm or lacking. **6. A. phaeocarpa**
2. Flower buds conical; sepals free; inflorescences axillary and ramiflorous.
 4. Stems ferruginous puberulous, the trichomes persistent; sepals strongly reflexed at anthesis; carpels 9-16. **2. A. crassipetala**
 4. Stems ferruginous dark brown to dark brown puberulous, glabrescent; sepals only slightly reflexed at anthesis; carpels 5-13.
 5. Sepals $8-13 \times 5-11$ mm, broadly ovate; pedicels distinctly thickened at apex, 3-5 mm in diameter; upper bract $5-9 \times 5-9$ mm; monocarps 21-35 mm. **1. A. allenii**
 5. Sepals $7-8 \times 5-6$ mm, ovate; pedicels slightly thickened at apex, 2 mm in diameter; upper bract 3.5×3.5 mm; monocarps 29-45 mm. **4. A. guatemalensis**

1. *Anaxagorea allenii* R.E. Fr., *Ann. Missouri Bot. Gard.* 42: 151 (1955). Holotipo: Panamá, *Allen 2143* (MO!). Illustr.: Maas & Westra, *Bot. Jahrb. Syst.* 105: 120, t. 13 (1984).

Shrubs to trees 2.5-10 m. Stems dark brown puberulous, glabrescent. Leaves 9.5-48.5 × 2.8-14.6 cm, narrowly elliptic to lanceolate or rarely oblanceolate, chartaceous to slightly coriaceous, glabrous above, sparsely brown puberulous and glabrescent below; midrib flat above, prominently raised below; secondary veins 10-18 per side, flat to slightly raised above, raised below; base (rarely acute) obtuse to rounded; apex acute to more often acuminate. Petioles 5-24 mm, 1-4 mm in diameter, dark brown puberulous. Inflorescences axillary or ramiflorous, 1 to several-flowered at a time; peduncles to 10 mm; pedicels 5-20 mm, 1-2 mm in diameter at the base to 3-5 mm in diameter at the apex, dark brown puberulous; upper bract 5-9 × 5-9 mm, just below to 3 mm below calyx, dark brown puberulous, persistent. Flower buds conical. Sepals 8-13 × 5-11 mm, free, broadly ovate, ferruginous brown puberulous, slightly reflexed, the apex acute. Outer petals 16-20 × 4-6 mm, narrowly oblong, ferruginous brown puberulous outside, beige-orange puberulous inside, the apex rounded; inner petals 8-12 × 2-4 mm, lanceolate, ferruginous brown puberulous outside, beige-orange puberulous inside, the apex acute. Stamens 50-70; staminodia 5-10. Carpels 7-13. Monocarps 21-35 mm; stipitate portion 15-25 mm; beak 2-5 mm. Seeds 9-12 × 5-6 mm. *Selvas altas perennifolias*. P (*de Nevers 7245*, MO). 0-500 m. (Mesoamérica, Colombia.)

2. *Anaxagorea crassipetala* Hemsl., *Diagn. Pl. Nov. Mexic.* 1: 2 (1878). Lectotipo (designated by Maas & Westra, 1984): Nicaragua, *Tate 3* (K). Illustr.: Maas & Westra, *Bot. Jahrb. Syst.* 105: 132, t. 17 (1984).

Shrubs to trees 2.5-10 m. Stems ferruginous puberulous. Leaves 8.8-38 × 2.1-12.8 cm, narrowly elliptic to elliptic, membranous, glabrous above, sparsely ferruginous puberulous and glabrescent below; midrib flat above, prominently raised below; secondary veins 8-18 per side, flat to slightly raised above, raised below; base obtuse to rounded; apex acuminate. Petioles 5-20 mm, 1-2 mm in diameter, ferruginous puberulous. Inflorescences axillary or ramiflorous, 1 to several-flowered at a time;

peduncles to 11 mm; pedicels 5-17 mm, 0.5-1 mm in diameter at the base to 1.5-3 mm in diameter at the apex, ferruginous puberulous; upper bract 2.5-4.5 × 2.5-4.5 mm, just below to 5 mm below calyx, ferruginous puberulous, persistent. Flower buds conical. Sepals 5-8 × 4-5 mm, free, ovate, ferruginous puberulous, strongly reflexed, the apex acute. Outer petals 15-20 × 4-5 mm, narrowly oblong to ovate, densely ferruginous puberulous outside, beige-orange puberulous inside, the apex obtuse to rounded; inner petals 7-14 × 2-3 mm, lanceolate, ferruginous puberulous outside, beige-orange puberulous inside, the apex acute. Stamens 35-40, staminodia 10-20. Carpels 9-16. Monocarps 20-28 mm; stipitate portion 11-19 mm; beak 1-3.5 mm. Seeds 8-11 × 4-7 mm. *Selvas altas perennifolias*. H (Maas et al. 8512, MO); N (Rueda et al. 2874, MO); CR (Carballo 273, MO); P (Hammel 1618, MO). 0-800 m. (Mesoamérica, Colombia, Ecuador, Perú, Bolivia.)

3. *Anaxagorea dolichocarpa* Sprague & Sandwith, *Bull. Misc. Inform. Kew* 1930: 475 (1930). Holotipo: Guyana, *Jenman 5089* (K). Illustr.: Maas & Westra, *Bot. Jahrb. Syst.* 105: 146, t. 18 (1985).

Trees 6-10 m. Stems sparsely ferruginous puberulous, glabrescent. Leaves 9.9-27.6 × 2.1-9.1 cm, narrowly elliptic to elliptic, membranous to slightly coriaceous, glabrous above, sparsely ferruginous puberulous and glabrescent below; midrib slightly impressed to flat above, prominently raised below; secondary veins 8-14 per side, flat above, raised below; base obtuse to acute and slightly decurrent; apex acuminate to cuspidate, the acumen to 3 cm. Petioles 4-14 mm, 1-3 mm in diameter, ferruginous puberulous, glabrescent. Inflorescences mostly ramiflorous, rarely axillary, 1 to several-flowered at a time; peduncles to 10 mm; pedicels 7-8 mm, 1 mm in diameter at the base to 1.5-2.5 mm in diameter at the apex, ferruginous puberulous; upper bract 2 × 2 mm, just below to 2-4 mm below calyx, ferruginous puberulous, persistent. Flower buds globose to broadly ovoid. Sepals 4-5 × 4 mm, fused initially and then splitting to near base, broadly ovate, ferruginous puberulous, slightly reflexed, usually deciduous, the apex acute. Outer petals 10-16 × 6-10 mm, ovate to elliptic, densely ferruginous puberulous outside, glabrous inside, the apex acute; inner petals 9-16 × 5-10 mm, ovate to elliptic, ferruginous puberulous outside, glabrous inside, the apex acute. Stamens 40-90; staminodia 10-50.

Carpels 5-11. Monocarps 20-25 mm; stipitate portion 12-13 mm; beak 0.5-2 mm. Seeds 8 × 4 mm. *Selvas altas perennifolias*. CR (Marín 146, MO). 0-300 m. (Mesoamérica, Colombia, Venezuela, Guyana, Surinam, French Guiana, Ecuador, Perú, Bolivia, Brasil.)

4. *Anaxagorea guatemalensis* Standl., *Trop. Woods* 7: 4 (1926). Holotipo: Guatemala, *Record* 41 (US!). Illustr.: Maas & Westra, *Bot. Jahrb. Syst.* 105: 157, t. 21 (1985).

Shrubs to trees 3-20 m. Stems ferruginous dark brown puberulous, glabrescent. Leaves 5.8-32.5 × 2.4-11.5 cm, narrowly elliptic to elliptic to rarely obovate, membranous to slightly coriaceous, glabrous above, sparsely ferruginous puberulous and glabrescent below; midrib slightly impressed to flat above, prominently raised below; secondary veins (5-)9-15 per side, flat above, raised below; base acute to more often obtuse and slightly decurrent; apex acuminate. Petioles 4-16 mm, 1-3 mm in diameter, ferruginous dark brown puberulous, glabrescent. Inflorescences axillary or ramiflorous, 1 to rarely 2-flowered at a time; peduncles to 8 mm; pedicels 6-11 mm, 1 mm in diameter at the base to 2 mm in diameter at the apex, ferruginous puberulous; upper bract 3.5 × 3.5 mm, just below to 1.5-3 mm below calyx, ferruginous puberulous, persistent. Flower buds conical. Sepals 7-8 × 5-6 mm, free, ovate, ferruginous puberulous, slightly reflexed, the apex acute. Outer petals 17-22 × 5-6 mm, narrowly ovate, densely ferruginous puberulous outside, sparsely beige puberulous inside, the apex acute; inner petals 13-17 × 2.5-3.5 mm, narrowly ovate, ferruginous puberulous outside, beige puberulous inside, the apex acute. Stamens 25-35; staminodia 10-15. Carpels 5-10. Monocarps 29-45 mm; stipitate portion 17-31 mm; beak 2-5 mm. Seeds 12-15 × 7-8 mm. *Selvas altas perennifolias*. B (Holst et al. 5843, MO); G (Marshall et al. 382, MO); H (Davidse et al. 34533, MO). 200-1000 m. (Mexico [Oaxaca, Veracruz], Mesoamérica.)

5. *Anaxagorea panamensis* Standl., *J. Wash. Acad. Sci.* 15: 101 (1925). Holotipo: Panamá, *Standley* 26168 (US!-1216856). Illustr.: Maas & Westra, *Bot. Jahrb. Syst.* 105: 165, t. 24 (1985).

Shrubs to 3.5 m. Stems ferruginous puberulous, glabrescent. Leaves 5.6-15.6 × 2-6.3 cm, narrowly elliptic to elliptic, membranous, glabrous above, sparsely ferruginous

puberulous and glabrescent below; midrib slightly impressed above, raised below; secondary veins 7-9 per side, flat above, raised below; base acute to obtuse; apex acuminate. Petioles 3-9 mm, ferruginous puberulous, glabrescent. Inflorescences axillary, usually with only a single flower; peduncles 8-20 mm; pedicels 8-15 mm, less than 0.5 mm in diameter at the base, 0.5-1 mm in diameter at the apex; upper bract 2.5×2.5 mm, just below calyx, persistent. Flower buds conical. Sepals 8-11 \times 4 mm, free, ovate, ferruginous puberulous, glabrescent, mostly erect, the apex acute. Outer petals 13-30 \times 4-5 mm, narrowly ovate, densely ferruginous puberulous, glabrescent, the apex acute; inner petals 10-17 \times 2.5-3 mm, narrowly elliptic, ferruginous puberulous, glabrescent, the apex acute. Stamens 25; staminodia 5. Carpels 5-10. Monocarps 23-30 mm; stipitate portion 15-20 mm; beak 2-3 mm. Seeds 11-13 \times 5-7 mm. *Selvas altas perennifolias*. CR (Grayum & Burton 4312, MO); P (Zetek 5565, MO). 0-200 m. (Endémica.)

6. *Anaxagorea phaeocarpa* Mart., *Fl. Bras.* 13(1): 40 (1841). Holotipo: Brazil, *Martius s.n.* (M). Illustr.: Mart., *Fl. Bras.*, t. 5, f. 4 (1841).

Anaxagorea costaricensis R.E. Fr.

Shrubs to trees 2.5-10 m. Stems ferruginous brown puberulous, glabrescent. Leaves 13.6-35.5 \times 4-11.5, elliptic to obovate, membranous, glabrous above, sparsely ferruginous puberulous and glabrescent below; midrib slightly impressed above, prominently raised below; secondary veins 10-17 per side, joining to form a conspicuous marginal vein, slightly impressed above, raised below; base acute to obtuse, often decurrent; apex acuminate to cuspidate. Petioles 6-18 mm, 1-3 mm in diameter, ferruginous brown puberulous, glabrescent. Inflorescences mostly ramiflorous, rarely axillary, 1 to several-flowered at a time; peduncles to 2-8 mm; pedicels 8-24, 1 mm in diameter at the base to 3 mm in diameter at the apex; upper bract 6 \times 6 mm, 1.5-5 mm below calyx, caducous. Flower buds ovoid. Sepals 5-11 \times 3-6 mm, initially fused to above middle, then splitting to the base, ovate, ferruginous puberulous, caducous, the apex acute. Outer petals 15-20 \times 4-6 mm, narrowly ovate, densely ferruginous puberulous outside, sparsely beige puberulous inside, the apex acute; inner petals 10-15 \times 3-5 mm, narrowly ovate, densely ferruginous puberulous outside, sparsely beige puberulous inside, the apex acute. Stamens 35-85; staminodia 20-45. Carpels 7-22.

Monocarps 25-42 mm; stipitate portion 15-29 mm; beak less than 1 mm or lacking. Seeds 10-15 × 5-8 mm. *Selvas altas perennifolias*. N (*Martínez S. 2141*, MO); CR (*Chacón 230*, MO); P (*McPherson 11815*, MO). 0-700 m. (Mesoamérica, Colombia, French Guiana, Ecuador, Perú, Brasil.)

2. *Annona* Juss.

Rollinia A. St.-Hill.

To be added.

3. *Cananga* (DC.) Hook. f. & Thomson, nom. cons.

By G.E. Schatz.

Small to large trees with drooping tiers of horizontal branches slightly upturned at the apex. Stems terete, sparsely lenticellate. Leaves semi-deciduous, distichous; petioles terete, latitudinally striated. Inflorescences axillary, few to several flowered dichasial racemes, pedunculate or flowers sometimes nearly sessile, pendent, the pedicel borne in the axil of a minute bract and bearing a second minute bract submedial. Sepals 3, valvate, connate at their base. Petals 6, in two more or less equal, valvate whorls, or the inner whorl slightly smaller, with longitudinal venation sometimes evident. Floral receptacle slightly convex. Stamens numerous, the connectives umbonate, apiculate. Gynoecium apocarpous, style absent, stigmas obconical or club-shaped, fused together into a head that abscises as a unit; ovules 2-16, lateral, in two slightly interdigitated rows. Fruit a cluster of free, stipitate, indehiscent, berry-like monocarps. Seeds flattened ellipsoid, with a tiny, rudimentary bilobed aril, the seed coat rugose to foveolate.

1. *Cananga odorata* (Lam.) Hook. f. & Thomson, *Fl. Ind.* 130 (1855). *Uvaria odorata* Lam., *Encycl.* 1(2): 595 (1785). Holotipo: China, *Sonnerat s.n.* (P). Illustr.: N.v. Ilán-Ilán, Ilang-Ilang; Gavilán, Lila, N.

Canangium odoratum (Lam.) King.

Trees to 25 m. Stems white puberulous, glabrescent. Leaves 4-20.8 × 2.3-9.4 cm, ovate to oblong to elliptic, membranous, glabrous above, sparsely puberulous below,

glabrescent; midrib flat to slightly raised above, raised below, sparsely puberulous; venation weakly brochidodromous, the secondary veins 8-11 per side; base oblique, rounded to truncate, rarely cuneate; apex acuminate, the acumen to 1.5 cm. Petioles 8-20 mm, puberulous. Inflorescences 2-6-flowered; peduncles to 30 mm; pedicels 25-50 mm, puberulous. Sepals 5-8 × 5-6 mm, ovate, tomentellous, the margins revolute, the apex acute to obtuse, sometimes reflexed. Petals 45-96 × 4-19 mm, narrowly lanceolate to linear, puberulous, more densely so at the base, greenish yellow with a reddish purple blotch at the base inside, the base broadly cuneate and then truncate, the apex long attenuate. Stamens 2.7-3 mm, the connectives 1 mm. Carpels 6-25; ovaries 2 mm; stigmas 2 mm; ovules 2-16. Monocarps 7-20 mm, 6-11 mm in diameter, oblong to ellipsoid, glabrous, fleshy, purple-black; stipe 5-14 mm. Seeds 6-9 × 5-6 mm, 1 mm thick. *Cultivado y naturalizado*. Ch (*Espejo et al. 2349*, MO); G (*Standley 73653*, F); H (*Zelaya 41*, MO); ES (*Berendsohn 295*, MO); N (*Robleto 1859*, MO); CR (*Acevedo 74*, MO); P (*D'Arcy 16238*, MO). 0-900 m. (Native from India to Northern Queensland, Australia, and the Philippines; cultivated throughout the Neotropics for its extremely fragrant flowers, the petals of which are distilled for perfume oil.)

4. *Crematosperma* R.E. Fr.

By G.E. Schatz.

Shrubs to medium trees. Stems terete, glabrous or densely covered with appressed or erect hairs. Leaves elliptic to obovate, chartaceous to coriaceous, glabrous above, glabrous to densely hairy below, the midrib raised above, conspicuously broad towards the base, raised below, the secondary venation brochidodromous, flat, slightly raised, or slightly impressed above, raised below, the base acute to rounded and sometimes decurrent, the apex acuminate to sometimes cuspidate. Petioles canaliculate, glabrous to densely puberulous. Inflorescences terminal on short axillary shoots or often ramiflorous, usually with a single flower, occasionally up to 8 in a rhipidium, distinctly pedunculate; pedicels usually thickening toward the apex, borne in the axil of to several minute triangular bracts, and bearing a single, larger, broadly ovate upper bract, persistent or caducous, densely puberulous. Flowers buds broadly to depressed ovoid. Sepals 3, free or

slightly connate at their base, imbricate, ovate to broadly ovate. Petals 6, free, in two imbricate, subequal whorls, thin, glabrous to densely puberulous outside, sparsely puberulous inside, margins ciliate, the outer petals ovate to broadly elliptic, the inner petals elliptic to narrowly obovate. Floral receptacle convex. Stamens numerous, free, elliptic to narrowly obovate, the apical prolongation of the connective transversely rhombic-hexagonal, truncate, the anthers extrorse. Gynoecium apocarpous, carpels 20-40; stigma sessile; ovules 1, basal to lateral to apical. Fruit a cluster of free, stipitate, mostly asymmetrical monocarps, often with an excentric apicule, berry-like. Seeds 1, elliptic to globose, the surface deeply to shallowly pitted, with a longitudinally encircling raised or sunken raphe, the endosperm ruminations spiniform. 29 spp. from southern Costa Rica to Bolivia.

Bibliografía: Pirie, M.D., *Crematosperma (and other evolutionary digressions)*: 1-256 (2005).

1. Leaves 7-22 × 2-7 cm, narrowly elliptic, glabrous above and below, with minute waxy protuberances; monocarps 7-11 mm in diameter, globose. **1. C. panamense**
1. Leaves 30-50 × 12-20 cm, narrowly elliptic or obovate-oblongate, glabrous and glossy above, sparsely lax sericeous below; monocarps 18-22 mm long, 10-12 mm in diameter, obliquely ovoid. **2. C. westrae**

1. *Crematosperma panamense* Maas, *Proc. Kon. Ned. Akad. Wetensch.*, C 89(3): 254 (1986). Holotipo: Panamá, *Johnston 1812* (MO!). Illustr.: Maas, *Proc. Kon. Ned. Akad. Wetensch.*, C 89(3): 254, t. 5-6 (1986).

Shrubs to trees 1.5-7(-20) m. Stems glabrous or sometimes with white trichomes to 0.2 mm at apex, verruculose. Leaves 7-22 × 2-7 cm, narrowly elliptic, membranous to chartaceous, glabrous above and below, with minute waxy protuberances; midrib slightly raised above, raised below; venation strongly brochidodromous, with 5-10 secondary veins per side, slightly raised above, raised below; base acute to obtuse to cuneate; apex acuminate. Petioles 2-10 mm, 1-2.5 mm in diameter, glabrous. Inflorescences axillary among leaves, usually solitary, or rarely several clustered, 1-flowered; peduncles 1-3 mm, 0.5-1 mm in diameter, 1-2 mm in diameter in fruit, sparsely appressed puberulous,

sometimes bearing 1-few bracts 1 mm, puberulous, ciliate; pedicels 10-25 mm, 0.5-0.8 mm in diameter at base to 1 mm in diameter at apex, 1.2 mm at base to 2 mm at apex in fruit, sparsely appressed puberulous, with a basal articulation, bearing 2 bracts, one below the articulation and one above, the lower bract similar to peduncular bracts, the upper bract 0.7-1.5 × 0.7-1.5 mm, triangular-ovate to broadly elliptic, puberulous, ciliate, persistent; sepals 1.5-3 × 1.5-3 mm, broadly ovate, glabrous, the margins ciliate, the apex rounded; outer petals 7-18 × 4-6 mm, narrowly ovate to narrowly elliptic-ovate, glabrous, the margins ciliate, the apex rounded; inner petals 6.5-25 × 4-6 mm, ovate, glabrous, the margins ciliate, the apex obtuse to rounded. Stamens 1.2-1.5 mm, filament less than 0.1 mm, connective depressed truncate, 5-angled. Carpels c. 35. Monocarps 3-10(-25), 7-11 mm in diameter, globose, the apex rarely apiculate, glabrous; stipes 7-21 mm, 1-1.5(-3) mm in diameter, glabrous. Seeds 5-12 mm, 6-10 mm in diameter, broadly transversely ellipsoid to globose. *Selvas altas perennifolias*. P (Herrera 1231, MO). 0-1000 m. (Endémica.)

2. *Crematosperma westrae* Pirie, *Blumea* 50: 58 (2005). Holotipo: Panamá, *Liesner* 682 (MO!). Illustr.: Pirie, *Blumea* 50: 58, t. 9 (2005).

Trees 4-8 m. Leaves 30-50 × 12-20 cm, narrowly elliptic or obovate-oblongate, chartaceous to coriaceous, glabrous and glossy above, sparsely lax sericeous below; midrib slightly raised above, raised and densely sericeous below, glabrescent; venation brochidodromous with 8-12 secondary veins per side, slightly raised above, raised and densely sericeous below, glabrescent; base acute and decurrent along petiole; apex abruptly cuspidate, the acumen to 1-2 cm. Petioles 6-20 mm, 3-6 mm in diameter, glabrous and verruculose, turning black upon drying. Inflorescences axillary at usually leafless nodes; flowers solitary; peduncle 2-3 mm, 2-3 mm in diameter (in fruit); pedicel 6-17 mm, 2-3 mm in diameter (in fruit), bearing an obtuse, 1-1.5 mm bract 5-10 mm above the base; sepals 2.5-3 × 2.5-3 mm, rounded, densely covered with appressed brown hairs, the apex rounded; outer petals 9 × 5 mm, elliptic to broadly elliptic-ovate, densely covered with appressed brown hairs, the apex rounded; inner petals 8 × 4 mm, elliptic, densely covered with appressed brown hairs, the apex obtuse to rounded. Stamens numerous, 1.3 mm, glabrous. Carpels, monocarps 6-10, 18-22 mm, 10-12 mm in

diameter, obliquely ovoid, glabrous, the base rounded, the apex rounded and often apiculate; stipes 4-14 mm, 1-2 mm in diameter. Seeds 16 mm, 10 mm in diameter, ellipsoid. *Selvas altas perennifolias*. P (*Sugden 613*, MO). 50-600 m. (Endémica.)

3. Crematosperma sp.

An undescribed species from Osa to be added.

5. Cymbopetalum Benth.

By G.E. Schatz.

Small to large treelets to trees. Stems often lenticellate, glabrous or initially puberulous to short sericeous, glabrescent. Leaves evergreen, membranous to subcoriaceous, sometimes bullate or rugulose above, midrib flattened above, prominently raised below, venation brochidodromous to rarely eucamptodromous. Petioles terete or canaliculate, minutely winged. Flowers solitary, pendent, terminal but appearing internodal or leaf-opposed, pedicels ebracteate. Sepals 3 (rarely 4), free or connate at their base, valvate. Petals 6 (rarely 8), free, in two highly differentiated whorls, valvate; outer petals membranous to chartaceous, thin, flat; inner petals usually thick, fleshy, cymbiform, the base narrowed into a claw, the margins incurved or involute. Floral receptacle convex, flattened apically. Stamens numerous, anthers extrorse, the connectives hexagonal, truncate to broadly conical. Gynoecium apocarpous, stigmas connate into a head abscising as a unit; ovules in one or two rows. Fruit a cluster of free, stipitate, abaxially dehiscent monocarps, the apex acute and sometimes rostrate to rounded. Seeds flattened ellipsoid, brown to black, shiny, covered by an orange to red, bilobed aril. 27 spp. from Nayarit, Mexico to Bolivia and Brasil.

Bibliografía: Murray, N.A. *Syst. Bot. Monogr.* 40: 1-121. (1993).

1. Ovules and seeds in two complete rows; monocarps cylindrical to ellipsoid, not constricted around the seeds, the apex rounded.
2. Outer petals 25-33 × 20-26 mm; monocarps 85-150 mm; seeds 23-34 mm.

9. C. steyermarkii

2. Outer petals 8-21 × 7-16 mm; monocarps to 85 mm; seeds 10-16 mm.
3. Carpels 7-15; inner petals 1 mm thick; monocarps straight. **2. C. costaricense**
3. Carpels 13-36; inner petals 2-3.5 mm thick; monocarps slightly curved.
4. Inner petals rugulose inside, the claw 3-5 × 3-10 mm; stipes of the monocarps 4-8 mm; stems glabrescent. **1. C. baillonii**
4. Inner petals slightly striated inside, not rugulose, the claw indistinct; stipes of the monocarps 6-14 mm; stems tomentellous. **4. C. mayanum**
1. Ovules and seeds in one straight or rarely zig-zag row; monocarps cylindrical, torulose, the apex usually rostrate or less often acute.
5. Pedicels 6.5 cm or often much longer.
6. Sepals 6-10 × 7-12 mm; monocarps 40-65 mm, the beak 4-5 mm. **6. C. penduliflorum**
6. Sepals 3-6 × 3-7 mm; monocarps 10-40 mm, the beak 1-2 mm.
7. Carpels 20-35; inner petals with involute margins and apex; leaves often strongly bullate. **3. C. lanugipetalum**
7. Carpels 5-10; inner petals with incurved to slightly involute margins, the apex erect; leaves not bullate. **5. C. mirabile**
5. Pedicels 4 cm or less.
8. Petioles 1-2 mm; inner petals with evident basal claw 1-2 × 4-6 mm, the apex involute. **8. C. stenophyllum**
8. Petioles 2-8 mm; basal claw of inner petals indistinct, the apex erect to slightly reflexed, not involute.
9. Stems glabrescent; leaves slightly to strongly rugulose above; monocarps with seeds arranged in zig-zag fashion, the apex obtuse to acute, rarely rostrate. **7. C. rugulosum**
9. Stems gray puberulous; leaves even above, not rugulose; monocarps with seeds arranged in a straight line, the apex distinctly rostrate. **10. C. torulosum**

1. Cymbopetalum baillonii R.E. Fr., *Acta Horti Berg.* 10(2): 190 (1931). Holotipo: México, Veracruz, *Liebmann 29 (C!)*. Illustr.:

Trees 4-20 m. Stems puberulous, glabrescent. Leaves 3.1-25.5 × 2.3-8.1 cm, oblong to elliptic, chartaceous to subcoriaceous, glabrescent; midrib flat above, raised below, sparsely puberulous; venation brochidromous, the secondary veins 10-15 per side, flat above, slightly raised below; base cuneate to rounded, less often acute, oblique; apex abruptly acuminate to cuspidate, the acumen to 1 cm. Petioles 3-7 mm, flat above, glabrescent. Pedicels 2.8-5.2 cm, sparsely puberulous. Sepals 3-5 × 4-8 mm, broadly ovate, connate at the base, puberulous, the apex acute. Outer petals 12-16 × 10-16 mm, ovate to rotund, puberulous, the venation slightly raised inside, smooth outside, the apex acute to obtuse; inner petals 20-23 × 20-23 mm, 2-3 mm thick, rotund to elliptic, papillose, rugulose inside, the midvein deeply impressed outside, the claw 3-5 × 3-10 mm, the margins and obtuse to rounded apex incurved. Stamens 3-4.5 mm connectives cushion-shaped. Carpels 19-36; ovaries 2.5-3.5 mm; stigmas 1.5-2.5 mm, columnar; ovules 18-30 in two rows. Monocarps 50-72 mm, 25-30 mm in diameter, oblong, slightly curved, glabrous, the apex rounded; stipe 4-8 mm. Seeds 10-15 × 6-9 mm, 4-6 mm thick, 15-22 per monocarp. *Selvas altas perennifolias*. T (Rico & Martínez S. 747, MO); Ch (*Breedlove 35018*, MO). 0-700 m. (Mexico [Oaxaca, Puebla, Veracruz], Mesoamérica.)

2. *Cymbopetalum costaricense* (Donn. Sm.) Saff., *J. Wash. Acad. Sci.* 2: 235 (1912). *Asimina costaricensis* Donn. Sm., *Bot. Gaz. (Crawfordsville)* 23: 2 (1897). Holotipo: Costa Rica, *Tonduz 8709* (US!). Illustr.:

Trees 3-15 m. Stems initially sparsely puberulous, soon glabrescent. Leaves (2.8-)5.2-27.3 × 2.5-10 cm, elliptic, membranous to chartaceous, glabrous; midrib slightly raised above flattening toward the base, raised below; venation weakly brochidromous, the secondary veins 8-12 per side, flat above, slightly raised below; base cuneate to obtuse, somewhat decurrent; apex acuminate to cuspidate, the acumen to 2.5 cm. Petioles 3-9 mm, flat above, glabrescent. Pedicels 1.6-8.5 cm, glabrous. Sepals 2-4 × 3-6 mm, broadly ovate, glabrous, connate at the base, the apex obtuse to acute. Outer petals 8-18 × 7-13 mm, broadly ovate, glabrescent, venation slightly raised inside, the apex acute; inner petals 11-21 × 8-14 mm, 1 mm thick, elliptic to rotund, smooth inside, puberulous, smooth outside, puberulous along midvein, the claw 2-4 × 4-6 mm, the margins incurved to involute, the apex acute, incurved. Stamens 2.5-3 mm, connectives depressed truncate.

Carpels 7-15; ovaries 1.8-2.5 mm; stigmas 1.4-2 mm, columnar; ovules 10-16 in two rows. Monocarps 35-60 mm, 20-30 mm in diameter, ellipsoid, glabrous, the apex rounded; stipe 3-12 mm. Seeds 10-15 × 5-9 mm, 4-6 mm thick, 9-12 per monocarp. *Selvas altas perennifolias*. CR (*Robles 1623*, MO); P (*Croat 38135*, MO). 0-1200 m. (Endémica.)

3. *Cymbopetalum lanugipetalum* Schery, *Ann. Missouri Bot. Gard.* 28: 427 (1941). Holotipo: Panamá, *Woodson & Schery 191a* (MO!). Illustr.:

Treelets 1-5 m. Stems puberulous, persistent or glabrescent. Leaves 6.2-37 × 2-11 cm, elliptic to sometimes lanceolate, membranous to chartaceous and often bullate, initially sparsely puberulous at base above, glabrescent, puberulous below, glabrescent; midrib flat to impressed above, prominently raised below, puberulous; venation brochidodromous, the secondary veins 10-18 per side, flat above, raised below; base acute to rounded, oblique; apex acuminate, the acumen to 2.5 cm. Petioles 1-3 mm, puberulous. Pedicels 6.5-40 cm, puberulous, glabrescent. Sepals 3-6 × 3-7 mm, broadly ovate, free, sparsely puberulous, glabrescent. Outer petals 15-23 × 10-17 mm, ovate, chartaceous, the apex acute; inner petals 21-40 × 21-27 mm, 1-2 mm thick, oblong to broadly elliptic, initially puberulous, glabrescent, smooth inside, or rarely venation slightly raised, smooth outside or often venation impressed, the claw indistinct, the margins involute, the apex abruptly cuspidate, the cusp involute. Stamens 4.8-6.3 mm, the connectives capitate. Carpels 20-35(-63); ovaries 2.2-3.5 mm; stigmas 4-6 mm, conduplicate; ovules 3-7 in one row. Monocarps 10-40 × 10 mm, torulose, somewhat curved, glabrescent, the apex rostrate, the beak 1-2 mm; stipe 3-20 mm. Seeds 10-12 × 6-8 mm, 4-5 mm thick, 1-5 per monocarp. *Selvas altas perennifolias*. CR (*Ocampo 88*, MO); P (*McPherson 6935*, MO). 0-850 m. (Mesoamérica, Colombia.)

4. *Cymbopetalum mayanum* Lundell, *Wrightia* 5(2): 25 (1974). Holotipo: Guatemala, *Lundell 15964* (LL? Not located fide Murray). Illustr.:

Trees 4-25 m. Stems golden to brown tomentellous. Leaves 5.7-24.4 × 2.9-7.3 cm, elliptic to oblong, chartaceous to subcoriaceous, initially sericeous below, glabrescent; midrib flat above, raised below, tomentellous or glabrescent; venation brochidodromous,

the secondary veins 9-16 per side, flat above, slightly raised below; base obtuse to rounded, oblique; apex acuminate to cuspidate, the acumen to 2.5 cm. Petioles 3-5 mm, flattened above, tomentellous. Pedicels 3.3-11.5 cm in flower, to 12 cm in fruit, tomentellous. Sepals 3-5 × 3-5 mm, broadly ovate, free, puberulous outside, the apex acuminate. Outer petals 13-21 × 10-16 mm, ovate, densely puberulous outside, the apex acute; inner petals 15-25 × 16-22 mm, 2-3.5 mm thick, rotund, slightly striated inside, the midvein impressed outside, puberulous, the claw indistinct, the margins and obtuse apex incurved. Stamens 3-4.5 mm; connectives depressed truncate. Carpels 13-25; ovaries 3-3.5 mm; stigmas 1-2 mm, columnar; ovules 20-28 in two rows. Monocarps 22-85 mm, 11-25 mm in diameter, oblong, slightly curved, glabrescent, the apex rounded; stipe 6-14 mm, initially puberulous, glabrescent. Seeds 12-16 × 6-8 mm, 4-6 mm thick, 6-28 per monocarp. *Selvas altas perennifolias*. T (*Matuda 3237*, F); Ch (*Breedlove 34114*, MO); B (*Davidse 35791*, MO); G (*Contreras 8867*, MO); H (*Hazlett 1603*, MO). 100-1540 m. (Endémica.)

5. *Cymbopetalum mirabile* R.E. Fr., *Acta Horti Berg.* 10(2): 192 (1931). Holotipo: México, Chiapas, *Ghiesbreght 721* (K!). Illustr.:

Cymbopetalum longissimum Lundell.

Treelets 1.5-6 m. Stems initially short sericeous, soon glabrescent. Leaves 12-21.8 × 3.2-6 cm, narrowly elliptic to oblong, chartaceous to subcoriaceous, glabrous; midrib raised above and below, glabrescent; venation brochidodromous, the secondary veins 12-23 per side, flat above, slightly raised below; base obtuse to rounded, oblique; apex acuminate, the acumen to 2 cm. Petioles 1-3 mm, flat above, puberulous, glabrescent. Pedicels 8-25 cm, glabrescent. Sepals 3-4 × 4-6 mm, broadly ovate, free, glabrescent, the apex acute. Outer petals 9-13 × 10-15 mm, broadly ovate, puberulous, the midvein raised inside, the apex acute; inner petals 22-30 × 12-18, 1.5 mm thick, elliptic, puberulous, smooth inside and outside, the claw indistinct to 1-2 × 4 mm, the margins incurved to slightly involute, apex acute, erect. Stamens 2.8-3.4 mm; connectives cushion-shaped with truncate apex. Carpels 5-10; ovaries 1.8-2.6 mm; stigmas 2.3-3.2 mm, columnar; ovules 6-8, in one row. Monocarps 30-40 mm, 12-14 mm in diameter, narrowly oblong, somewhat torulose and curved, glabrous except puberulous at base and along suture, the

apex rostrate, the beak to 1.5 mm; stipe 5-13 mm, puberulous. Seeds 12-15 × 7 mm, 4.5-6.5 mm thick, 4-6 per monocarp. *Selvas altas perennifolias*. Ch (*Méndez Ton 4341*, MO); G (*Contreras 9134*, P). 0-1200 m. (Endémica.)

6. *Cymbopetalum penduliflorum* (Dunal) Baill., *Adansonia* 8: 268 (1868). *Unona penduliflora* Dunal, Monogr. Anonac. 100-101 (1817). Lectotipo (designated by Murray, 1993): *Sessé & Mociño Icon. Pl. 6331.97* (HU!).

Trees 5-15 m. Stems initially short sericeous, glabrescent. Leaves 11-17 × 3.1-6 cm, elliptic to oblong, chartaceous to subcoriaceous, glabrous; midrib flat to impressed towards the base above, raised below; venation weakly brochidodromous, the secondary veins 12-16 per side, flat and evident above, raised below; base obtuse to rounded, oblique; apex acuminate. Petioles 2-4 mm, flat above, short sericeous. Pedicels 9-17 cm, sparsely puberulous. Sepals 6-10 × 7-12 mm, broadly ovate, connate the base base, puberulous, the apex acute. Outer petals 17-24 × 14-20 mm, ovate, puberulous, the apex acute; inner petals 23-32 × 18-25 mm, 1.5-2 mm thick, broadly ovate, puberulous, smooth and with the venation slightly raised inside, smooth outside, the claw indistinct to 1 × 4-6 mm, the margins involute, the apex acute, involute to erect. Stamens 4-5 mm; connectives capitate, long-papillate. Carpels 14-21; ovaries 3.6-5.5 m; stigmas 1.6-2.6 mm, columnar; ovules 10-19 in one row. Monocarps 40-65 mm, 15-18 mm in diameter, cylindrical, slightly curved, glabrous, rostrate, the beak 4-5 mm; stipe 10-16 mm. Seeds 14-16 × 9-10 mm, 5-6 mm thick, 4-6(-10) per monocarp. *Selvas altas perennifolias*. G (*Steyrmark 51855*, F). 1200-1400 m. (Endémica.)

7. *Cymbopetalum rugulosum* N.A. Murray, *Syst. Bot. Monogr.* 40: 54 (1993). Holotipo: Panamá, *Hammel 2503* (MO!). Illustr.: Murray, *Syst. Bot. Monogr.* 40: 56, t. 19a-c (1993).

Treelets 2-5 m. Stems sparsely puberulous, glabrescent. Leaves 6.2-30 × 3.2-10 cm, elliptic to oblanceolate, chartaceous, glabrous, rugulose and sometimes somewhat scabrous above; midrib flat to slightly raised toward the base above, prominently raised below; venation brochidodromous, the secondary veins 9-14 per side, flat to slightly raised above, raised below; base cuneate, apex acuminate, the acumen to 1.7 cm. Petioles

3-8 mm, flat above, puberulous. Pedicels 3.1-4 cm in flower, to 7.5 cm in fruit. Sepals 6 × 5 mm, broadly ovate, connate at base, glabrous, the apex apiculate. Outer petals 15-21 × 11-12 mm, ovate, chartaceous, the apex acute; inner petals 24-28 × 11-15 mm, 1 mm thick, oblong to ovate, sparsely puberulous, smooth to slightly corrugated inside, smooth or the midvein slightly raised outside, the claw indistinct, the margins involute, the apex acute to abruptly acuminate, erect to slightly reflexed. Stamens 4-5 mm, connectives truncate, puberulous. Carpels 10-17; ovaries 2-3.5 mm; stigmas 2.5-3 mm, columnar; ovules 6-9 in one row. Monocarps 8-32 × 8-10 mm, torulose, glabrous, the apex acute to obtuse, rarely slightly rostrate; stipe 12-19 mm. Seeds 11-15 × 8-10 mm, 5 mm thick, 1-4 per monocarp. *Selvas altas perennifolias*. P (McPherson & Aranda 10184, MO). 10-900 m. (Endémica.)

8. *Cymbopetalum stenophyllum* Donn. Sm., *Bot. Gaz. (Crawfordsville)* 20: 2 (1895). Holotipo: Guatemala, *Donnell Smith 1491* (US-1391605!, US-1391606!). Illustr.: Murray, *Syst. Bot. Monogr.* 40: 52, t. 17 (1993).

Treelets 3-7 m. Stems initially puberulous, soon glabrescent. Leaves 3.9-22 × 2.1-5.5 cm, narrowly elliptic, membranous, glabrous; midrib raised above and below, puberulous, glabrescent; venation brochidodromous, the secondary veins 9-14 per side, flat above, raised below; base cuneate to acute, somewhat oblique; apex acute to acuminate, the acumen to 2 cm. Petioles 1-2 mm, flat above, glabrescent. Pedicels 1.8-3.4 cm in flower, to 6 cm in fruit, glabrous. Sepals 3-5 × 3-6 mm, broadly ovate, connate at the base, the apex acute to obtuse. Outer petals 17-18 × 11-13 mm, ovate, puberulous, the venation slightly raised inside, the apex acute; inner petals 17-22 × 11-14 mm, 0.5 mm thick, elliptic, puberulous, venation slightly raised inside, smooth outside or the venation and midvein impressed, the claw 1-2 × 4-6 mm, the margins and acute apex involute. Stamens 4-5.6 mm; connectives truncate. Carpels 9-19; ovaries 2.6-3.4 mm; stigmas 2.8-3.2 mm, columnar; ovules 5-8 in one row. Monocarps 32-45 mm, 9-13 mm in diameter, glabrous, torulose, curved, rostrate, the beak to 4 mm; stipe 8-11 mm, puberulous, glabrescent. Seeds 10-11 × 7 mm, 5-6 mm thick, 4-6 per monocarp. *Selvas altas perennifolias*. Ch (*Matuda 625*, MO); G (*Donnell Smith 1491*, US); ES (*Rosales 677*, MO). 80-700 m. (Endémica.)

9. *Cymbopetalum steyermarkii* N.A. Murray, *Syst. Bot. Monogr.* 40: 35 (1993).

Holotipo: Guatemala, *Steyermark 49470* (F!). Illustr.: Murray, *Syst. Bot. Monogr.* 40: 37, t. 13 (1993).

Trees 15-23 m. Stems initially short sericeous, glabrescent. Leaves 10-2 14.5 × 2.7-4.3 cm, elliptic, glabrous; midrib flat above, raised below, glabrous; venation brochidodromous, the secondary veins 10-14 per side, flat above, slightly raised below; base cuneate to rounded; apex acute to acuminate, the acumen to 1.1 cm. Petioles 3-5 mm, flat above, glabrescent. Pedicels 2.5-7.2 cm, glabrous. Sepals 3-6 × 6 mm, broadly ovate, free, puberulous, the apex acute. Outer petals 25-33 × 20-26 mm, broadly ovate, puberulous, verrucose, the venation slightly raised inside, the apex acute; inner petals 25-35 × 21-25 mm, 2 mm thick, ovate to elliptic, puberulous, verrucos, the venation raised inside, impressed outside, the claw indistinct, the margins and acute apex involute. Stamens 3.4-4 mm; connectives truncate. Carpels 24-31; ovules 14-22 in two rows. Monocarps 85-135 mm, 35-55 mm in diameter, oblong, glabrous, the apex rounded; stipe 4-5 mm. Seeds 23-34 × 11-14 mm, oblong, 14-22 per monocarp. *Selvas altas y medianas perennifolias*. Ch (*Martínez S. et al. 20686*, MO); G (*Steyermark 49470*, F). 200-1150 m. (Mexico [Oaxaca], Mesoamérica.)

10. *Cymbopetalum torulosum* G.E. Schatz, *Ann. Missouri Bot. Gard.* 72: 535

(1985). Holotipo: Costa Rica, *Schatz & Grayum 1029* (MO!). Illustr.:

Treelets 2-5 m. Stems gray puberulous. Leaves 8.8-29 × 3.6-9.4 cm, elliptic to occasionally oblanceolate, membranous, often bullate, initially sparsely puberulous, glabrescent; midrib slightly raised above, puberulous, prominently raised below, puberulous; venation brochidodromous, the secondary veins 12-22 per side, flat above, slightly raised below; base cuneate; apex acuminate to cuspidate, the acumen to 3.5 cm. Petioles 2-6 mm, flat above, puberulous, glabrescent. Pedicels 2-4 cm in flower, to 5.3 cm in fruit, puberulous. Sepals 3-5 × 4-5 mm, broadly ovate, free, puberulous, margins slightly revolute, apex acute. Outer petals 11-16 × 10-15 mm, broadly ovate, puberulous, the apex acute; inner petals 16-25 × 10-14 mm (to 36 × 24 mm when fresh), to 1 mm thick, broadly ovate to elliptic, puberulous, the claw indistinct, the margins involute, the

apex acute, erect. Stamens 3-3.5 mm, the connective truncate. Carpels 8-25; ovaries 2-3.2 mm; stigmas 1.2-2.2 mm, columnar; ovules 7-12, in one row. Monocarps 13-80 × 10 mm, torulose, glabrous, the apex rostrate, the beak 2-5 mm; stipe 8-15 mm, initially puberulous, glabrescent. Seeds 11-13 × 6-7 mm, 4-5 mm thick, 1-10 per monocarp.

Selvas altas perennifolias. N (Moreno & Robleto 26013, MO); CR (Haber et al. 1843, MO); P (Stern & Chambers 127, MO). 40-1000 m. (Endémica.)

Thomsen 1047 and 829 from BOSCOA station, 3.5 km W of Rincon, with 11+ cm pedicel, 12 lateral veins/side, 5-10 monocarps, seeds in 2 rows, apex slightly acute (not completely rounded: possible hybrid between *Cymbopetalum costaricense* and *C. lanugipetalum*? Also *Maas et al. 9503*?

6. *Desmopsis* Saff.

By G.E. Schatz.

Shrubs to small trees. Stems terete. Leaves evergreen, distichous, membranous to chartaceous, the venation weakly to strongly brochidodromous. Inflorescences few-flowered rhipidia, terminal but appearing leaf-opposed or internodal, rarely cauliflorous on older branches or the main trunk, pedunculate, the flowers pendent, with a strong odor of ripe banana at anthesis, the pedicel usually borne in the axil of a foliaceous bract or sometimes the basal bract minute, and bearing a second minute bract along the pedicel. Sepals 3, valvate. Petals 6, in two valvate whorls, more or less equal to subequal, the two whorls moderately to distinctly differentiated, fleshy, yellow at anthesis, sometimes with a reddish blotch at the base inside. Stamens numerous, the anther connectives truncate discoid. Gynoecium apocarpous, the carpels several to many; stigma globose to clavate; ovules 1-8(-17), lateral, uniseriate, or rarely biseriate. Fruit a cluster of free monocarps, globose to cylindric-oblong to ellipsoid, stipitate to nearly sessile, red to deep purple, the mesocarp fleshy. Seeds discoid to hemispherical, pale to medium brown, dull to slightly shiny, smooth and minutely foveolate, or sometimes irregularly rugose, the raphe a shallow encircling furrow. 17 spp. from Mexico to Colombia, and 1 sp. on Cuba.

1. Leaves with persistent, dense, velutinous indumentum below.

2. Pedicels 11-15 mm, elongating to 26 mm in fruit; petals 25-30 mm; stipes of the monocarps 12-25 mm. **3. D. dukei**
2. Pedicels usually much longer, 12-118 mm; petals 12-20 mm; stipes of the monocarps 2-11 mm.
 3. Sepals 8 mm, triangular, free, not reflexed; petals 12-15 mm, subequal, the inner petals narrower; carpels 9-20; stipes of the monocarps 5-11 mm. **10. D. oerstedii**
 3. Sepals 3-6 mm, ovate, reflexed; petals 16-20 mm, more or less equal; carpels 6-9; stipes of the monocarps 2-5 mm. **13. D. trunciflora**
1. Leaves glabrous or initially with sparse indumentum below, glabrescent.
 4. Base of leaves emarginate to subcordate or sagittate. **5. D. heteropetala**
 4. Base of leaves acute to rounded, never emarginate to sagittate.
 5. Sepals 9-22 × 6-14 mm, persistent, often into fruit.
 6. Leaves drying black, not verrucose below; pedicels to 50 mm; basal bract of the pedicel 20-55 × 18-45 mm, foliaceous. **7. D. macrocalyx**
 6. Leaves not drying black, minutely verrucose below; pedicels 8-19 mm; basal bract of the pedicel minute. **14. D. verrucipes**
 5. Sepals 1-12 × 2-8 mm, deciduous, not persisting into fruit.
 7. Basal bract of the pedicel minute, never foliaceous.
 8. Leaves verrucose below; sepals 9-12 mm; carpels 10-15; monocarps distinctly stipitate, the stipe 5-8 mm. **4. D. erythrocarpa**
 8. Leaves not verrucose below; sepals 2-6 mm; carpels 6-12; monocarps nearly sessile to shortly stipitate, the stipe 2-6 mm.
 9. Carpels 6-12; monocarps 24-42 mm; stipe 3-6 mm, stout. **2. D. dolichopetala**
 9. Carpels 3-5; monocarps to 27 mm; stipe 2-5 mm, slender. **12. D. schippii**
 7. Basal bract of the pedicel foliaceous, sometimes caducous.
 10. Leaves verrucose below.
 11. Sepals 8 × 6 mm; petal whorls more or less equal, 30-36 mm; monocarps to 21 mm, 13-16 mm in diameter. **8. D. maxonii**
 11. Sepals 2-4 × 2-5 mm; petal whorls subequal, the inner petals distinctly narrower, 18-23 mm; monocarps 4-15 mm, 5-10 mm in diameter.

12. Basal bract of the pedicel persistent into fruit; carpels 17-22; stipes of the monocarps 6-15 mm. **1. D. bibracteata**
12. Basal bract of the pedicel often caducous; carpels 5-9; stipes of the monocarps 5-8 mm. **6. D. lanceolata**
10. Leaves not verrucose below.
13. Base of leaves obtuse to rounded; sepals connate; petals to 20 mm; ovules 2; stipe of the monocarps 2-5 mm. **13. D. trunciflora**
13. Base of the leaves cuneate to obtuse; sepals free; petals 22-35 mm; ovules 4-8; stipe of the monocarps 7-22 mm.
14. Stems sparsely puberulous, glabrescent; pedicels sparsely puberulous; petal whorls subequal, connate at their base, the outer petals ovate, the inner petals narrowly triangular. **9. D. microcarpa**
14. Stems densely ferruginous tomentose; pedicels densely ferruginous tomentellous; petal whorls more or less equal, free, narrowly triangular to narrowly oblong. **11. D. panamensis**

1. *Desmopsis bibracteata* (B.L. Rob.) Saff., *Bull. Torrey Bot. Club* 43: 190 (1916).
Unona bibracteata B.L. Rob., *Amer. J. Sci.* 150: 175 (1895). Holotipo: Nicaragua,
Wright 1 (GH!). Illustr.:

Shrubs to trees to 6 m. Stems sparsely golden puberulous, glabrescent. Leaves (1.6-3.1-13.9 × (0.7-1.2-5.4 cm, narrowly elliptic to elliptic, membranous, glabrous and shiny above, glabrate and verrucose below; midrib flat above, raised below; secondary veins 9-14 per side, flat to slightly raised above and below; base base cuneate and slightly decurrent; apex acute to acuminate, the tip rounded. Petioles 1.5-5 mm, swollen, sparsely golden puberulous. Inflorescences 1-2-flowered; peduncles 3-8 mm; pedicels 17-26 mm, elongating to 39 mm in fruit; basal bract 4-16 × 4-22 mm, ovate to rounded, glabrous, often folded conduplicate, the base cordate, the apex obtuse to rounded; pedicellar bract minute, 3-14 mm from base of pedicel. Sepals 3-4 × 4-5 mm, broadly ovate, very sparsely puberulous, slightly reflexed, the apex obtuse. Petal whorls subequal, fleshy, yellow; outer petals 18 × 9 mm, triangular, sparsely puberulous, the base cuneate to obtuse, abruptly curved inward forming a short claw, the margins revolute, the apex

rounded and slightly reflexed; inner petals 23×6 mm, narrowly oblong, sparsely puberulous outside, glabrous inside, the base cuneate to obtuse, abruptly curved inward forming a short claw, the margins revolute, the apex rounded and slightly reflexed. Stamens c. 140, 1.2-1.5 mm; filaments 0.4 mm along margin, 0.7 mm at center; connectives 0.3 mm, sparsely short setaceous. Carpels 17-22; ovaries 1.8 mm, densely short setaceous; stigma 0.5 mm in diameter, obliquely napiform, densely short setaceous; ovules 2-4. Monocarps 4-15 mm, 5-10 mm in diameter, globose to oblong, glabrous, the base and apex rounded, usually constricted around seeds upon drying; stipe 6-15 mm, slender. Seeds 7-8 mm in diameter, 3-4 mm thick, minutely foveolate. *Selvas altas o medianas subperennifolias*. ES (Calderón 314, US); N (Robleto 923, MO); CR (Jiménez 955, MO); P (Pittier 3367, US). 0-1400 m. (Endémica.)

2. *Desmopsis dolichopetala* R.E. Fr., *Acta Horti Berg.* 13(3): 106 (1941). Holotipo: Honduras, *Yuncker et al.* 6155 (S!). Illustr.:

Trees 6-8 m. Stems densely golden puberulous, glabrescent. Leaves $9.2-22 \times 3.1-7$ cm, narrowly elliptic, membranous, glabrous above, sparsely ferruginous, rigid appressed pubescent below; midrib flat above, raised below, sparsely sericeous; secondary veins 9-12 per side, flat above, slightly raised below; base acute to obtuse and slightly decurrent; apex acute to acuminate. Petioles 2-7 mm, densely puberulous. Inflorescences 1-2-flowered, sometimes cauliflorous; peduncles 4-9 mm; pedicels 38-89 mm; basal bract minute, caducous; pedicellar bract minute, 12-24 mm from base of pedicel. Sepals 1-2 \times 2-3 mm, shallowly triangular, densely sericeous. Petal whorls more or less equal, 40-55 \times 3.5-6 mm, linear triangular, puberulous to densely sericeous at the base outside, glabrous inside, the base truncate, the apex acute. Stamens c. 70, 1.2-1.5 mm; filaments 0.2 mm along margin, 0.4 mm at center; connectives 0.1-0.2 mm. Carpels 6-12; ovaries 1.2-1.8 mm, densely setaceous; stigma 0.8 mm in diameter, globose, sparsely short setaceous; ovules 1-4. Monocarps 24-42 mm, 24-26 mm in diameter, globose to oblong, glabrous, the base and apex rounded; stipe 3-6 mm, stout. Seeds $21 \times 14-18$ mm, 6-9 mm thick, flattened ellipsoid to hemispherical, smooth to flaky, lacking foveoles. *Selvas mesófilas de montañas*. H (Walker 431, MO). 1400-1800 m. (Endémica.)

3. *Desmopsis dukei* G.E. Schatz, *ined.* (200X). Holotipo: Panamá, *Duke 8777* (MO!).

Illustr.:

Trees 4-20 m. Stems densely golden brown tomentose. Leaves 4-18.3 × 1.5-9 cm, elliptic, membranous, glabrous above, short golden velutinous below; midrib impressed above, golden tomentose, prominently raised below, golden hirsute-tomentose; secondary veins 7-9 per side, flat above, only slightly raised below; base cuneate to rounded; apex acuminate. Petioles 2-6 mm, densely golden tomentose. Inflorescences 2-flowered; peduncles 1-2 mm, densely golden tomentose; pedicels 11-15 mm, elongating to 26 mm in fruit, densely golden tomentose, persistent in fruit; basal bract 7-12 × 4-8 mm, ovate, glabrous above, sparsely short golden velutinous below, the base obtuse to subcordate, the apex acute, often caducous; pedicellar bract minute to comparable in size, shape, and indument to basal bract, 5-8 mm from base of pedicel. Sepals 8 × 7 mm, triangular, sericeous outside, glabrous inside, the base truncate and decurrent, the apex acute. Petal whorls more or less equal (the inner petals slightly narrower), 25-30 × 7 mm, lanceolate, sericeous outside especially towards the base, glabrous inside, the base truncate, the apex acute. Stamens c. 100, 1.8 mm; filaments 0.3 mm; connectives 0.3 mm. Carpels 13; ovaries 2 mm, densely golden sericeous; stigma 0.5 mm in diameter, globose, densely golden hirsute-tomentose; ovules 4. Monocarps 9-17 × 9-14 mm, globose to oval, glabrous, the base and apex rounded, sometimes slightly constricted around seeds upon drying; stipe 12-25 mm, slender. Seeds 7-9 mm in diameter, 4-6 mm thick, discoid, foveolate. *Selvas altas perennifolias*. CR (*Gomez-Laurito 8808*, F); P (*Duke 8798*, MO). 0-330 m. (Mesoamérica, Colombia.)

4. *Desmopsis erythrocarpa* Lundell, *Wrightia* 5(2): 26 (1974). Holotipo: Guatemala, *Contreras 5976* (LL). Illustr.:

Trees 3-6 m. Stems sparsely golden-ferruginous hispid-sericeous. Leaves 4.5-22.5 × 1.5-7.4 cm, narrowly elliptic, membranous, initially sparsely appressed pubescent above and below, the hairs to 0.7 mm, glabrescent above, weakly minutely verrucose below; midrib slightly impressed above, more so towards the base, sparsely tomentose, prominently raised below, initially sericeous, glabrescent; secondary veins 9-11 per side, flat above, only slightly raised below; base cuneate to attenuate; margins slightly

revolute; apex acuminate to caudate, the acumen to 2.5 cm. Petioles 2-8 mm, slightly swollen, sparsely golden tomentose. Inflorescences 4-flowered; peduncles 2 mm; pedicels to 48 mm, slender; basal bract minute, caducous; pedicellar bract 1-3 × 1-2 mm, narrowly triangular, tomentose, deciduous, 14-22 mm from base of pedicel. Sepals 9-12 × 3-4 mm, narrowly triangular, sparsely golden tomentose and minutely verrucose outside, glabrous inside, the base truncate and decurrent, the apex acuminate. Petal whorls more or less equal, 36-47 × 4 mm, sparsely white sericeous towards the base outside, glabrous inside, the base truncate, the apex acute. Stamens c. 50; filaments 0.2 mm; connectives 0.1 mm. Carpels 10-15; ovaries 1.2 mm; stigma 0.5 mm in diameter, globose, densely tomentose; ovules 2. Monocarps 9-15 × 7-12, globose to ellipsoid, glabrous, the base and apex rounded; stipe 5-8. Seeds 8-9 mm in diameter, 5 mm thick, discoid to flattened globose, irregularly rugose. *Selvas altas subperennifolias*. B (*Atha & Brewer 1168*, NY, U); G (*Contreras 5912*, MO). 0-100 m. (Endémica.)

5. *Desmopsis heteropetala* R.E. Fr., *Acta Horti Berg.* 10(2): 316 (1931). Holotipo: Costa Rica, *Pittier 7967* (BR). Illustr.:

Trees to 6 m. Stems glabrous. Leaves 10.8-37.6 × 4.2-16.3 cm, elliptic, membranous, glabrous above and below; midrib slightly impressed above, prominently raised below; secondary veins 11-15 per side, slightly elevated above and below; base emarginate to subcordate to sagittate; apex acuminate, the acumen to 2.5 cm. Petioles 2-4 mm, swollen, glabrous. Inflorescences 2-4-flowered; peduncles 10-15 mm; pedicels 35-83 mm, glabrous, the peduncle/pedicel elongating to 130 mm in fruit, very stout, to 4 mm in diameter; basal bract 20-40 × 20-40 mm, broadly ovate to orbicular, glabrous, often folded conduplicate, the base cordate, the apex obtuse; pedicellar bract minute, tomentellous, 15-25 mm from base of pedicel. Sepals 3 × 5 mm, broadly ovate, glabrous, the base truncate, the apex obtuse. Petal whorls differentiated; outer petals 12-15 × 7-12 mm, ovate, sparsely puberulous-sericeous outside, glabrous inside, the base rounded, the apex acute; inner petals 14-16 × 4-5 mm, lanceolate, sparsely puberulous-sericeous outside, glabrous inside, the base cuneate and bent inward to form a claw 2 mm, the apex acute. Stamens c. 100, 2 mm; filaments 0.2-0.3 mm; connectives 0.1 mm. Carpels 7-20; ovaries 1.6-2 mm, golden tomentose; stigma 0.6 mm, clavate, densely short setaceous;

ovules 2. Monocarps 18-35 mm, 16-24 mm in diameter, globose to ellipsoid, glabrous, the base and apex rounded; stipe 4-13 mm, 3-6 mm in diameter, stout. Seeds 6-12 mm in diameter, 3 mm thick, discoid, smooth, minutely foveolate *Selvas altas perennifolias*. CR (*Herrera 4416*, MO). 20-500 m. (Endémica.)

6. *Desmopsis lanceolata* Lundell, *Lloydia* 2(2): 85 (1939). Holotipo: México, Chiapas, *Matuda 2299* (MICH!). Illustr.: Lundell, *Lloydia* 2(2): 86, t. 3 (1939).

Desmopsis guatemalensis Standl. & Steyer., *D. izabalensis* Standl. & Steyer.

Shrubs to trees 2.5-6 m. Stems densely ferruginous-golden tomentose. Leaves 2.7-13.9 × 0.7-4.2 cm, narrowly elliptic, membranous to chartaceous, glabrous and weakly to markedly verrucose above, sparsely sericeous and weakly to markedly verrucose below, glabrescent; midrib weakly impressed above, puberulous, prominently raised below, sparsely golden sericeous; secondary veins 8-13 per side, flat above, slightly raised below; base acute to cuneate; apex acute, the tip rounded. Petioles 2.5-6 mm, densely ferruginous-golden tomentose, slightly swollen. Inflorescences 2-flowered; peduncles 2-7 mm; pedicels 6-45 mm, slender, sparsely sericeous; basal bract 5-14 × 3-14 mm, lanceolate, sparsely sericeous below along midrib, often caducous, the base acute to obtuse, the apex acute; pedicellar bract minute to 11 × 8 mm, 2-13 mm from base of pedicel. Sepals 2-3 × 2-3 mm, ovate, sparsely puberulous and verrucose outside, glabrous and verrucose inside, the base truncate, the margins involute, the apex acute to obtuse and sometimes apiculate, reflexed at anthesis. Petal whorls subequal; outer petals 19 × 4-5 mm, narrowly oblong, sparsely puberulous to sericeous and verrucose outside, glabrous and verrucose inside, the base obtuse and abruptly bent inwards forming a claw 1 mm, the margins involute, the apex acute; inner petals 18 × 2-3 mm, narrowly oblong to linear, sparsely puberulous to sericeous and verrucose outside, glabrous and verrucose inside, the base obtuse and abruptly bent inwards forming a claw 1 mm, the margins revolute, the apex acute. Stamens 40-45, 1.2-1.6 mm; filaments 0.2 mm; connectives 0.1 mm. Carpels 5-9; ovaries 1.1-1.6 mm; stigma 1 mm in diameter, globose to obpuriform; ovules 2. Monocarps to 13 mm, 10 mm in diameter, globose to subglobose, the base and apex rounded; stipe 5-8 mm. Seeds 9 mm in diameter, 4 mm thick, subglobose to hemispherical, smooth, minutely foveolate. *Selvas medianas subperennifolias*. Ch (*Reyes*

García et al. 1696, MO); G (*Steyermark 37331*, F). 150-1500 m. (Mexico [Oaxaca], Mesoamérica.)

7. *Desmopsis macrocalyx* G.E. Schatz, *ined.* (200X). Holotipo: Panamá, *Liesner 1038* (MO!). Illustr.:

Trees to 12 m tall. Stems glabrous. Leaves (4.5-)8.3-28.4 × (1.6-)3.4-11.2 cm, elliptic, membranous, glabrous above and below, drying black; midrib slightly impressed above, prominently raised below, glabrous; secondary veins 9-12 per side, flat above, slightly raised below; base cuneate to obtuse; apex acuminate to caudate, the acumen to 2.3 cm. Petioles 3-11 mm, very sparsely tomentellous initially, glabrescent, drying black, swollen. Inflorescences 1-2-flowered; peduncles to 4 mm, elongating to 14 mm in fruit; pedicels to 43 mm, elongating to 50 mm in fruit, 3 mm in diameter, initially sparsely tomentellous, glabrescent; basal bract 20-55 × 18-45 mm, broadly ovate, glabrous, often conduplicate folded, the base cordate, the apex acute to acuminate; pedicellar bract minute, tomentellous, c. midway from base of pedicel. Sepals 10 × 6 mm at anthesis, accrescent and persistent in fruit, expanding to 22 × 14 mm, ovate, glabrous, the base truncate, the apex acute. Petal whorls more or less equal, 17 × 4 mm, lanceolate, sparsely sericeous outside, glabrous at the base to sparsely sericeous at the apex inside, the base truncate, the apex acute. Stamens numerous, 1.2 mm; filaments 0.2 mm; connectives 0.1 mm. Carpels 18-23; ovaries **x.x**; stigma 0.3 mm in diameter, globose, densely golden setaceous; ovules 2-5. Monocarps 9-25 mm, 8-15 mm in diameter, subglobose to oval, glabrous, the base and apex rounded; stipe 7-15 mm. Seeds 9 mm in diameter, 2 mm thick, discoid, smooth to somewhat rugose. *Selvas altas perennifolias*. P (*Antonio 4850*, MO). 10-500 m. (Endémica.)

8. *Desmopsis maxonii* Saff., *Bull. Torrey Bot. Club* 43: 188 (1916). Holotipo: Panamá, *Pittier 3154* (US-677550). Illustr.:

Shrubs to trees 1.5-10 m. Stems initially very sparsely golden short sericeous, glabrescent. Leaves 2.1-22 × 0.9-8.7 cm, elliptic to ovate, membranous, glabrous above, glabrous to very sparsely sericeous and weakly to strongly verrucose below; midrib impressed above, prominently raised below, initially very sparsely white sericeous,

glabrescent; secondary veins 8-10 per side, slightly raised above and below; base cuneate to acute; apex acute to acuminate. Petioles 3-8 mm, initially very sparsely golden short sericeous, glabrescent. Inflorescences 1-2-flowered; peduncles 3-15 mm; pedicels 35-98 mm, glabrous, slender; basal bract 3-25 × 3-20 mm, broadly ovate, glabrous, often conduplicate folded, the base subcordate to cordate, the apex acute, rarely caducous; pedicellar bract minute, 10-30 mm from base of pedicel. Sepals 8 × 6 mm, ovate, glabrate, minutely verrucose outside, slightly connate at truncate base, the apex acute. Petal whorls more or less equal, the inner petals slightly narrower than the outer petals, 30-36 × 6-8 mm, narrowly triangular, very sparsely sericeous towards the base outside, glabrous inside, the base rounded, the apex acute. Stamens c. 80, 1.1-1.6 mm; filaments 0.2-0.3 mm; connectives 0.1-0.2 mm. Carpels 6-15; ovaries 2 mm, densely sericeous; stigma 0.4 mm in diameter, globose, short setaceous; ovules 2-5. Monocarps to 21 mm, 13-16 mm in diameter, globose to oval, glabrous, the base and apex rounded, slightly constricted around the seeds; stipe 2-32 mm, 1 mm in diameter, slender. Seeds 7-11 mm in diameter, 2-3 mm thick, discoid to hemispherical, smooth, minutely foveolate. *Selvas mesófilas de montañas*. CR (Davidse et al 28462, MO); P (Correa et al 10000, MO). 600-1600 m. (Endémica.)

9. *Desmopsis microcarpa* R.E. Fr., *Acta Horti Berg.* 10(1): 23 (1930). Holotipo: Costa Rica, *Pittier 16014* (B!). Illustr.: Fries, *Ann. Missouri Bot. Gard.* 49: 197, t. 160 (1962).

Desmopsis glabrata Schery.

Shrubs to trees 1.5 -15 m. Stems sparsely puberulous, glabrescent. Leaves 4.7-24 × 1.7-10.1 cm, elliptic, membranous, initially very sparsely puberulous above, glabrescent, glabrous below; midrib slightly impressed above, puberulous, prominently raised below, sparsely puberulous; secondary veins 7-10 per side, flat above, slightly raised below; base cuneate to obtuse, slightly decurrent; apex acuminate to caudate, the acumen to 3.5 cm. Petioles 3-9 mm, sparsely puberulous, swollen. Inflorescences 2-3-flowered; peduncles 2-21 mm, sparsely puberulous; pedicels 10-83 mm, elongating to 95 mm in fruit, sparsely puberulous, slender; basal bract 7-38 × 7-22 mm, ovate to round, sparsely puberulous towards the base close to midrib outside, glabrous inside, the base cordate, the apex acute

to rounded, often conduplicate folded; pedicellar bract minute, sparsely puberulous, 11-40 mm from base of pedicel. Sepals 6-8 × 6-8 mm, ovate, sparsely puberulous outside, glabrous inside, the base truncate, the margins ciliate, the apex acute to apiculate. Petal whorls subequal, connate at the base; outer petals to 33 × 15 mm, ovate, sparsely short sericeous outside, glabrous inside, the base obtuse, bent inwards to form a short claw, the margins strongly revolute, the apex acute, the tip rounded and incurved; inner petals to 35 × 11 mm, narrowly triangular, sparsely short sericeous to puberulous outside, glabrous inside, the base obtuse, bent inwards to form a short claw, the margins strongly revolute, the apex acute, slightly incurved. Stamens c. 75, 1.9-2.1 mm; filaments 0.2-0.3 mm; connectives 0.3 mm. Carpels 8-17; ovaries 1.6-1.9 mm; stigma 0.5 in diameter, globose, densely tomentellous; ovules 4-8. Monocarps to 21 × 15 mm, ellipsoid to oblong, glabrous, the base and apex rounded, somewhat constricted around the seeds upon drying; stipe 7-22 mm. Seeds to 12 mm in diameter, 3-4 mm thick, discoid or hemispherical, smooth, minutely foveolate. *Selvas altas perennifolias*. N (*Rueda 2685*, MO); CR (*Robles 2231*, MO); P (*von Wedel 2464*, MO). 0-1400 m. (Endémica.)

10. *Desmopsis oerstedii* Saff., *Bull. Torrey Bot. Club* 43: 191 (1916). Holotipo: Costa Rica, *Oersted 148* (C!). Illustr.:

Shrubs to trees 2-8 m. Stems densely ferruginous tomentose to hirsute. Leaves 3.2-17.3 × 2.2-8.8 cm, membranous, glabrate and glossy above, golden velutinous below; midrib impressed above, densely golden velutinous, prominently raised below, densely ferruginous hirsute; secondary veins 8-10, flat above, slightly raised and densely ferruginous hirsute below; base cuneate to obtuse; apex acuminate. Petioles 3-7 mm, densely ferruginous tomentose to hirsute. Inflorescences 1-2-flowered, occasionally cauliflorous; peduncles 3-4 mm; pedicels 32-118 mm, densely ferruginous tomentose; basal bract 8-25 × 5-20 mm, broadly ovate to orbicular, densely tomentose outside, glabrous inside, often caducous; pedicellar bract minute, lanceolate, 10-38 mm from base of pedicel. Sepals 8 × 5 mm, triangular, densely velutinous-tomentose outside, glabrous inside, the base truncate, the apex acute. Petal whorls subequal, the inner petals slightly narrower, 12-15 × 4-7 mm, lanceolate to ovate, short sericeous to tomentellous outside, glabrous inside, the base truncate, the apex acute. Stamens c. 100, 1.4-1.6 mm; filaments

0.1-0.2 mm; connectives 0.1-0.2 mm. Carpels 9-20; ovaries 1.4-1.6 mm, densely tomentose; stigma 0.4 mm in diameter, globose, densely velutinous; ovules 2-4. Monocarps to 17 mm, 11 mm in diameter, globose to oval, the base and apex rounded; stipe 5-11 mm, densely short sericeous. Seeds 7-11 mm in diameter, 3-4 mm thick, discoid, foveolate to ruguose. *Selvas mesófilos de montañas*. CR (*Mora 239*, MO); P (*Knapp 1583*, MO). 800-1800 m. (Endémica.)

11. *Desmopsis panamensis* (B.L. Rob.) Saff., *Bull. Torrey Bot. Club* 43: 185 (1916). *Unona panamensis* B.L. Rob., *Amer. J. Sci.* 150: 175 (1895). Holotipo: Panamá, *Hayes s.n. (468)* (GH!). Illustr.: Saff., *Bull. Torrey Bot. Club* 43: 185, t. 7 (1916).

Trees to 15 m. Stems densely ferruginous tomentose. Leaves 3-26.3 × 1.7-9.1 cm, elliptic to narrowly elliptic, membranous, glabrous and with somewhat of a matte finish when dry above, initially sparsely sericeous below, glabrescent; midrib impressed above, sparsely puberulous, prominently elevated below, fulvous-ferruginous tomentose to sericeous; secondary veins 10-15 per side, flat above, raised below, sparsely fulvous-ferruginous puberulous; base cuneate to acute; apex acuminate. Petioles 3-5 mm, ferruginous puberulous, swollen. Inflorescences to 6-flowered; peduncles 4-16 mm, densely ferruginous tomentellous; pedicels 25-73 mm, elongating to 90 mm in fruit, densely ferruginous tomentellous; basal bract 3-42 × 2-26 mm, broadly ovate to orbicular, the base subcordate, the apex obtuse to acuminate; pedicellar bract 3 × 3 mm, 3-36 mm from base of pedicel. Sepals 2-3 × 4-5 mm, broadly ovate, ferruginous tomentellous outside, glabrous inside, the base truncate and decurrent, the apex acute and sometimes apiculate, sometimes reflexed. Petal whorls more or less equal, 22-31 × 4-7 mm, narrowly triangular to narrowly oblong, glabrous, the base obtuse and curved inward to form a short claw, the margins strongly revolute, the apex acute, the tip rounded and incurved. Stamens c. 100, 1.5 mm; filaments 0.3-0.4 mm; connectives 0.1 mm. Carpels 6-10; ovaries 1.4-1.8 mm, densely sericeous to setaceous; stigma 0.5 mm in diameter, globose, densely short setaceous; ovules 5-6. Monocarps to 28 mm, 17 mm in diameter, oblong, puberulous, the base and apex rounded; stipe 8-12 mm. Seeds 10 mm in diameter, 4 mm thick, smooth, minutely foveolate. *Selvas altas subperennifolias*. P (*Croat 7373*, MO). 0-800 m. (Endémica.)

12. *Desmopsis schippii* Standl., *Field Mus. Nat. Hist., Bot. Ser.* 11(4): 130-131 (1932). Holotipo: Belize, *Schipp 960* (F-657797). Illustr.:

Desmopsis brevipes R.E. Fr.

Shrubs to trees 1.5-10 m. Stems initially sparsely golden-ferruginous puberulous, glabrescent. Leaves 3.1-22 × 1.4-7.9 cm, narrowly to broadly elliptic, membranous, glabrous above, initially very sparsely puberulous below, glabrescent; midrib slightly impressed above, glabrous, prominently raised below, golden appressed puberulous; secondary veins 7-8 per side, flat above, slightly raised below, glabrous; base cuneate to rounded; apex acuminate. Petioles 2-6 mm, sparsely golden-ferruginous puberulous, somewhat swollen. Inflorescences 1-2-flowered, often cauliflorous; peduncles to 2 mm; pedicels 9-70 mm, glabrous, slender to more stout when shorter; basal bract minute; pedicellar bract minute. Sepals 3 × 3-4 mm, broadly ovate, glabrous, the base truncate, the apex obtuse to rounded. Petal whorls more or less equal, to 44 × 6 mm, narrowly oblong to linear, sparsely short sericeous outside, glabrous inside, the base obtuse and bent inwards to form a short claw, the apex obtuse to rounded. Stamens c. 40, 1.5-1.9 mm; filaments 0.2 mm; connectives 0.1 mm. Carpels 3-5; ovaries 1.9 mm, densely short golden-brown sericeous; stigma 0.8 mm in diameter, globose, densely setaceous; ovules 2-3. Monocarps to 27 mm, 15-25 mm in diameter, usually spherical to less often oblong, glabrous, the base and apex rounded; stipe 2-5 mm. Seeds to 12 mm in diameter, 5 mm thick, discoid or hemispherical, irregularly flaky rugose. *Selvas altas perennifolias y mesófilas de montañas*. T (*Conrad et al. 2772*, MO); B (*Schipp 960*, MO); H (*Clewell & Cruz 4205*, MO); N (*Rueda et al. 4267*, MO); CR (*Bello 1151*, MO); P (*Antonio 2074*, MO). 0-1200 m. (Endémica.)

13. *Desmopsis trunciflora* (Schltdl. & Cham.) G.E. Schatz, *Candollea* 49: 419 (1994). *Xylopia trunciflora* Schltdl. & Cham., *Linnaea* 6: 417 (1831). Holotipo: México, *Schiede 1287* (B!). Illustr.:

Annona? bibracteata Hook., *Desmopsis galeottiana* (Baill.) R. E. Fr., *D. galeottiana* var. *subnuda* R.E. Fr., *Guatteria bibracteata* (Hook.) Hemsl., *Trigyneia galeottiana*

Baill., *Unonopsis galeottiana* (Baill.) R.E. Fr., *U. trunciflora* (Schltdl. & Cham.) R.E. Fr., *Xylopicrum trunciflorum* (as "*truncifolium*") (Schltdl. & Cham.) Kuntze.

Trees to 12 m. Stems moderately to densely golden tomentose to hirsute. Leaves 2.2-16 × 1.2-6.3 cm, elliptic to slightly obovate, membranous to weakly chartaceous, glabrous above, very sparsely appressed pubescent to densely short white velutinous below; midrib impressed above, sparsely to densely tomentose, prominently raised below, very sparsely tomentose to densely golden hirsute; secondary veins 9-10 per side, flat above, slightly raised below; base obtuse to rounded; apex acuminate to rounded. Petioles 3-5 mm, sparsely to densely tomentose, swollen. Inflorescences 3-4-flowered, occasionally cauliflorous; peduncles 3-13 mm; pedicels 12-66 mm, sparsely tomentellous; basal bract 3-35 × 2-21 mm, broadly lanceolate to broadly ovate, the base subcordate, the apex acute, often caducous; pedicellar bract 3-15 × 2-10 mm, ovate, 3-10 mm from base of pedicel. Sepals 3-6 × 3-6 mm, ovate, connate at their base for 2 mm, reflexed at anthesis, tomentellous outside, glabrous inside, the base emarginate, the apex obtuse to acute. Petal whorls more or less equal, 16-20 × 8-10 mm, ovate, short sericeous outside, glabrate inside, the base cuneate to rounded and bent inwards to form a short claw, the apex acute. Stamens c. 70, 1.5 mm; filaments 0.2 mm; connectives less than 0.1 mm. Carpels 6-9; ovaries 1.5 mm; stigma 0.4 mm in diameter, globose, densely short setaceous; ovules 2. Monocarps 8-20 mm, 8-12 mm in diameter, globose to oval, glabrous, the base and apex rounded; stipe 2-5 mm. Seeds 8 mm in diameter, 4 mm thick, hemispherical, flaky rugose. *Selvas altas perennifolias*. T (*Puig 694* or *701*), MEXU); Ch (*Calzada 9946*, XAL). 0-900 m. (Mexico [Veracruz], Mesoamérica.)

14. *Desmopsis verrucipes* Chatrou, G.E. Schatz & N. Zamora, *Blumea* 51: 216-217 (2001). Holotipo: Costa Rica, *Chatrou, Oosterhof & Aguilar 102* (CR!). Illustr.: Chatrou et al., *Blumea* 51: 217, t. 4 (2001).

Trees to 8 m. Stems glabrous. Leaves 13.1-32 × 4.3-12.3 cm, narrowly elliptic to broadly elliptic, membranous, glabrous above, glabrous and verruculose below; midrib slightly impressed above, prominently raised below, glabrous; secondary veins 11-14 per side, flat above, slightly raised below; base cuneate; apex acuminate. Petioles 5-13 mm, glabrous, swollen. Inflorescences perennating dichasial condensed rhipidia bearing 1

flower at a time, internodal or often cauliflorous; peduncle (= perennating rhipidial axis) 1-6 mm; pedicels 8-19 mm, sparsely tomentellous; basal bract minute; pedicellar bract minute, 3-6 mm from base of pedicel. Sepals 9-20 × 5-10 mm, triangular, foliaceous with evident venation, persistent, short sericeous and verruculose outside, glabrous inside, the base rounded to somewhat emarginate, the apex acute. Petal whorls more or less equal, 15-30 × 5-7 mm, narrowly lanceolate to triangular, sparsely sericeous outside, glabrous inside, the base truncate, the apex acute. Stamens c. 80, 2 mm; filaments 0.3 mm; connectives 0.1 mm. Carpels 15-22; ovaries 1.6-1.9 mm, sericeous; stigma 0.2 mm in diameter, globose, densely golden setaceous; ovules 4-6. Monocarps 8-18 mm, 9-11 mm in diameter, oval, glabrous, the base and apex rounded; stipe 5-12 mm. Seeds 100 mm in diameter, 2 mm thick, irregularly rugose. *Selvas altas perennifolias*. CR (Fonseca 23, MO). 0-100 m. (Endémica.)

7. *Duguetia* A. St. Hill.

By G.E. Schatz.

Trees 10-30 m. Stems terete, densely to completely covered with stellate hairs or stellate to subentire lepidote. Leaves mostly narrowly elliptic to somewhat oblong, chartaceous, sparsely to moderately densely covered with either stellate hairs, or stellate to subentire lepidote; midrib impressed above, raised below; secondary venation brochidodromous, flat to slightly raised above, raised below; base acute to rounded and sometimes decurrent; apex usually acuminate. Petioles swollen, canaliculate, usually densely stellate lepidote. Inflorescences leaf-opposed to supra-axillary condensed rhipidia, often at leafless nodes, bearing 1 to several flowers at a time, often perennial and bearing ultimately up to 25 flowers in total; peduncles usually short, pedicels borne in the axil of a minute bract, and bearing a second, caducous bract along the pedicel. Sepals 3, valvate, free or slightly connate at their base. Petals 6, in two subequal whorls, imbricate, free. Stamens numerous, connectives discoid. Fertile carpels 25-100, free at anthesis; style/stigma lanceoloid to terete; ovule 1 per carpel, basal. Fruit a globose cluster of sessile monocarps, thus appearing pseudosyncarpous, subtended by a basal collar of connate, sterile carpels, the individual monocarps obovoid, obovoid-oblong, obtrulloid to

clavate, rounded in cross-section to distinctly angled, free and somewhat connivent to partially fused along their lateral walls, sometimes completely fused and syncarpous, somewhat woody, the areoles depressed ovoid to pyramidal, smooth to verrucose-rugose to tuberculate, sometimes pruinose, usually apiculate. Seeds obovoid; rudimentary aril indistinct as pale-colored basal zone. c. 90 Neotropical spp. from Nicaragua to Bolivia, and 4 spp. in West to Central Africa.

1. Fertile carpels c. 150; basal collar of c. 25 connate sterile carpels, 20-22 mm in diameter; monocarps fused for over 50% in fruit, the areoles densely covered with tubercles 1-2 mm. **4. D. tuberculata**

1. Fertile carpels 25-100; basal collar of 5-15 connate, sterile carpels, 5-20 mm in diameter; monocarps free in fruit, the areoles smooth or rugose-striate.
2. Leaves with indumentum of erect, stellate hairs; fertile carpels 25-30; basal collar of 5 connate, sterile carpels, 5 mm in diameter; areoles of monocarps densely covered with grey stellate indumentum. **2. D. gentryi**

2. Leaves with indumentum of stellate to subentire scales, i.e., lepidote; fertile carpels 40-100; basal collar of 10-15 connate, sterile carpels, 10-20 mm in diameter; areoles glabrous, or covered with sparse lepidote indumentum, or pruinose.

3. Monocarps indistinctly 2-4 angled or rounded in cross section; upper half of monocarps and areoles striate-rugose, the areoles 3-4 mm, depressed ovoid, the apex obtuse to rounded and shortly apiculate; fertile carpels c. 55.

3. D. panamensis

3. Monocarps distinctly 4-6-angled in cross section, smooth; areoles 5-10 mm, pyramidal; fertile carpels 40-50 or 75-100.

4. Fertile carpels 75-100; areoles glabrous; leaves with cuneate to acute base.

1. D. confusa

4. Fertile carpels 40-50; areoles usually pruinose; leaves with obtuse to rounded base, rarely acute. **5. D. vallicola**

1. *Duguetia confusa* Maas, *Bot. Jahrb. Syst.* 118: 195 (1996). Holotipo: Panamá, *Mori & Kallunki 2206* (MO!). Illustr.: Maas, *Bot. Jahrb. Syst.* 118: 196, t. 4 (1996).

Trees to 25 m. Stems densely pale brown stellate to subentire lepidote. Leaves 9-36 × 2.9-11.5, narrowly elliptic, glossy glabrous above, densely to completely pale brownish-grey stellate to subentire lepidote below; midrib impressed above, raised below; secondary veins 10-15 per side; base cuneate to acute; apex acute to acuminate, the acumen to 2 cm. Petioles 3-7 mm, 2-3 mm in diameter, densely lepidote. Inflorescences leaf-opposed to supra-axillary, 1-4 -flowered at a time, to 8 flowers in total; peduncles 3-5 mm, 2 mm in diameter, to 5 mm in diameter in fruit; pedicels 5-10 mm, 2 mm in diameter, to 5 mm in diameter in fruit; upper bract 3-4 mm, depressed ovate, in upper 1/3 or 1/2 of pedicel, caducous. Sepals 12-15 × 9-11 mm, ovate triangular, connate at their base, completely pale brown lepidote outside, the apex obtuse. Petals 14-20 × 5-10 mm, oblong-ovate to narrowly elliptic, completely greyish white lepidote outside, the base strongly concave, the apex obtuse. Stamens 1-1.5 mm; connectives 0.1 mm, 0.8-1 mm in diameter, discoid. Fertile carpels 75-100; ovaries 2.5 mm, subglabrous to stellate lepidote along sides. Fruit 35-55 mm in diameter, subglobose, subtended by basal collar of 10-15 connate, sterile carpels, 10-20 mm in diameter; monocarps 18-22 mm, 8-12 mm in diameter, obtrulloid to oblong-obovoid, free, the areoles 5-10 mm, shallowly pyramidal to pyramidal, distinctly 5-6-ridged, sparsely to densely stellate lepidote, the apex apiculate, 1-2 mm. Seeds 12-15 mm, 8-9 mm in diameter, shiny dark brown. *Selvas altas perennifolias*. N (*Rueda et al. 4861*, MO); CR (*Hammel et al. 16849*, MO); P (*Herrera & Contreras 925*, MO). 0-1000 m. (Mesoamérica, Colombia.)

2. *Duguetia gentryi* Maas, *Bot. Jahrb. Syst.* 121: 474 (1999). Holotipo: Colombia, *Renteria et al. 2367* (COL). Illustr.: Maas, *Bot. Jahrb. Syst.* 121: 475, t. 9-11. (1999).

Trees 13-15 m. Stems densely covered with brown stellate hairs 0.2-0.6 mm in diameter. Leaves 20-32 × 6-9 cm, narrowly elliptic, glabrous above, sparsely covered with erect, stellate hairs 0.2-0.6 mm in diameter below; midrib impressed above, raised below, densely covered with erect stellate hairs below; secondary veins 15-17 per side; base obtuse, apex acuminate, the acumen to 2 cm. Petioles 5-10 mm, 2-3 mm in diameter, covered with brown stellate hairs. Inflorescences supra-axillary, 2-flowered at a time, to

25 flowers in total; peduncles 2-4 mm; sympodial rachis to 30 mm; pedicels 8-13 mm, 2 mm in diameter, to 15 mm, 3 mm in diameter in fruit; upper bract 7 mm, broadly ovate, about halfway along pedicel, caducous. Sepals 20-23 × 8-15 mm, elliptic-ovate, completely covered with brown, erect stellate hairs outside, sparsely to densely covered with white, simple to branched hairs 0.1-0.4 mm inside, connate at their base, the apex acute. Petals 25-27 × 10-13 mm, ovate-triangular, densely covered with white to greyish stellate hairs 0.2-0.3 mm outside, sparsely to densely covered with white, simple to branched hairs 0.1-0.4 mm inside, the base inside callose, grooved, the apex acute. Stamens 1.5 mm; connectives 0.4-0.5 mm, 0.7-0.8 mm in diameter, discoid, densely papillate. Fertile carpels c. 25-30; ovaries 2.5-3 mm, densely covered with white stellate hairs at base, otherwise subglabrous; stigma covered with white simple hairs. Fruit 30-50 mm, 25-50 mm in diameter, globose to subglobose, subtended by basal collar of 5 connate, sterile carpels, 5 mm in diameter; monocarps 10 mm, 8 mm in diameter, obovoid, free, the areoles 3-4 mm, depressed ovoid, densely to completely covered with greyish stellate hairs 0.1-0.2 mm, the apex obtuse and apiculate. Seeds 8 mm, 4 mm in diameter. *Selvas altas perennifolias*. P (Duke 8743, MO). 100-400 m. (Mesoamérica, Colombia.)

3. *Duguetia panamensis* Standl., Publ. *Field Columbian Mus., Bot. Ser.* 4(8): 207-208 (1929). Holotipo: Panamá, *Cooper 418* (F-579538!). Illustr.: Fries, *Ann. Missouri Bot. Gard.* 49: 207, t. 164 (1962).

Trees to 15 m. Stems densely golden stellate lepidote. Leaves 4.8-22 × 1.4-6 cm, narrowly elliptic-oblong to oblanceolate, glabrous above, sparsely lepidote below, glabrescent; midrib impressed above, raised below; secondary veins 10-14 per side; base cuneate to attenuate; apex acuminate, the acumen to 3 cm. Petioles 3-6 mm, 1-2 mm in diameter, sparsely lepidote. Inflorescences leaf-opposed or occasionally cauliflorous, simple or occasionally branched, 1-3(-5)-flowered; peduncles 0-2 mm; pedicels 2-4 mm. Sepals 10-12 × 8 mm, ovate, the apex acute. Petals 9-16 × 5-7 mm, elliptic-oblong, moderately densely silvery lepidote outside, the apex acute. Stamens 1 mm. Fertile carpels c. 55. Fruit 50-55 mm in diameter, globose, subtended by basal collar of ca 10 connate, sterile carpels, 14 mm in diameter; monocarps 16-22 mm, 7-8 mm in diameter,

clavate, indistinctly-2-4 ribbed, free, the areoles 3-4 mm, depressed ovoid, the apex obtuse to rounded and shortly apiculate, the upper half of monocarps and areoles striated rugose. Seeds 12 mm, 8 mm in diameter. *Selvas altas perennifolias*. N (*Laguna 117*, MO); CR (*Schatz & Grayum 1113*, MO); P (*Cooper 418*, F). 0-100 m. (Endémica.)

4. *Duguetia tuberculata* Maas, *Bot. Jahrb. Syst.* 118: 224 (1996). Holotipo: Panamá, *Cardenas 2140* (MO!). Illustr.: Maas, *Bot. Jahrb. Syst.* 118: 225, t. 16 (1996).

Trees to 30 m. Stems completely pale brown, stellate to subentire lepidote. Leaves 5-17.5 × 1.5-5.3 cm, narrowly elliptic, glabrous above, sparsely stellate lepidote below; midrib impressed above, raised below; secondary veins 12-15 per side; base acute to attenuate and somewhat decurrent; apex acuminate, the acumen to 1.5 cm. Petioles 3-10 mm, 1 mm in diameter, completely pale brown, stellate to subentire lepidote. Inflorescences leaf-opposed to supra-axillary, simple or sometimes with 2 rhipidia, 1-4-flowered, ultimately to 15 flowers in total, the sympodial rachis to 10 mm; peduncles 1 mm, 1 mm in diameter, to 5 mm, 5 mm in diameter in fruit; pedicels 10 mm, 1 mm in diameter, to 20 mm, 5-7 mm in diameter in fruit; upper bract minute. Mature flowers unknown. Fertile carpels c. 150. Fruit 35-70 mm in diameter, subglobose, subtended by basal collar of c. 25 connate, sterile carpels, 20-22 mm in diameter; monocarps 20-25 mm, 6-10 mm in diameter, fused for c. 50 %, obovoid-obtrulloid, the areoles 6-7 mm, pyramidal, completely covered with brown erect stellate hairs 0.1-0.4 mm in diameter and dense tubercles 1-2 mm, the apex apiculate, the apicle 3-4 mm. Seeds 10 mm, 7 mm in diameter. *Selvas altas perennifolias*. P (*Hammel et al 16303*, MO). 0-850 m. (Mesoamérica, Colombia.)

5. *Duguetia vallicola* J.F. Macbr., *Contr. Gray Herb.* 56: 51 (1918). Holotipo: Colombia, *Whitford & Pinzon 3* (GH). Illustr.:

Trees 10-25 m. Stems densely golden greyish stellate lepidote. Leaves 9.7-34.2 × 3-11 cm, narrowly elliptic to somewhat oblong, sparsely grayish stellate lepidote and stellate above, glabrescent, sparsely golden stellate lepidote and greyish stellate below; midrib impressed above, moderately densely golden greyish stellate lepidote, prominently raised below, moderately densely golden greyish stellate lepidote; secondary

veins 12-18 per side, raised below; base obtuse to rounded, less often acute; apex acuminate, the acumen to 2 cm. Petioles 3-6 mm, 1-2 mm in diameter, densely golden greyish stellate lepidote. Inflorescences leaf-opposed, often at leafless nodes; peduncles 2-3 mm, 3-5 mm in diameter in fruit; pedicels 12-15 mm, elongating to 25 mm, 5 mm in diameter in fruit, densely greyish stellate; bract 5 mm, in upper half of pedicel, caducous. Sepals 8-12 × 4-6 mm, ovate, densely grey stellate both outside and inside, reflexed, the apex acute. Petals to 25 × 15 mm, ovate densely grey stellate both outside and inside, the apex obtuse. Stamens 1.3-1.5 mm. Fertile carpels c. 40-50. Fruit 40-55 mm in diameter, globose, subtended by basal collar of 10-15, connate sterile carpels, 13 mm in diameter; monocarps 15-25 mm, 9-11 mm in diameter, obovoid-oblong to ellipsoid, free, 4-5-angled, the areoles 7-9 mm, pyramidal, smooth and often pruinose, the apex short apiculate. Seeds 16-17 mm, 7-8 mm in diameter. *Selvas altas perennifolias*. P (Díaz 425, MO). 0-100 m. (Mesoamérica, Colombia.)

8. Guatteria Ruiz et Pav.

To be added.

9. Klarobelia Chatrou

By G.E. Schatz.

Shrubs to large trees. Stems terete, lenticellate, glabrous to sparsely appressed pubescent. Leaves narrowly elliptic to oblong, chartaceous, glossy glabrous above, glabrous to sparsely appressed pubescent below; midrib impressed above, raised below; venation brochidodromous; base cuneate and somewhat decurrent to obtuse to rounded; apex acute to acuminate. Inflorescences usually 1-flowered, terminal on axillary short shoots, the short shoots bearing either small bracts or rarely large foliaceous bracts; pedicels ebracteate. Flowers bisexual or male. Sepals 3, imbricate, free or connate. Petals 6, in two subequal whorls, imbricate, the inner petals covering the stamens and carpels throughout floral development, fleshy, white to cream. Stamens numerous, many more in male flowers, the filaments short, the connectives discoid. Carpels numerous, free, style absent, stigma discoid to ellipsoid; ovule 1, basal. Fruit a cluster of stipitate monocarps;

monocarps oblong to ellipsoid, the base and apex rounded, sometimes apiculate, red to blackish red. Seeds ellipsoid, smooth to slightly striate, the raphe impressed, straight to sinuous, the endosperm soft with cross-shaped, lamellate ruminations. 10 spp. from Costa Rica to Peru and Brasil.

Bibliografía: Chatrou, L.W., *Changing Genera*: 105-192. (1998).

1. Fruit with (50-) 80-85 (-150) monocarps; monocarps ellipsoid to oblong, 8-9.5 mm in diameter; stipes 9-33 mm; short shoots bearing 1-5 bracts 5×2 mm. **1. K. anomala**
2. Fruit with 5-10 monocarps; monocarps broadly ellipsoid, 16-17 mm in diameter; stipes 28-72 mm; short shoots usually bearing 1-2 foliaceous bracts $7-9 \times 2.5-3.5$ cm, rarely only bracteoles. **2. K. stipitata**

1. Klarobelia anomala (R.E. Fr.) Chatrou, *Changing Genera*: 123 (1998).

Crematosperma anomalum R.E. Fr., *Kongl. Svenska Vetenskapsakad. Handl. , ser. 3*, 24(10): 4 (1948). Holotipo: Colombia, *Killip & García 33600* (S). Illustr.: Fries, *Ann. Missouri Bot. Gard.* 49: 181, t. 154 (1962).

Malmea anomala (R.E. Fr.) Maas.

Shrubs to trees 3-25 m. Stems glabrous, or very sparsely appressed yellowish brown pubescent. Leaves $7-31.6 \times 3-11.4$ cm, narrowly elliptic to oblong, glabrous above and below; midrib very sparsely appressed yellowish brown pubescent below; secondary veins 8-12 per side; base obtuse to rounded, rarely acute; apex acute to acuminate. Petioles 4-11 mm, 2-3 mm in diameter, glabrous, verrucose. Short shoots usually from leafless nodes, sometimes borne among leaves or cauliflorous on trunk, 2-6 mm, 1.5-2.5 mm in diameter, to 3-7 mm in diameter in fruit, sparsely appressed pubescent, bearing 1-5 bracts, the bracts 5×2 mm, the apex acute, caducous; pedicels 7-22 mm, 1-3 mm in diameter, to 4-6 mm in diameter in fruit. Sepals 3-5 mm, connate, subglabrous, the margin ciliate. Petals $14-30 \times 14-22$ mm, subcircular to elliptic, subequal, the outer petals glabrous outside, moderately densely pubescent inside, the inner petals moderately densely pubescent outside, glabrous inside, the apex obtuse. Stamens 200-300 in male flowers, 50-60 in bisexual flowers, 1.5-3.5 mm, the filaments 0.5-1 mm. Carpels c. 150; ovaries 1.8-2.0 mm, glabrous to densely pubescent; stigma 0.6-0.8 mm, glabrous. Fruit

with (50-) 80-85 (-150) monocarps; monocarps 16-26 mm, 8-9.5 mm in diameter, ellipsoid to oblong, glabrous, verrucose, the apex apiculate, the apicle caducous; stipes 9-33 mm, 1 mm in diameter. Seeds 16-17 × 8-9 mm, raphe straight. *Selvas altas perennifolias*. P (Herrera 937, MO). 0-600 m. (Mesoamérica, Colombia.)

2. Klarobelia stipitata Chatrou, *Changing Genera* 143 (1998). Holotipo: Costa Rica, Jiménez *et al.* 667 (CR). Illustr.:

Trees 15-30 m. Stems moderately densely appressed brown pubescent. Leaves 9.6-16.5 × 3.5-5 cm, narrowly elliptic, glabrous above, very sparsely appressed brown pubescent below; midrib moderately densely appressed brown pubescent below; secondary veins 8-11 per side; base cuneate and somewhat decurrent; apex acute to acuminate. Petioles 5-8 mm, 1-2 mm in diameter, moderately densely appressed brown pubescent below. Short shoots among leaves, solitary, or rarely paired, 8-61 mm, 1 mm in diameter, to 3 mm in diameter in fruit, densely reddish brown appressed pubescent, glabrescent in fruit; usually bearing 1-2 foliaceous bracts, or sometimes only minute bracteoles, the foliaceous bracts 7-9 × 2-5-3.5 cm; pedicels to 25 mm, 1 mm in diameter, to 55 mm, 2-4 mm in diameter in fruit. Mature flowers unknown. Fruits with 5-10 monocarps; monocarps 21-24 mm, 16-17 mm in diameter, broadly ellipsoid, glabrous, verrucose; stipes 28-72 mm, 1-1.5 mm in diameter. Seeds 21-24 mm, 14-16 mm in diameter, the raphe sinuous. *Selvas altas perennifolias*. CR (Aguilar 520, MO). 100-830 m. (Endémica.)

10. *Malmea* R.E. Fr.

By G.E. Schatz.

Medium trees. Stems sparsely to densely sericeous. Leaves chartaceous, the venation brochidodromous, the tertiary veins reticulate. Petioles flat above to shallowly canaliculate. Inflorescences terminal, but sometimes appearing leaf-opposed, or sub-axillary or supra-axillary, a 1-4-flowered pedunculate rhipidium, the pedicel borne in the axil of bract, with an articulation near the base, and bearing an amplexicaul bract above the middle. Flowers bisexual. Sepals 2 or 3, free, imbricate in bud. Petals 4 or 6, in two

subequal whorls, free, imbricate, chartaceous to subcoriaceous. Floral receptacle dome-shaped to depressed ovoid. Stamens numerous, extrorse dehiscent, the filament very short, the connectives discoid. Gynoecium apocarpous; carpels numerous, stigma discoid; ovule one, basal. Fruit a cluster of free, stipitate, indehiscent, ellipsoid monocarps. Seeds ellipsoid, pitted, the raphe a slightly elevated rib, hard endosperm with spiniform ruminations. 6 spp. from Panamá to Brasil.

Bibliografía: Chatrou, L. *Changing Genera* 144-155. (1998).

1. *Malmea dimera* Chatrou, *Novon* 7: 346 (1997). Holotipo: Panamá, *Corea A. et al* 4367 (PMA). Illustr.: Chatrou, *Novon* 7: 346 (1997).

Trees 3-15 m. Stems sparsely short sericeous, glabrescent. Leaves 4.2-22 × 1.6-7.7 cm, narrowly elliptic to elliptic, or rarely narrowly obovate to obovate, chartaceous, glabrous above and below, lustrous above, initially verrucose below, less evident with age; midrib slightly impressed above, prominently raised and keeled below, initially sparsely short golden sericeous below, glabrescent; secondary veins 8-13 per side, slightly raised above and below; base acute to attenuate; apex acute to acuminate. Petioles 3-7 mm, 1.5-2 mm in diameter, initially short golden sericeous, glabrescent, verrucose. Peduncles 3-10 mm, 0.5-2 mm in diameter, densely short sericeous; pedicels 12-31 mm, 1 mm in diameter at base to 2 mm in diameter at apex, densely short sericeous, borne in the axil of a caducous bract, 1.5-3 mm, and bearing midway or in the upper half a second bract, 1.5 mm, broadly ovate-triangular, the apex obtuse to rounded, semi-amplexicaul, densely sericeous. Sepals 2, 3-4.5 × 5-6 mm, very broadly ovate to transversely broadly elliptic, glabrous to sparsely puberulous outside, glabrous inside, the margin ciliate, the apex rounded. Outer petals 2, 10-15 × 10-12 mm, broadly elliptic, glabrous, concave, the apex obtuse to rounded, the margin ciliate; inner petals 2, 6-13 × 7-12 mm, broadly elliptic, glabrous, concave, the apex obtuse to rounded, the margin ciliate. Stamens c. 150, 1.5-2 mm. Carpels 25-45; ovaries 1.5 mm, densely setaceous; ovule 1. Monocarps 25-45, 16-20 mm, 7-9 mm in diameter, ellipsoid, glabrous to sparsely puberulous, verrucose; stipe 18-34 mm, 0.5 mm in diameter at the base to 2 mm in diameter at the apex. Seeds 16-18 mm, 6-8 mm in diameter. *Selvas altas perennifolias*. P (*Croat 34626*, MO). 20-600 m. (Mesoamerica, Colombia.)

11. *Mosannonna* Chatrou

By G.E. Schatz.

Trees to 20 m. Stems glabrous to subglabrous to moderately densely pubescent. Leaves narrowly elliptic to elliptic, chartaceous to subcoriaceous, glabrous above, glabrous to sparsely pubescent, or papillate and glaucous below; midrib raised above, sometimes only flat above, raised below; venation brochidodromous, the secondary veins 5-15 per side, slightly raised above, raised below; base attenuate to rounded; apex acute to acuminate. Petioles shallowly canaliculate to flat above, verrucose to rugulose. Inflorescences 1-flowered, terminal but usually appearing leaf-opposed, usually borne among the leaves, pedunculate, the pedicels borne in the axil of bract just below the supra basal articulation and bearing a second bract above the articulation. Sepals 3, imbricate, free. Petals 6 in two subequal whorls, imbricate, spreading in early development and leaving the stamens and carpels exposed, the inner petals then closing over the stamens and carpels at anthesis, coriaceous, with food areas along the margins of inner petals towards the base, the base truncate to rounded, the apex obtuse to rounded. Stamens numerous, extrorse dehiscent, the filaments short, the connectives discoid. Carpels numerous, free, stigmas discoid; ovule 1 per carpel, basal. Fruit a cluster of free, stipitate monocarps. Seeds pitted to striate near raphe, the raphe a slightly raised rib; endosperm moderately hard, the ruminations irregularly lamellate, broadly so near raphe to narrowly so away from raphe. 15 spp. from Mexico to Peru and Brasil.

Bibliografía: Chatrou, L.W., *Changing Genera*: 105-192. (1998).

1. Leaves glaucous and papillate below.

2. Leaves 1.6-4 cm wide; length-width ratio of leaves 3.8-5.5.

3. *M. garwoodii*

2. Leaves (2-) 4-11 cm wide; length-width ratio of leaves 1.9-3.4.

.5. *M. hypoglauca*

1. Leaves not glaucous nor papillate below, often shiny.

3. Secondary veins 10-12 per side; leaves often glaucous above.

1. *M. costaricensis*

3. Secondary veins 6-10 per side; leaves never glaucous above.

4. Leaves 2.9-13 (-16) cm.

2. *M. depressa*

4. Leaves 12.5-23.5 cm.

5. Stem glabrous; leaves glabrous, subcoriaceous.

6. *M. maculata*

5. Stems glabrous to sparsely covered with appressed hairs; leaves glabrous to sparsely pubescent below, chartaceous.

4. *M. guatemalensis*

1. *Mosannonna costaricensis* (R.E. Fr.) Chatrou, *Changing Genera* 157 (1998).

Malmea costaricensis R.E. Fr., *Acta Horti Berg.* 10(2): 320 (1931). Holotipo: Costa Rica, Pittier & Durand 9990 (BM). Illustr.:

Trees to 7 m. Stems glabrous to rather densely covered with appressed to erect, brown hairs 0.2-0.4 mm. Leaves 16-23 × 4.5-7 cm, narrowly elliptic, chartaceous, glabrous above and below, often glaucous above; midrib glabrous to rather densely covered with appressed to erect, brown hairs 0.2-0.4 mm; secondary veins 10-12 per side; base acute to cuneate; apex acuminate. Petioles 4-7 mm, 1.5-2 mm in diameter, glabrous to rather densely covered with appressed to erect, brown hairs 0.2-0.4 mm below, verrucose to rugulose. Peduncles 9-11 m; pedicels 6-10 mm, 1-2 mm in diameter, to 15 mm in fruit; bracts 1.5-2 × 2 mm, clasping, the upper bract at 1/3 to 1/2 from base of pedicel. Sepals 2-3.5 × 4-5.5 mm, broadly ovate, glabrous to densely pubescent outside, the margins ciliate. Petals 16-23 × 9-15 mm, elliptic or ovate, glabrous to sparsely puberulous outside, the margins ciliate, the apex obtuse. Stamens c. 100, 2-2.4 mm; filaments 0.2-0.4 mm. Carpels c. 75; ovaries 1.4 mm, densely pubescent; stigma 1.5 mm, glabrous. Fruit of c. 40 monocarps; monocarps 12-13 mm, 7 mm in diameter, ellipsoid, subglabrous, verrucose, the apex slightly apiculate; stipes 12-15 mm, 1 mm in diameter. Seeds 12 mm, 7 mm in diameter. *Selvas altas perennifolias*. CR (Schatz & Grayum 1111, MO). 0-450 m. (Endémica.)

2. *Mosannonna depressa* (Baill.) Chatrou, *Changing Genera* 159 (1998). *Anona? depressa* Baill., *Adansonia* 8: 267 (1868). Holotipo: México, Veracruz, Liebmann 20 (C!). Illustr.:

Duguetia leiophylla Donn. Sm., *Guatteria depressa* (Baill.) Saff. ex Standl., *G. gaumeri* Greenm., *G. leiophylla* (Donn. Sm.) Saff. ex Standl., *Malmea depressa* (Baill.) R. E. Fr., *M. gaumeri* (Greenm.) Lundell, *M. leiophylla* (Donn. Sm.) Lundell.

Trees to 15 m. Stems glabrous to sparsely covered with light brown appressed hairs 0.2-0.3 mm. Leaves 2.9-13 (-16) × 1.2-7.2 mm, narrowly elliptic, subcoriaceous, glabrous above, glabrous to sparsely pubescent below; midrib glabrous to sparsely covered with light brown appressed hairs 0.2-0.3 mm; secondary veins 8-9 per side; base attenuate to obtuse; apex acute to acuminate. Petioles 4-7 mm, 1-2 mm in diameter, glabrous to sparsely covered with light brown appressed hairs 0.2-0.3 mm below, verrucose to rugulose. Peduncles 1-13 mm; pedicels 8-28 mm, 1-2 mm in diameter, to 45 mm, 3 mm in diameter in fruit; bracts. Sepals 2-5 × 3-6 mm, broadly ovate, glabrous to densely pubescent outside, ciliate. Petals 25-39 × 14-27 mm, elliptic, glabrous, verrucose, the margins ciliate, the apex obtuse. Stamens 150-200. Carpels 50-100. Fruit of 20-75 monocarps; monocarps 10-17 mm, 6-10 mm in diameter, broadly ellipsoid. Glabrous to pubescent, verrucose, the apex sometimes apiculate; stipes 8-21 mm, 1 mm in diameter. Seeds 9-12 mm, 6-9 mm in diameter. *Selvas medianas caducifolias*. Ch (*Breedlove & Smith 21935*, MO); Y (*Cabrera & de Cabrera 4677*, MO); C (*Shepherd 15*, F); QR (*Cabrera & de Cabrera 6531*, MO); B (*Davidse & Brant 32758*, MO); G (*Contreras 7197*, MO); H (*Hawkins et al. 132*, MO). 0-1200 m. (Endémica.)

3. *Mosannonia garwoodii* Chatrou & Welzenis, *Changing Genera* 164 (1998).

Holotipo: Panamá, *Garwood & Williams 1959B* (PMA). Illustr.:

Shrubs to trees to 15 m. Stems subglabrous, sometimes lenticellate. Leaves 8.3-16 × 1.6-4 cm, narrowly elliptic, chartaceous, glabrous above, glaucous and papillate below; midrib subglabrous below; secondary veins 12-15 per side; base acute to obtuse; apex acuminate. Petioles 2-6 mm, 1-1.5 mm in diameter, subglabrous below, verrucose to rugulose. Peduncles 1-3 mm, 0.5-1 mm in diameter; pedicels 21-35 mm, 1-2 mm in diameter, to 3.5 mm in diameter in fruit; bracts 1-1.5 × 1-3 mm, broadly ovate, the upper bract just above to 1/2 the way from base of pedicel. Sepals 1.5-2 × 4-5 mm, depressed ovate, glabrous, the margins ciliate, the apex obtuse. Petals 18-27 × 12-16 mm, broadly elliptic to broadly ovate, glabrous, verrucose. Stamens c. 200, 2.4-3.2 mm; filaments 1 mm. Carpels c. 50-100; ovaries 0.8-1.2 mm, glabrous; stigma 1-2 mm, sparsely yellowish brown puberulous. Fruit of 20-40 monocarps; monocarps 16-20 mm, 8-9 mm in diameter, ellipsoid, glabrous, verrucose, the apex sometimes apiculate; stipes 10-22 mm, 1-1.5 mm

in diameter. Seeds 15 mm, 8 mm in diameter. *Selvas altas subperennifolias*. P (Foster2922, MO). 0-165 m. (Endémica.)

4. *Mosannonna guatemalensis* (Lundell) Chatrou, *Changing Genera* 166 (1998). *Malmea guatemalensis* Lundell, *Wrightia* 5(2): 27 (1974). Holotipo: Guatemala, *Contreras 4408* (LL). Illustr.:

Trees to 7 m. Stems glabrous to sparsely covered with appressed hairs 0.2-0.3 mm. Leaves 11.5-23.5 × 3.1-7 cm, narrowly elliptic to lanceolate, chartaceous, glabrous above, glabrous to sparsely pubescent below; midrib glabrous to sparsely covered with appressed hairs 0.2-0.3 mm below; secondary veins 8-9 per side; base cuneate to obtuse; apex acuminate. Petioles 6 mm, 1-2 mm in diameter, glabrous to sparsely covered with appressed hairs 0.2-0.3 mm below, verrucose to rugulose. Peduncles 4 mm, 1 mm in diameter; pedicels 18 mm, 1 mm in diameter; bracts caducous, the upper 1/2 from base of pedicel. Sepals 2 × 3 mm, broadly ovate, glabrous, the margins ciliate. Petals 18-26 × 13-15 mm, elliptic, glabrous, verrucose, the margins ciliate. Stamens numerous. Carpels numerous. Fruits and seeds unknown. *Selvas altas subperennifolias*. G (*Contreras 4408*, LL). (Endémica.)

5. *Mosannonna hypoglauca* (Standl.) Chatrou, *Changing Genera* 166 (1998). *Guatteria hypoglauca* Standl., *Publ. Field Columbian Mus., Bot. Ser.* 4(8): 207 (1929). Holotipo: Panamá, *Cooper 661* (F!). Illustr.:

Malmea hypoglauca (Standl.) R.E. Fr.

Trees 5-10 m. Stems subglabrous, sometimes lenticellate. Leaves 6-18.5 × 2-11 cm, narrowly elliptic, chartaceous, glabrous, above, glaucous and papillate below; midrib subglabrous below; secondary veins 7-11 per side; base acute to rounded; apex acute to acuminate. Petioles 3-10 mm, 1.5-2.5 mm in diameter, subglabrous, verrucose to rugulose. Peduncles 1-6 mm, 1-2 mm in diameter, to 24 mm in fruit; pedicels 3-9.5 mm, 1.5-2.5 mm in diameter, to 14 mm, 3 mm in diameter in fruit; bracts 1-2 × 1-4 mm, the upper bract 1/5 to 1/2 from base of pedicel. Sepals 1.5-3.5 × 3-4 mm, depressed ovate, glabrous to sparsely pubescent outside, the margins ciliate. Petals 15-30 × 8-20 mm, elliptic to obovate, glabrous, verrucose, the margins ciliate. Stamens 200-250, 1.8-2.5

mm; filaments 0.4 mm. Carpels 55-70; ovaries 1.2-1.7 mm, subglabrous; stigma 0.8-1.2 mm, densely covered with hairs 0.2mm. Fruit of 45-60 monocarps; monocarps 10-22 mm, 7-11 mm in diameter, glabrous, verrucose, ellipsoid, the apex obtuse; stipes 5.5-15 mm, 1-1.5 mm in diameter. Seeds 16-18 mm, 6-9 mm in diameter. *Selvas altas perennifolias*. P (*Herrerra & Contreras* 923, MO). 0-500 m. (Mesoamérica, Colombia.)

6. *Mosannonna maculata* Chatrou & Welzenis, *Changing Genera* 164 (1998).

Holotipo: Colombia, *Brand & Ascanio* 473 (COL). Ilustr.:

Trees to 20 m. Stems glabrous, often lenticellate. Leaves 12.5-20.5 × 3.5-6.5 cm, narrowly elliptic, subcoriaceous, glabrous above and below; midrib glabrous below; secondary veins 6-10 per side; base attenuate to acute; apex acuminate. Petioles 4-6 mm, 1-2 mm in diameter, glabrous below, verrucose to rugulose. Peduncles 2.5-9 mm, 0.5-1.5 mm in diameter; pedicels 8-24 mm, 1-2 mm in diameter, to 31 mm in fruit; bracts 0.5-2.5 × 1-2.5 mm, broadly to depressed ovate, the apex obtuse to rounded, the upper bract at 1/3 to 1/2 from base of pedicel. Sepals 1.5-5 × 2.5-4.5 mm, depressed ovate, glabrous, the margins ciliate. Petals 18-30 × 13-21 mm, elliptic to obovate, glabrous, verrucose. Stamens 250-350, 1.9-2.3 mm; filaments 0.3-0.5 mm. Carpels 60-110; ovaries 1 mm, glabrous; stigma 1.2 mm, glabrous. Fruit of 15-30 monocarps; monocarps 17-22 mm, 8-14 mm in diameter, ellipsoid, glabrous, verrucose; stipes 9-15 mm, 1-1.5 mm in diameter. Seeds 15.5 mm, 6.5 mm in diameter, ellipsoid. *Selvas altas perennifolias*. P (*Duke* 14166, MO). 0-100 m. (Mesoamérica, Colombia.)

12. *Oxandra* A. Rich

To be added.

13. *Porcelia* Ruiz & Pavón

By G.E. Schatz.

Medium trees. Stems distinctly lenticellate. Leaves deciduous, membranous, the venation eucamptodromous, the tertiary veins percurrent, the base weakly to strongly oblique, decurrent. Petioles shallowly canaliculate. Flowers solitary, pendent, terminal, but usually

appearing leaf-opposed or internodal, pedicels ebracteate. Sepals 3, free, imbricate in bud, with overlapping margins at anthesis. Petals 6, in two subequal whorls, free, chartaceous to subcoriaceous, with faint longitudinal venation slightly raised inside, creamy yellow, the margin of the inner petals involute except at the apex, and bearing specialized food tissue. Floral receptacle slightly convex. Stamens numerous, anthers locellate, extrorse-latorse, the connectives hexagonal, truncate to slightly depressed. Gynoecium apocarpous; ovules in two rows. Fruit a cluster of free, stipitate indehiscent, monocarps, glabrous, thick-walled and woody, with a fleshy pulp surrounding the seeds, the apex rounded. Seeds lunate to flattened oblong. 7 spp. from Costa Rica to Brasil.

Bibliografía: Murray, N.A. *Syst. Bot. Monogr.* 40: 1-121. (1993.)

1. *Porcelia magnifructa* (Schery) R.E. Fr., *Ark. Bot., n.s.*, 1(6): 343 (1950).

Cymbopetalum magnifructum Schery, *Ann. Missouri Bot. Gard.* 30: 87 (1943). Holotipo: Panamá, *Allen 2455* (MO!). Illustr.: Fries, *Ann. Missouri Bot. Gard.* 49: 202, t. 162 (1962).

Trees 6-12 m. Stems tomentellous, glabrescent, distinctly lenticellate. Leaves 3.4-23 × 1.8-8.6 cm, broadly ovate to elliptic, initially sparsely puberulous, glabrescent; midrib flat above, prominently raised below, sparsely puberulous below; secondary veins 6-10 per side, slightly raised above, raised below; base obtuse to rounded; apex acute to acuminate. Petioles 3-8 mm, 1-2 mm in diameter, tomentellous, glabrescent. Pedicels 24-44 mm, sparsely puberulous. Sepals 3-5 × 3.5-5 mm, broadly ovate to rotund, sparsely puberulous, the apex rounded. Outer petals 18-25 × 11-16 mm, broadly ovate to elliptic, the apex obtuse to rounded; inner petals 11-16 × 7-13 mm, elliptic, the apex obtuse to rounded. Stamens 2.2-2.6 mm. Carpels 12-19; ovaries 1.8-2.8 mm; ovules 11-16. Monocarps 1-4, 6.2-8.3 cm, 3.1-3.5 cm in diameter, oblong, straight to slightly curved; stipe 0.8-3.0 cm, 0.4-0.7 cm in diameter. Seeds 24-29 × 12-16 mm, 8-10 mm thick. *Selvas altas caducifolias*. CR (*Maas et al. 9489*, U); P (*McPherson & Stockwell 10902*, MO). 200-300 m. (Endémica.)

14. *Pseudomalmea* Chatrou

By G.E. Schatz.

Medium to tall trees. Stems glabrous. Leaves membranous to subcoriaceous, the venation brochidodromous, the midvein impressed above, the tertiary veins reticulate. Petioles flat and glabrous above, slightly winged. Inflorescences terminal on axillary shoots, usually single-flowered, with several foliaceous leaves on shoot below articulation, the pedicel above the articulation bearing a single bract. Flowers male or bisexual, androdioecious. Sepals 3, free, imbricate. Petals 6, in two whorls, free, imbricate, spreading in early floral development and leaving the androecium or androecium/gynoecium uncovered, the inner petals closing at anthesis. Floral receptacle transverse elliptic. Stamens numerous, anthers extrorse, the connectives discoid, flat on top. Gynoecium apocarpous; carpels numerous, ovary with one basal ovule, stigma discoid. Fruit a cluster of free, stipitate, indehiscent monocarps, glabrous. Seeds with slightly raised, straight raphe; endosperm rumination lamellate. 4 spp. from Panama to Bolivia.

Bibliografía: Chatrou, L. W., *Changing Genera*: 105-192. (1998).

1. *Pseudomalmea darienensis* Chatrou, *Blumea*, 51(2): 217 (2006). Holotipo: Panamá, McPherson, Hensold, Palacios, Herrera & Polanco 15345 (MO!). Illustr.: Chatrou, *Changing Genera*: 218. (1998).

Trees 14-25 m. Stems glabrous. Leaves 5.4-19 x 3.6-8 cm, elliptic, glabrous or with sparse appressed hairs 0.2-0.6 mm, verruculose; midrib impressed above, raised below, with sparse appressed hairs 0.2-0.6 mm below; secondary veins 7-9 per side, flat above, slightly raised below; base acute to obtuse and shortly attenuate at point of attachment with petiole; apex acuminate, the acumen 5-14 mm. Petioles 3-8 mm, 1-2 mm in diameter, glabrous or with sparsely covered with appressed hairs 0.2-0.6 mm. Pedicels in fruit 9-25 mm, 3-4 mm in diameter, sparsely covered with appressed hairs, bract above articulation 1 x 2.5 mm, the outer side covered with appressed hairs 0.2-0.6 mm. Flowers unknown. Monocarps 10-39, 18-32 mm, 10-19 mm in diameter, ellipsoid to oblong, reddish brown when dry, sparsely covered with erect to appressed hairs 0.2-0.6 mm, verruculose; stipes 25-55 cm, 0.1-0.2 cm in diameter, reddish brown when dry, sparsely covered with erect to appressed hairs 0.2-0.6 mm; fruiting receptacle 11-15 mm in diameter, 6-8 mm high, transversely ellipsoid, densely covered with short erect hairs.

Seeds 16-36 x 9-17 mm, shallowly transversely striate, raphe slightly raised, reddish brown. *Selvas altas perennifolias*. P (McPherson, Hensold, Palacios, Herrera & Polanco 15345, MO!). 100-150 m. (Colombia).

To be added.

15. *Sapranthus* Seem.

By G.E. Schatz.

Shrubs to small trees, often deciduous. Stems terete, sparsely puberulous to densely tomentose or hirsute. Leaves elliptic to broadly obovate, membranous, glabrous or velutinous to hispid-strigose and occasionally verrucose above, puberulous to hirtellous to velutinous or hispid-strigose below, the midrib impressed above, glabrous to densely hirsute, prominently raised below, puberulous to densely hirsute, rarely with domatia present in the axils of the midrib and lateral veins below, the secondary venation eucamptodromous to weakly brochidodromous and percurrent, the base cuneate to rounded, occasionally somewhat inaequilateral and subcordate, the apex obtuse to cuspidate. Petioles somewhat swollen, weakly to strongly canaliculate, tomentose to hirsute. Flowers pendent, mostly solitary, terminal, but often appearing leaf-opposed, or inflorescences borne on the main trunk or older wood in condensed rhipidia; pedicels borne in the axil of a minute bract, and bearing a minute to broadly ovate, foliaceous bract from near the base to the midpoint of the pedicel. Sepals 3, free, imbricate, lanceolate to triangular to broadly ovate, foliaceous with evident venation, membranous, sparsely puberulous to densely velutinous and occasionally hirsute above the veins, occasionally reflexed at anthesis, the base truncate and decurrent along the pedicel, the apex obtuse to acute to acuminate. Petals 6, free, in two subequal, imbricate whorls, lanceolate to elliptic to oblong, membranous with evident venation, or fleshy and lacking venation at anthesis, reddish to deep maroon and the flowers then foetid, or green and the flowers with a fruity fragrance, the inner petals bearing a corrugated food body at their base inside, sometimes much reduced. Floral receptacle convex, densely setaceous at the

base of the stamens and ovaries. Stamens 55-180, attached to the receptacle by a helical, thread-like fiber; filaments very short, the anther connectives expanded truncate discoid to slightly rounded above the thecae, minutely muriculate to tuberculate. Gynoecium apocarpous, carpels 2-29; stigma globose to napiform to flattened ellipsoid, attached to the ovary obliquely, sparsely to densely pubescent; style absent or rarely very short; ovary prismatic to ellipsoid, irregularly 4-sided, sparsely to densely short setaceous-sericeous to velutinous; ovules 5-23, in two rows, or rarely in one row. Fruit a cluster of free, indehiscent monocarps, oblong-cylindrical to obovoid, nearly sessile to shortly stipitate, green, gray or dull beige, or rarely orange. Seeds lunate to lunate-wedge shaped, or rarely discoid. 7 (possibly 8) spp. from Mexico to Colombia.

1. Leaves weakly to strongly verrucose, especially on the upper surface; domatia present in the axils of the lateral veins with the midrib below; ovules lateral in one row; monocarps subglobose to cylindrical, at most 1.5 cm in diameter, orange at maturity; seeds discoid. **4. S. microcarpus**
1. Leaves never verrucose; domatia in the axils of the lateral veins with the midrib absent below; ovules lateral in two distinct rows; monocarps ellipsoid-oblong to obovoid, greater than 1.5 cm in diameter, green to grayish or yellow-green at maturity; seeds lunate to lunate-wedge shaped.
2. Leaves hispid and somewhat scabrous; flowers borne in clusters at condensed flowering nodes on old wood, primarily along the main trunk from ground level on up, i.e. trunciflorous. **5. S. palanga**
2. Leaves velutinous-tomentose to densely hirsute along the midrib; flowers solitary, terminal but appearing leaf-opposed, or borne on perennial short-shoots just back from the leaves.
3. Flowers borne on perennial short-shoots just back from the leaves, i.e. ramiflorous; monocarps bearing lamellar lacerate, plate-like excrescences to 1 cm high on their surface. **2. S. chiapensis**
3. Flowers solitary, terminal but appearing leaf-opposed; monocarps with smooth surface.

4. Petals fleshy at anthesis, lacking any evident venation, green; stamens c. 60; carpels 2-5. **7. S. viridiflorus**
4. Petals membranous at anthesis, with evident venation, red to deep maroon; stamens 100 or more; carpels 9-22.
5. Petals 26-33 × 8-12 mm, red at anthesis; carpels 9-13. **1. S. campechianus**
5. Petals 25-183 × 11-70 mm, deep maroon at anthesis; carpels more than 13.
6. Leaves short white velutinous-tomentose; sepals 6-18 × 5-12 mm, densely gray tomentose. **6. S. violaceus**
6. Leaves long white velutinous to densely golden hirsute along the midrib above and below; sepals 15-22 × 12-16 mm, densely golden hirsute above the veins. **3. S. hirsutus**

1. Sapranthus campechianus (Kunth) Standl., *Contr. U.S. Natl. Herb.* 23: 279 (1922). *Asimina* (as "*Asimia*") *campechiana* Kunth in H.B.K., *Nov. Gen. Sp.* 5: 61 (1821). Holotipo: México, Campeche, *Humboldt & Bonpland s.n.* (P). Illustr.: *Asimina insularis* Hemsl.

Shrubs to small trees 2-10 m. Stems densely golden-gray tomentose. Leaves 2.8-21.2 × 1.6-8.6 cm, elliptic to obovate, initially sparsely puberulous above, glabrescent, densely white tomentose to villous below; midrib weakly impressed above, light fulvous tomentose, prominently raised below; venation weakly brochidodromous, the secondary veins 8-2 per side, raised below; base cuneate to obtuse; apex acuminate. Petioles 2-9 mm, densely golden-gray tomentose. Flowers solitary; pedicels 4-21 mm, densely golden-gray tomentose, the pedicellar bract 4-20 × 3-9 mm, narrowly ovate, along the lower half of the pedicel, densely golden-gray tomentose. Sepals 4-8 × 3-5 mm, triangular, strongly reflexed at anthesis, the apex acute. Petals membranous, green initially, then yellow to red, reddish brown, or brown at anthesis, the venation slightly raised outside, slightly impressed inside; outer petals 26-33 × 8-12 mm, narrowly ovate, concave, the longitudinal veins 7 from the base, sparsely puberulous outside, minutely sparsely puberulous inside, the base obtuse to rounded and ultimately truncate, 4 mm broad, the apex obtuse to acute; inner petals 25-33 × 8-11 mm, elliptic to oblong, convex, sparsely puberulous outside, glabrous inside, the longitudinal veins 3, the base obtuse and

then abruptly narrowed to a geniculate claw, 3×2 mm, the food body white, glistening, the apex obtuse to acute with a rounded tip. Stamens c. 100, 1.3-1.5 mm; filament 0.1 mm. Carpels 9-13; stigma globose, 1 mm in diameter, obliquely attached to the ovary, sparsely white setaceous, the hairs to 0.5 mm long; ovary 1.5-1.7 mm cylindrical-prismatic, densely sericeous; ovules 8 in two rows; the torus sparsely setaceous. Monocarps 1.8-3.4 cm, 1.5-2.5 cm in diameter, ellipsoid to obovoid, sessile, initially densely golden-gray tomentose to velutinous, glabrescent, greenish, yellow, grayish, or black at maturity. Seeds 12×7 mm, 7 mm thick, lunate-wedge shaped, the seed coat smooth, grayish. *Selvas altas semicaducifolias*. T (*Rico 697*, MEXU); Ch (*Miranda 5271*, MEXU); Y (*Gaumer 1094*, MO); C (*Flores 9951*, XAL); QR (*Sousa & Cabrera 11241*, MEXU); B (*Croat 23556*, MO); G (*Croat 24651*, MO); H (*Standley 54270*, F). 0-1200 m. (Endémica.)

2. *Sapranthus chiapensis* G.E. Schatz, *ined.* (200X). Holotipo: México, Chiapas, *Matuda 16420* (MEXU!). Illustr.:

Shrub 4-5 m. Stems densely golden tomentose. Leaves $5-20.7 \times 2.8-7.9$ cm, elliptic to obovate, sparsely puberulous and glossy above, drying dark reddish-brown, white velutinous below; midrib weakly impressed above, golden velutinous, prominently raised beneath, densely golden velutinous; venation weakly brochidodromous, the secondary veins 11-13 per side, raised below; base slightly inaequilateral, cuneate to rounded; apex acuminate. Petiole 4-11 mm, densely golden velutinous-tomentose. Flowers borne one at a time on perennial short shoots (rhipidia) on older wood back from the leaves, i.e. ramiflorous, the short shoots to 2 cm; pedicel 7-10 mm in flower, elongating to 18 mm and 8 mm in diameter in fruit, densely gray tomentellous; pedicellar bract $6-7 \times 4-6$ mm, broadly ovate to orbicular, borne near the base of the pedicel, densely gray tomentellous the base obtuse to rounded, the apex acute to obtuse. Sepals $12-13 \times 7-11$ mm, broadly ovate, densely gray tomentellous, reflexed at anthesis, the base truncate to concave and decurrent along the pedicel, the apex acute. Petals membranous, densely tomentellous outside, especially above the veins, very sparsely puberulous inside, dark purple, with 5-7 longitudinal veins interconnected by faint crossveins, the former prominently raised on the outside; outer petals $28-36 \times 10-16$ mm, elliptic, concave, the base cuneate, 4 mm

broad at point of attachment, the apex acute with a rounded tip; inner petals 28-31 × 10-13 mm, elliptic to oblong, the base tapering abruptly and geniculate, forming a claw 3 mm long, 3 mm broad at the point of attachment, 5 mm broad at the point of the bend, the apex obtuse with a rounded tip, the food body 4 × 6 mm, consisting of c. 6 ridges. Stamens c. 100, 2.1 mm; filament 0.4 mm. Carpels c. 20; stigma 1.5 mm in diameter, ellipsoid to subglobose, attached to the style obliquely, sparsely villous, the hairs to 0.5 mm; style 0.7 mm; ovary 1.6-1.8 mm, prismatic, densely setaceous; ovules 10, lateral in two rows. Monocarps to 6.3 cm, 4.5 cm in diameter, elliptic-oblong, stipitate, densely gray tomentellous, the surface with anastomosing, plate-like, lamellar lacerate excrescences to 1.1 cm; stipe 7 mm. Seeds 18 × 14 mm, 9 mm thick, lunate-wedge shaped, the seed coat smooth, light tan. *Selvas medias caducifolias*. Ch (*Matuda 16466*, MEXU). (Endémica.)

3. *Sapranthus hirsutus* G.E. Schatz, *ined.* (200X). Holotipo: Honduras, *Williams & Molina R. 18053* (MO!). Illustr.:

Trees 5-15 m. Stems densely golden hirsute. Leaves 7.5-26.5 × 2.9-8.9 cm, elliptic to oblanceolate or obovate, white velutinous; midrib impressed above, prominently raised below, densely golden hirsute; venation weakly brochidodromous, the secondary veins 13 per side, raised below, densely golden hirsute; base cuneate to rounded; apex abruptly acuminate to cuspidate. Petiole 3-7 mm, densely golden hirsute. Flowers solitary, terminal, but appearing leaf-opposed, emitting a strong foetid odor; pedicel 12-22 mm, densely golden hirsute; pedicellar bract 12-32 × 12-19 mm, broadly ovate, densely golden hirsute above the veins, borne approximately at midpoint of pedicel, the base rounded to subcordate and somewhat ampexicaul and decurrent along the pedicel, the apex acute. Sepals 15-22 × 12-16 mm, broadly ovate, sparsely velutinous and densely hirsute above the veins outside. Petals 50-68 × 16-25 mm, lanceolate to elliptic, membranous, sparsely hirsute to velutinous outside, more densely so above the raised 5 to 7 longitudinal veins, very sparsely velutinous inside, dark maroon, the base cuneate, the apex triangular with veins interconnected by faint crossveins, the food body consisting of 6 ridges separated by 5 furrows, these connecting with the longitudinal veins. Stamens c. 140, 2.4-2.6 mm; filament 0.2 mm. Carpels c. 22; stigma 1.0 mm in diameter, subglobose to ellipsoid,

obliquely attached to the ovary, sparsely setaceous, the hairs to 0.5 mm long; ovary 2 mm, prismatic-cylindrical, densely sericeous-setaceous; ovules 7-12 in two rows. Fruit unknown. *Selvas*. H (*Molina 13657*, F). 1050-1200 m. (Endémica.)

4. *Sapranthus microcarpus* (Donn.Sm.) R.E. Fr., *Kongl. Svenska Vetenskapsakad. Handl., n.s.*, 34(5): 12 (1900). *Porcelia microcarpa* Donn. Sm., *Bot. Gaz. (Crawfordsville)* 20:1 (1895). Holotipo: Guatemala, *Donnell Smith 1484* (B!). Illustr.: *Asimina? purpusii* Brandegee, *Sapranthus ligularis* Saff. ex R.E. Fr.

Shrubs to small trees 1-12 m. Stems sparsely puberulous. Leaves 0.7-16.2 × 0.5-7.5 cm, elliptic to obovate, glabrous and verrucose above, sparsely puberulous to hirtellous and sometimes verrucose below; midrib impressed above, increasingly so toward the base, puberulous, prominently raised below, sparsely hirtellous; venation weakly brochidodromous, the secondary veins 6-8 per side, raised below, sparsely hirtellous, with domatia present in the axils of the lateral veins and midrib below; base cuneate; margin ciliate; apex acute to acuminate. Petiole 3-6 mm, sparsely puberulous. Flowers solitary, with a slight unpleasant odor; pedicel 9-83 mm, very slender, becoming stout in fruit, to 4 mm in diameter; pedicellar bract 4-33 × 2-13 mm, lanceolate-linear to ovate-elliptic, puberulous above, puberulous-villous below, borne near the base of the pedicel to 15 mm from the base of the pedicel, the base obtuse to acute, the apex acute. Sepals 8-12 × 3-4.8 mm, lanceolate to ovate, densely puberulous outside, sparsely puberulous inside, reflexed at anthesis, the base truncate to concave and somewhat decurrent along pedicel, the apex obtuse to acute. Petals membranous, the color variable within a population, cream-yellow with a purple blush at the base inside to pink or dull red to deep maroon; outer petals 21-35 × 6-11 mm, oblong-lanceolate, concave, thin, sparsely puberulous outside, very sparsely puberulous inside, the base rounded, 2-3 mm broad at point of attachment, the apex obtuse to acute; inner petals 24-54 × 7-11 mm, lanceolate, sparsely puberulous outside, glabrous inside, the apex acute and curved to one side, the base tapering abruptly and forming a claw 2 × 2 mm, the food body 2 × 4 mm, white, glistening. Stamens c. 55, 1.1-1.4 mm; filament 0.3 mm; thecae 0.7-1 mm. Carpels 10-13; stigma 0.7 mm, 0.5 mm in diameter, globose-ellipsoid, attached to the ovary obliquely, tuberculate and sparsely setaceous, the hairs to 0.5 mm, cream yellow; ovaries 1.4-1.5

mm, lanceoloid-prismatic, densely short setaceous-sericeous; ovules 3-5(-10), in one row. Monocarps 1.6-4.5 cm, 1.6 cm in diameter, subglobose to cylindrical, glabrous, fleshy, stipitate, the base rounded, the apex rounded and sometimes apiculate; stipe 3-4 mm. Seeds 11 mm in diameter, 6 mm thick, discoid, flattened on both sides or round on one side if situated at the apex or base of the monocarp, the seed coat smooth, light tan, with an encircling equatorial ridge. *Selvas medias caducifolias*. Ch (*Matuda 17296*, MEXU); G (*Standley 79684*, F); H (*Nelson et al. 302*, MO); ES (*Croat 32795*, MO). 10-1400 m. (Mexico [Colima, Jalisco, Oaxaca, Veracruz], Mesoamérica.)

5. *Sapranthus palanga* R.E. Fr., *Acta Horti Berg.* 10(1): 12 (1930). Holotipo: Costa Rica, *Oersted 158* (C!). Illustr.:

Sapranthus palanga var. *santaerosae* R.E. Fr.

Trees to 12 m. Stems somewhat appressed, densely white hispid, glabrescent. Leaves 4.2-9.8 × 3.9-6.1 cm, elliptic to obovate, the first leaves of a shoot sometimes orbicular, initially sparsely appressed hispid above, the hairs to 1 mm long, glabrescent, hispid and somewhat scabrous below; midrib slightly impressed above, prominently raised below; venation eucamptodromous, the secondary veins 10-13 per side, slightly impressed above, prominently raised below, densely hispid; base cuneate to rounded and somewhat truncate to subcordate at the point of attachment to the petiole; margins ciliate; apex obtuse to acuminate. Petioles 4-16 mm, somewhat appressed, dull white hispid. Inflorescences condensed rhipidia along the main trunk and older horizontal branches; pedicels 14-37 mm, puberulous, the pedicellar bract 5-11 × 3-9 mm, elliptic-ovate to ovate-rounded, densely tomentose, usually borne near the base of the pedicel, occasionally to 12 mm from the base of the pedicel, the base decurrent and somewhat amplexicaul, the apex acute to rounded. Sepals 5-12 × 6-11 mm, triangular to broadly ovate, tomentose, reflexed at anthesis, the apex obtuse to acuminate with a rounded tip. Petals membranous, glabrous outside except puberulous above the veins, glabrous inside, dark maroon at anthesis, the venation prominently raised outside, slightly raised inside, with a central vein extending the full length of the petal, and c. 6 additional veins extending from the base parallel to the central vein and branching before the apex; outer petals 86-112 × 31-46 mm, lanceolate to ovate, the base rounded, concave, geniculate, the

point of attachment 7 mm broad, the apex acute to obtuse; inner petals 81-102 × 29-37 mm, narrowly elliptic to oblong, the base cuneate and then abruptly narrowed to form a short claw, 4-7 mm broad, 1-2 mm thick at the point of attachment, concave, geniculate 3 mm from the base, the food body 7 mm at the middle to 6 mm at the margins, 3 mm from the base, i.e. just above the bend, consisting of 6-7 ridges separated by furrows, fleshy, cream to yellow, glistening, the margins strongly revolute above the level of the food body, the apex acute to obtuse. Stamens c. 180, 2.5-2.9 mm; filament 0.3 mm along the margin, 0.7 mm long in the middle; thecae 2.1 mm along outer margin, 1.8 mm along inner margin. Carpels 10-29; stigma 1.5-1.6 mm, 1 mm in diameter, flattened ellipsoid, attached to the ovary obliquely, sparsely pilose, the yellow hairs to 1 mm long; ovaries 2.9-3.3 mm, prismatic, very short setaceous; ovules 18-23 in two rows. Monocarps to 9.5 cm, 4 cm in diameter, oblong and somewhat curved, stipitate, grayish green and slightly glaucous, the apex rounded; stipe to 1.6 cm. Seeds to 33 × 19 mm, 7 mm thick, lunate, the seed coat smooth, light chocolate brown. $2n = 18$. *Selvas medias caducifolias*. N (Grijalva 704, MO); CR (Grayum et al. 6092, MO). 10-650 m. (Endémica.)

6. *Sapranthus violaceus* (Dunal) Saff., *Science n.s.* 33: 471 (1911). *Unona violacea* Dunal, *Monogr. Anonac.* 105, t. 25 (1817). Lectotipo (designated by Schatz, 2001): *Sessé & Mociño Icon. Pl. 1791.97* (HU!).

Asimina foetida Rose, *A. nicaraguensis* (Seem.) Hemsl., *Porcelia nicaraguensis* (Seem.) Benth. ex Ram. Goyena, *Sapranthus borealis* R.E. Fr., *S. foetidus* (Rose) Saff., *S. longepedunculatus* R.E. Fr., *S. megistanthus* Standl. & Steyer., *S. nicaraguensis* Seem., *Uvaria nicaraguensis* (Seem.) Baill.

Trees to 10 m. Stems densely brownish gray velutinous-tomentose. Leaves 2.7-29.8 × 2.1-11.7 cm, elliptic to obovate, sparsely white velutinous above, white velutinous below; midrib slightly impressed above, prominently raised below, densely white velutinous; venation weakly brochidodromous, secondary veins 10-15 per side, slightly raised above, prominently raised below; base cuneate to truncate and somewhat decurrent; apex obtuse to long acuminate. Petiole 3-13 mm, densely brownish gray velutinous-tomentose. Flowers solitary, occasionally cauliflorous, with a strong fetid odor at anthesis; pedicels 6-43 mm, densely tomentose, the pedicellar bract 6-35 × 4-22 mm broad, broadly ovate

to triangular, densely tomentose, borne 2-18 mm from the base of the pedicel, the base cuneate to cordate and decurrent along the pedicel, the apex obtuse to acuminate. Sepals 6-18 × 5-12 mm, broadly ovate to triangular, densely tomentose, the base truncate and decurrent along the pedicel, the apex rounded to acuminate. Petals 25-183 × 11-70 mm, elliptic to oblong, membranous, deep maroon at anthesis, sparsely gray puberulous, the venation prominently raised on the outer surface, the base obtuse to cuneate, geniculate and abruptly narrowing to form a short claw, the food body cream-yellow, fleshy, glistening, the apex obtuse to acuminate. Stamens 100-160, 1.3-2 mm; filament 0.2 mm. Carpels 13-38; stigma 1-1.2 mm, 1 mm in diameter, flattened ellipsoid, yellowish, sparsely velutinous; style 0.3-1.3 mm long; ovary 1.2-2.2 mm, prismatic, irregularly 4-sided, densely short golden velutinous; ovules 8-12 in two rows. Monocarps 2.9-6.8 cm, 1.9-3.0 cm in diameter, obovoid to oblong, stipitate, densely grayish golden tomentellous, glabrescent; stipe 2-8 mm. Seeds 14-21 × 11 mm, 6-9 mm thick, lunate wedge-shaped, the seed coat smooth, orange-brown. *Selvas medias caducifolias*. G (Kellerman 6614, MEXU); H (Molina 105, MEXU); ES (Witsberger 302, MO); N (Schatz & Stevens 587, MO). 0-1200 m. (Mexico [Colima, Guerrero, Jalisco, Mexico, Michoacan, Nayarit, Oaxaca, Sinaloa, Veracruz], Mesoamérica.)

7. *Sapranthus viridiflorus* G.E. Schatz, *Novon* 8: 436 (1998). Holotipo: Costa Rica, Schatz 963 (MO!). Illustr.: Schatz, *Novon* 8: 437, t. 1-2 (1998).

Trees to 12 m. Stems brownish-gray tomentose. Leaves 5.6-29 × 2.7-12.1 cm, elliptic to oblong-obovate, sparsely white velutinous above, white velutinous below; midrib slightly impressed above, densely white velutinous, especially toward the base, prominently raised below, drying purplish black, short white hirsute; venation weakly brochidodromous, the secondary veins 8-15 per side, raised below, short white hirsute; base cuneate to rounded and somewhat truncate; margin finely ciliate; apex acuminate to cuspidate. Petioles 4-10 mm, brownish gray tomentose. Flowers solitary, terminal but appearing leaf-opposed (or rarely cauliflorous and borne on older wood), with a fruity fragrance, albeit with a slightly fetid component; pedicel 10-17 mm, sparsely tomentellous; pedicellar bract 5-9 × 3-5 mm, ovate to rounded, borne near the base of the pedicel to 8 mm from the base, the base decurrent along the pedicel, the apex acute to

obtuse, the margins revolute. Sepals 7-8 × 5-7 mm, triangular, slightly reflexed, tomentellous outside, the base truncate, the apex acute. Petals membranous and with evident venation in bud, becoming fleshy and lacking any evident venation at anthesis, revealing faint venation when dried, green with a purple blush at the base inside; outer petals 26-29 × 12-15 mm, broadly lanceolate to ovate, initially sparsely tomentellous outside, glabrescent, the base rounded, the apex acute; inner petals 24-28 × 11-13 mm, narrowly ovate, concave, glabrous, the base cuneate, the margins strongly revolute, the apex acute, the food body 2.5 × 4.5 mm, broadly triangular, vestigial, i.e, lacking fleshy ridges, white. Stamens c. 60, 1.8-2.3 mm; filament 0.3 mm; thecae 1.4-1.9 mm. Carpels 2-5, usually 4; stigma 1.5 × 2 mm broad, napiform, with a medial furrow, setaceous, yellowish white; ovaries 2 mm, prismatic, setaceous; ovules 10-17 in two rows. Monocarps to 10 cm, 4.5 cm in diameter, oblong, stipitate, green at maturity, puberulous, the base and apex rounded; stipe 3 mm, obliquely attached to the monocarp. Seeds 23 × 15 mm, 7 mm thick, lunate, the seed coat smooth, light orange-brown. *Selvas altas perennifolias*. N (Neill & Vincelli 3612, MO); CR (Herrera & Robles 754, MO); P (Holdridge 6231, MO). 0-1700 m. (Endémica.)

J. Deago 346 Panama, Veraguas, Distrito de Montijo, Cerro Hoya, subiendo por el rio Pedregal 740 m 7.17'45"N, 80.40'05" second collection of *Sapranthus* from Panama, probably *S. viridiflorus* 2 monocarps, densely chocolate brown tomentose, but not fully mature

16. *Stenanona* Standl.

Reedrollinsia J.W. Walker

By G.E. Schatz.

Dwarf to small trees, rarely clonal and then spreading vegetatively by underground shoots. Stems terete, densely golden to ferruginous tomentose to hirsute to villous-hirsute. Leaves lanceolate-elliptic to obovate, membranous to chartaceous, glabrous or sparsely white puberulous to pilose above, often a darker, glossier green than the lower surface when fresh, drying to a matte, grayish green, very sparsely golden-tomentose, densely golden or white tomentose, or velutinous to pilose below, the

midrib flat or weakly to strongly impressed above, more deeply so toward the base, glabrous or densely golden hirsute to villous, prominently elevated below, glabrous or densely golden to ferruginous tomentose to villous-hirsute, the secondary venation semicraspedromous, weakly brochidodromous, or brochidodromous, the base cuneate to rounded and often rounded to somewhat subcordate-emarginate at the point of attachment with the petiole, often somewhat oblique, the apex acuminate to caudate. Petioles swollen, terete to weakly to strongly canaliculate, sparsely tomentose to densely golden or ferruginous hirsute. Inflorescences condensed rhipidia, terminal, but appearing subopposite to supra-axillary, ramiflorous, trunciflorous, basiflorous, or flagelliflorous. Flowers pendent; peduncle 3 - 4 mm, or absent; pedicel 3 - 190 mm, densely golden tomentose, bearing several minute bracts near the base. Sepals 3 or 4, free or connate, narrowly lanceolate to broadly ovate or triangular, often persistent in fruit. Petals 6 or 8 in 2 subequal or differentiated whorls, free or connate, and then with the margins of the inner petals fused to the inner surface of the outer petals toward their middle, the margins of the outer petals free, narrowly linear to lanceolate, relatively thin and only moderately fleshy, with slightly elevated longitudinal venation outside, verrucose or smooth inside, salmon pink to wine or blood red, purple, or cream, the apex caudate to long-aristate. Stamens numerous, attached to the torus by a helical, thread-like fibre, extrorse; filaments short, the connective expanded above the thecae, truncate discoid, or prolonged into a deltoid, ligulate appendage, either horizontal and directed toward the gynoecium, or vertical. Gynoecium apocarpous, carpels 4-ca.120; stigma globose, napiform or pyriform, minutely tuberculate-papillate, densely tomentose or sparsely setaceous; ovary ellipsoid to prismatic, tomentose to setaceous; ovules 1-8, uniseriate or rarely biseriate. Fruit a cluster of free monocarps, globose to cylindrical-oval to ellipsoid to clavate, sessile or stipitate, smooth or bearing laminar, lacerate excrescences, tomentellous or rarely verrucose. Seeds irregularly shaped, ellipsoid, flattened globose, discoid, or sometimes lenticular, the seed coat usually covered with fruit wall remnants, rugose to flaky rugose, rarely smooth, the endosperm ruminations spiniform to peg-shaped. 14 spp., southern Mexico (Veracruz) to southern Colombia.

Two new species to be described, one from Chiapas and one from Guatemala.

1. Inner and outer petal whorls fused for some portion of their length.
 2. Inner and outer petal whorls fused for 90 mm, i.e., for more than 75% of their length; carpels ca. 30; monocarps shortly stipitate, the stipe 4 mm. **10. S. tubiflora**
 2. Inner and outer petals whorls fused for 4-5 mm, i.e., for less than 10% of their length; carpels 2-10; monocarps sessile.
 3. Bracts on the pedicel alternate, 1 mm apart; inflorescences mostly ramiflorous; ovules 2-4, uniseriate; monocarps smooth. **7. S. panamensis**
 3. Bracts on the pedicel opposite; inflorescences mostly trunciflorous; ovules 8, biseriate; monocarps bearing laminar, lacerate excrescences. **3. S. costaricensis**
1. Inner and outer petal whorls free.
 4. Inner and outer petals subequal, linear-lanceolate to linear-triangular; plants not clonal; ovules 2 or more.
 5. Flowers usually 3-merous, very rarely 4-merous; sepals free.
 6. Pedicels 9-23 mm; sepals 2-3 x 2.5-3 mm; monocarps ellipsoid to oblong to subglobose, stipitate, verrucose. **8. S. stenopetala**
 6. Pedicels 2.5-5 mm; sepals 6-15 x 2-4 mm; monocarps globose, sessile, irregularly tuberculate. **9. S. tuberculata**
 5. Flowers 4-merous; sepals connate.
 7. Leaves glabrous below; inflorescences trunciflorous; pedicels 8-12 mm. **2. S. cauliflora**
 7. Leaves golden velutinous below; inflorescences borne among the leaves; pedicels 75-190 mm.
 8. Secondary veins 13-20 per side; petals 5-8 mm broad at base, cream throughout. **1. S. carrillensis**
 8. Secondary veins 9-13 per side; petals 2-4 mm broad at base, wine red for basal 5-10 mm and then cream ochre above. **4. S. hondurensis**
 4. Inner and outer petals differentiated, the outer petals linear-triangular, the inner petals lanceolate; plants clonal, spreading vegetatively by underground shoots; ovule 1.
 9. Petals 23-44 mm long; sepals c. 3 mm long; pedicels sparsely hairy; plants without minute, lens-like warts; 100-140 m. **5. S. humilis**

9. Petals 10-20 mm long, sepals 1.5-2 mm long; pedicels rather densely hairy; leaves and monocarps covered with minute, lens-like warts; 1000-1250 m.

6. *S. monticola*

Bibliografía: Schatz, G. E. & P. J. M. Maas. *Blumea* 55: 205–223. (2010).

1. *Stenanona carrillensis* G.E. Schatz & Maas, *Blumea* 55: 207 (2010). Holotipo: Costa Rica, *Schatz & Young 962* (WIS!). Illustr.: Schatz & Maas, *Blumea* 55: 209, pl. 1a (2010).

Trees to 6 m. Stems densely golden hirsute-tomentose. Leaves 18.5-32.3 x 5.4-9.9 cm, narrowly elliptic to lanceolate-elliptic, membranous, glabrous, dark glossy green above when fresh, drying matte grayish green, golden velutinous below; midrib weakly impressed above, initially densely golden tomentose toward the base, glabrescent, prominently elevated below, densely golden hirsute; venation brochidodromous, the secundar veins 13-20 per side, prominently elevated below, densely golden hirsute; base rounded to obtuse; margins densely golden ciliate; apex long acuminate to acuminate-cuspidate. Petioles 9-18 mm, swollen, weakly canaliculate, densely golden hirsute tomentose. Inflorescence a 2 to 5-flowered rhipidium bearing 1 flower at a time; peduncle 4 mm, densely golden tomentose; pedicel 100-123 mm, slender, densely golden tomentose, borne in the axil of a densely golden tomentose, ovate bract, 3.5 x 1.5 mm, the apex acute, the pedicel also bearing a second minute bract, less than 1 x 1 mm, 12 mm from the base. Sepals 4, 10 x 7 mm, connate at the base, broadly ovate, densely golden tomentose outside, glabrous inside, with longitudinal venation the apex acuminate to cuspidate. Petals 8, in 2 subequal (the inner petals somewhat longer and narrower than the outer petals), free whorls, 53-56 x 5-8 mm, triangular-lanceolate, tapering evenly to less than 1 mm broad just below the apex, flat, thin, cream-white when fresh, turning reddish-purple when dried or placed in alcohol, sparsely white tomentose inside and outside, more densely tomentose toward the apex, with 5 longitudinal veins visible outside, the base truncate, narrowly concave proximally and pressed tightly against the stamens, the margins sparsely ciliate, the apex acuminate. Stamens ca. 120, 1.4 mm;

filaments 0.3 mm; thecae 1.1 mm; connectives 0.7 mm broad, expanded, truncate discoid, minutely tuberculate, rose-pink. Carpels ca. 32; ovaries prismatic, 1.3-1.5 mm, densely setaceous; stigmas 2 mm, 1 mm in diameter, pyriform, minutely papillate-tuberculate, fused into a head abscising as a unit; ovules 2-3, uniseriate. Monocarps to 15 mm, 10 mm in diameter, ellipsoid to oval, the base and apex rounded, shortly stipitate, drying purple, densely golden puberulous; stipe 4 mm, densely golden tomentose. Mature seed unknown. *Selvas altas perennifolias*. CR (Schatz & Fetcher 1045, CR). 370 m. (Endémica.)

2. *Stenanona cauliflora* (J.W. Walker) G.E. Schatz, *Candollea* 49: 465 (1994).

Reedrollinsia cauliflora J. W. Walker, *Rhodora* 73(795): 461 (1971). Holotipo: México, Chiapas, *Walker 357* (GH!). Illustr.:

Trees to 8 m. Stems sparsely appressed puberulous, the vegetative buds densely golden sericeous. Leaves 9.5-29.6 x 5.9-10.6 cm, elliptic to elliptic-obovate, membranous, essentially glabrous above and below, with only very scattered white appressed indumentum; midrib impressed above, more deeply so toward the base, prominently elevated below, sparsely appressed puberulous; venation brochidodromous, the secondary veins 12-17 per side, only slightly elevated below; base obtuse to rounded, sometimes somewhat oblique; apex acuminate to cuspidate, the acumen to 2 cm. Petioles 13-20 mm, deeply canaliculate, sparsely appressed puberulous. Inflorescences condensed rhipidia, sometimes bearing several flowers at a time, trunciflorous; pedicels 8-12 mm, densely appressed golden puberulous, borne in the axil of an ovate bract, 2 x 2 mm, and bearing a second minute bract 5 mm from the base. Sepals 4, 15 x 7 mm, connate for 3 mm at their base, triangular, the apex acuminate, sparsely tomentose. Petals 8 in 2 subequal, free whorls, 60-105 x 7-9 mm, linear-triangular to narrowly triangular, evenly tapering to 2 mm broad just below the apex, flat, thin, maroon, sparsely appressed puberulous at the base outside becoming increasingly more tomentose toward the apex, somewhat verrucose toward the base inside, with 3 major and 4 lesser, slightly elevated longitudinal veins, and faint interconnecting venation just barely visible the inner petals the base truncate, concave proximally and pressed tightly against the stamens, the apex acute. Stamens ca. 180, 2.6 mm; filaments 0.4 mm; thecae 2.0 mm; connectives 0.2 mm

thick, expanded truncate discoid. Carpels ca. 120; ovaries 2.0 mm, prismatic, tomentose, setaceous at the base; stigmas 0.9 mm in diameter, globose to napiform, densely short setaceous, attached to the ovary obliquely; ovules 2-4, uniseriate. Monocarps to 30 mm, 14 mm in diameter, clavate to cylindrical, the base cuneate, the apex rounded, shortly stipitate, pale orange, glabrous; stipe 3 mm. Seeds 8-10 mm in diameter, 4 mm thick, discoid. *Selvas altas perennifolias*. T (*Hammel & Merello 15515*, MO); Ch (*Vasquez 1125*, XAL). 50-450 m. (Endémica.)

3. *Stenanona costaricensis* R.E. Fr., *Acta Horti Berg.* 13(3): 103 (1941). Holotipo: Costa Rica, *Kupper 569* (M!). Illustr.:

Trees to 6 m. Stems densely golden-ferruginous hirsute, the hairs less than 1 mm. Leaves (3.9-)9.4-24.2 x (1.8-)3.2-8.5 cm, elliptic-obovate to obovate, membranous, initially sparsely tomentose above, glabrescent, sparsely to densely white velutinous below; midrib impressed above, golden hirsute, more densely so toward the base, prominently elevated below, densely golden-ferruginous hirsute; venation weakly brochidodromous, the secondary veins 10-15 per side, raised below, both white and golden-ferruginous hirsute; base obtuse to rounded, somewhat oblique; margins sparsely ciliate; apex long acuminate to cuspidate, the acumen to 2.7 cm. Petioles 2-6 mm, densely golden-ferruginous hirsute. Inflorescences condensed 1-3-flowered rhipidia bearing 1 flower at a time, borne at concentrated perennial flowering areas along the main trunk (i.e., trunciflorous), or occasionally on older branches; pedicels 4-6 mm, densely golden hirsute, borne in the axil of a densely golden hirsute, ovate, hood-like bract, 1 x 1 mm, and bearing 1 mm from the base of the pedicel two additional opposite, densely golden hirsute, narrowly oblong bracts, 1 x < 1 mm, the base decurrent along the pedicel, the apex acute. Sepals 3, free, 7-15 x 4-8 mm, ovate, red, sparsely golden sericeous, with visible brochidodromous venation, the base rounded to obtuse, the apex acuminate to cuspidate. Petals 6, in 2 subequal, connate whorls, 31-62 x 6 mm, narrowing abruptly to 3 mm broad 16 mm from the base, narrowly lanceolate, somewhat fleshy, especially toward the base, rose-pink to dark wine or blood red, sparsely white tomentellous, verrucose both outside and inside, with 3-5 slightly elevated longitudinal veins outside, the base cuneate to acute, the margins of the inner petals fused to the inner surface of the

outer petals near their middle for 5 mm proximally, the margins of the outer petals free, the apex markedly aristate. Stamens ca. 35, 1.4-2.0 mm; filaments 0.4 -- 1.0 mm; thecae 1 mm; connectives to 0.5 mm long, a deltoid appendage projecting toward the gynoecium, minutely tuberculate. Carpels 2-6; ovaries 3 mm, prismatic, connivent, densely golden setaceous; stigmas 0.9 mm in diameter, globose, connivent, finely tuberculate, each tubercle with a minute hair; ovules 6-8, biseriate. Monocarps to 25 mm in diameter, globose, sessile, dull red at maturity, bearing lamellar, lacerate excrescences to 1 cm, some of which are fused to form plates 1.7 cm broad, the lobes to 0.5 cm deep, the sinuses acuminate, the mesocarp orange. Mature seed unknown. *Selvas altas perennifolias*. N (Miller & Sandino 1152, MO); CR (Herrera & Rivera 825, MO). 40-1300 m. (Endémica.)

4. *Stenanona hondurensis* G.E. Schatz, F. Coe & Maas, *Blumea* 55: 211 (2010).

Holotipo: Honduras, Brant & Zuniga 2840 (MO!). Illustr.: Schatz & Maas, *Blumea* 55: 209, pl. 1b-e (2010).

Trees to 15 m. Stems densely golden tomentose. Leaves 9-23.5 x 3-8.6 cm, narrowly elliptic to elliptic, occasionally broadest slightly above the middle, membranous, glabrous above, densely whitish golden velutinous below; midrib weakly impressed above, initially whitish golden tomentose, glabrescent, prominently elevated below, densely whitish golden tomentose; venation weakly brochidromous, the secondary veins 9-13 per side, prominently elevated below, densely tomentose; base rounded to subcordate and slightly oblique; margin densely ciliate; apex acute to long acuminate, rarely retuse through aborted development, the acumen to 1.5 cm. Petioles 7-12 mm, terete, densely whitish golden tomentose. Inflorescences several to 5 (or more)-flowered, occasionally branched rhipidia, terminal but appearing internodal 2-5 mm below the first leaf of the renewal shoot; peduncles 4-15 mm, densely golden tomentose; pedicels (75-)135-190 mm long, slender, densely golden tomentose, bearing a minute bracteole 5-25 mm from the base. Sepals 4, 5-8 x 2-4 mm, ovate to triangular, densely golden tomentose outside, slightly recurved at anthesis, connate at the base, the apex acuminate. Petals 8, in 2 subequal, free whorls, 50-80 x 2-4 mm, linear-triangular, evenly tapering to a point at the acute apex, the inner petals slightly narrower, wine red for the basal 5-10 mm and then

cream white above. Stamens ca. 120, 1.5-2.0 mm; filament 0.2 mm; outer thecae longer than the inner; connective thickened, truncate discoid. Carpels 25-35; ovary 1.0 mm, cylindric, velutinous; stigma 0.8-1.2 mm, sessile, pyriform, coherent and abscising en masse; ovules 2. Monocarps to 15 mm, 12 mm in diameter, ellipsoid to oblong, stipitate, turning ochre yellow, densely puberulous; stipe 4-7 mm, attached somewhat obliquely to the monocarp. Seeds 10 mm x 7 mm in diameter, flattened ellipsoid. *Selvas altas perennifolias*. H (Aguilar 4088, MO). 140-330 m. (Endémica.)

5. *Stenanona humilis* (Miranda) G.E. Schatz, *Candollea* 49: 465 (1994). *Sapranthus humilis* Miranda, *Ceiba* 4: 126 (1954). Holotipo: México, Chiapas, *Miranda 6583* (MEXU!). Illustr.: Schatz & Maas, *Blumea* 55: 212, 213, pl. 2a, 3a, b (2010).

Dwarf trees to 0.5 m, clonal, spreading by underground shoots. Stems densely golden hirsute-tomentose. Leaves 5.7-13.5 x 2-4.9 cm, elliptic to elliptic-obovate, membranous, glabrous above, initially sparsely light golden tomentose below, glabrescent; midrib strongly impressed above, more deeply so toward the base, golden hirsute, prominently elevated below, sparsely golden hirsute-tomentose; venation brochidodromous, the secondary veins 7-10 per side, elevated and sparsely golden tomentose below; base acute to rounded, oblique, and somewhat emarginate-subcordate at the point of attachment to the petiole; margin initially ciliate, glabrescent; apex long acuminate to cuspidate, the acumen to 1.8 cm. Petioles 1.2-3.0 mm, densely golden-ferruginous hirsute-tomentose. Inflorescences 1-3-flowered rhipidia borne among the leaves, terminal, but appearing opposite a leaf or supra-axillary; peduncles 1 mm; pedicel 9-21 mm, very slender, initially sparsely golden tomentose, glabrescent, bearing 2-3 narrowly lanceolate, densely golden sericeous bracts near the base. Sepals 3, 3 x 1 mm, narrowly lanceolate, sparsely golden sericeous outside, more densely so toward the apex, glabrous inside, wine red, reflexed at anthesis, the base rounded to truncate, the apex aristate. Petals 6, in two differentiated, free whorls, geniculate 2 mm from the base, wine red; outer petals 23-44 x 1-2 mm, linear-triangular, sparsely sericeous outside, strongly keeled and glabrous inside, with 3 longitudinal veins, the base rounded to truncate, the apex long-aristate; inner petals 23-44 x 4 mm, lanceolate, very sparsely sericeous outside, glabrous inside, verrucose both outside and inside, with 5-7

longitudinal veins, slightly elevated both outside and inside, the base rounded to truncate, the apex long-aristate. Stamens ca. 30, 1.2 mm; filaments 0.6 mm; thecae 0.5 mm long, the cream connectives either expanded truncate discoid or with a deltoid appendage projecting toward the gynoecium. Carpels 4-8; ovaries 1.2 mm, ellipsoid, densely sericeous; stigmas 0.2 mm in diameter, globose, short setaceous, rose; ovule 1. Monocarps 8-13 mm, 5-7 mm in diameter, ellipsoid, shortly stipitate, red at maturity, the base and apex rounded; stipe 1-3 mm. Seeds just slightly smaller than the monocarp, ellipsoid. *Selvas altas perennifolias*. Ch (*Miranda 6583*, MEXU). 130-140 m. (Veracruz, Mesoamérica.)

6. *Stenanona monticola* Maas & G.E. Schatz, *Blumea* 55: 217 (2010). Holotipo: Mexico, *Breedlove 58440* (CAS). Illustr.: Schatz & Maas, *Blumea* 55: 214, 215, f. 2, 3 (2010).

Shrubs or trees 1-10 m. Stems densely covered with erect to half-appressed hairs. Leaves 8-13 x 1.5-4 cm, narrowly elliptic, membranous, glabrous above, sparsely covered with appressed hairs below, strongly punctate with minute lens-like warts; midrib impressed above, sparsely covered with erect hairs or glabrous, prominently raised below; secondary veins 6-8 per side, slightly elevated below; base cordate to obtuse; apex acute to acuminate, the acumen 5-10 mm. Petioles 2-4 mm, densely covered with erect to half-appressed hairs. Inflorescences leaf-opposed or slightly lower than leaf (supra-axillary), 1- or less often 2-flowered. Indument: peduncle, pedicels, bracts, and outer side of sepals and petals densely to rather densely covered with erect to appressed hairs. Flowers pendulous; peduncle 0.5-2 mm; pedicels 10-20 mm, slender, bract 1, close to base, narrowly triangular, 1-2 mm long; sepals 3, free, 1.5-2 x 0.5-1 mm, narrowly triangular, apex acute; petals 6, free, in 2 unequal whorls, purple, outer petals 10-16 x 0.5-1 mm, linear, with a caudate apex 7-8 mm long; inner petals, 10-20 x 1-5 mm, narrowly ovate-triangular with a caudate apex 5-10 mm long. Stamens 25-50, 1-1.5 mm long, apical part of connective depressed ovate-triangular, densely covered with orange dots, glabrous, projecting toward the gynoecium. Carpels 3; ovary 0.8-1 x 0.4-0.5 mm, transversely ellipsoid, densely covered with appressed hairs; stigma densely papillate; ovule 1. Monocarps 10-20 x 6-10 mm, ellipsoid, shortly stipitate, strongly punctate with

minute lens-like warts, sparsely covered with appressed hairs to glabrous; stipes 1-2 mm. Seed 9-12 x 6-7 x 4-5 mm, ellipsoid. *Selvas altas perennifolias*. Ch (*Breedlove 58440*, MO). 1000-1250 m. (Endémica.)

7. *Stenanona panamensis* Standl., Publ. Field Columbian Mus., Bot. Ser. 4(8): 205 (1929). Holotipo: Panamá, *Cooper 427* (F-578549). Illustr.: Fries, *Ann. Missouri Bot. Gard.* 49: 200, f. 161 (1962); Schatz & Maas, *Blumea* 55: 213, pl. 3c, d, f (2010).

Trees to 6 m. Stems densely golden-ferruginous villous-hirsute, the hairs to 2 mm. Leaves (3.4-)13.4-21.1 x (1.6-)4.8-7.6 cm, oblanceolate to narrowly obovate, membranous, initially sparsely pilose above, glabrescent, sparsely whitish golden pilose below; midrib impressed above, prominently elevated below, golden villous-hirsute; venation weakly brochidodromous to semicraspedromous, the secondary veins 8-12 per side, prominently elevated below, whitish golden villous-hirsute; base rounded to emarginate, somewhat oblique; margin sparsely ciliate; apex long acuminate to cuspidate, the acumen to 2.6 cm. Petioles 1-4 mm, densely golden-ferruginous villous-hirsute. Inflorescences 1-3-flowered rhipidia bearing 1 flower at a time, borne mostly along horizontal branches well back from the leaves, i.e., ramiflorous, occasionally at the juncture of horizontal branches and the main trunk, but not trunciflorous; pedicels 4-5 mm, densely villous-hirsute, borne in the axil of a green, densely white villous-hirsute, linear-lanceolate bract, 4-5 x 1.5 mm, the apex acuminate, and bearing less than 1 mm from the base of the pedicel and 1 mm apart from each other 2 additional distichous, alternate, rose-purple, densely golden villous-hirsute, narrowly oblong bracts, 3-4 x 1 mm, the base decurrent along the pedicel, the apex acuminate. Sepals 3, 11 x 4.5 mm, broadly ovate, rose, golden villous-hirsute, with visible brochidodromous venation, the base rounded to obtuse, the apex cuspidate to aristate. Petals 6, in 2 subequal, connate whorls, 53 x 12 mm, narrowing abruptly to 2 mm broad 15 mm from the base, lanceolate, somewhat fleshy, especially toward the base, initially rose-salmon to wine red, becoming deep blood red at anthesis, sparsely white tomentellous both inside and outside, verrucose both inside and outside, with 3-5 slightly elevated longitudinal veins outside, the base cuneate to acute, the margins of the inner petals fused to the inner surface of the outer petals near their middle for 4 mm proximally, the margins of the outer petals free, the

apex markedly aristate. Stamens ca. 65, 2-2.5 mm; filaments 0.4-1.0 mm; thecae 1 mm; connectives to 0.5 mm, prolonged into a deltoid appendage projecting toward the gynoecium. Carpels 10; ovaries 1.5 mm, prismatic, connivent, densely golden setaceous; stigmas 0.8 mm in diameter, globose to napiform, connivent; ovules 2-4, uniseriate. Monocarps to 20 mm, 15 mm in diameter, subglobose to clavate, sessile, dull brown turning red at maturity, initially densely tomentose, glabrescent, the base obtuse to cuneate, the apex rounded. Seeds 12 mm, 10 mm in diameter, discoid to lenticular. *Selvas altas perennifolias*. CR (Grayum et al. 4451, MO); P (Cooper 427, F). 25-40 m. (Endémica.)

8. *Stenanona stenopetala* (Donn. Sm.) G.E. Schatz, *Candollea* 49: 465 (1994).

Porcelia stenopetala Donn. Sm., Bot. Gaz. (Crawfordsville) 40: 1 (1905). Holotipo: Guatemala, von Türckheim 11868 (= Donnell Smith 8469) (US). Illustr.: Schatz & Maas, *Blumea* 55: 213, pl. 3e (2010).

Desmopsis stenopetala (Donn. Sm.) R. E. Fr., *Sapranthus stenopetalus* (Donn. Sm.) Saff. ex Standl.

Trees to 9 m. Stems densely golden tomentose. Leaves 5.5-32 x 2.2-9.8 cm, narrowly elliptic to elliptic-obovate, membranous to chartaceous, glabrous above, dark glossy green when fresh, drying matte grayish green, whitish golden velutinous below; midrib weakly impressed above, more deeply so toward the base, initially golden hirsute toward the base, glabrescent, prominently elevated below, densely golden hirsute-tomentose; venation weakly brochidodromous, the secondary veins 10-17 per side, prominently elevated below, densely golden hirsute-tomentose; base cuneate to obtuse, sometimes oblique; margins densely golden ciliate; apex acuminate to cuspidate, the acumen to 2 cm. Petiole 3-8 mm, canaliculate, densely golden tomentose. Inflorescences condensed rhipidia bearing 1 flower at a time at flowering nodes along the main trunk (trunciflory), or rarely among the leaves; pedicels 9-23 mm, densely golden tomentose, borne in the axil of a minute, caducous bract, and bearing near the base of the pedicel a second broadly ovate bract, 0.8-1 x 1.5 mm, densely golden tomentose, the apex acute. Sepals 3 (rarely 4), 2-3 x 2.5-3 mm, broadly ovate, densely golden tomentose outside, glabrous inside, the apex acute. Petals 6 (rarely 8) in 2 subequal, free whorls, the inner petals

slightly narrower than the outer petals at the base, 40-60 x 4 mm, tapering evenly to 0.1 cm broad just below apex, linear-lanceolate to linear-triangular, salmon pink to pink, densely whitish golden tomentellous outside, glabrous and faintly verrucose inside, with 3 longitudinal veins visible in rehydrated material, the base truncate, concave proximally and pressed tightly against the androecium, with fine reticulations inside at the base marking the impressions of the stamens, the acuminate apex. Stamens ca. 90, 1.6 mm; filaments 0.1-0.3 mm; outer thecae 1.5 mm; inner thecae 1.3 mm; connectives to 0.8 mm, either expanded truncate discoid or prolonged into a deltoid appendage projecting toward the gynoecium. Carpels 6-16; ovaries 1.7 mm, prismatic, connivent, hispid-setaceous at the base grading to villous-tomentose at the apex; stigmas 0.8 mm in diameter, globose to napiform, with a medial crease, connivent, densely tomentose; ovules 6-8, uniseriate. Monocarps to 18 mm long, 13 mm in diameter, ellipsoid to oblong to subglobose, shortly stipitate, red at maturity, initially golden tomentose, glabrescent, verrucose, the base rounded, the apex acute to obtuse; stipe to 3 mm, sparsely golden tomentose. Seeds 9 mm in diameter, 5 mm thick discoid. *Selvas altas perennifolias*. T (*Schatz et al. 1179*, MEXU); Ch (*Gomez Pompa 322*, US); B (*Davidse et al. 35703*, MO); G (*Contreras 6729*, MO). 105-825 m. (Endémica.)

9. *Stenanona tuberculata* G.E. Schatz & Maas, *Blumea* 55: 219 (2010). Holotipo: Honduras, *Hawkins & Merello 743* (MO!). Illustr.: Schatz & Maas, *Blumea* 55: 216, pl. 4a-c (2010).

Trees 5-10 m. Stems densely ferruginous golden sericeous-strigose to 0.8 mm. Leaves 5-24.2 x 2-8.4 cm, obovate to elliptic-oblancheolate, membranous, initially sparsely white appressed puberulous to 0.2 mm above, glabrescent, sparsely to moderately densely white sericeous 0.4-0.5 mm below; midrib impressed above, rather densely appressed golden tomentose, especially towards the base, prominently raised below, rather densely appressed golden sericeous-strigose 0.2-0.5 mm; secondary veins (7-) 11-14 per side, slightly elevated below, sparsely to moderately densely appressed golden sericeous-strigose; base cuneate to obtuse and then rounded at the point of attachment to the petiole, slightly asymmetrical; margin sparsely ciliate; apex (acute) acuminate to cuspidate, the acumen to 3.1 cm. Petioles 2-2.5 mm, densely ferruginous golden sericeous-strigose

0.8 mm. Inflorescences cauliflorous, simple or sometimes branched rhipidia, the sympodial axis to 3-4 mm; pedicels 2.5-5 mm, borne in the axis of minute bract, densely golden puberulous, bearing a second minute bract just above the base of the pedicel, caducous. Sepals 6-15 x 2-4 mm, free, lanceolate, moderately densely golden puberulous, with evident venation, the base obtuse, the apex acuminate. Petals 6 in two subequal, free whorls, 30-45 x 2-5 mm, linear triangular, sparsely golden puberulous. Stamens ca. 75, 1.5-2 mm, apical part of connective directed towards the gynoecium. Carpels 2-4; ovaries 1.1-1.3 mm, 0.7-1 mm in diameter, densely golden tomentose; stigma c. 1 mm in diameter, suglobose; ovules 4, biseriata. Monocarps 19-23 mm in diameter, globose, sessile, irregularly tuberculate, the tubercles to 2 mm, densely golden gray puberulous. Seeds 13 x 7-9 mm, wedge-shaped. *Selvas altas perennifolias*. H (Brant & Zuniga 2832, MO). 140-500 m. (Endémica.)

10. *Stenanona tubiflora* G.E. Schatz & Maas, *Blumea* 55: 221 (2010). Holotipo: Panamá, *de Nevers 7715* (MO!). Illustr.: Schatz & Maas, *Blumea* 55: 216, f. 5, pl. 4e, f (2010).

Trees to 4 m. Stems densely golden tomentose. Leaves 25.3-46.5 x 9.8-17.6 cm, oblanceolate to obovate, membranous, initially very sparsely, white appressed pubescent above, glabrescent, sparsely white to golden puberulous, as well as with scattered long white appressed pubescence below; midrib impressed above, white puberulous, prominently elevated below, golden tomentose; venation brochidodromous, the secondary veins 16-21 per side, slightly elevated below, white puberulous; base rounded to subcordate; apex cuspidate to caudate, the acumen to 4.2 cm. Petioles 5-6 mm, golden tomentose. Inflorescences condensed rhipidia, bearing 1 flower at a time, borne on the main trunk near the base (basiflory), the flower actually lying on the ground; rhipidium/peduncle to 13 mm; pedicel 4 mm long, tomentellous, bearing several minute ovate to narrowly triangular bracteoles 1-2 mm. Sepals 3, 24-26 x 10-11 mm, ovate, slightly reflexed, green, puberulous outside, sparsely puberulous inside, with 5 slightly elevated longitudinal veins visible outside, the base rounded to truncate, the margins involute, the apex caudate and. Petals 6, in 2 subequal, connate whorls, 115-128 x 11-15 mm, narrowly oblong, fleshy, purple outside, maroon inside, sparsely puberulous outside,

the base truncate, the margins of the inner petals fused to a medial keel on the inside of the outer petals to within 25-28 mm of their apex, i.e., for approx. 3/4 of their length, therefore forming a long tube, the margins of the outer petals free, the margins of all petals involute distally beyond the point of fusion, the medial keel along the inside of the inner petals to 0.7 cm tall, becoming highly rugose papillate-verrucate 5.5 cm from the base and broadening toward the base to 0.5 cm broad, the keel on the outer petals also papillate-verrucate at the base, all petals with a deep furrow on the outside corresponding to the keel on the inside, the apex acute to acuminate. Stamens ca. 35, 4 mm; filaments 1 mm; thecae 3 mm; connectives only slightly prolonged into a deltoid appendage projecting toward the gynoecium. Carpels ca. 30; ovaries 3-4 mm, cylindrical and slightly curved, densely short sericeous; stigmas 1.5 mm, ellipsoid, minutely tuberculate, attached to the ovary obliquely by a very short style, connate into a head abscising as a unit; ovules 4, uniseriate. Monocarps 25-40 mm, 12-20 mm in diameter, ellipsoid to oblong, shortly stipitate, verrucose, golden puberulous, the mesocarp red, the base rounded, the apex acute; stipe 4-6 mm. Seeds 10-15 mm in diameter, globose to discoid. *Selvas altas perennifolias*. P (Herrera 1775, MO). 85-350 m. (Endémica.)

17. *Unonopsis* R.E. Fr.

By G.E. Schatz.

Shrubs to large trees. Young stems mostly sparsely to densely covered with appressed or erect, simple hairs, sometimes glabrous. Leaves mostly narrowly elliptic to narrowly obovate, symmetrical or slightly asymmetrical, chartaceous to sometimes coriaceous, upper surface glabrous or with some appressed or erect hairs along the primary vein, lower surface glabrous or sparsely to densely covered with appressed or erect hairs, mainly along the primary and secondary veins, venation brochidodromous, primary vein raised above and below, secondary veins impressed or sometimes flat to raised above, raised below, tertiary veins usually distinct, percurrent. Petioles canaliculate, sparsely to densely covered with appressed to erect, simple hairs. Inflorescence and flower indument: inflorescences axes, pedicel, outer surface of bracts, sepals, outer petals, and exposed outer surface of inner petals densely to sparsely covered with appressed to erect,

simple hairs, the inner surface of bracts, sepals and petals glabrous. Inflorescences axillary among leaves or on older branches or rarely cauliflorous, mostly composed of 1-5(-10) rhipidia, sessile or pedunculate; rhipidia 1-15-flowered; pedicels borne in the axil of a basal bract and bearing an upper bract mostly in the lower half to the middle of the pedicel, ovate to broadly ovate to ovate-triangular, 1-3 mm long. Flower buds globose to subglobose, or ovoid to depressed ovoid. Sepals 3, mostly connate at the base, valvate, much smaller than petals. Petals 6, free, in two valvate, subequal whorls, fleshy, outer ones broadly to depressed ovate, flat to concave, inner ones broadly ovate, usually strongly concave, usually with a slightly raised, exposed, medial, narrowly triangular keel on the outer surface. Floral receptacle broadly ovoid, transversely ellipsoid or cylindrical. Stamens numerous, free, connective shield truncate discoid, sometimes papillate, anthers extrorse. Gynoecium apocarpous, carpels few to numerous, free, often densely covered with appressed hairs, stigma broadly ovoid or shallowly obconical, hairy or glabrous; ovules 1-5, basal or lateral, rarely apical. Fruit a cluster of free monocarps, often subtended by persistent sepals, usually stipitate, mostly globose to ellipsoid, glabrous or sometimes covered with appressed to erect hairs. Seeds 1-5 per monocarp, transversely ellipsoid to globose, often dark brown, pitted, with a distinct raised raphe completely surrounding the seed, ruminations spiniform. 48 species from Mexico to Bolivia

Bibliografía: Maas, P.J.M., L.Y.Th. Westra & M. Vermeer, *Blumea* 52: 413-554 (2007).

1. Young stems glabrous.

2. Young stems glaucous; petiole 2-4 mm; leaf base cordate to obtuse; pedicels 7-18 mm; monocarps 1-seeded. **13. U. stevensii**

2. Young stems not glaucous; petiole 5-10 mm; leaf base acute; pedicels 25-40 mm; monocarps 2-seeded. **8. U. osae**

1. Young stems sparsely to densely hairy, glabrescent.

3. Leaves distinctly bullate.

4. Leaves 20-40 × 7-14 cm, base cordate, lower surface densely to rather densely covered with erect hairs. **15. U. theobromifolia**

4. Leaves 10-20 × 2.5-7 cm, base acute to obtuse, lower surface sparsely covered with erect to appressed hairs. **1. U. bullata**
3. Leaves flat, not distinctly bullate.
5. Lower surface of leaves densely to rather densely covered with mostly erect hairs.
6. Base of the leaves cordate.
7. Petioles 3-5 mm; pedicels 15-30 mm; stipes 6-12 mm. **5. U. longipes**
7. Petioles 5-10 mm; pedicels 3-10 mm; stipes 2-4 mm. **15. U. theobromifolia**
6. Base of the leaves acute to obtuse.
8. Hairs of leafy twigs and lower surface of leaves curly; leaves narrowly elliptic. **4. U. hammelii**
8. Hairs on leafy twigs and lower surface of leaves straight; leaves narrowly obovate or narrowly elliptic.
9. Petiole 3-5 mm; base of the leaves obtuse to cordate; inflorescence 1- or 2-flowered; seeds 11-13 mm long; monocarp wall c. 0.2 mm thick. **5. U. longipes**
9. Petiole 4-15 mm; base of leaves acute to obtuse; inflorescence 2-5(-15)-flowered; seeds 8-10 mm long; monocarp wall c. 0.5 mm thick. **3. U. darienensis**
5. Lower surface of leaves sparsely covered with hairs or glabrous.
10. Flowers appearing solitary.
11. Pedicels 50-115 mm.
12. Leaves 25-40 × 7-13 cm; petiole 7-13 mm; pedicels 50-115 mm. **11. U. penduliflora**
12. Leaves 9-14 × 3-4 cm; petiole 3-5 mm; pedicels 50-80 mm. **2. U. cf. costaricensis**
11. Pedicels 10-50 mm.
9. Leaves 14-49 cm long; monocarps 10-50. **10. U. panamensis**
9. Leaves 9-14 cm long; monocarps 3-15. **2. U. costaricensis**
10. Flowers in few- to many-flowered inflorescences, sometimes seemingly 1-flowered.

13. Leaf base cordate.
14. Young stems and lower surface of leaf covered with curly hairs; tertiary veins of leaves distinct; inflorescences mostly compact; monocarps several-seeded. **14. U. storkii**
14. Young stems and lower surface of leaves covered with straight hairs; tertiary veins of leaves indistinct; inflorescences mostly lax; monocarps 1-seeded. **9. U. pacifica**
13. Leaf base acute to obtuse.
15. Leaves 10-15 × 4-6 cm; secondary veins 7-9 per side; monocarps 2-3-seeded. **7. U. megalosperma**
15. Leaves 12-42 × 4-19 cm; secondary veins 10-20 per side; monocarps 1-seeded.
16. Secondary veins 10-16 per side; inflorescences highly branched, many-flowered; monocarps 1-15(-50), 11-20(-25) mm in diameter, the surface smooth when dry, not strongly shriveled. **12. U. pittieri**
16. Secondary veins 18-20 per side; inflorescences not highly branched, 2-4-flowered; monocarps 2-9, 24-29 × 32-25 mm, the surface strongly shriveled when dry. **6. U. macrocarpa**

1. Unonopsis bullata Maas & G.E. Schatz, *Blumea* 52(3): 458 (2007). Holotipo: Panamá, *Maas et al.* 9560 (U!). Illustr.: Maas, Westra & Vermeer, *Blumea* 52(3): 459, t. 14 (2007).

Tree 2-15 m. Stems tomentellous. Leaves (2.7-)3.6-25.5 × 1.1-6.4 cm, narrowly elliptic to elliptic, sometimes narrowly obovate, chartaceous, densely to rather densely verruculose, initially very sparsely puberulous, glabrescent; slightly to strongly bullate; primary vein impressed above, initially sparsely puberulous, glabrescent, raised below, sparsely puberulous; secondary veins (10-)14-20 per side, slightly to deeply impressed above, raised and sparsely puberulous below; base acute to obtuse, asymmetrical; apex acuminate to cuspidate, the acumen to 20 mm. Petioles 2-5 mm, 1-2 mm diameter, tomentellous. Inflorescences 1-2 flowered rhipidia (however the second flower

apparently failing to develop beyond the bud stage), axillary; peduncles 3 mm, bearing several minute bracts at the base, densely tomentellous; pedicels 8-20 mm, slender, marked by a basal articulation and bearing a minute bract approximately midway, densely tomentellous, elongating to 35-45 mm and becoming rigid in fruit. Sepals 1×2 mm, basally connate, densely short puberulous outside, glabrous inside. Petal whorls subequal; outer petals $5-6 \times 4-6$ mm, broadly ovate, strongly concave, short puberulous outside, glabrous inside; inner petals 3×3 mm, broadly ovate, thicker and fleshier than the outer petals, glabrous outside and inside except short puberulous outside along a narrowly triangular medial keel marking the exposed area of non-overlap by adjacent outer petals. Stamens 1-1.5 mm. Carpels 4-8; ovule 1, basal. Monocarps 11-20 mm in diameter, globose, glabrous, purple black at maturity; stipes $6-15 \times 1-2$ mm. Seeds $10-13 \times 9-11 \times 5-8$ mm. *Selvas altas perennifolias*. CR (R. Aguilar & Schmidt 995, INB); P (McPherson 10748, MO). 0-500 m. (Endémica.)

2. *Unonopsis costaricensis* R.E. Fr., *Acta Horti Berg.* 13(3): 105 (1941). Holotipo: Costa Rica, *Standley 33897* (US!). Illustr.:

Tree 5-16 m. Stems initially densely white tomentose, glabrescent. Leaves (3.0-)6.5-16.3 \times (1.1-)2.2-5.3 cm, narrowly elliptic to elliptic, chartaceous, primary vein slightly raised above, raised below; secondary veins 10-14 per side, base acute, symmetrical to slightly asymmetrical; apex acuminate, the acumen 5-10 mm. Petioles 5-7 mm, 1-2 mm diameter, tomentellous. Inflorescences usually a single flower, axillary; peduncles 3 mm, bearing several minute bracts at the base, densely tomentellous; pedicels 15 mm, slender, marked by a basal articulation and bearing a minute bract approximately midway, densely tomentellous, elongating to 25-50 mm and becoming rigid in fruit. Sepals $2 \times 2.5-3$ mm, basally connate, shallowly ovate triangular, sparsely to densely short puberulous outside, glabrous inside. Petal whorls subequal; outer petals 8×9 mm, broadly ovate, sparsely puberulous outside, glabrous inside; inner petals not seen. Stamens 1 mm. Carpels > 50 ; ovules 1-3. Monocarps $14-20 \times 13-16$, globose to ellipsoid, apex apiculate, sparsely puberulous, glabrescent, red at maturity; stipes $5-10 \times 1-2$ mm. Seeds $12-15 \times 10-12 \times 9-10$ mm. *Selvas altas perennifolias*. CR (*Davidse & Herrera 26282*, MO). 800-1400 m. (Endémica.)

3. *Unonopsis darienensis* Maas & Westra, *Blumea* 52(3): 469 (2007). Holotipo: Panamá, *McPherson 15398* (F!). Illustr.: Maas, Westra & Vermeer, *Blumea* 52(3): 472, t. 17 (2007).

Tree or shrub 3-15 m. Stems rather densely covered with brownish, short hairs, glabrescent. Leaves 15-45 × 4-16(-22) cm, narrowly obovate, chartaceous, glabrous above except primary vein densely covered with erect hairs, densely to soon sparsely covered with erect hairs below; secondary veins 13-16 per side; base acute to obtuse; apex acuminate, the acumen 5-15 mm. Petioles 4-15 mm, 2-8 mm diameter. Inflorescences composed of 2-5 rhipidia, each 2-3 flowered, sympodial rachis to 15 mm; pedicels 8-15 mm, slender, densely covered with appressed and erect brown hairs, elongating to 15-35 × 2-5 mm and becoming rigid in fruit. Sepals 1.5-2.5 × 1.5-3 mm, basally connate, shallowly triangular, densely covered appressed brown hairs outside. Petal whorls subequal; outer petals 6-8 × 5-6 mm, broadly ovate, slightly concave, densely covered with appressed brown hairs outside, glabrous inside, the base truncate, the apex acute; inner petals 4-5 × 3-4 mm, broadly ovate, strongly concave, glabrous outside and inside except densely hairy keel. Stamens 1-1.5 mm. Carpels c. 10; ovule 1-3. Monocarps 10-18 × 10-13 mm in diameter, ellipsoid to subglobose, initially rather densely covered with appressed hairs, glabrescent, dark red with bluish bloom at maturity; stipes 5-20 × 1-2 mm. Seeds 8-10 × 7-8 × 5-6 mm. *Selvas altas perennifolias*. P (*Galdames et al. 1317*, PMA). 0-400 m. (Mesoamérica, Colombia.)

4. *Unonopsis hammelii* G.E. Schatz & Maas, *Blumea* 52(3): 487 (2007). Holotipo: Costa Rica, *Hammel 11608* (CR!). Illustr.: Maas, Westra & Vermeer, *Blumea* 52(3): 488, t. 20 (2007).

Tree 10-20 m. Stems tomentellous, the hairs curly, glabrescent. Leaves 12-22 × 4.5-8 cm, narrowly elliptic, symmetrical to slightly asymmetrical, coriaceous, glabrous and shiny above, rather densely to sparsely covered with erect, curly, brown hairs below; slightly to strongly bullate; primary vein impressed above, initially sparsely puberulous, glabrescent, raised below, sparsely puberulous; secondary veins 10-13 per side, slightly to deeply impressed above, raised and sparsely puberulous below; base acute to obtuse;

apex shortly acuminate to cuspidate, the acumen to 10 mm. Petioles 5-8 mm, 1-2 mm in diameter, tomentellous. Inflorescences on older branches, rarely among leaves, composed of 2-5 rhipidia, each 1-2(-7)-flowered; sympodial rachis to 4 mm; pedicels 10-15 mm, 1-1.5 mm in diameter, densely covered with erect, curly, brown hairs, elongating to 30 mm, 3 mm in diameter in fruit, upper bract at 1/8 to 1/3 from base of pedicel, 1.5-2 mm long, broadly ovate-triangular, outer surface densely covered with erect, curly, brown hairs. Sepals 1-2 × 3-4 mm, shallowly ovate-triangular, basally connate, outer surface densely covered with erect, curly, brown hairs. Petal whorls subequal, cream, creamy orange, or yellow in vivo; outer petals 5-6(-9) × 5-6(-8) mm, broadly ovate, slightly concave, outer surface densely covered with erect, curly, brown hairs; inner petals 4-6 × 4-5 mm, broadly ovate, strongly concave, thicker and fleshier than the outer petals, outer surface glabrous outside except short puberulous along a narrowly triangular medial keel marking the exposed area of non-overlap by adjacent outer petals. Stamens 1-1.5 mm. Carpels 50-60; ovule 1. Monocarps 5-40, 13-18 mm in diameter, globose, rather densely to sparsely covered with erect, curly, brown hairs, purple black at maturity; stipes 8-15 mm, initially sparsely puberulous, glabrescent. Seeds 8-11 × 8-9 × 2-5 mm. *Selvas altas perennifolias*. CR (*Mora & Rojas* 823, INB); P (*Maas et al.* 9522, PMA). 0-400 m. (Endémica.)

5. *Unonopsis longipes* Maas & Westra, *Blumea* 52(3): 491 (2007). Holotipo: Colombia, *Warner 301* (MO!). Illustr.: Maas, Westra & Vermeer, *Blumea* 52(3): 492, t. 22 (2007).

Tree 2-10 m. Stems densely covered with appressed and erect, persistent, hairs. Leaves 20-30 × 7.5-12 cm, narrowly elliptic to narrowly obovate, symmetrical or rarely slightly asymmetrical, chartaceous, sparsely to rather densely verruculose, glabrous above except primary vein densely covered with appressed hairs, rather densely covered with erect and appressed hairs below; secondary veins 12-14 per side, slightly impressed above; base obtuse to cordate; apex acuminate, the acumen 5-30 mm. Petioles 3-5 mm, 2-3 mm diameter. Inflorescences among leaves, sometimes seeming terminal due to abortion of stem apex, or on older stems, composed of 1-2 rhipidia, each 1-2-flowered; pedicels 15-30 mm, 1-2 mm diameter, densely covered with appressed and erect hairs,

elongating to 50 mm in fruit, upper bract at 1/6 to 1/3 from base of pedicel, 2-3 mm, broadly ovate, outer surface densely covered with appressed and erect hairs. Sepals 1.5-2 × 3 mm, free, shallowly ovate-triangular, outer surface densely covered with appressed and erect hairs. Petal whorls subequal, cream to yellow in vivo; outer petals 8-10 × 7-8 mm, broadly ovate, slightly concave, densely covered with appressed and erect hairs outside; inner petals 6-7 × 5-6 mm, broadly ovate, strongly concave, glabrous outside except the densely hairy exposed narrowly triangular medial keel. Stamens 1.5-2 mm. Carpels 5-10; ovule 3. Monocarps 5-10, 15-17 × 12-15 mm, ellipsoid to subglobose, sparsely covered with appressed and erect hairs, green to blue-green in vivo; stipes 6-12 mm, 1-2 mm in diameter Seeds 11-13 × 8-11 × 5-6 mm. *Selvas altas perennifolias*. P (*Galdames et al. 1538*, MO). 50-1070 m. (Mesoamérica, Colombia.)

6. *Unonopsis macrocarpa* Maas & van Setten, *Proc. Kon. Ned. Akad. Wetensch.*, C 91(3): 265 (1988). Holotipo: Panamá, *Folsom 4324* (MO!). Illustr.: Maas & van Setten, *Proc. Kon. Ned. Akad. Wetensch.*, C 91(3): 265, t. 23 (1988).

Trees 5-12 m. Stems sparsely sericeous, soon glabrescent. Leaves 29-42 × 12-19 cm, narrowly elliptic to elliptic, chartaceous, glabrous above and below, densely verruculose; primary vein raised above and below; secondary venation weakly brochidodromous, the secondary veins 18-20 per side; base acute to obtuse, slightly asymmetrical; apex acuminate, acumen 5-10 mm. Petioles 5-9 mm, 4-5 mm in diameter, glabrous. Inflorescences on older stems, incompletely known, rhipidia 1-2-flowered; peduncles 2 mm; pedicels 15-25 mm, 1.5-2 mm in diameter, elongating to 20-35 mm, 3.5-4.5 mm in diameter in fruit, upper bract at 1/3 to 1/2 from base of pedicel, 1/5-2 mm, shallowly triangular-ovate, densely covered with appressed hairs outside. Sepals 1.5-2 × 3-4.5 mm, shallowly ovate-triangular, connate, rather densely covered with appressed hairs outside. Petal whorls subequal; outer petals 6-8 × 6 mm, broadly ovate, slightly concave, sparsely covered with appressed hairs outside; inner petals 5-6 × 4-6 mm, 1.5 mm thick at apex, very broadly ovate, strongly concave, glabrous except for hairy exposed medial keel. Stamens 1-1.5 mm. Carpels c. 10; ovaries 2 mm, densely covered with appressed hairs; ovule 1. Monocarps 2-9, 24-30 × 32-35 mm, transversely broadly ellipsoid, glabrous, deeply rugose shrivelled when dry; stipes 6-14 mm, 4-5 mm in diameter Seeds 25-27 ×

20-24 × 15-16 mm, light brown. *Selvas altas perennifolias*. P (Kirkbride & Duke 1222, MO). 1200 m. (Endémica.)

7. *Unonopsis megalosperma* Maas & Westra, *Blumea* 52(3): 498 (2007). Holotipo: Panama, *Maas et al.* 2789 (U!). Illustr.: Maas, Westra & Vermeer, *Blumea* 52(3): 499, t. 24 (2007).

Tree 4-8 m. Stems sparsely covered with appressed hairs, soon glabrescent. Leaves 10-15 × 4-6 cm, elliptic, symmetrical to slightly asymmetrical, chartaceous, sparsely to not verruculose, sparsely covered with appressed, long hairs to glabrous above, sparsely covered with appressed long hairs below, particularly along the primary vein, to glabrous below; secondary veins 7-9 per side, slightly raised to impressed above; base obtuse to sometimes acute; apex acuminate, the acumen 5-15 mm. Petioles 4-6 mm, 2 mm diameter Inflorescences on older stems, composed of 1-3 rhipidia, each 1-(or 2-) flowered; pedicels 10-15 mm, 1 mm diameter, rather densely covered with appressed hairs, upper bract at base of pedicel, c. 1.5 mm long, broadly ovate-triangular, densely covered with appressed hairs outside. Sepals 1-1.5 × 1.5-2 mm, basally connate, shallowly ovate-triangular, rather densely covered with appressed hairs outside. Petal whorls subequal, white or green with yellow inner side in vivo; outer petals 4-7 × 4-8 mm, broadly ovate, slightly concave, rather densely covered with appressed hairs outside; inner petals 3-6 × 3-5 mm, broadly ovate, strongly concave, glabrous except densely hairy exposed keel. Stamens c. 1.5 mm. Carpels 5-10, ovary 1.5 mm, densely covered with appressed, white hairs; ovules 3. Monocarps 2, 33 × 30 mm, very broadly ellipsoid, initially rather densely covered with appressed hairs, glabrescent, surface rugulose, wall 0.3-0.5 mm thick; stipes 5 mm × 3 mm in diameter Seeds 20-24 × 20-22 × 10-12 mm, dark brown. *Selvas altas perennifolias*. P (*Folsom et al.* 5680, MO). 600-850 m. (Endémica.)

8. *Unonopsis osae* Maas & Westra, *Blumea* 52(3): 506 (2007). Holotipo: Costa Rica, *Allen* 5839 (F!). Illustr.: Maas, Westra & Vermeer, *Blumea* 52(3): 507, t. 28 (2007).

Tree or shrub 3-10 m. Stems glabrous. Leaves 15-36 × 3-9 cm, narrowly oblong-elliptic, slightly falcate, chartaceous, sparsely or not verruculose, glabrous above and

below; secondary veins 12-15 per side; base acute; apex acuminate, the acumen 5-10 mm. Petioles 5-10 mm, 1-3 mm diameter. Inflorescences cauliflorous on the main trunk or on older stems, composed of 1(-3) rhipidia, each 1-2(-5)-flowered, sympodial rachis to 3 mm; pedicels 25-40 mm, 0.5-1 mm in diameter, sparsely covered with appressed hairs, upper bract at 1/5 to 1/4 from base of pedicel, c. 1mm long, broadly to shallowly ovate-triangular, sparsely covered with appressed hairs outside. Sepals 1-1.5 × 1-3 mm, basally connate, shallowly ovate-triangular, sparsely to rather densely covered with appressed hairs outside. Petal whorls subequal, white with green base in vivo; outer petals 6-8 × 6-7 mm, broadly ovate, concave, densely covered with appressed hairs outside; inner petals 5-7 × 4-7 mm, broadly ovate, concave, glabrous except densely hairy exposed keel. Stamens 1.5-2 mm. Carpels 10-20, ovary 2-3 mm, densely covered with appressed near apex; ovules 2. Monocarps 5-20, 10-22 mm in diameter, globose to ellipsoid, glaucous, orange to red to deep purple in vivo; stipes 10-20 mm, 1 mm in diameter. Seeds 11-13 × 9-11 × 3-6 mm. *Selvas altas perennifolias*. CR (*G. Herrera et al.* 4486, MO). 0-540 m. (Endémica.)

9. *Unonopsis pacifica* R.E. Fr., *Ark Bot. n.s.* 1: 340 (1950). Holotipo: Colombia, *Cuatrecasas 15973* (F). Illustr.: Fries, *Ark Bot. n.s.* 1: xxx, t. 5 (1950).

Trees 6-28 m. Stems rather densely covered with erect hairs, soon glabrescent. Leaves 18-40 × 7-14 cm, narrowly ovate to narrowly obovate, chartaceous, rather densely to densely verruculose, glabrous above or sometimes with hairs along the primary and secondary veins, sparsely covered with appressed hairs to glabrous below; primary vein prominently raised above and below; secondary veins 15-18 per side, impressed above, raised below; base obtuse to slightly cordate; apex acute to abruptly acuminate, the acumen 1-10 mm. Petioles 5-10 mm, 2-3 mm in diameter, rather densely puberulous. Inflorescences on older stems, composed of 2-7 rhipidia, each 2-3(-10)-flowered; peduncles 2-3 mm; sympodial rachis 10-35 mm; pedicels 10-25 mm, c. 1 mm in diameter, elongating to 20-45 mm, 2-4 mm in diameter in fruit, subglabrous, upper bract at 1/4-1/2 from base of pedicel, 1-2 mm long, ovate-triangular to broadly so, densely covered with appressed and erect hairs outside. Sepals 1-2 mm, nearly completely connate, forming a cup-shaped, barely lobed structure, 4-6 mm in diameter, densely

covered with appressed hairs outside. Petal whorls subequal, yellow to white in vivo; outer petals 7-10 × 6-7 mm, ovate-triangular to broadly so, slightly concave, densely covered with appressed hairs outside; inner petals 5-6 × 4-5 mm, ovate, strongly concave, glabrous outside except sparsely puberulous on narrowly triangular exposed keel. Stamens 1-1.5 mm. Carpels 10-15; ovaries 3.5-4 mm; ovule 1. Monocarps 5-12, 12-22 mm in diameter, globose, glabrous; stipes 8-15 mm, 1-2 mm in diameter *Selvas altas perennifolias*. P (Hammel et al. 16230, MO). 0-850 m. (Mesoamérica, Colombia, Ecuador.)

10. *Unonopsis panamensis* R.E. Fr., *Ann. Missouri Bot. Gard.* 42: 151 (1955).

Holotipo: Panamá, Allen 2647 (MO!). Illustr.: Fries, *Ann. Missouri Bot. Gard.* 49: 190, t. 157 (1962).

Shrub or tree 4-10 m. Stems sparsely covered with erect, white, minute hairs and sometimes with a few appressed hairs, soon glabrescent. Leaves 14-40 × 4-10 cm, narrowly oblong-elliptic, chartaceous, densely verruculose, glabrous above, sparsely covered with scattered appressed hairs to glabrous below; primary vein prominently raised above and below, secondary veins 14-21 per side, prominently raised above and below; base acute to obtuse; apex acuminate to cuspidate, the acumen 5-20 mm. Petioles 5-10 mm, 2-3 mm in diameter Inflorescences on older stems, 1(-2)-flowered; pedicels c. 10 mm, 1 mm in diameter, elongating to 20 mm, 2-4 mm in diameter in fruit, densely covered with appressed, brown hairs, glabrescent, upper bract at c. 1/4 from base of pedicel, c. 1mm long, broadly ovate-triangular, densely covered with appressed, brown hairs outside. Sepals 1.5-2 × 2-2.5 mm, shallowly triangular, basally connate, densely covered with appressed hairs outside. Petal whorls subequal, white in vivo; outer petals 6-9 × 6-12 mm, broadly to depressed ovate, slightly concave, rather densely covered with appressed hairs outside; inner petals 4-7 × 4-6 mm, broadly ovate, strongly concave, glabrous outside except sparsely puberulous on narrowly triangular exposed keel. Stamens 1-1.5 mm. Carpels 50-75; ovaries 1-1.5 mm, densely covered with appressed hairs; ovules 3 or 4. Monocarps 10-50, 10-20 × 10-15 mm, globose to ellipsoid, glabrous; stipes 10-20 mm, 1-15 mm in diameter Seeds 10-12 × 9-10 × 57 mm, dark brown. *Selvas altas perennifolias*. P (de Nevers 5964, MO). 0-900 m. (Endémica.)

11. *Unonopsis penduliflora* G.E. Schatz & Maas, *Blumea* 52(3): 511 (2007).

Holotipo: Costa Rica, *Hammel 12099* (CR!). Illustr.: Maas, Westra & Vermeer, *Blumea* 52(3): 512, t. 29 (2007).

Trees 2-6 m. Stems sparsely to rather densely covered with erect, curly, short hairs and some appressed long hairs, soon glabrescent. Leaves 25-50 × 7-16 cm, narrowly elliptic to narrowly obovate, chartaceous, somewhat bullate in vivo, densely verruculose, sparsely covered with erect, curly hairs along the primary and secondary veins to glabrous above, sparsely covered with appressed hairs along primary, secondary, and tertiary veins to glabrous below; primary vein prominently raised above and below, secondary veins 12-17 per side; base cuneate to acute; apex acuminate, acumen 15-25 mm. Petioles 7-15 mm, 3-4 mm in diameter, canaliculate and conspicuously swollen, sparsely covered with appressed hairs, drying black. Inflorescences borne on older stems, occasionally from the main trunk, a solitary flower, pendulous; peduncles 5 mm; pedicels 50-115 mm, c. 1 mm in diameter, to 3 mm in diameter in fruit, sparsely covered with appressed hairs to glabrous, upper bract at 1/10 to 1/6 from the base of the pedicel, 1.2 mm long, broadly to shallowly ovate-triangular, rather densely to sparsely covered with appressed hairs outside. Sepals 1.5-2.5-1.5 × 4 mm, deltate, basally connate, rather densely covered with appressed, brown hairs outside. Petal whorls subequal, cream-white in vivo: outer petals 13-24 × 9-16 mm, 3 mm thick, ovate-triangular, flat to slightly concave, sparsely covered with appressed hairs outside; inner petals 10-11 × 9-10 mm, broadly ovate-triangular, strongly concave, glabrous except the hairy exposed triangular medial keel. Stamens 1.5-2 mm. Carpels 40-100, ovaries 1.5-2 mm, densely covered with appressed golden brown hairs; ovule 1, lateral near the base. Monocarps 2-30, 13-25 mm in diameter, subglobose, initially sparsely covered with appressed hairs, glabrescent, red at maturity; stipes 12-17 mm, 1 mm in diameter. Seed 12-15 × 11-12 × 8-10 mm, pale to dark brown. *Selvas altas perennifolias*. CR (*Grayum et al.* 6938, MO). 70-1200 m. (Endémica.)

12. *Unonopsis pittieri* Saff., *J. Wash. Acad. Sci.* 15(5): 102. (1925). Holotipo:

Panamá, *Pittier 3871* (US!). Illustr.:

Unonopsis schippii R. E. Fr.

Tree 5-25 m. Stems sparsely to rather densely covered with appressed hairs, glabrescent. Leaves 12-45 × 4-16(-22) cm, narrowly elliptic to narrowly obovate, symmetrical to sometimes slightly asymmetrical, chartaceous, rather densely verruculose or not, glabrous or sparsely to densely covered with appressed and erect hairs along the primary and secondary veins above and below; primary vein impressed to slightly raised above, secondary veins 10-16 per side; base acute to obtuse; apex acuminate, acumen 5-20 mm. Petioles 4-15 mm, 1-4(-8) mm diameter. Inflorescences borne on older stems, often panicle-like, composed of 2-10 rhipidia, each 2-3(-10)-flowered, peduncle 0-10 mm, sympodial rachis 15-35 mm; pedicels 3-15 mm, 1-15 mm in diameter, elongating to 7-45 mm, 2-6 mm in diameter in fruit, sparsely to densely covered with appressed and erect brown hairs, upper bract at 1/5-2/5 from base of pedicel, 1-2 mm, depressed ovate-triangular, sparsely to densely covered with appressed hairs outside. Sepals 1-2.5 × 1.5-4 mm, shallowly ovate-triangular, basally connate, sparsely to densely covered with appressed hairs outside. Petal whorls subequal, cream to yellow in vivo; outer petals (4-6)-9 × 4-8 mm, ovate, flat to slightly concave, densely covered with appressed hairs outside; inner petals 4-7 × 3-6 mm, broadly ovate, strongly concave, glabrous outside except exposed densely hairy medial keel. Stamens 1-2 mm. Carpels 10-25, ovaries 1-2 mm, sparsely to densely covered with appressed hairs; ovule 1, lateral. Monocarps 1-15, 11-20(-25) in diameter, subglobose, initially sparsely covered with appressed hairs, glabrescent, dark red to purple with bluish bloom at maturity; stipes 5-20 mm, 1-3 mm in diameter. Seed 10-20 × 9-18 × 5-14 mm, brown. *Selvas altas perennifolias*. P (Croat 22841, MO). 0-800 m. (Endémica, or possibly in Colombia.)

13. *Unonopsis stevensii* G.E. Schatz, *Novon* 8: 439 (1998). Holotipo: Costa Rica, *Stevens et al.* 24716 (MO!). Illustr.: Schatz, *Novon* 8: 439, t. 3 (1998).

Slender tree 2-12 m. Stems glaucous, glabrous. Leaves 12.0-25.0 × 2.0-6.3 cm, narrowly oblong-elliptic to oblanceolate, slightly falcate, chartaceous, not or sparsely verruculose along primary vein, glabrous above and below; primary vein raised above and below, secondary veins 13-18 per side; base cordate to obtuse, somewhat asymmetrical; apex long acuminate to caudate, acumen 10-20 mm. Petioles 2-4 mm, 1-2

mm in diameter, stout, initially glaucous. Inflorescences axillary among leaves or cauliflorous, composed of 1-4 rhipidia, each 1-2(-6)-flowered; sympodial rachis to 5 mm; pedicels 7-12 mm, c. 1 mm in diameter, elongating to 18 mm in fruit, rather densely covered with appressed brown hairs, upper bract at 1/4-1/3 from base of pedicel, < 1 mm, ovate-triangular, rather densely covered with appressed brown hairs outside. Sepals 1-2 × 1-2 mm, deltate, basally connate, densely covered with appressed brown hairs outside. Petal whorls subequal, yellow in vivo: outer petals 3-5 × 3-4 mm, broadly ovate, slightly concave, densely covered with appressed brown hairs outside; inner petals 3-5 × 2-4 mm, broadly ovate to ovate, strongly concave, glabrous outside except hairy along exposed triangular medial keel. Stamens 1.0-1.1 mm. Carpels 3-8, ovaries 1-1.5 mm, densely covered with appressed brown hairs; ovules 1 or 2. Monocarps 5-8, 12-18 mm in diameter, subglobose, orange-red, glaucous; stipes 9-14 mm, 1 mm in diameter. Seeds 10-12 × 7-9 × 4-6 mm, pale brown. *Selvas altas perennifolias*. CR (Grayum 9822, MO). 0-170 m. (Endémica.)

14. *Unonopsis storkii* Standl. & L. O. Williams, *Fieldiana, Bot.* 29(10): 546 (1963).

Holotipo: Costa Rica, *Stork 4608* (UC). Illustr.:

Tree or shrub 3-15 m. Stems densely covered with erect, curly, brown, glabrescent. Leaves 15-47 × 4-19(-22) cm, narrowly elliptic to narrowly obovate, chartaceous, densely verruculose, glabrous except sparsely covered with erect hairs, curly, hairs along primary vein above, sparsely covered with appressed and erect hairs to glabrous below; primary vein impressed above, secondary veins 17-20 per side; base cordate to obtuse; apex acuminate, acumen 10-25 mm. Petioles 5-10 mm, 3-5 mm diameter. Inflorescences borne among leaves or on older stems, composed of 1-3 rhipidia, each 1-3(-5)-flowered, peduncle 0-8 mm, sympodial rachis to 3 mm; pedicels 10-20 mm, c. 1 mm in diameter, elongating to 30-50 mm, 4 mm in diameter in fruit, densely covered with appressed brown hairs, upper bract at 1/4 from base of pedicel, 2-3 mm, broadly ovate-triangular, densely covered with appressed brown hairs outside. Sepals 1.5-3 × 2-5 mm, shallowly ovate-triangular, basally connate, densely covered with appressed brown hairs outside. Petal whorls subequal, cream to white in vivo: outer petals 7-12 × 7-11 mm, broadly ovate-triangular, slightly concave, densely covered with appressed brown hairs

outside,; inner petals 6-8 × 5-8 mm, broadly ovate, strongly concave, glabrous except densely hairy along exposed medial keel. Stamens 1.5-2 mm. Carpels 40-50, ovaries 1-1.5 mm, densely covered with appressed hairs; ovule 3-6, lateral. Monocarps 10-25, 10-23 × 10-16 mm, ellipsoid to subglobose, initially rather densely covered with appressed hairs, glabrescent, red at maturity; stipes 5-20 mm, 1-2 mm in diameter Seeds 9-11 × 9-11 × 2-5 mm, brown. *Selvas altas perennifolias*. P (Croat 22841, MO). 0-500 m. (Endémica.)

15. *Unonopsis theobromifolia* Zamora & Poveda, *Phytologia* 64(5): 399 (1988).

Holotipo: Costa Rica, *Zamora et al.* 1327 (CR). Illustr.:

Tree or shrub 2-15 m. Stems rather densely covered with erect brown hairs, glabrescent. Leaves 18-45 × 6-14 cm, narrowly elliptic to slightly narrowly obovate, chartaceous, somewhat bullate, densely verruculose, glabrous except rather densely covered with erect hairs along primary vein above, densely covered with erect hairs below; primary vein raised above and below, secondary veins 12-18 per side, impressed above; base cordate to obtuse; apex acuminate to cuspidate, acumen to 5-40 mm. Petioles 5-10 mm, 2-3 mm in diameter Inflorescences axillary among leaves or on older branches, composed of 1-2 rhipidia, each 1-2(-8)-flowered, sympodial rachis to 3 mm; pedicels 3-5 mm, 1 mm in diameter, elongating to 10 mm, 3 mm in diameter in fruit, densely covered with appressed and erect brown hairs, upper bract t 1/4-1/3 from base of pedicel, 2-4 mm, broadly ovate-triangular, densely covered with appressed brown hairs outside. Sepals 3-4 × 3-4 mm, shallowly triangular, basally connate, densely covered with appressed brown hairs outside. Petals whorls unequal, cream to white in vivo: outer petals 6-8 × 5-7 mm, broadly ovate, flat to slightly concave, densely covered with appressed hairs outside; inner petals 4-6 × 4-5 mm, 1 mm thick, broadly ovate, concave, glabrous except densely hairy along exposed narrowly triangular medial keel. Stamens 1-1.5 mm. Carpels 7-11, ovaries 1-2 mm, densely covered with appressed hairs; ovules 2-5, lateral. Monocarps 5-9, 12-28 × 12-18 mm, ellipsoid to subglobose, initially densely covered with appressed and erect hairs, glabrescent, red at maturity in vivo; stipes 2-4 mm, 2-4 mm in diameter Seeds 10-12 × 8-10 × 4-6 mm, brown. *Selvas altas perennifolias*. CR (*Herrera 4459*, MO). 0-700 m. (Endémica.)

18. Xylopia L.

To be added.