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# FLORA OF GUATEMALA

PAUL C. STANDLEY

AND

JULIAN A. STEYERMARK

FIELDIANA: BOTANY

VOLUME 24, PART VI

*Published by*

CHICAGO NATURAL HISTORY MUSEUM

DECEMBER 27, 1949









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PART VI



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PAUL C. STANDLEY

*Curator of the Herbarium*

AND

JULIAN A. STEYERMARK

*Associate Curator of the Herbarium*

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## CONTENTS

### Families Included in Part VI

	PAGE		PAGE
Trigoniaceae.....	1	Staphyleaceae.....	223
Vochysiaceae.....	2	Icacinaceae.....	225
Polygalaceae.....	5	Aceraceae.....	229
Dichapetalaceae.....	22	Hippocastanaceae.....	233
Euphorbiaceae.....	25	Sapindaceae.....	234
Callitrichaceae.....	171	Sabiaceae.....	273
Buxaceae.....	172	Impatiaceae.....	275
Coriariaceae.....	174	Rhamnaceae.....	277
Julianiaceae.....	175	Vitaceae.....	293
Anacardiaceae.....	177	Tiliaceae.....	302
Cyrillaceae.....	195	Malvaceae.....	324
Aquifoliaceae.....	196	Bombacaceae.....	386
Celastraceae.....	201	Sterculiaceae.....	403
Hippocrateaceae.....	218	Saurauiaceae.....	428





## TRIGONIACEAE

*Reference:* Paul C. Standley, Trigoniaceae, N. Amer. Fl. 25: 297–298. 1924.

Trees or shrubs, sometimes scandent; leaves opposite or alternate, simple, entire, penninerved; stipules usually present, large, interpetiolar, sometimes connate; flowers perfect, small, irregular, 2-bracteolate, racemose or paniculate; sepals 5, free or connate at the base, subequal, imbricate, deciduous; petals 3 or 5, white or pink, free, subperigynous, alternate with the sepals, unequal and somewhat papilionaceous, contorted in bud; stamens 5–12, with 2–6 of the fertile ones united, the tube cleft on one side; filaments filiform, the anthers 4-celled, oval, opening by longitudinal introrse slits; disk sometimes present; ovary free, 3-celled; style terminal, simple, the stigma capitate or obliquely truncate; ovules 2 or more in each cell, 2-seriate, attached to a central placenta, anatropous; fruit capsular, 3-celled, septically 3-valvate, the valves separating from the central column and themselves often separating into endocarp and epicarp; seeds 2 or more in each cell, the testa thin, covered with long wool; endosperm carnose, the embryo straight, the cotyledons plane, the radicle short.

Three genera, one in the Malay Peninsula, the others in tropical America. Only one is represented in North America.

### TRIGONIA Aublet

Usually woody vines; leaves opposite, short-petiolate, generally white-tomentose beneath; stipules simple or bifid at the apex, deciduous; flowers small, in terminal panicles or compound racemes; sepals connate at the base, unequal, the 2 inner ones larger; petals very unequal, the posterior one largest, calcarate or saccate, pilose in the throat of the spur, the blade reflexed, the 2 anterior ones ascending, narrow, barbate above the base, the other 2 petals smaller, approximate, keel-like; stamens 10 but usually only 6 of them fertile; 2–4 hypogynous glands or a crenate crest present opposite the posterior petal; ovary attenuate to the style, hirsute, the stigma obliquely truncate; ovules several or numerous; capsule trigonous, usually pubescent outside and often also within; seeds several in each cell, compressed-globose.

About 30 species, in tropical America. Two other Central American ones have been described from Nicaragua and Panama.

Leaves mostly 4.5–8.5 cm. long, in age glabrous beneath or nearly so, with about 5 pairs of lateral nerves; capsule 2 cm. long or shorter; petioles 5 mm. long or shorter.....*T. rasa*.  
Leaves mostly 9–14 cm. long, usually abundantly pilose beneath even in age, with about 7 pairs of lateral nerves; capsule usually 2.5 cm. long; petioles mostly 7–13 mm. long.....*T. floribunda*.

**Trigonia floribunda** Oerst. Vid. Medd. 38. 1856.

Moist or dry thickets on plains and foothills, chiefly on the Pacific slope, 850 meters or less; Zacapa; Chiquimula; Jutiapa; Santa Rosa; Suchitépéquez; Retalhuleu. Chiapas; Honduras and Salvador to Panama.

A small or large, woody vine, the slender branches densely floccose-tomentose at first, soon glabrate; petioles 5–20 mm. long, mostly about 10 mm.; leaf blades elliptic-oblong to lance-oblong or obovate-oblong, 1.5–6 cm. wide, usually acute, obtuse or acute at the base, floccose-tomentose above when young but soon glabrate and green, covered beneath at first with a very dense, white tomentum, in age green but usually pilose, the lateral nerves 7–9 pairs; inflorescence thyrsoid-paniculate, much exceeding the leaves, 10–25 cm. long, the pedicels 1–2 mm. long; sepals lance-oblong, acute, 3–4 mm. long, tomentose outside; petals white, 3–4 mm. long, the spur globose, 2 mm. long; perfect stamens 6, glabrous, shorter than the petals; capsule obtusely trigonous, 2–3 cm. long, glabrate; seeds 6–9 in each cell, covered with long, whitish or fulvous, silky hairs.

This is probably the plant reported from Guatemala by Hemsley as *T. guianensis* Aubl., on the basis of a collection made by Bernoulli and Cario. In *T. floribunda* the young leaves almost always are covered on the lower surface with a very dense, white tomentum, but on adult leaves scarcely a trace of the tomentum is to be seen.

**Trigonia rasa** Standl. & Steyerm. Field Mus. Bot. 23: 59. 1944.

Dry or moist, brushy plains or hillsides, 300 meters or somewhat higher; Santa Rosa (type collected at Río Panal, lower slopes of Volcán de Tecuamburro, along road between Cuilapa and Chiquimulilla, *Standley* 78584); Retalhuleu (west of Retalhuleu); endemic.

A woody vine with elongate branched stems, the young ones hirtellous or puberulent; leaves subchartaceous, on petioles 2–5 mm. long, elliptic-oblong to oblong-ovate or ovate, mostly 4.5–8.5 cm. long and 2–3.5 cm. wide, narrowly long-acuminate, obtuse at the base, glabrous above or puberulent only on the costa, almost glabrous beneath in age, with a few scattered straight hairs on the costa and nerves, the lateral nerves about 5 pairs; inflorescences apparently small and 6 cm. long or less, the fruiting pedicels 7 mm. long or shorter; capsule oblong-ovoid, 1.5–2 cm. long, 1 cm. broad, sparsely pilose, densely covered with prominent pale lenticels.

## VOCHYSIACEAE

*References:* Paul C. Standley, *Vochyaceae*, N. Amer. Fl. 25: 301–303. 1924; F. A. Stafleu, *A Monograph of the Vochysiaceae*, Rec. Trav. Bot. Neer. 41: 398–540. 1948.

Trees or shrubs, often with resinous sap, the branchlets terete or angulate; leaves opposite or verticillate, simple, entire, penninerved; stipules small, some-

times reduced to glands or absent; flowers perfect, irregular, large or small, bi-bracteolate, in racemes, panicles, or thyrses; sepals 5, connate at the base, imbricate, subequal or very unequal, deciduous, one of them often calcarate or saccate; petals yellow, white, bluish, or purplish, free, perigynous or epigynous, rarely 5, subequal, and imbricate in bud, usually fewer than the sepals (0-3) and contorted or imbricate in bud; stamens inserted with the petals, typically 10 but only 1 of them fertile; filaments cylindric or filiform, the anthers linear to oval, 4-celled, dehiscent by 2 longitudinal introrse slits; ovary free or rarely inferior, 1-3-celled; style simple, terminal, the stigmas depressed-capitate, somewhat 3-lobate; ovules 2 or more in each cell, anatropous, attached to a central placenta; fruit usually capsular, loculicidally 3-valvate; seeds commonly winged, often pilose or lanate; endosperm none; embryo straight, the cotyledons thin, convolute, the radicle short, superior.

Five genera, all except the following confined to South America.

### VOCHYSIA Jussieu

Trees or shrubs; leaves opposite or verticillate, coriaceous, the stipules small or none; inflorescence terminal, thyrsoïd, composed of racemously arranged, 2-10-flowered, scorpioid, pedunculate cymes; sepals unequal, the posterior one large and usually produced into a spur; petals 3, rarely 1 or none, inserted in the throat of the calyx, linear or spatulate, the anterior one commonly largest; fertile stamen 1, the filament subulate or filiform, the anther basifixed, elongate, surpassed by the connective, this cucullate at the apex; staminodia 2 or none; ovary free, 3-celled, attenuate to a filiform style; capsule coriaceous or ligneous, 3-angulate, 3-celled; seeds 1 in each cell, oblong, compressed, winged.

About 55 species, all except 4 in South America. One species is known in Central America from Costa Rica and Panama, and another occurs in Tabasco. The genus was first published by Aublet under the name *Vochya*. By Jussieu the name was published as *Vochisia*, but most authors have used the form *Vochysia* adopted here.

Leaves acuminate or long-acuminate, broadest at or below the middle.

*V. guatemalensis*.

Leaves obtuse or rounded at the apex, usually broadest above the middle.

*V. hondurensis*.

***Vochysia guatemalensis*** Donn. Smith, Bot. Gaz. 12: 131. *pl.* 23. 1887. *Vochya guatemalensis* Standl. N. Amer. Fl. 25: 302. 1924. *Ruanchap* (Quechí).

Moist or wet forest, 350-1,500 meters; Alta Verapaz (type from Pansamalá, *Tuerckheim* 943); Huehuetenango. Honduras; Mexico.

A large tree, often 15 meters high or more, with pale bark, the branchlets glabrous; stipules subulate, 3 mm. long; leaves 3-4-verticillate or the uppermost opposite, on petioles 2-3 cm. long, oblong-lanceolate, 9-15 cm. long, 2.5-5.5 cm. wide, rather abruptly acuminate or long-acuminate, acute or acuminate at the

base, coriaceous, glabrous; flowers bright yellow, the thyrses terminal and axillary, forming large leafy panicles 10–18 cm. long, the rachis sparsely puberulent, the cymes 3–4-flowered; blade of the posterior sepal 15–20 mm. long, the spur half as long; petals oblong-obovate, the intermediate one half as long as the calyx and 4 mm. wide, the others slightly shorter and much narrower; anther glabrous, 10 mm. long.

What was presumed to be this species was noted as in flower in April along river banks near San Pedro Carchá, where the branches were not accessible.

**Vochysia hondurensis** Sprague, Kew Bull. 183. 1922. *Vochysia hondurensis* Standl. N. Amer. Fl. 25: 303. 1924. *San Juan*; *Sanpedrano*; *Palo bayo* (Petén); *Sayuc* (Petén, Maya); *Robanchab* (Alta Verapaz).

Moist or wet forest, at or little above sea level; Petén; Izabal; Alta Verapaz. Oaxaca to British Honduras; Honduras; Nicaragua; Costa Rica.

A tree 15–25 meters tall, the crown dense, rounded or depressed, the trunk tall and slender, much exceeding the crown, the bark smooth and grayish; branchlets glabrous; leaves 3–4-verticillate, on slender petioles 1–2.5 cm. long, oblong or oblanceolate-oblong, 8–15 cm. long, 2.5–5 cm. wide, rounded or obtuse at the apex and usually emarginate, acute or acuminate at the base, coriaceous, glabrous; flowers bright yellow, the thyrses terminal and axillary, 6–20 cm. long; blade of the posterior sepal 15 mm. long, the spur half as long; petals obovate, about 5 mm. long, ciliolate; anther glabrous, 6–10 mm. long; capsule narrowly oblong, deeply 3-sulcate, somewhat verrucose, acutely angulate, about 4.5 cm. long and 1.5 cm. broad.

Known in British Honduras by the names “white mahogany,” “yemeri,” “emeri,” and “emery”; called “corpus” and “corpo” in Oaxaca; known in Nicaragua as “barba chele.” The tree is a conspicuous and strikingly handsome one when covered with its brilliant yellow flowers. It is abundant in many places on the hills of the Quiriguá region, as well as elsewhere in Izabal, where it often stands high above the surrounding trees. It is common about Puerto Barrios. The wood is reddish brown or pale brown with a pinkish hue and a golden sub-luster, although the surface may appear dull and mealy; light in weight, fairly tough, coarse-textured, inclined to be gritty and hard on tools when dry, holds its place well when manufactured; fairly resistant to decay and insects. The wood has been exported in small amounts from British Honduras to the United States for use as veneers. In the Lake Izabal region it is used in making canoes. In Oaxaca the tree is reported to attain a height of 27 meters or more and a trunk diameter of 60–100 cm.

The wood is used there for railroad ties. It is questionable whether this species can be maintained as distinct from *V. guatemalensis*, to which it is very closely related, and separable by characters that appear to have slight importance, if any at all.

Stafleu (loc. cit., p. 466) has recently described a var. *parvifolia* from British Honduras (El Cayo district, *Gentle* 2479), characterized by having smaller 3-verticillate leaves and smaller apiculate flower buds.

**POLYGALACEAE**

*Reference:* S. F. Blake, Polygalaceae, N. Amer. Fl. 25: 305-379. 1924.

Herbs, shrubs, or trees, sometimes woody vines, often with glands in the tissues of the leaves and also in the flowers and fruits; leaves alternate, opposite, or verticillate, simple, entire, short-petiolate, without stipules but sometimes with small stipular glands; flowers small or medium-sized, perfect, zygomorphic, generally racemose or spicate, each subtended by a bract and 2 bractlets; sepals 5, free, or the lower 2 united, one posterior, 2 anterior, 2 lateral and interior, the last (wings) usually much larger and petaloid; petals 3, rarely 5, hypogynous, the anterior one (keel) boat-shaped, often with a terminal beak or fimbriate crest; stamens usually 8, rarely 3-7, the filaments united for most of their length into a sheath, this split on the upper side, usually united at the base to the keel or upper petals or both; anthers mostly confluent 1-celled, dehiscent by a sub-terminal pore; intrastaminal disk present or reduced to a gland at the base of the ovary, or wanting; gynoecium of 1-2, rarely 3-5, united carpels, the style 1, the stigma 2-lobate, often penicillate; ovules solitary, rarely 2-6, pendulous; fruit a capsule, drupe, or samara, loculicidally dehiscent or indehiscent; seeds usually solitary in each cell, generally pubescent, arillate, and with endosperm; embryo straight, axial.

Ten genera with numerous species, widely distributed in tropical and temperate regions. Only the following are represented in North America.

- Ovary and fruit 2-celled; fruit a compressed capsule.
  - Lower petals united with the keel; capsule usually broader than oblong; herbs or shrubs; leaves alternate or verticillate.....*Polygala*.
  - Lower petals free from the keel; capsule narrowly cuneate-oblong; usually woody vines, sometimes erect shrubs; leaves alternate.....*Bredemeyera*.
- Ovary and fruit 1-celled; fruit indehiscent, drupaceous or samaroid.
  - Keel petal with a plicate crest; fruit a samara, with a large broad wing on the lower side; woody vines.....*Securidaca*.
  - Keel petal not cristate; fruit drupaceous, not or very obscurely winged (in Central American species); erect shrubs or herbs.....*Monnina*.

**BREDEMEYERA Willdenow**

Mostly woody vines, sometimes suberect shrubs; leaves alternate, ovate or oblong, penninerved; flowers small, in terminal panicles; sepals unequal, the 2

inner ones large and petaloid, wing-like, the 2 lateral ones adnate at the base to the stamen tube, erect-connivent; keel petal about as long as the lateral ones, concave-galeate, entire or 3-lobate, ecristate; stamens 8, united below into a sheath; anthers dehiscent by an oblique introrse pore; ovary 2-celled, the style curved, stigmatose and emarginate at the apex; capsule compressed, subcarinose, cuneate-oblong, loculicidally dehiscent on the margins; seeds pendulous, glabrous or pilose, comose at the hilum with very long hairs; endosperm scant.

About 60 species, in tropical America and Australia. Only one reaches North America.

**Bredemeyera lucida** (Benth.) A. Bennett in Mart. Fl. Bras. 13, pt. 3: 51. 1874. *Catocoma lucida* Benth. in Hook. Journ. Bot. 4: 101. 1842.

Moist or wet thickets or open forest, sometimes on open forested slopes or in second growth, 300 meters or less; Petén; Izabal. British Honduras; Honduras; northern South America.

A shrub or a woody vine, when erect usually 2-4 meters high, when scandent as much as 12 meters long, the branches slender, puberulent; leaves short-petiolate, coriaceous, lustrous, elliptic to oblong, mostly 5-9 cm. long, acute or obtuse, with an obtuse tip, obtuse at the base, green and usually glabrous above, somewhat paler beneath, scaberulous or strigillose with lustrous golden hairs or often glabrate, the nerves and veins prominent and reticulate on both surfaces; panicles usually large and many-flowered, often much-branched, leafy, often densely flowered, the flowers greenish yellow, pedicellate, 3 mm. long; sepals broadly ovate or suborbicular, ciliate and pubescent; ovary pilose; fruit cuneate-oblong, 10-15 mm. long, shallowly emarginate, attenuate at the base, glabrous; seeds densely hirsute and comose with very long and slender hairs.

### MONNINA Ruiz & Pavón

Herbs or shrubs, rarely somewhat scandent; leaves alternate, entire, estipulate or with stipular glands; flowers small, usually blue or lilac, in terminal and axillary, sometimes paniculate racemes; sepals 5, deciduous, the 3 outer ones herbaceous, free or the 2 lower ones united, the 2 inner ones (wings) much larger, petaloid; petals 3, the lower one (keel) boat-shaped, not unguiculate, not appendaged, free or nearly so; 2 upper petals usually oblong or liguliform, united below to the staminal sheath; stamens 8 or 6, the filaments united nearly to the apex into a sheath, the anthers confluent 1-celled, opening by a large introrse apical pore; ovary 1-celled, the style sickle-shaped, the stigma lobes dissimilar; ovules solitary, pendulous; disk usually reduced to a gland at the base of the ovary; fruit samaroid, narrowly and almost equally winged, or more often drupaceous, the surface rugose; seed glabrous, not arillate, the testa thin; endosperm thick.

About 85 species, distributed from southwestern United States to Chile and Argentina, most numerous in the Andes of South America. Twelve are known in North America, and 6 besides those listed here are known from other parts of Central America.

Racemes not at all comose, the bracts ovate, acute, 1.2–2.2 mm. long, not exceeding the buds; leaves usually 1–3 cm. wide and broadest above the apex. Pubescence of the stems closely appressed. . . . . *M. xalapensis*.

Racemes more or less comose toward the apex, the bracts mostly lanceolate and acuminate or attenuate, 2.5–7 mm. long, often conspicuously exceeding the buds; leaves mostly 3–6 cm. wide, broadest at or below the middle.

Pubescence of the stems and leaves of short spreading hairs. . . . *M. guatemalensis*.

Pubescence of the stems and leaves of closely appressed hairs. . . . *M. sylvatica*.

***Monnina guatemalensis*** Chodat, Bull. Herb. Boiss. 4: 249. 1896. *Yaxtám* (Huehuetenango).

Moist or wet thickets, 1,000–1,700 meters; Alta Verapaz (type from Cobán, *Tuerckheim* 8377); Baja Verapaz; Quiché; Huehuetenango. Chiapas.

A slender shrub 1.5–2.5 meters high, with few branches, the stems densely short-pilose with spreading hairs; leaves short-petiolate, rather thick when dried and often lustrous, oval or elliptic, 6–11 cm. long, acute or acuminate, cuneate to rounded at the base, pilosulous with short spreading hairs on both surfaces, the lateral nerves 6–8 pairs; peduncles several near the ends of the branches, axillary and extra-axillary, the racemes mostly 5–15 cm. long; bracts lance-ovate, acuminate, 5–7 mm. long, the pedicels 1 mm. long, the flowers violet; sepals 3–3.8 mm. long; wing petals 4.5 mm. long; fruit ovoid, 7.5–8.5 mm. long, coarsely rugose-reticulate, glabrous, narrowly and obscurely marginate, at first red, glossy black at maturity.

***Monnina sylvatica*** Schlecht. & Cham. Linnaea 5: 231. 1830. *Llorón de montaña* (Chiquimula).

Moist or wet thickets or mixed forest, 900–2,400 meters; Baja Verapaz; Chiquimula; Suchitupéquez; Quezaltenango; San Marcos. Southern Mexico; Costa Rica.

An herb or shrub 1–2.5 meters high with few branches, the stems thinly pubescent with short appressed hairs; leaves thin, short-petiolate, mostly elliptic or ovate-elliptic, 7–15 cm. long, 3–6.5 cm. wide, acuminate, cuneate at the base, sparsely strigillose on both surfaces, somewhat paler beneath; peduncles several or numerous, simple or branched, the racemes dense or interrupted, 18 cm. long or shorter, the flowers short-pedicellate, violet or orchid-purple; bracts lance-subulate, 4.5–5 mm. long, soon deciduous; sepals suborbicular-ovate to oval-ovate, 2–2.5 mm. long; wing petals 4–4.5 mm. long; fruit ovoid, 6–7 mm. long, coarsely rugose-reticulate, cristate on the upper margin and with a fluted wing 1 mm. wide on the lower margin.

***Monnina xalapensis*** HBK. Nov. Gen. & Sp. 5: 414. 1823. *San Benito*; *Tinta*; *Lap-chisquit* (fide Aguilar); *Tintilla*; *Zacate de venado*; *Tintamora*.

Wet to dry thickets and forest, often in oak, pine, or *Cupressus* forest, common in second growth, 1,200–3,500 meters, abundant in

many regions; Alta Verapaz; Zacapa; Jutiapa; Guatemala; Sacatepéquez; Chimaltenango; Sololá; Quiché; Totonicapán; Huehuetenango; Quezaltenango; San Marcos. Southern Mexico; Costa Rica; Panama.

A shrub 1–3.5 meters high, often much-branched, the branches erect or strongly ascending, sparsely or densely strigillose; leaves thin, petiolate, oblanceolate or narrowly obovate, 4–8.5 cm. long, acuminate or acute, attenuate at the base, sparsely strigillose throughout, paler beneath; peduncles axillary and terminal, the racemes dense or interrupted, mostly 10 cm. long or shorter, the flowers violet or purple, short-pedicellate; bracts triangular-ovate, acute or obtuse, deciduous; sepals triangular-ovate or oblong-ovate, acute or obtuse, 2–3 mm. long; wings rounded-oval or oval, 5–6 mm. long; fruit ellipsoid-ovoid, rugose-reticulate, 6–8.5 mm. long, at first red, becoming purple or purplish black when ripe, very juicy.

When loaded with ripe fruit, this is a conspicuous and rather handsome shrub, but the flowers are not conspicuous. Deer browse on the plant, and presumably it is eaten also by sheep and goats. In the Occidente the purple juice of the ripe fruit is sometimes used in place of ink.

#### POLYGALA L.

*Reference:* S. F. Blake, A revision of the genus *Polygala* in Mexico, Central America, and the West Indies, *Contr. Gray Herb.* 47: 1–122, pls. 1, 2. 1916.

Herbs, shrubs, or trees; leaves alternate, or often opposite or verticillate, simple, entire, short-petiolate, very rarely with stipular glands; flowers mostly small and white, pink, or purple, in terminal or axillary, rarely extra-axillary racemes, rarely umbellate; sepals 5, the 3 outer ones herbaceous, free or the lower 2 connate, deciduous or persistent, the 2 inner ones (wings) petaloid or rarely subherbaceous, usually much larger than the others; petals normally 3, united at the base, the lowest (keel) boat-shaped, unguiculate, sometimes 3-lobate, unappendaged or usually with an apical beak or crest; 2 upper petals ligulate to ovate, sometimes galeate; stamens 8, rarely 6, the filaments united almost to the apex, the anthers usually confluent 1-celled, opening by an apical pore; ovary 2-celled, the ovules solitary, pendulous from the apex of the central placenta; style usually slender, bent, more or less excavate at the apex, the stigma 2-lobate; capsule equally or unequally 2-celled, often winged or marginate, compressed contrary to the partition, loculicidally dehiscent; seeds globose to fusiform or conic, usually pubescent, almost always arillate, with or without endosperm, the testa crustaceous.

Species 500 or more, widely distributed in temperate and tropical regions. About 180 are known from North America. A very few besides those listed here are found in southern Central America.

Keel petal obtuse, without a crest or beak.

Calyx with all its sepals free.



Wing sepals very small, about one-third longer than the outer sepals; capsule subcoriaceous, thick-walled. Erect shrub with somewhat coriaceous leaves and yellowish flowers..... *P. jamaicensis*.

Wing sepals much larger than the outer sepals; capsule membranaceous-herbaceous, thin-walled.

Lower sepals petaloid, the upper sepal herbaceous, persistent; capsule about 3 mm. long; aril of the seed glabrous..... *P. Purpusii*.

Lower sepals herbaceous, like the others, all deciduous; capsule usually much larger; aril pubescent, at least at the apex.

Wings rounded-oval or broadly oval, usually less than twice as long as wide..... *P. consobrina*.

Wings oblong, oblong-oval, or oblong-obovate, from almost twice to 4 times as long as wide.

Wings 7-10 mm. long..... *P. costaricensis*.

Wings 6.5 mm. long or shorter.

Wings glabrous..... *P. polymorpha*.

Wings pubescent dorsally.

Wings sparsely long-pilose dorsally; leaves lance-elliptic to linear. *P. trichoptera*.

Wings incurved-puberulent along the costa and toward the apex; leaves ovate or lance-ovate.

Seed glabrous..... *P. guatemalensis*.

Seed pubescent..... *P. Durandi*.

Calyx with the 2 lower sepals connate.

Plants annual..... *P. bryzoides*.

Plants perennial, often woody.

Flowers green..... *P. hondurana*.

Flowers purple or violet.

Branches of the inflorescence subtomentose..... *P. Securidaca*.

Branches of the inflorescence puberulent or strigose..... *P. floribunda*.

Keel petal with a beak or crest at the apex.

Capsule winged or marginate on the upper cell, marginless on the lower cell.

Capsule strongly transverse-rugose or transverse-veined..... *P. rhysoarpa*.

Capsule smooth, not transverse-rugose..... *P. Salviniiana*.

Capsule marginless, or narrowly and equally marginate on both cells.

Leaves all or most of them verticillate.

Racemes subglobose, as broad as long..... *P. conferta*.

Racemes much longer than broad.

Capsule 1.5 mm. long..... *P. asperuloides*.

Capsule 2-2.5 mm. long..... *P. aparinoides*.

Leaves not verticillate except rarely a few whorls on the lowest part of the stem.

Racemes slender and much elongate, mostly 5 mm. broad or less, tapering at the apex.

Stems glabrous.

Plants perennial, usually with several stems..... *P. alba*.

Plants annual, the stems solitary.

Seed glabrous; flowers white, densely crowded in the racemes. *P. gracillima*.

Seed pubescent; flowers purple or white, the racemes rather lax. *P. leptocaulis*.

Stems glandular-puberulent.

Capsule more than 3 mm. long; flowers white. . . . . *P. Berlandieri*.

Capsule 1.5–1.7 mm. long; flowers purple or white.

Seed appressed-pubescent, the hairs not glochidiate; aril well developed. . . . . *P. paniculata*.

Seed covered with incurved uncinat-tipped hairs; aril obsolete. . . . . *P. glochidiata*.

Racemes mostly short and broad, generally about as broad as long, usually not at all tapering at the apex, rarely more elongate but then 8–10 mm. thick.

Stems with several whorls of leaves below; racemes very dense and many-flowered, mostly more than twice as long as broad. . . . . *P. hygrophila*.

Stems with a single whorl of leaves at the very base, or all the leaves usually alternate.

Wings conspicuously cuspidate at the apex. . . . . *P. longicaulis*.

Wings rounded or merely apiculate at the apex.

Wings 4.7–5.3 mm. long; aril minute. . . . . *P. adenophora*.

Wings 2.7–3.6 mm. long; aril 0.5–1.3 mm. long. . . . . *P. variabilis*.

### ***Polygala adenophora* DC. Prodr. 1: 327. 1824.**

Wet open pine forest, at or little above sea level; British Honduras. Trinidad and northern South America (Guianas).

A very slender, erect annual 15–35 cm. high, simple or branched above, glabrous, sometimes papillose below; leaves alternate, linear, 4–16 mm. long, erect or ascending; racemes solitary at the ends of the peduncles, obtuse, 7–12 mm. broad, 1–4 cm. long, most often about as long as broad; bracts ovate, deciduous, the pedicels 1 mm. long, the flowers purple or rarely white; sepals oval or ovate, apiculate or obtuse, 1.3–2 mm. long; wings narrowly elliptic, about 5 mm. long, obscurely apiculate or obtuse; keel with a lobate crest near the apex; capsule narrowly elliptic, 3.5 mm. long, 1–1.3 mm. wide; seed obconic, pilose, comose at the apex, 1.8–2 mm. long, the aril minute.

### ***Polygala alba* Nutt. Gen. Pl. 2: 87. 1818.**

Moist or wet, open places, 300–1,000 meters; Huehuetenango (Ciénaga de Lagartero; between Nentón and Las Palmas). Western United States; Mexico.

Stems slender, erect, usually numerous from a perennial root, simple or sparsely branched, usually 15–35 cm. high, glabrous; leaves scattered except for 1–2 verticels at the base of the stem, the lowest spatulate-obovate and 4–12 mm. long, the others linear, cuspidate-acuminate, 8–25 mm. long; racemes dense, conic-cylindric, about 5 mm. thick, 2–8 cm. long; flowers white or sometimes tinged with purple; sepals ovate to oblong, obtuse, 1.3–1.5 mm. long, the wings elliptic, almost 3 mm. long; keel 3 mm. long, the crest of 4 lobes on each side; capsule elliptic or oblong-elliptic, 2.5–2.9 mm. long; seed pilose, 2.3–2.5 mm. long, the aril 0.8–1.5 mm. high, its 2 lobes oblong, appressed.

The seeds of the Guatemalan specimens are more spreading-pilose than is typical of the species.

**Polygala aparinoides** Hook. & Arn. Bot. Beechey Voy. 227. 1836. *P. nemoralis* A. W. Benn. Journ. Bot. 17: 172. 1879, in part (type from Chilascó, Baja Verapaz, *Salvin & Godman*). *P. Vogtii* Chodat, Mém. Soc. Phys. Genève 31(2), pt. 2: 144. 1893 (based in part on material from Cobán, Alta Verapaz, *Tuerckheim* 136). *Ipecacuana blanca*; *Peor es nada* (Huehuetenango).

Moist or wet forest or thickets, sometimes in pine forest, occasionally in marshes, 2,600 meters or lower; Alta Verapaz; Baja Verapaz; El Progreso; Izabal; Zacapa; Chiquimula; Santa Rosa; Quiché. Central and southern Mexico.

Stems slender, solitary or several from a slender perennial base, erect or spreading, often 40 cm. long or more; leaves 5-verticillate throughout or the uppermost scattered, lanceolate or the lowest broader, 1-2 cm. long, 5-10 mm. wide, acute or subacute, cuspidate, acute at the base, sessile or nearly so, the margins obscurely denticulate; racemes cylindric, tapering at the apex, rather dense, 5-6 mm. thick, 16 cm. long or usually much shorter, the pedicels less than 1 mm. long; flowers purplish or reddish mixed with green; sepals broadly oval or ovate, glandular-ciliate, 1.5-1.8 mm. long; wings elliptic-obovate, 2-3.5 mm. long, rounded; keel cristate at the apex; capsule broadly elliptic, 2-2.5 mm. long; seed appressed-pilose, equaled by the 2 narrowly oblong, appressed lobes of the aril.

This has been reported from Guatemala as *P. verticillata* L., *P. Boykinii* Nutt., and *P. galioides* Poir.

**Polygala asperuloides** HBK. Nov. Gen. & Sp. 5: 403. 1823.

At or little above sea level; Izabal (near Izabal, *Sereno Watson* 19). British Honduras; Panama; Colombia.

Stems 1-several from an annual root, erect or ascending, 10-30 cm. long; leaves all 5-verticillate or the uppermost in 2's or 3's, the lowest ones rounded-obovate, 7-9 mm. long, 4.5-5 mm. wide, the middle and upper ones lanceolate or lance-elliptic, 1-2 cm. long, cuspidate, with obscurely denticulate margins; flowers pink, the racemes 3-5 mm. thick, 1-5 cm. long, the pedicels 0.4 mm. long; sepals rounded-ovate to oblong, 1 mm. long or less; wings broadly elliptic, 1.5 mm. long; keel cristate at the apex; capsule suborbicular, 1.5 mm. long; seed appressed-pilose, 1.5 mm. long, the aril 1 mm. long, with 2 oblong appressed lobes.

**Polygala Berlandieri** Wats. Proc. Amer. Acad. 21: 416. 1886.

Grassy hillsides or a weed in cultivated ground, 1,200-2,300 meters; Santa Rosa; Guatemala. Mexico; Salvador.

A slender erect annual, often much-branched, 5-15 cm. high, densely stipitate-glandular; lowest leaves 4-5-verticillate, most of the leaves scattered and linear, 5-20 mm. long, acute, cuspidate; racemes cylindric, rather lax, 5 cm. long or shorter, the pedicels 0.8 mm. long; flowers usually white, the sepals rounded-ovate or ovate-oblong, subacute or obtuse, 1.2 mm. long; wings spatulate-obovate, 2.3 mm. long, rounded at the apex; keel cristate at the apex; capsule narrowly elliptic, 3.3 mm. long or slightly shorter; seed 2.5 mm. long, sericeous, the aril 0.5 mm. long, 2-lobate.

***Polygala bryzoides*** St. Hil. Fl. Bras. Merid. 2: 44. 1829. *P. angustifolia* HBK. Nov. Gen. & Sp. 5: 405. 1823, not *P. angustifolia* Gilib. 1781.

Moist or dry, rocky and open or grassy slopes, sometimes on sandbars along streams or in pine forest, 1,500 meters or less; Petén; Alta Verapaz; Baja Verapaz; Izabal; Zacapa; Jutiapa; Santa Rosa; Suchitepéquez; Retalhuleu; Huehuetenango. Mexico; Honduras and Salvador to Panama; West Indies; southward to Brazil.

Plants annual, simple or branched, 10–30 cm. high, very slender, pubescent throughout with short, straight or incurved and more or less appressed hairs; leaves alternate, linear or lanceolate, 1.5–4.5 cm. long, 2–9 mm. wide, acute or acuminate at each end, 1-nerved, often almost glabrous; flowers pinkish purple and greenish, the racemes terminal and axillary, 1.5–5 cm. long, the pedicels mostly recurved, more than 1 mm. long; sepals oblong-ovate, obtuse, sparsely ciliate at the apex, with 2–3 pairs of pedicellate glands, 1.5–1.8 mm. long; wings broadly cuneate-obovate, retuse, 3–4 mm. long; capsule oblong-oval, 3 mm. long; seed 2.5 mm. long, the aril 0.7 mm. long.

***Polygala conferta*** A. W. Benn. ex Hemsl. Diag. Pl. Nov. 2. 1878.

Open pine forest, 1,000–1,200 meters; Huehuetenango; reported by Blake as collected in Guatemala, “Barranca de Fuerengo,” *Bernoulli* 105; the locality name is incorrectly transcribed, and we are unable to guess what it may be. Central and southern Mexico.

A slender erect annual, simple or sparsely branched, 7–14 cm. high, glabrous; lowest leaves 5-verticillate, spatulate-obovate, 3.5–7.5 mm. long, the middle leaves linear, 7–13 mm. long, acuminate, mucronate; racemes headlike, dense and many-flowered, 6 mm. broad, the pedicels 1.2–1.5 mm. long; flowers pinkish or greenish white, the sepals rounded-ovate or ovate, obtuse or subacute, 1 mm. long; wings oval, 1.8 mm. long; keel cristate; capsule rounded-oval, 1.3 mm. long; seed pubescent, 1 mm. long, the aril 0.7 mm. high, with 2 oblong appressed lobes.

***Polygala consobrina*** Blake, Contr. Gray Herb. 47: 48. 1916. *P. Hayesii* Blake, loc. cit. (type collected near Guatemala, *Sutton Hayes* in 1860). *Hierba del rosario*; *Ipecacuana*; *Calzón de niño*.

Moist slopes, fields, or thickets, 150–2,000 meters; Chiquimula; Santa Rosa; Escuintla (type from Escuintla, *J. D. Smith* 1980); Guatemala; Chimaltenango. Salvador.

Perennial from a rather thick, woody root, the stems usually several, erect or ascending, 10–30 cm. high, densely puberulent with mostly incurved hairs; lower leaves oval, obtuse, the middle and upper ones alternate, ovate, 2–5 cm. long, acute, broadly cuneate at the base, reticulate-veined, puberulent; racemes dense and many-flowered, mostly 5 cm. long or shorter, the flowers violet or greenish violet; sepals lanceolate, acuminate, 3 mm. long; wings oblong-oval,

4.5–5.5 mm. long, 2.5 mm. wide, rounded at the apex, ciliate, pilosulous on the outer surface; capsule oval, densely ciliate and pilosulous, 9 mm. long; seed 6 mm. long, the aril 2.3–3.8 mm. high, pilose.

This has been reported from Guatemala as *P. americana* Mill. and *P. hebantha* Benth. The species of this group, formerly passing as *P. americana*, have been multiplied beyond reason, upon characters that apparently are variable and obscure. It is probable that at least half, and still better two-thirds, of the recently proposed ones should be reduced to synonymy.

***Polygala costaricensis*** Chodat, Bull. Soc. Bot. Belg. 30, pt. 1: 298. 1891. ?*P. guatemalensis* Gandog. Bull. Soc. Bot. France 60: 454. 1913, not *P. guatemalensis* A. W. Benn. 1895. *P. platycarpa* var. *stricta* Chodat, Mém. Soc. Phys. Genève 31(2), pt. 2: 27. 1893 (type collected between Rabinal and Santa Ana, Baja Verapaz, Bernoulli 1092). *P. isotricha* Blake, Contr. Gray Herb. 47: 53. 1916. *Ipecacuana amarilla* (fide Aguilar).

Moist or wet thickets or forest, often in pine-oak forest, or in rather dry, exposed, rocky places, sometimes a weed in coffee plantations, 150–2,100 meters; Alta Verapaz; Zacapa; Chiquimula; Jalapa; Jutiapa; Santa Rosa; Guatemala; Sacatepéquez; Chimaltenango; Quiché; Suchitepéquez; Quezaltenango. Chiapas; Costa Rica.

Perennial from a woody root, sometimes suffrutescent at the base, the stems solitary or several, simple or branched, erect to procumbent, sometimes 75 cm. long but usually much shorter, puberulent and sometimes short-pilose; leaves short-petiolate, thin, ovate or ovate-lanceolate, 2.5–6.5 cm. long, acute or acuminate, obtuse or cuneate at the base, reticulate-veined, rather sparsely puberulent and sometimes short-pilose; racemes lax or rather dense, 3–12 cm. long, the flowers purple or violet, short-pedicellate; sepals lanceolate, acuminate, 2.5–3 mm. long; wings oblong to oblong-oval, 8–10 mm. long, sparsely puberulent along the costa and at the apex; capsule oval, ciliate, puberulent, about 10 mm. long; seed short-pilose, the aril 2.7 mm. high.

This has been reported from Guatemala as *P. americana* Mill.

***Polygala Durandi*** Chodat, Bull. Soc. Bot. Belg. 30, pt. 1: 300. 1891. *Sopladorcito*; *Hoja de aire*.

Open or shaded banks, moist thickets, or open oak forest, 200–2,100 meters; El Progreso; Zacapa; Chiquimula; Jalapa; Jutiapa; Santa Rosa; Escuintla; Guatemala; Chimaltenango; Sololá; Huehuetenango. Costa Rica.

Perennial from a woody root, the stems solitary or several, erect or ascending, 50 cm. long or less, simple or branched, densely pubescent with short hairs; leaves short-petiolate, alternate, ovate or ovate-lanceolate, 2–5 cm. long, acute or acuminate.

nate, or the lowest oval and obtuse, cuneate or obtuse at the base, thin, reticulate-veined, sparsely or often densely pubescent; racemes mostly 4–5 cm. long, dense or lax, many-flowered, the flowers violet or purple, short-pedicellate; sepals lanceolate, acute, 2–2.8 mm. long; wings oblong, 6 mm. long, rounded at the apex, sparsely ciliate, puberulent along the costa and near the apex; capsule oval, pubescent, 1 cm. long; seed 5 mm. long, pilose, the aril 3 mm. high.

This and related species are used in medicine in Guatemala, at least in household remedies. The roots of some American species of *Polygala* are used like ipecac (*Cephaelis Ipecacuanha*).

***Polygala floribunda*** Benth. Pl. Hartweg. 58. 1840. *P. sphaerospora* Chodat, Bot. Jahrb. 52, Beibl. 115: 75. 1914 (type collected above San Jerónimo, Baja Verapaz, *Seler* 3393). *Chupac*, *Chopac*, *Raxjuc* (Alta Verapaz, Quecchí).

Moist or wet thickets or forest, often in pine forest, sometimes in second growth, 1,000–1,800 meters; Alta Verapaz; Baja Verapaz; Zacapa; Jalapa; Santa Rosa; Guatemala; Quiché; Huehuetenango. Chiapas and perhaps elsewhere in southern Mexico.

An erect shrub 1–3 meters high, or often a large woody vine, sparsely pubescent or puberulent or usually almost glabrous; leaves short-petiolate, rather thick and firm, rather conspicuously reticulate-veined, ovate or lanceolate, 4–10 cm. long, acute or acuminate, mucronate, obtuse or cuneate at the base, paler beneath; racemes lax, many-flowered, mostly 10–20 cm. long, axillary and terminal, often very numerous, the pedicels 8–13 mm. long; flowers bright purple; sepals subequal, obtuse, oval, ciliate, 4 mm. long; wings suborbicular, 8–11 mm. long or in fruit somewhat larger, venose, ciliate; capsule transversely broad-oblong and orbiculate, stipitate, ciliate and pubescent, about 8 mm. long and 10 mm. wide; seed globose, tomentose, 3 mm. thick, the aril 2 mm. high.

A common and showy plant of the Cobán region, often occurring in great abundance, especially in thickets and rather open pine forest. It is an exceptionally beautiful plant because of its brilliantly colored flowers, and it is much planted for ornament, not only in Cobán but in other parts of Guatemala. The shrub is usually erect in cultivation, but in the woods it usually is a small or medium-sized vine. In *North American Flora* it is stated that the species of *Polygala* are never scandent, but this one is decidedly so. In Alta Verapaz the roots are used as a substitute for soap, giving abundant suds when macerated in water. They are used particularly for removing dandruff, and for treating eczema and other cutaneous diseases. The roots also are chewed to cleanse the teeth and harden the gums.

***Polygala glochidiata*** HBK. Nov. Gen. & Sp. 5: 400. 1823.

Moist fields, brushy slopes, oak-pine forest, 800–1,900 meters, or sometimes at even lower elevations; Jutiapa; Santa Rosa; Saca-

tepéquez; Huehuetenango. Mexico; British Honduras; Honduras; Costa Rica; Cuba; South America.

A very slender annual 30 cm. high or less, often much-branched, finely stipitate-glandular; lower leaves 5-verticillate, the lowest lance-obovate, 3-4.5 mm. long, the middle and upper leaves linear, 5-12 mm. long, cuspidate; racemes cylindric, rather lax, 5-6 mm. thick, 1-8 cm. long; flowers short-pedicellate, rose-purple, rarely white; sepals elliptic or oblong, obtuse, 1 mm. long; wings obovate-oval, 2.5 mm. long, rounded at the apex; keel cristate at the apex; capsule elliptic, 1.5 mm. long; seed 1 mm. long, covered with incurved uncinately-tipped hairs, these spreading when wet; aril obsolete.

***Polygala gracillima*** Wats. Proc. Amer. Acad. 22: 398. 1887.

Open places in pine-oak forest, 1,200-2,400 meters; Baja Verapaz; Chiquimula; Quiché; Huehuetenango. Mexico.

A very slender, erect, glabrous annual, 10-20 cm. high, usually much-branched above; lowest leaves ternate, obovate, 3-3.5 mm. long, the others scattered, linear, 2-7 mm. long; racemes dense, many-flowered, tapering at the apex, 6-25 mm. long, 2.5 mm. thick; flowers short-pedicellate, white, the bracts persistent, lance-subulate; sepals ovate or oval, 0.6 mm. long; wings oblong-oval, 1.3 mm. long; keel cristate at the apex; capsule suborbicular, 1 mm. long; seed black, glabrous, ellipsoid-fusiform, striate, 0.5 mm. long, the aril minute.

***Polygala guatemalensis*** A. W. Benn. Journ. Bot. 33: 108. 1895.

Known only from the type, Cobán, Alta Verapaz, 1,340 meters, *Tuerckheim* 298 (in part).

Perennial, suffrutescent, 50 cm. high, with few erect branches, rather densely and finely pubescent; leaves alternate, short-petiolate, ovate, 2.5-4 cm. long, acuminate, reticulate-veined, sparsely pubescent on both surfaces; racemes rather dense, 4.5-9.5 cm. long; sepals lanceolate, acute, 3 mm. long; wings oblong, 5-6 mm. long, rounded at the apex, puberulent along the costa and near the apex; immature capsule oval, pilosulous, 8 mm. long; seed glabrous, 2.2 mm. long, the aril 1 mm. high.

***Polygala hondurana*** Chodat, Bot. Jahrb. 52, Beibl. 115: 75. 1914. *P. tonsa* Blake, Contr. Gray Herb. 47: 63. 1916 (type from La Vega, Santa Rosa, *Heyde & Lux* 3067).

Moist or usually wet thickets or forest, 600-1,800 meters; Alta Verapaz; Chiquimula; Jalapa; Jutiapa; Santa Rosa; Huehuetenango. Honduras; Salvador; Nicaragua.

Perennial from a rather thick, nodose root, erect, a meter high or less, usually frutescent, often with numerous, erect or ascending, slender, green branches, sparsely puberulent or glabrate; leaves short-petiolate, alternate, thin, ovate to lanceolate, 5-10 cm. long, long-acuminate, usually rounded or obtuse at the base,

deep green above, paler beneath; racemes lax, few-flowered, mostly shorter than the leaves, the bracts caducous, the pedicels slender, 4–8 mm. long; flowers pale green; sepals ciliate, puberulent, 3 mm. long; wings ovate-orbicular, 8–9 mm. long, venose, glabrous; capsule quadrate-orbicular, deeply emarginate, 6–7 mm. long and equally wide; seed tomentose, 4.8 mm. long, the aril 2 mm. high.

This species is easily recognized by its shrubby habit and large pale green flowers. The name "hierba del rosario" is applied to this species in Salvador. It has been reported from Guatemala as *P. monninoides* HBK.

***Polygala hygrophila* HBK.** Nov. Gen. & Sp. 5: 395. *pl.* 508. 1823.

Savannas or grassy pine forest, at or little above sea level; British Honduras. Chiapas; Panama; northern South America.

A slender erect annual, 35 cm. high or less, simple or with a few erect branches, glabrous; lowest leaves verticillate, the upper ones scattered, linear or lance-linear, 13–18 mm. long; racemes cylindric-ovoid, slightly comose at the apex, about 2 cm. long and 8 mm. thick; sepals oval, 1.8 mm. long; wings oval, 4.5 mm. long, rounded at the apex, green tinged with pale red or deep pink; keel cristate; capsule subglobose, turgid; seed ellipsoid, 1.7 mm. long, pubescent, the aril 1 mm. long.

This has been reported from British Honduras as *P. Timoutou* Aubl., a South American species, with much broader leaves, extending northward into Panama.

***Polygala jamaicensis* Chodat,** Mém. Soc. Phys. Genève 31(2), pt. 2: 11. 1893. *P. petenensis* Lundell, Lloydia 4: 51. 1941 (type from Sabana Zis, northwestern end of Lago de Petén, *C. L. Lundell* 3187). *Limonaria cimarrona*.

In forest, 800 meters or less; Petén (Camp 36, Guatemalan boundary). British Honduras; Jamaica.

A shrub or small tree, in Guatemala 1–3 meters high, much-branched, woody throughout, the branches densely puberulent or finally glabrate; leaves short-petiolate, ovate to ovate-lanceolate, 3.5–8.5 cm. long, obtuse to acuminate, cuneate at the base, sparsely and minutely strigillose; peduncles 1–1.5 mm. long, the axis of the raceme 3–6 mm. long, the pedicels 2–5 mm. long, puberulent, the flowers few, yellow; sepals rounded-ovate or deltoid-ovate, 1.5 mm. long; wings deltoid-ovate, 2 mm. long; keel 4 mm. long; capsule subquadrate, lobate one-fifth its length, with rounded lobes, ciliate and pubescent, 7–11 mm. wide, stipitate; seed 6 mm. long, the aril 3 mm. high.

After comparing the two known collections of *P. petenensis* with numerous Jamaican collections of *P. jamaicensis*, we are unable to find any characters by which they can be distinguished.



**Polygala leptocaulis** Torr. & Gray, Fl. N. Amer. 1: 130. 1838.  
*P. Pringlei* Wats. Proc. Amer. Acad. 25: 142. 1890. *Tamiz*.

Open, grassy, moist or wet plains, often in marshes or in oak forest, 2,000 meters or less; Izabal; Jalapa; Jutiapa; Quiché; Huehuetenango. Southern United States; Mexico; British Honduras; Honduras; Salvador; Cuba; South America.

A very slender, erect annual, 50 cm. high or less, glabrous, simple or sparsely branched; leaves alternate, linear, 8–25 mm. long; racemes cylindric, lax or dense, 13 cm. long or less, about 5 mm. thick; flowers lilac or greenish pink, short-pedicellate; sepals ovate, obtuse, 1 mm. long; wings obovate, 2 mm. long, rounded at the apex; keel cristate; capsule oblong, 1.6–1.8 mm. long; seed subcylindric, appressed-pubescent, 1.2 mm. long, the aril minute, 2-lobate.

This has sometimes been confused with *P. paludosa* St. Hil.

**Polygala longicaulis** HBK. Nov. Gen. & Sp. 5: 396. 1823.  
*Cambray* (Huehuetenango).

Moist savannas or pine forest, sometimes in dry rocky open places, 1,400 meters or less; Petén; Izabal; Zacapa; Chiquimula; Jalapa; Jutiapa; Santa Rosa; Quiché; Huehuetenango. Central and southern Mexico; British Honduras to Panama; West Indies; South America.

A slender erect annual, 45 cm. high or less, glabrous, simple or branched above; leaves alternate, linear, 4–16 mm. long, erect or ascending; racemes very obtuse, dense, 7–12 mm. broad, usually little longer than broad but sometimes almost 5 cm. long; bracts ovate, deciduous, the pedicels 1 mm. long; flowers rose-purple; sepals oval or ovate, apiculate or obtuse, 1.5–2 mm. long; wings narrowly elliptic, about 5 mm. long, obscurely apiculate or obtuse; keel cristate; capsule narrowly elliptic, 3.5 mm. long; seed obconic, pilose, comose at the apex, 2 mm. long, the aril minute.

This has been reported from Guatemala as *P. trichosperma* Torr.

**Polygala paniculata** L. Pl. Jam. Pugill. 18. 1759. *P. paniculata* f. *leucoptera* Blake, Contr. Gray Herb. 47: 101. 1916. *Lanillo*; *Ipecacuana*; *Rax cukichoj* (Cobán, Quecchí); *Mentol*; *Menta*.

Moist fields, banks, or thickets, on sandbars along streams, often a weed in cultivated or waste ground, sometimes in open, oak or pine forest, 2,000 meters or less, most frequent at low elevations; Alta Verapaz; Zacapa; Chiquimula; Jalapa; Jutiapa; Santa Rosa; Escuintla; Guatemala; Sacatepéquez; Suchitépéquez; Retalhuleu; Quiché; Huehuetenango; Quezaltenango; San Marcos. Texas; southern Mexico; British Honduras to Salvador and Panama; West Indies; South America.

A slender erect annual 10–30 cm. high, often much-branched, densely stipitate-glandular; lowest leaves verticillate, the others alternate, linear, 8–18 mm. long; racemes lax, cylindrical, 5–6 mm. thick, 9 cm. long or less, the flowers short-pedicellate, purplish, pink, or white; sepals ovate or oblong-ovate, obtuse, 1.3 mm. long; wings obovate or spatulate-obovate, 2–2.5 mm. long, rounded at the apex; keel cristate; capsule elliptic, 1.7 mm. long; seeds appressed-pubescent, 1.5 mm. long, the aril 0.4–0.8 mm. long, the 2 lobes appressed.

Called “hierba del cólico” in Salvador, where the plant is used in domestic medicine. The Guatemalan names “menta” and “mentol” allude to the fact that the roots, when chewed, have a mint-like taste. The same flavor is found in the roots of *Polygala* species of the southern United States, as is well known to children living where the plants are found. This is by far the commonest *Polygala* of Central America, being an unattractive weedy plant, often common about dwellings and in waste ground generally.

***Polygala polymorpha*** Chodat, Bot. Jahrb. 52, Beibl. 115: 74. 1914.

Usually on dry limestone hillsides, sometimes a weed in cornfields, 900–2,600 meters; endemic; Huehuetenango (type from Chaculá, *Seler* 3130).

Perennial from a somewhat ligneous root, the stems few or numerous, erect or decumbent, 10–20 cm. long, strigillose; leaves short-petiolate, alternate, ovate-elliptic to narrowly lance-oblong, 2–3.5 cm. long, obtuse or acute, thick, mucronate, sparsely and minutely strigillose; racemes lax, terminal, few-flowered; flowers purple, 6–7 mm. long; sepals lance-linear, acute; wings oblong-elliptic, glabrous; capsule oblong, 9 mm. long, cuneate at the base, pilosulous; seed hirsute, the aril 3-lobate.

***Polygala Purpusii*** Brandeg. Univ. Calif. Publ. Bot. 4: 88. 1910.

Dry, open, often rocky slopes, 1,200–1,600 meters; Huehuetenango (region of Cuilco). Puebla, Mexico.

An erect perennial as much as 50 cm. high, herbaceous or suffrutescent below, the perpendicular root rather thick and lignescent, the stems few or numerous, simple or sparsely branched, incurved-pilosulous, terete; leaves on short slender petioles, oval to oblong-oval, 9–18 mm. long, 4–11 mm. wide, rounded or very obtuse at the apex, acute at the base, incurved-puberulent, usually rather densely so, especially beneath; racemes terminal, sessile or short-pedunculate, 12 cm. long or shorter, laxly many-flowered, the flowers lavender, slender-pedicellate, the pedicels recurved in age; bracts rather conspicuous, narrowly lanceolate; upper sepal herbaceous, persistent and conspicuous in fruit, 3 mm. long or less; lower sepals petaloid, oblong-obovate, deciduous, not unguiculate, 3.5 mm. long; wings obovate-oval, 4–4.7 mm. long; keel whitish, with a yellowish tip; capsule sub-orbicular, incurved-puberulent toward the apex, 3 mm. long; seed obovoid, pilose, 2.5 mm. long; aril glabrous, 2-lobate.

***Polygala rhysocarpa* Blake, N. Amer. Fl. 25: 366. 1924.**

Dry rocky mountain slopes, 2,800–3,500 meters; Huehuetenango (below Calaveras, Sierra de los Cuchumatanes, *Steyermark* 50347). Veracruz, Mexico.

Stems few or several from a very slender, annual root, 25 cm. high or less, erect or nearly so, simple or sparsely branched, puberulent with spreading gland-like hairs; lowest leaves obovate, 3–5 mm. long, puberulent, the other leaves alternate, oblanceolate or linear, 4–15 mm. long, acuminate at each end, puberulent; racemes cylindric, acute or acuminate, dense above, lax below, 3–5 mm. thick, 1.5–7 cm. long; bracts lance-subulate, deciduous; flowers greenish white or purplish; sepals ovate to lance-elliptic, obtuse to acuminate, 1–1.6 mm. long; wings obovate, 2–2.2 mm. long, rounded at the apex, cuneate at the base; keel about 2 mm. long, the crest on each side consisting of a cuneate lamella and 2 entire or 2-parted lobes; capsule oblique-oval, emarginate, rounded at the base, glabrous, with 6–7 conspicuous, usually greenish veins on each side of the septum and also evidently transverse-rugose, winged on the upper side at the apex, 3 mm. long; seed cylindric, often curved, pubescent, 1.8 mm. long, the aril 1 mm. long, its 2 linear lobes appressed.

***Polygala Salviniana* A. W. Benn. Journ. Bot. 17: 203. 1879.**

*P. macroloncha* Chodat, Bot. Jahrb. 52, Beibl. 115: 84. 1914 (type from Zaragoza, Chimaltenango, *Seler* 2925). *P. microloncha* Chodat, loc. cit. (type collected near Chaculá, Huehuetenango, *Seler* 3138). *P. oxysepala* Blake, Contr. Gray Herb. 47: 109. 1916 (type from Santa Rosa, Baja Verapaz, *Tuerckheim* 1202). *Peor es nada* (Huehuetenango).

Open hillsides, fields, or brushy slopes, often in pine or oak forest, 900–2,700 meters; Baja Verapaz; Jalapa; Santa Rosa; Sacatepéquez (type from Volcán de Fuego, above Las Calderas, *Salvin*); Chimaltenango; Sololá; Quiché; Huehuetenango; Quezaltenango. Honduras.

Perennial from a somewhat ligneous root, the stems usually several, slender and wiry, erect or ascending, simple or sparsely branched, 60 cm. long or less, strigillose or puberulent; leaves alternate, linear-acicular, 5–13 mm. long, cuspidate, 1-nerved, sparsely puberulent or almost glabrous; racemes lax or rather dense, 7 mm. thick, 6 cm. long or shorter, the bracts subulate, deciduous; flowers short-pedicellate, greenish white; sepals ovate or ovate-lanceolate, obtuse to acuminate, 1–1.8 mm. long; wings obovate, 3–3.5 mm. long, obtuse; capsule elliptic, 2.5 mm. long; seed oblong, pubescent, 2 mm. long, the aril 1.2–1.5 mm. long, the 2 lobes oblong.

This has been reported from Guatemala as *P. scoparia* HBK.

***Polygala Securidaca* Chodat, Bot. Jahrb. 52, Beibl. 115: 76. 1914. *Hierba grande*.**

Common in mountain forests of Honduras; to be expected in the mountains of Chiquimula.

A shrub, the branches subtomentose when young; leaves short-petiolate, alternate, ovate-elliptic, 4-7 cm. long, obtuse, rounded at the base, subcoriaceous, softly tomentulose; racemes terminal, solitary or subpaniculate, short-cylindric, 3-5 cm. long, 2.5 cm. broad, the rachis tomentulose or hirsute, the pedicels hirsute, 7 mm. long; flowers purple, 10-12 mm. long.

**Polygala Seleri** Chodat, Bot. Jahrb. 52, Beibl. 115: 73. 1914.

Known only from the type, from Cuesta de la Concepción, Jacaltenango, Huehuetenango, *Seler* 3244.

Perennial from a ligneous root, the stems slender, branched, 20-30 cm. long, puberulent; leaves alternate, short-petiolate, ovate or ovate-lanceolate, 3-5.5 cm. long, acute or acuminate, glabrate; racemes rather lax, 5-10 cm. long, the flowers violet, 9 mm. long, short-pedicellate; upper sepal very acute; wings elliptic-oblong, glabrous, obtuse or short-acute, twice as long as broad, 9 mm. long; ovary long-pilose; immature capsule orbicular, ciliate.

We know this plant only by a photograph of the type.

**Polygala trichoptera** Chodat, Bot. Jahrb. 52, Beibl. 115: 74. 1914.

Known only from the original material, limestone hillsides, Uaxacanal, Huehuetenango, 1,300-1,400 meters, *Seler* 2796, 2904.

Perennial, the stems slender, erect, hirsute, 10-20 cm. high, simple or sparsely branched; leaves lance-elliptic to lanceolate or linear, sparsely hirsute above, conspicuously venose beneath, 2-4 cm. long, 7-16 mm. wide; racemes 7-12-flowered, 2-4 cm. long, the pedicels 2.5 mm. long; flowers violaceous, 6 mm. long; sepals lance-linear, hirsute, acute; wings obovate-oblong, very obtuse, sparsely long-pilose dorsally; immature capsule elliptic-obovate, very hirsute.

We have seen nothing to represent this species.

**Polygala variabilis** HBK. Nov. Gen. & Sp. 5: 397. *pl.* 509. 1823. *P. variabilis* f. *leucanthema* Blake, Contr. Gray Herb. 47: 96. 1916. *Cola de mico*.

Open rocky slopes, sometimes in savannas, 1,500 meters or less; Zacapa; Chiquimula; Jalapa; Jutiapa. Southern Mexico; British Honduras; South America.

A slender erect annual, simple or sparsely branched, the stems obscurely stipitate-glandular, especially below; leaves alternate, linear, 4-9 mm. long; racemes short and thick, rather dense, 7-10 mm. broad, usually about as long as broad, the axis sometimes elongating in age; flowers short-pedicellate, rose-purple or sometimes white; sepals ovate, rounded or obtuse at the apex, 1-2 mm. long; wings elliptic, 2.7-3.5 mm. long, rounded at the apex; keel cristate; capsule ovate-

oblong, 2.5–3 mm. long; seed obconic, sericeous-comose, 2.7 mm. long, the aril 2-lobate, 0.5 mm. high, appressed.

In the typical form the flowers are rose-purple; in f. *leucanthema* they are white. Both forms have been collected in Guatemala.

### SECURIDACA Jacquin

Mostly woody vines, rarely erect shrubs; leaves alternate, entire, broad, short-petiolate, generally with stipular glands; flowers rather large for the family, mostly rose-colored, in terminal and axillary, often paniculate racemes; sepals 5, free, deciduous, the 3 outer ones herbaceous, the 2 inner ones (wings) much larger, petaloid; petals 3, deciduous, united at the base, the lowest (keel) boat-shaped, unguiculate, with a subapical fimbriate crest, the 2 upper petals united with the base of the stamen tube; stamens 8, the filaments united almost to the apex to form a sheath; anthers confluent 1-celled, opening by a large introrse-apical pore; disk a low fleshy ring at the base of the ovary; ovary 1-celled, the style sickle-shaped, excavate at the apex, the stigma lobes 2, approximate; ovule solitary, pendulous; fruit a 1-celled 1-seeded samara, with a large wing on the lower side, sometimes marginate on the upper side or rarely almost equally winged; seed glabrous, not arillate, the testa thin; endosperm none; cotyledons thick-fleshy, oily.

About 30 species in tropical America, Africa, and Asia. Two other Central American species have been found in Costa Rica and Panama.

Pubescence of the lower leaf surface of closely appressed hairs . . . . . *S. diversifolia*.  
 Pubescence of the lower leaf surface of spreading hairs . . . . . *S. sylvestris*.

**Securidaca diversifolia** (L.) Blake, Contr. U. S. Nat. Herb. 23: 594. 1923. *Polygala diversifolia* L. Sp. Pl. 703. 1753. *S. erecta* Jacq. Enum. Pl. Carib. 27. 1760. *Bejuco anisillo* (Petén, fide Lundell).

Moist or dry thickets, often in second growth, sometimes in forest, 1,800 meters or less, mostly at 300 meters or lower; Petén; Izabal; Zacapa; Chiquimula; Santa Rosa; Escuintla; Retalhuleu. Mexico; British Honduras to Panama; Lesser Antilles; South America.

A small or large, woody vine, the branches slender, strigose; leaves on very short petioles, elliptic-oblong to broadly ovate or oval, 4–10 cm. long, 2–5.5 cm. wide, obtuse or acute, rounded or cuneate at the base, chartaceous, sparsely or densely strigillose on both surfaces, paler beneath, lustrous above, the venation rather prominent and closely reticulate on both surfaces; racemes many-flowered, simple or branched, 5–10 cm. long, the bracts lanceolate to ovate, acuminate, deciduous; pedicels 4–7 mm. long, the flowers rose or purple; sepals oval, ciliate, 2.5–3.5 mm. long; wings 8–11 mm. long; body of the samara turgid, elevated-reticulate, 5–8 mm. long, the wing obovate, 3–5 cm. long, 1–1.5 cm. wide near the middle, strigose or glabrate.

This and the following are handsome and showy vines, often producing large masses of beautiful, rose-colored or purple flowers. Apparently the vines flower for only a short time. The flowers much resemble those of Leguminosae, and most persons on seeing the plants for the first time assume that they belong to that family.

*Securidaca sylvestris* Schlecht. *Linnaea* 14: 381. 1840.

Moist or dry thickets or mixed forest, often in second growth, 2,000 meters or less; Petén; Alta Verapaz; Zacapa; Chiquimula; Jutiapa; Escuintla; Sololá; Quezaltenango; San Marcos. Western and southern Mexico; British Honduras; Honduras; Costa Rica.

A small or large, woody vine, the branches densely hirtellous or pilosulous; leaves on very short petioles, ovate to oblong-elliptic, 3-7 cm. long, 1.5-3 cm. wide, acute or obtuse, rounded or cuneate at the base, sparsely or densely pilosulous on both surfaces with spreading hairs, lustrous above, paler beneath, the venation prominent and closely reticulate on both surfaces; racemes lax or dense, 10 cm. long or less, the bracts ovate or lance-ovate, deciduous, 1.5-4 mm. long, the pedicels 4-6 mm. long, the flowers rose-purple; sepals oval or rounded, 2.5-4 mm. long, ciliate and pilosulous; wings 8-11 mm. long; body of the samara 7-9 mm. long, reticulate, the wing obovate, 3-4 cm. long, 12-14 mm. wide, short-pilosulous.

This is perhaps the plant reported by Hemsley from Guatemala as *S. mollis* HBK. on the basis of a Friedrichsthal collection. The locality is not cited, and there is no certainty that the plant came from Guatemala. *S. mollis* is a synonym of *S. coriacea* Bonpl., a species ranging from South America north into Panama. In Salvador *S. sylvestris* is called Coralmeca, and it is used there, with salt, in treating certain diseases of cattle. The vine is said to be used there also as a *barbasco* or fish poison. Seeds of these plants seem to be spread widely by some means, for small sterile plants are common in fields where no adult plants are found, and they often invade cultivated fields.

## DICHAPETALACEAE

*Reference:* H. A. Gleason, *N. Amer. Fl.* 25: 381-383. 1924.

Trees or shrubs, sometimes scandent; leaves alternate, 2-ranked, entire, membranaceous or coriaceous, short-petiolate, penninerved; stipules small and narrow, deciduous; inflorescence a loose or dense cyme, sometimes capitate, axillary, the peduncle often adnate to the petiole; bracts small and narrow, deciduous; flowers sessile or short-pedicellate, small and inconspicuous, perfect or unisexual, regular or somewhat zygomorphic; receptacle flat or concave; sepals 5, imbricate, free or slightly connate at the base, equal or nearly so; petals 5, alternate with the sepals, free or connate into a short tube, equal or conspicuously unequal, often bifid or bilobate and more or less involute or cucullate; stamens 5, alternate with

the petals, either free, hypogynous, and with slender complanate filaments somewhat dilated at the base, or epipetalous with nearly or quite sessile anthers; anthers usually 5, sometimes 3, 2-celled, introrse, with a broad connective; hypogynous disk unilateral in zygomorphic flowers, of 5 scales alternate with the stamens in regular flowers; ovary superior, 2-3-celled; styles 2-3, united below, with recurved stigmas; ovules 2 in each cell, suspended near the summit of the cell, anatropous; fruit drupaceous, more or less compressed, the exocarp thin, leathery or fleshy; seed usually 1, without endosperm.

Three genera, in the tropics of both hemispheres. Only the following genus is known from continental North America.

### DICHAPETALUM Thouars

Trees or shrubs, sometimes woody vines; leaves short-petiolate, usually membranaceous; stipules linear or narrowly lanceolate; inflorescence usually laxly cymose, with few or many flowers, arising from the axils of the upper leaves, the peduncle adnate for part of its length to the petiole; flowers small, whitish, short-pedicellate, perfect or unisexual, regular or nearly so; receptacle flat or somewhat concave; sepals free or barely connate at the base, equal or subequal, spreading or ascending; petals free, equal or nearly so, ascending or erect, short-unguiculate, bifid or bilobate, the apex cucullate; stamens free and distinct, the filaments slender, compressed, somewhat dilated below; anthers 5; hypogynous disk of 5 minute scales.

About 80 species in the tropics of both hemispheres, most abundant in Africa. Two other species are known in Central America, from Costa Rica and Panama.

Branches of the inflorescence and the sepals hirsute or hispid with long stiff spreading hairs; leaves hirsute beneath, the veins conspicuously impressed on the upper surface.....*D. bullatum*.

Branches of the inflorescence and sepals short-pilose or puberulent; leaves velutinous-pilose to glabrate beneath, the veins not or only slightly impressed on the upper surface.

Leaf blades mostly oblong or lance-oblong, somewhat narrowed to a rounded base, mostly 3-5 cm. wide, puberulent or sparsely pilose beneath, the hairs of the costa often appressed.....*D. chiapense*.

Leaf blades mostly broadly obovate to oblong-obovate, usually acute, acutish, or merely obtuse at the base, generally 7-13 cm. wide, densely velutinous-pilose beneath with spreading hairs.....*D. Donnell-Smithii*.

***Dichapetalum bullatum*** Standl. & Steyerm. Field Mus. Bot. 23: 169. 1944.

Moist or wet thickets or mixed forest, sometimes in *Manicaria* swamps, 500 meters or usually at or near sea level; endemic; Izabal (type collected along road between Puerto Barrios and Santo Tomás, *Steyermark* 39874).

An erect or subscandent shrub, the branchlets thick, ochraceous, usually lustrous, when young densely hispid with stiff, sordid or brownish hairs; leaves

very large, short-petiolate, thick-membranaceous, strongly bullate, the thick petiole 5–8 mm. long, densely hispid; leaf blades elliptic or broadly elliptic, sometimes oblong-elliptic, 17–28 cm. long, 11–18 cm. wide, abruptly acute or acuminate, rounded or subcordate at the base, sparsely hispid above or in age glabrate, the nerves and veins conspicuously impressed, densely hirsute or hispid beneath with rather long, stiff hairs, the veins elevated and laxly reticulate; inflorescence small, terminal or pseudoterminal, branched from the base or composed of several simple inflorescences, the primary branches very slender, 1–1.5 cm. long, densely hispid, the flowers umbellate at the end of the peduncle, the long slender pedicels almost filiform, hispidulous; sepals narrowly oblong, obtuse, 3–3.5 mm. long, densely whitish-tomentulose outside and hispid with appressed stiff white hairs; petals about as long as the sepals, bilobate at the apex, glabrous, white turning blackish purple in drying; filaments very slender, glabrous, longer than the petals; ovary densely white-tomentose.

**Dichapetalum chiapense** Standl. Field Mus. Bot. 17: 196. 1937.

Wet forest or thickets, 1,500 meters or less; Petén; Alta Verapaz; Suchitupéquez; Huehuetenango. Chiapas, the type from Mt. Ovando, *E. Matuda* 679; British Honduras; Atlantic coast of Honduras.

Shrub or small tree as much as 8 meters high, sometimes scandent, the branchlets closely fulvous-tomentulose or glabrate; petioles stout, 5–8 mm. long, the blades mostly oblong or lance-oblong, subcoriaceous, 8–13 cm. long and 2–3.5 cm. wide or larger, usually gradually acuminate or long-acuminate, generally somewhat narrowed to the rounded or very obtuse, often somewhat unequal base, dark green above when dried, glabrous or somewhat tomentose along the costa, more or less pilose beneath at first with chiefly appressed hairs, later glabrate, with about 9 pairs of lateral nerves, the ultimate veins prominent and laxly reticulate; inflorescence small, with few to many flowers, the branches densely fulvous-tomentose; fruit 1–2-celled, when 1-celled broadly oval or subglobose, about 2 cm. long and 1.5 cm. wide, densely fulvous-tomentose.

**Dichapetalum Donnell-Smithii** Engler, Bot. Jahrb. 23: 144. 1896. *Symphyllanthus Donnell-Smithii* Gleason, N. Amer. Fl. 25: 381. 1924.

Moist or dry thickets and forest, 1,800 meters or less, chiefly in the Pacific bocacosta; endemic; Alta Verapaz; Santa Rosa; Escuintla (type from Escuintla, *J. D. Smith* 2067); Sacatepéquez; Chimaltenango; Retalhuleu; Quezaltenango; San Marcos.

Usually a shrub but sometimes a tree of 10 meters, the young branchlets densely fulvous-tomentose or short-pilose; leaves on very short petioles, usually very thin and bright green, oblong-obovate to broadly obovate, mostly 10–25 cm. long and 7–13 cm. wide, sometimes larger, commonly obtuse or rounded at the apex and abruptly acuminate, mostly acute or subacute at the base but rarely somewhat rounded, sparsely or densely pilose above, beneath usually densely velutinous-pilose, the lateral nerves mostly 5–7 pairs; cymes small and usually



few-flowered, the branches densely fulvous-pilose; sepals spreading, rounded-ovate, obtuse, densely tomentose outside; petals shorter than the sepals, 2 mm. long, bifid almost to the middle; fruit brownish, compressed-ellipsoid, 1.5-2 cm. long, densely velutinous-pilose.

The species has been reported from Guatemala under the name *D. pedunculatum* Baillon. The shrub is a common one at many localities in the Pacific bocacosta or even far down upon the plains, but it is inconspicuous, even when in flower, when it reminds one somewhat of some of the shrubby Lauraceae. The plants of this genus are best marked by the fact that the peduncles are united with the petioles, a character not found in other Guatemalan plants.

### EUPHORBIACEAE. Spurge Family

Trees, shrubs or herbs, sometimes scandent and twining, mostly with milky sap; leaves chiefly alternate, sometimes opposite or verticillate, simple or rarely digitately compound, sometimes palmate-lobate, dentate or entire; stipules often present; inflorescence highly variable in form, the flowers usually small but sometimes large, unisexual, monoecious or dioecious, generally regular; perianth sometimes none, usually small, often dissimilar in flowers of the 2 sexes, either a calyx or a calyx and a corolla, the segments free or united, imbricate or valvate in bud; staminate flowers with an intrastaminal or extrastaminal disk, or this of separate glands or lobes; stamens sometimes indefinite, often as many as the sepals or fewer, sometimes only 1, the filaments free or united; rudimentary ovary present or none; disk of the pistillate flower annual or cupular, or of separate glands, or absent; ovary usually 3-celled, sometimes 1-4-celled or the cells rarely more numerous; styles as many as the carpels, free or connate, entire, cleft, or laciniate; ovules 1 in each cell, or 2 and collateral, pendulous, anatropous, attached at the inner angle of the cell, the raphe ventral; micropyle often covered with a caruncle, this persistent and conspicuous on the seed; fruit generally capsular and separating into 2-valvate cocci, these separating from the persistent axis or columella, or the fruit drupaceous and indehiscent; seeds commonly as many as the ovules; endosperm usually abundant and carnosé, the cotyledons broad and flat, rarely thick and carnosé.

One of the largest families of plants, with more than 200 genera and 7,000 species. Other genera besides those listed here are represented in southern Central America, mostly groups consisting of a single species. The majority of the plants of the family are distinguished by the combination of milky sap and dry 3-celled fruit, but there are numerous exceptions. The family includes many plants of great economic importance, the most valuable being *Hevea*, from which practically all commercial rubber is obtained. In many species the sap is poisonous or at least highly irritant, and the seeds often possess purgative properties, or in large amounts are poisonous. The family has been monographed by Pax in the

Pflanzenreich, as noted on the following pages. The work has been exceptionally well done, and all the genera have been covered except a few of the very large ones, notably *Croton*, *Phyllanthus*, and *Euphorbia*. The nomenclature in the groups that have not been treated is, naturally, not altogether satisfactory, and it is likely that numerous changes in names will have to be made when these large genera are treated critically.

Flowers surrounded by a calyx-like or slipper-shaped involucre containing both staminate and pistillate flowers; perianth none or minute.

Involucre calyx-like or cupular, regular . . . . . *Euphorbia*.

Involucre slipper-shaped or shoe-shaped, very asymmetric . . . . . *Pedilanthus*.

Flowers not involucre or, if so, the involucre containing only staminate or pistillate flowers, never shoe-shaped; perianth usually present and well developed.

Ovules 2 in each cell; flowers apetalous or the petals, when present, usually small and scale-like; flowers fasciculate or solitary in the leaf axils, rarely spicate.

Fruit capsular; pubescence not lepidote.

Flowers partly in stiff spikes or racemes; leaves coriaceous . . . . . *Amanoa*.

Flowers axillary and solitary or fasciculate, or in slender racemes or panicles; leaves usually membranaceous.

Petals well developed, relatively large . . . . . *Astrocasia*.

Petals minute or none . . . . . *Phyllanthus*.

Fruit drupaceous; pubescence sometimes lepidote.

Pubescence lepidote . . . . . *Hieronyma*.

Pubescence not lepidote . . . . . *Drypetes*.

Ovules 1 in each cell; petals often well developed; flowers often in racemes, spikes, or panicles.

Stamens in bud bent inward, the apex of the anther turned downward.

Flowers usually with petals, mostly in terminal racemes.

Sepals equal or nearly so, not appendaged . . . . . *Croton*.

Sepals unequal, the outer ones of the pistillate flowers with conspicuous stalked glands or appendages . . . . . *Julocroton*.

Stamens straight in bud, the tips of the anthers turned upward.

Flowers in dichotomous cymes. Plants often armed with stinging hairs, herbaceous or woody, never scandent.

Plants bearing few or usually very numerous stinging hairs . *Cnidocolus*.

Plants without stinging hairs . . . . . *Jatropha*.

Flowers variously arranged but never in dichotomous cymes.

Inflorescence subtended by 2 large, opposite, green, white, or reddish, foliaceous bracts, these about as broad as long; plants twining herbs or shrubs, or rarely low erect shrubs, the leaves often digitately compound or deeply lobate . . . . . *Dalechampia*.

Inflorescence not as described above.

Leaves deeply lobate.

Leaves peltate; calyx lobes valvate; stamens numerous . . . *Ricinus*.

Leaves usually not peltate; calyx lobes imbricate; stamens 10.

*Manihot.*

Leaves entire or dentate, rarely with one or two very shallow lobes.

Leaves mottled or spotted with red, yellow or white, entire or obscurely lobate; cultivated shrubs, rarely escaping to thickets.

*Codiaeum.*

Leaves not mottled with other colors than green; chiefly native plants.

Segments of the staminate calyx valvate in bud.

Stipules indurate and spinescent.....*Ophellantha.*

Stipules not spinescent, sometimes none.

Staminate flowers with well-developed petals.

Plants sericeous; capsule not tuberculate.

    . Petals 8-12; stamens numerous.....*Garcia.*

    Petals 4-5; stamens 5-15.....*Ditaxis.*

Plants hirsute or hispidulous; capsule tuberculate.

*Caperonia.*

Staminate and pistillate flowers without petals.

Plants twining and scandent, rarely erect but then with stinging hairs.

    Capsule 4-celled; plants woody, without stinging hairs.

*Plukenetia.*

    Capsule 3-celled; plants herbaceous throughout or nearly so, usually with stinging hairs.....*Tragia.*

Plants not twining or scandent, without stinging hairs.

    Anther cells elongate and narrow, often flexuous; flowers spicate or racemose, sometimes subcapitate; herbs, shrubs, or small trees.....*Acalypha.*

    Anther cells short, globose or oblong; shrubs or trees.

        Flowers solitary or fasciculate in the leaf axils...*Adelia.*

        Flowers, at least the staminate ones, racemose, spicate, or paniculate.

            Staminate flowers paniculate.....*Alchornea.*

            Staminate flowers racemose or spicate.

                Pubescence of stellate hairs.....*Bernardia.*

                Pubescence of simple hairs, or none....*Cleidion.*

Segments of the staminate flowers imbricate or open in bud.

    Leaves with scattered brown scales on the lower surface; flowers enclosed in a globose involucre.....*Pera.*

    Leaves without scales; flowers not enclosed in an involucre.

        Petioles bearing conspicuous glands below the base of the blade.

            Leaves dentate.....*Sapium.*

            Leaves entire or essentially so.....*Tetrorchidium.*

        Petioles without glands, or the glands borne at the very apex.

            Flowers paniculate.

                Bracts foliaceous; panicles broad; leaves very large, cordate.....*Omphalea.*

- Bracts not foliaceous; panicles raceme-like; leaves small, not cordate.....*Mabea*.
- Flowers spicate or racemose.
- Ovary 5-20-celled, the fruit very large; leaves glabrous.
- Leaves cordate at the base; fruit dry.....*Hura*.
- Leaves not cordate at the base; fruit fleshy.*Hippomane*.
- Ovary normally 3-celled.
- Leaves tomentose beneath; staminate flowers densely crowded on the rachis.....*Dalembertia*.
- Leaves glabrous; staminate flowers not densely crowded.
- Staminate calyx none or rudimentary..*Gymnanthes*.
- Staminate calyx well developed.
- Calyx deeply 3-parted.....*Sebastiania*.
- Calyx shallowly lobate.....*Stillingia*.

### ACALYPHA L.

*Reference:* F. Pax & K. Hoffmann, *Acalypha*, Pflanzenreich IV. 147, xvi. 1924.

Annual or perennial herbs or more frequently shrubs or small trees; leaves alternate, petiolate, bistipulate, mostly ovate, dentate, 3-5-nerved or penninerved, often punctulate; flowers monoecious or rarely dioecious, apetalous, small or minute; staminate flowers glomerate within small bracts, short-pedicellate; pistillate flowers 1-5 within a conspicuous, often accrescent bract, or pedicellate in the axis of a small, scarcely foliaceous bract; inflorescences unisexual or bisexual, the staminate usually ament-like, slender, the pistillate inflorescence paniculate, racemose, or usually spicate; androgynous spikes usually with pistillate flowers below and staminate above; androgynous and pistillate inflorescences axillary or terminal, the staminate ones always axillary; disk none; staminate calyx globose in bud, in anthesis valvately 4-parted; stamens generally 8, the filaments free; anther cells distinct, divaricate or pendulous, oblong or linear, in the open flower flexuous-vermiform; pistillate sepals 3-5, connate at the very base or rarely higher, small, imbricate; ovary usually 3-celled, often muricate; styles free or short-connate, generally lacinulate; ovules solitary in the cells; capsule generally small, tridymous, the cocci bivalvate; seeds small, subglobose, distinctly or obsoletely carunculate, the testa crustaceous; endosperm carnose, the cotyledons broad, flat.

Species almost or fully 400, in both hemispheres, chiefly in tropical regions, very few extending into temperate areas. A few other species are found in southern Central America.

Pistillate flowers pedicellate; pistillate bracts minute.

Leaves very glutinous on the upper surface, glabrous on both surfaces.

*A. gummifera*.

Leaves not glutinous-viscid.

Leaves broadly ovate, broadest at or near the base, palmate-nerved.

*A. villosa*.

Leaves oblong to lance-oblong or elliptic-oblong, penninerved or essentially so.  
*A. costaricensis.*

Pistillate flowers sessile; pistillate bracts mostly large and foliaceous. Shrubs, trees, or herbs.

Plants herbaceous, mostly annual, sometimes perennial.

Lobes or teeth of the pistillate bracts short, oblong or ovate, obtuse, little if at all exceeding the united portion of the bract.

Inflorescences all or mostly axillary, very lax and interrupted. A low annual.....*A. indica.*

Inflorescences partly terminal, very dense.

Spikes mostly twice as long as broad or shorter; plants annual.

Stems bearing numerous gland-tipped hairs....*A. pseudoalopecuroides.*

Stems without gland-tipped hairs.....*A. Poiretii.*

Spikes several times as long as broad; plants usually perennial.

Stems stipitate-glandular.....*A. subviscida.*

Stems without glandular pubescence.

Leaves small, mostly 3 cm. long or shorter, obtuse or acute.

*A. phleoides.*

Leaves all or mostly much larger, usually acuminate.

Leaves hirsute with long stiff spreading hairs.....*A. triloba.*

Leaves sparsely pilose or hispidulous with short hairs.

*A. guatemalensis.*

Lobes of the pistillate bracts linear or filiform, much longer than the united portion of the bract.

Spikes 3 times as long as broad or usually shorter, mostly 3 cm. long or less.

Spikes all axillary; leaves mostly obtuse.....*A. arvensis.*

Spikes partly terminal; leaves abruptly acuminate.....*A. alopecuroides.*

Spikes several to many times as long as broad, most of them much more than 3 cm. long, at least at maturity.

Ovary and capsule pubescent.

Fruiting bracts cleft almost to the base into 7-13 slender, almost subulate lobes.....*A. setosa.*

Fruiting bracts incisely 19-25-dentate to about the middle or somewhat more deeply.....*A. persimilis.*

Ovary and capsule glabrous.....*A. polystachya.*

Plants shrubs or trees, woody throughout or nearly so, when shrubs usually tall and more than a meter high.

Inflorescences terminal and axillary, the terminal spikes wholly pistillate, all or nearly all the pistillate spikes terminal only.

Leaves penninerved, all or most of them broadest at or above the middle.

Branches hirsute with spreading fulvous hairs; leaves usually densely pilose beneath.....*A. lancetillae.*

Branches glabrous or pubescent with very short, appressed hairs; leaves glabrous beneath or nearly so.

Bracts pilose with gland-tipped hairs, equaling or longer than the capsule.....*A. Ferdinandi.*

Bracts without gland-tipped hairs, shorter than the capsule. *A. Skutchii.*

- Leaves palmate-nerved, ovate or usually very broadly ovate, broadest at or near the base.
- Lowest pistillate bracts leaf-like, much larger than the upper ones, sometimes 5 cm. long..... *A. chlorocardia*.
- Lowest pistillate bracts not leaf-like, of about the same size as the upper ones.
- Leaves 7-12 cm. wide, coarsely crenate, densely and finely velutinous-pilose beneath..... *A. Mortoniana*.
- Leaves mostly 2-6 cm. wide, finely crenate, variously pubescent beneath or almost glabrous.
- Pistillate spikes slender, much interrupted..... *A. firmula*.
- Pistillate spikes dense, continuous.
- Pistillate bracts 7-10-dentate..... *A. Schiedeana*.
- Pistillate bracts mostly 11-15-dentate..... *A. mollis*.
- Inflorescences all axillary.
- Spikes bisexual, a few pistillate bracts present at the base of the spike which consists mostly of staminate flowers..... *A. diversifolia*.
- Spikes unisexual, the staminate and pistillate flowers in separate spikes.
- Pistillate spikes short and globose or oblong, or bearing only 1-3 or rarely more bracts.
- Pistillate spikes globose or subglobose, with very numerous bracts.  
*A. trachyloba*.
- Pistillate spikes consisting of only 1-few scattered bracts.
- Pistillate spikes with mostly 3-6 remote bracts, or sometimes with only 1-2..... *A. euphrasiostachys*.
- Pistillate spikes with only 1-2 bracts, mostly with only 1.
- Bracts 9-11-laciniate..... *A. unibracteata*.
- Bracts 13-17-laciniate..... *A. leptopoda*.
- Pistillate spikes slender, elongate, linear or oblong-linear, bearing very numerous bracts.
- Pistillate bracts entire, or sometimes dentate but the leaves then colored; cultivated plants.
- Pistillate bracts entire; leaves green..... *A. hispida*.
- Pistillate bracts dentate; leaves colored..... *A. Wilkesiana*.
- Pistillate bracts dentate or laciniate; leaves green; native plants.
- Branches densely glandular-pubescent..... *A. Langiana*.
- Branches without glandular pubescence.
- Leaves penninerved, broadest at or above the middle, glabrous or nearly so..... *A. Ferdinandi*.
- Leaves palmate-nerved, broadest at or near the base, glabrous or densely pubescent.
- Lowest bracts of the pistillate inflorescence leaf-like, much larger than the upper ones, sometimes 5 cm. long.  
*A. chlorocardia*.
- Lowest bracts of the pistillate spikes of about the same size as the upper ones.
- Pistillate bracts 2-lobate at the apex; leaves glabrous or nearly so..... *A. tenuicauda*.
- Pistillate bracts not bilobate; leaves usually densely pilose, sometimes almost glabrous..... *A. macrostachya*.

*Acalypha alopecuroides* Jacq. Icon. Pl. Rar. 3: 19. pl. 620. 1786-93.

Rocky mountain slopes with *Juniperus*, 1,350-1,500 meters; Huehuetenango. Southern Mexico; British Honduras; Honduras; Panama; West Indies; northern South America.

An erect annual, mostly 50 cm. high or less, simple or sparsely branched, the stems pubescent and more or less glandular-pilose; leaves on slender petioles 2-6 cm. long, membranaceous, triangular-ovate or rounded-ovate, 3-7 cm. long, acuminate or cuspidate-acuminate, rounded or subcordate at the base, crenate, sparsely hirsute or pilosulous on both surfaces when young, glabrate in age, palmate-nerved, the petioles glandular-pilose above; spikes terminal and axillary, the terminal ones pistillate, in fruit sometimes 5 cm. long, 1-1.5 cm. wide, very dense and many-flowered, the pistillate ones often bearing a few staminate flowers at the apex, the axillary spikes wholly staminate or with a few pistillate flowers at the base; pistillate bracts 7-9 mm. long, 3-5-lobate almost to the middle, the lobes triangular-ovate, setaceous, long-pilose and glandular, 1-flowered; ovary pilose, the styles 2-fid or entire; capsule 2 mm. long, the lobes dorsally carinate; seeds 1 mm. long, narrowly ovoid.

The Maya name in Yucatan is recorded as "xmizbil"; names reported from Salvador are "taba de pollo," "gusanillo," and "tarco," but these may pertain rather to *A. arvensis*. The species is rare in most parts of Central America, the majority of the collections reported from that area as *A. alopecuroides* being rather *A. arvensis*.

*Acalypha arvensis* Poepp. & Endl. Nov. Gen. 3: 21. 1845. *Hierba del cáncer*; *Gusanillo*; *Gusanito*; *Mata-gusano*; *Corrimiento* (Petén); *Sajoí* (Petatán, Huehuetenango); *Ccul* (Chimaltenango, fide Tejada); *Ztajnoy* (Quiché, fide Tejada).

Moist or wet thickets, fields, or banks, often a weed in cultivated or waste ground, frequent on sandbars along streams, 1,500 meters or less; Petén; Alta Verapaz; Izabal; El Progreso; Zacapa; Santa Rosa; Escuintla; Guatemala; Suchitepéquez; Retalhuleu; San Marcos; Huehuetenango. Southern Mexico; British Honduras; Honduras; Costa Rica; Panama; Martinique; tropical South America.

Plants annual, erect or ascending, usually 50 cm. high or less, simple or branched, the stems sometimes more elongate, procumbent, and rooting at the lower nodes, spreading-pilose or glabrate, densely pubescent on the younger parts; leaves membranaceous, on petioles 2-3.5 cm. long, rhombic-ovate or rhombic-lanceolate, mostly 3-7 cm. long, acute or obtuse, obtuse at the base, palmate-nerved, crenate-serrate, pilose on both surfaces with spreading or appressed hairs or sometimes glabrate; spikes slender-pedunculate, axillary, androgynous, the upper ones almost wholly pistillate, 1.5-2.5 cm. long, 10-13 mm. broad, bearing a few staminate flowers at the apex; lower spikes almost wholly staminate, 2 mm.

thick; fruiting bracts 5 mm. wide, 4-7-lobate to the middle, the lobes triangular-ovate, filiform-acuminate, hirsute, some of the hairs gland-tipped; styles lacinulate; capsule 2 mm. broad, pilose; seeds broadly ovoid, 1 mm. long.

Called "gatito" in Yucatan; "espinosilla" (Oaxaca); "hierba del gusano" (Veracruz). The plant is known everywhere in Guatemala by the name "hierba del cáncer," and it is much used in household medicine. There is a general belief among the country people that it is a remedy for "cancer" (of which they often have very vague ideas), and it is used commonly in treating sores, cutaneous and venereal diseases, and the bites of various poisonous animals.

***Acalypha chlorocardia*** Standl. Field Mus. Bot. 8: 18. 1930.

Known only from the type, Middlesex, British Honduras, on river bank, 60 meters, *W. A. Schipp* S-45.

A shrub a meter high, the young branches rather densely hirsute with long spreading whitish hairs; stipules 1 cm. long, linear-subulate, glandular-denticulate; leaves membranaceous, on petioles 12-16 cm. long, ovate or broadly ovate, 12-15 cm. long, 7-9 cm. wide, long-acuminate, rounded and shallowly cordate at the base, closely appressed-serrate, sparsely hirsute above, thinly hispidulous beneath, palmately 5-7-nerved at the base; terminal spike pistillate, 19 cm. long, rather dense, the bracts numerous, the lowest ones resembling the leaves, as much as 7 cm. long, narrowly long-acuminate, the upper ones sessile, cordate-clasping, 1 cm. long, about 15-serrate, acuminate, appressed-hispidulous, the uppermost bracts only 5 mm. long, acute, crenate-serrate; pistillate flowers sessile; ovary densely hispidulous; style branches multilacinulate.

From the single sheet of this species it is difficult to decide whether the pistillate spikes are really terminal. In general appearance the plant resembles *A. macrostachya*.

***Acalypha costaricensis*** (Kuntze) Knobloch in Just, Bot. Jahresb. 19: 337. 1894. *Ricinocarpus costaricensis* Kuntze, Rev. Gen. 615. 1891.

Moist or wet, usually dense, mixed forest or thickets, 2,000 meters or less; Izabal; Escuintla; Sacatepéquez; Chimaltenango; Suchitépéquez; Quezaltenango; San Marcos. Chiapas; British Honduras; Honduras; Costa Rica.

A slender shrub 1.5-5 meters high, the young branches green, terete, at first densely pubescent or hirsute, soon glabrate; leaves thin, bright green, on slender petioles 4-12 cm. long, oblong or elliptic-oblong, mostly 10-20 cm. long and 4-10 cm. wide, long-acuminate, obtuse or acute at the base or often rounded or cuneate to a narrow, subtruncate or subcordate base, coarsely crenate-dentate, essentially penninerved, glabrous or nearly so or often hirsute beneath or on both surfaces, the lateral nerves 6-11 pairs; flowers monoecious or dioecious; pistillate inflorescence terminal, paniculate, usually lax and much-branched, often 20 cm. long,



pedunculate, the branches hirsute or almost glabrous; pistillate bracts very small, 1-2-flowered, the pedicels 1.5 mm. long or more; ovary densely muricate; style elongate, pinnate-lacinulate, usually purple-red.

A very common shrub in the Atlantic lowlands, often in second growth. Material of this species has been reported from Guatemala as *A. Schlechtendaliana* Muell. Arg., a species of southern Mexico that does not reach Central America, so far as our material indicates. The key characters used by Pax and Hoffman for separating these two species are not reliable, but it is believed that both are good species, separable on other characters.

***Acalypha diversifolia*** Jacq. Pl. Hort. Schoenbr. 2: 63. pl. 244. 1797. *A. leptostachya* HBK. Nov. Gen. & Sp. 2: 96. 1817. *A. diversifolia* var. *leptostachya* Muell. Arg. in DC. Prodr. 15, pt. 2: 854. 1866. *A. tabascensis* Lundell, Lloydia 4: 51. 1941. *Cacucup* (Alta Verapaz); *Ciiche* (Maya); *Palo de sangre* (Petén, fide Lundell).

Moist or wet thickets or forest, often in second growth thickets, sometimes in open pine forest, 1,000 meters or less; Petén; Alta Verapaz; Izabal. Southern Mexico; British Honduras to Panama; tropical South America.

Usually a rather slender shrub of 1.5-3 meters, sometimes a tree of 6 meters, the branches often elongate and recurved, when young villous or appressed-pilose, in age glabrate and brown or reddish brown; leaves thick-membranaceous, on petioles 1-2 cm. long or rarely longer, oblong-lanceolate to oblong-ovate, mostly 7-15 cm. long, acuminate or long-acuminate, obtuse at the base, serrate or crenate, penninerved, with 6-9 pairs of lateral nerves, velutinous-pubescent or glabrate; stipules 5-6 mm. long, linear-setaceous from a broad base; flowers monoecious; spikes axillary, staminate or androgynous and then with 1-2 pistillate bracts at the base, 5-11 cm. long, 2-4 mm. thick, sessile or subsessile, the staminate portion of the spike often deciduous, or the inflorescence wholly pistillate and consisting of 1 or few crowded pistillate bracts; pistillate bracts obtuse or acute, shallowly few-dentate, 1-3-flowered, in fruit 4-6 mm. broad; ovary muricate, hispidulous; styles pinnately lacinulate; capsule almost 3 mm. broad; seeds 1.5 mm. long, minutely puncticulate.

Known in Honduras as "costilla de caballo" and "costilla de danto"; "tapa-camino" (Veracruz). This is a very common shrub of second growth thickets along almost the whole Atlantic coast of Central America.

***Acalypha euphrasiostachys*** Bartlett, Proc. Amer. Acad. 43: 55. 1907.

Known in Guatemala only from the type, Zacapa, Dept. Zacapa, 185 meters, C. C. Deam 190. Also in the State of Mexico, Mexico.

A slender shrub 1-2 meters high, the young branches hispidulous and puberulent, in age glabrate and dark reddish brown; leaves membranaceous, on slender petioles 1-2 cm. long, ovate or elliptic-ovate, 3-8 cm. long, 2-4.5 cm. wide, abruptly acuminate, obtuse to subcordate at the base, serrate, palmately 3-5-nerved, thinly or rather densely soft-pilose on both surfaces with rather short, spreading, soft hairs; spikes all axillary, the staminate about 1 cm. long, lax and interrupted, sessile; pistillate spikes 2-7 cm. long, the bracts remote, usually 3-7, sometimes only 1-2, about 8 mm. long and 10 mm. wide, 1-flowered, about 13-dentate, with unequal subacuminate teeth, hispidulous and glandular-pubescent; ovary densely pilose; styles multilacinulate.

A little-known plant, of somewhat uncertain status. Although placed by Pax and Hoffmann far apart from *A. leptopoda*, it is actually closely related to that species.

***Acalypha Ferdinandi*** K. Hoffm. Pflanzenreich IV. 147, xvi: 63. 1924.

Moist or wet, mixed forest, often on limestone, 1,300 meters or less; Alta Verapaz (type from Cubilgüitz, *Tuerckheim* II.187); Izabal. Atlantic lowlands of Honduras; Costa Rica.

A slender shrub 2 meters high, or sometimes a tree of 7 meters, the branches slender, usually glabrous; leaves firm-membranaceous, on slender petioles 1.5 cm. long or shorter, obovate-oblong to oblanceolate or lanceolate, usually broadest above the middle, 8-18 cm. long, 2.5-7 cm. wide, rather abruptly acuminate or caudate-acuminate, attenuate to a narrow, truncate or cordate base, serrate, penninerved, usually glabrous, the lateral nerves 7-10 pairs; stipules 5-10 mm. long, setaceous-filiform, rigid; flowers monoecious, the spikes axillary, 2.5-7 cm. long, short-pedunculate, the staminate very dense; pistillate spikes mostly in the upper leaf axils, sometimes terminal, lax, in fruit as much as 15 cm. long, the bracts remote, in fruit as much as 1 cm. long and wide, rounded-ovate, acute, 1-2-flowered, puberulent and stipitate-glandular, 13-15-dentate, the teeth short, acute or acuminate; ovary muricate, hirtellous and often stipitate-glandular; styles multilacinulate.

Called "costilla de danto" in Honduras. This has been recorded from Guatemala as *A. cuneata* Muell. Arg. var. *obovata* Muell. Arg., a quite different South American species.

***Acalypha firmula*** Muell. Arg. Linnaea 34: 21. 1865 (type from Salvador). *A. porphyrantha* Standl. Journ. Arnold Arb. 11: 32. 1930 (type from Siguatepeque, Comayagua, Honduras). *Hierba de San Antonio* (fide Aguilar).

Usually in moist or dry, pine or oak forest, 1,100-2,000 meters; Chiquimula; Jalapa; Guatemala. Honduras; Salvador.

A slender shrub 1-3 meters high, the branches pilose with spreading hairs or almost glabrous, purplish-red or ferruginous in age; leaves firm-membranaceous,

on slender petioles 1-7 cm. long, ovate to broadly ovate or oblong-ovate, 3-11 cm. long, mostly abruptly long-acuminate, rounded and shallowly cordate at the base, crenate-serrate, glabrous or sometimes rather densely soft-pilose; staminate spikes axillary, sessile, dense, short; pistillate spikes terminal, subsessile, very lax and interrupted, the bracts in fruit only 3 mm. long, shallowly about 11-dentate, stipitate-glandular; styles bright purple-red, showy; ovary muricate and hirtellous; seeds almost 2 mm. long.

The leaves frequently are deep purple on the lower surface.

***Acalypha guatemalensis*** Pax & Hoffm. Pflanzenreich IV. 147, xvi: 27. 1924. *Hierba del cáncer*.

Moist or dry fields or thickets, sometimes in rather open forest, especially of oak or *Alnus*, or on open banks, frequently a weed in cultivated ground, 750-2,500 meters; Baja Verapaz; Jalapa; Santa Rosa; Guatemala; Sacatepéquez; Chimaltenango; Sololá; Quiché; Huehuetenango (type from Jacaltenango, *Seler* 3261); Quezaltenango. Honduras.

Plants herbaceous, usually perennial but sometimes annual, erect or ascending, sometimes a meter high but usually lower, simple or branched, mostly erect, sometimes decumbent, when young puberulent or pilosulous with ascending or sub-appressed hairs; leaves on petioles 3 cm. long or usually shorter, rounded-ovate or rhombic-ovate, 4-7 cm. long, acuminate or acute, obtuse to usually broadly rounded at the base, crenate, membranaceous, 5-nerved, thinly pilose along the nerves and veins or sometimes rather densely and softly pubescent, in age often glabrate; flowers monoecious, the spikes mostly androgynous, terminal and axillary, generally numerous, the larger ones 4-5 cm. long or more, very dense, many-flowered, pedunculate or subsessile; staminate portion of the spike short, dense; pistillate bracts in fruit 5 mm. broad, 5-7-lobate to the middle, setose and bearing short gland-tipped hairs, 1-2-flowered, the lobes lanceolate; ovary hirtellous; styles pinnately 6-10-lacinulate, purple-red; capsule tuberculate, 3 mm. in diameter; seeds ovoid, smooth, 2 mm. long.

This has been reported from Guatemala as *A. alopecuroides* Jacq.

***Acalypha gummifera*** Lundell, Contr. Univ. Mich. Herb. 4: 10. 1940.

Wet mixed forest, often or usually on limestone, 150-875 meters; Petén (type from Camp 34, British Honduras boundary, *W. A. Schipp* 1290); Alta Verapaz; Izabal. British Honduras.

A slender shrub 1-2.5 meters high, glabrous throughout; leaves firm-membranaceous, on slender petioles 1-4 cm. long, lanceolate or narrowly lanceolate, 8-14 cm. long, 1-4 cm. wide, narrowly long-acuminate, narrowed to the narrowly rounded base, penninerved or somewhat 3-nerved at the base, remotely and inconspicuously serrulate, very lustrous and glutinous-viscid on the upper surface, somewhat paler beneath, sparsely barbellate beneath in the axils of the nerves, the lateral nerves 5-6 pairs; flowers monoecious, the spikes axillary, the staminate

ones 3–6.5 cm. long, very dense; pistillate flowers paniculate, the panicles as much as 6 cm. long, with sparse filiform branches; capsule almost 3 mm. long, glabrous; seeds reddish brown, ovoid, 2 mm. long.

The species is well marked by the very lustrous, glutinous upper surface of the leaves, a character found in no other local species.

***Acalypha hispida*** Burm. Fl. Ind. 203. *pl.* 61, *f.* 1. 1768.

Perhaps native of the islands of the South Pacific, but grown for ornament in most tropical regions; planted commonly in Guatemala, mostly in the tierra caliente, but also in such places as Guatemala and Antigua.

A shrub, the stout branches tomentulose at first; leaves slender-petiolate, broadly rhombic-ovate, 9–15 cm. long, cuspidate-acuminate, cuneately narrowed at the base, firm-membranaceous, serrate, glabrate, 3-nerved at the base, penninerved above; flowers dioecious; pistillate spikes axillary, pendent, 30 cm. long or less, very dense, the style branches red or purple-red; bracts small, ovate-lanceolate, entire, pubescent.

Sometimes called "chenille plant" in English; "cola de zorro" (Salvador); "nemiz" (Maya); "cola de gato" (Yucatan). The very numerous, large, thick, drooping, bright red or purple-red flower spikes are very showy and ornamental.

***Acalypha indica*** L. Sp. Pl. 1030. 1753.

The typical form of this species is widely distributed in the Old World tropics. In tropical North America it is represented by the following variety:

***Acalypha indica* var. *mexicana*** (Muell. Arg.) Pax. & Hoffm. Pflanzenreich IV. 147, xvi: 35. 1924. *A. mexicana* Muell. Arg. Linnaea 34: 41. 1865.

Moist or wet fields or thickets, usually a weed in waste or cultivated ground, 1,200–2,400 meters; Alta Verapaz; Guatemala; Sacatepéquez; Chimaltenango; Huehuetenango; Quezaltenango. Southern Mexico; Costa Rica.

A slender annual, erect or decumbent, simple or usually branched, often branched from the base, mostly 50 cm. high or lower, the stems sparsely pubescent when young, soon glabrate; leaves on long slender petioles, thin, ovate or rhombic-ovate, 2–6 cm. long, acute or usually obtuse, cuneate or rounded at the base, crenate, glabrous or nearly so in age, 5-nerved at the base; spikes axillary, androgynous, solitary or geminate, mostly very short, the staminate portion 1 cm. long or less; pistillate bracts 1–4, often remote, foliaceous at maturity, suborbicular, 6–12 mm. broad, dentate, 1–2-flowered, sparsely setulose-pilose on the nerves;

ovary pilose, the style short, sparsely lacinulate; capsule short-pilose, 2 mm. broad; seeds broadly ovoid, 1.5 mm. long, minutely punctulate.

The occurrence of this plant in Guatemala is such that it may be presumed to be of foreign origin. It is rarely found except in cultivated ground or in the immediate vicinity of settlements.

***Acalypha lancetillae*** Standl. Field Mus. Bot. 4: 312. 1929.

Wet mixed lowland forest, at or little above sea level; Izabal. British Honduras; Atlantic coast of Honduras (type from Lancetilla Valley near Tela).

A shrub or small tree 1-6 meters high, sparsely branched, the branches densely pilose with soft spreading hairs, the older ones pale brown; stipules setaceous 7-13 mm. long; leaves thin, on petioles 1-4 cm. long, oblong to obovate-oblong or oblanceolate, mostly 7-17 cm. long and 3-7 cm. wide, short-acuminate or long-acuminate, gradually narrowed below to the narrow, obtuse to shallowly cordate base, closely serrate, hirsute or hirtellous above, densely velutinous-pilose beneath, penninerved, the lateral nerves about 11 pairs; flowers monoecious, the staminate spikes dense, slender, axillary, subsessile, mostly 5-8 cm. long, 2 mm. thick; terminal spike about 7 cm. long and 1 cm. thick, the terminal portion caudiform, staminate, dense, the pistillate portion about 4.5 cm. long, short-pedunculate; pistillate bracts as much as 7 mm. long, cleft into about 11 linear-subulate lobes extending almost to the base of the bract, densely hispidulous, eglandular, the axillary pistillate spikes reduced to usually a single sessile bract; styles much elongate, with very numerous capillary branches; capsule hispidulous.

***Acalypha Langiana*** Muell. Arg. Linnaea 34: 159. 1865.

In canyon, 1,100 meters, Guatemala (Fiscal, *C. C. Deam* 6108). Southern Mexico.

A slender shrub about a meter high, the branches densely short-pilose and bearing numerous short gland-tipped hairs; leaves slender-petiolate, thin, ovate or lance-ovate, 4-7 cm. long, acuminate, rounded at the base, crenate, 5-nerved at the base, glabrate above, densely velutinous-pilose beneath with very short hairs; stipules setaceous; flowers monoecious, the spikes axillary, unisexual, short-pedunculate; pistillate spikes laxly flowered, the bracts 3 mm. long, 5 mm. broad, reniform, about 2-flowered, rounded-obtuse, densely glandular-puberulent, shallowly 9-13-dentate, the teeth triangular, acute; ovary somewhat muriccate, pubescent; styles pectinately 6-9-lacinulate; seeds minutely foveolate-punctulate.

The available material of this species is scant, and the proper position of the single Guatemalan collection is somewhat uncertain.

***Acalypha leptopoda*** Muell. Arg. Linnaea 34: 39. 1865.

A slender shrub 1-3.5 meters high, the indument of the stems and leaves variable; leaves on petioles 1-6 cm. long, membranaceous or thick-membranaceous and rather rigid, lance-ovate to broadly ovate, mostly 4-10 cm. long, acuminate or long-acuminate, rounded or shallowly cordate at the base, serrate, the young

leaves pubescent on both surfaces, 3-nerved at the base, penninerved above the base; stipules 5–10 mm. long, subulate-filiform; flowers monoecious, the spikes axillary, the staminate ones 3–6 cm. long, pedunculate, dense; pistillate spikes consisting of 1 or 2 bracts, borne on a very slender peduncle 2–3.5 cm. long; fruiting bracts about 8 mm. broad, 1-flowered, orbicular, incised-dentate almost to the base, the 13–17 teeth lanceolate, acute, sometimes sparsely and minutely stipitate-glandular; ovary pubescent; styles pectinately multilacinulate; capsule slightly muricate; seeds 1.5 mm. long, puncticulate.

The species as treated by most authors consists of the two following varieties:

***Acalypha leptopoda* var. *glabrescens*** Muell. Arg. in DC. Prodr. 15, pt. 2: 824. 1866. *A. Lotsyi* Donn. Smith, Bot. Gaz. 20: 544. 1895 (type from Pansamalá, Alta Verapaz, *Tuerckheim* 1242). *Tejedor*; *Lolosán*, *Loasám* (Alta Verapaz, Quechí); *Canilla de venado*.

Dry to wet thickets or rather thin forest, sometimes in pine forest, 2,100 meters or less; Alta Verapaz; Baja Verapaz; Chiquimula; Jalapa; Jutiapa; Santa Rosa; Guatemala; Sacatepéquez; Chimaltenango; Retalhuleu; Quezaltenango; San Marcos; Huehuetenango. Southern Mexico; Honduras and Salvador to Panama.

Leaves and stems glabrate, or the leaves often quite glabrous at maturity.

Around Cobán the plant is used commonly in domestic medicine, as a lotion for treating burns, infected cuts, and various skin affections, and as a shampoo for the hair.

***Acalypha leptopoda* var. *mollis*** Muell. Arg. in DC. Prodr. 15, pt. 2: 824. 1866. *Bisic* (Cobán, Quechí).

Dry to wet thickets, often in open or dense, moist or wet forest, 600–2,300 meters; Alta Verapaz; El Progreso; Jutiapa; Santa Rosa; Guatemala; Quiché; Huehuetenango. Southern Mexico; Honduras; Costa Rica.

Leaves densely velutinous-pilose, especially beneath, the pubescence persistent in age.

The two varieties probably are not systematically important, although the plants differ visibly in appearance. They do not have distinctive ranges in Guatemala.

***Acalypha macrostachya*** Jacq. Pl. Hort. Schoenbr. 2: 63. *pl.* 245. 1797.

A stout shrub 1–4.5 meters high, variable in pubescence, the branches usually thick and with large pith; leaves membranaceous, on petioles 5–25 cm. long, ovate to broadly ovate or triangular-ovate, 10–25 cm. long, 6–18 cm. wide, usually

abruptly acuminate or caudate-acuminate, rounded and often cordate at the base, serrate, palmate-nerved; stipules 1-1.5 cm. long, linear-lanceolate from an ovate base, glandular-ciliate, persistent; flowers monoecious or perhaps sometimes dioecious; spikes axillary, as much as 40 cm. long, sessile or short-pedunculate; staminate spikes dense, up to 5 mm. in diameter; pistillate spikes dense or lax, sometimes with staminate flowers at the apex; pistillate bracts very numerous, broadly ovate, shallowly 13-27-dentate, 1-flowered, the teeth triangular, acuminate, in fruit 5-7 mm. wide; ovary hispid, the styles purple-red, 10-20-lacinulate; capsule almost 4 mm. broad, pilose; seeds 2 mm. long, minutely puncticulate.

The species, as treated by Pax and Hoffmann, includes the following varieties, separated on the basis of pubescence, and not sharply separable. Still another variety is reported by the same authors from Peru and Bolivia.

***Acalypha macrostachya* var. *hirsutissima* (Willd.) Muell.** Arg. Linnaea 34: 11. 1865. *A. hirsutissima* Willd. Sp. Pl. 4: 528. 1805. *A. sidaefolia* HBK. Nov. Gen. & Sp. 2: 95. 1817. *A. macrostachya* var. *sidaefolia* Muell. Arg. Linnaea 34: 11. 1865. *Comida de venado* (Quezaltenango); *Chichicaste de agua* (fide Aguilar); *Chichicaste* (Santa Rosa; probably an erroneous name); *Sesic* (Quechí).

Wet to dry, brushy hillsides or ravines or moist or wet forest, 2,000 meters or less, most frequent at about 1,000 meters; Alta Verapaz; Baja Verapaz; Izabal; Santa Rosa; Escuintla; Guatemala; Huehuetenango; Quezaltenango; San Marcos. Southern Mexico; British Honduras; Honduras and Salvador to Panama; tropical South America.

Young branches and petioles usually very densely pilose; leaves densely velutinous-pilose on the lower surface, the pubescence persistent in age.

Sometimes called "shuampa" in Salvador. This has been reported from Guatemala as *A. caucana* Muell. Arg., a South American species. Both these varieties have approximately the same distribution in Guatemala and are of apparently little or no taxonomic importance.

***Acalypha macrostachya* var. *macrophylla* (HBK.) Muell.** Arg. in Mart. Fl. Bras. 11, pt. 2: 345. 1874. *A. macrophylla* HBK. Nov. Gen. & Sp. 2: 96. 1817.

Moist or wet thickets or rather open, mixed forest, often on steep rocky hillsides, 250-1,500 meters; Alta Verapaz; Santa Rosa; Escuintla; Sacatepéquez; Chimaltenango; Suchitepéquez; Retalhuleu; Quezaltenango; San Marcos. Honduras to Panama; tropical South America.

Branches and petioles sparsely or rather densely hirsute or pubescent; leaves in age glabrate except on the nerves.

***Acalypha mollis* HBK.** Nov. Gen. & Sp. 2: 94. 1817.

At 1,200–1,500 meters; Baja Verapaz (Panzal); Guatemala. Southern Mexico.

A shrub, the branches stout, densely velutinous-pilose; leaves membranaceous, on slender petioles 1–4 cm. long, broadly ovate to lance-ovate, mostly 7–11 cm. long, narrowly long-acuminate or cuspidate-acuminate, rounded or very obtuse at the base, serrate-dentate, 5-nerved at the base, usually very densely soft-pilose, especially beneath; flowers monoecious, the staminate spikes axillary, 3–5 cm. long, 2–3 mm. thick, pedunculate, very dense; pistillate spikes terminal and in the axils of the uppermost leaves, pedunculate, very dense, 1 cm. thick, short or usually much elongate; pistillate bracts reniform-ovate, 11–15-dentate, 2–3-flowered; ovary villous-pubescent; styles 8–12-lacinulate.

***Acalypha Mortoniana* Lundell,** Bull. Torrey Club 64: 552. 1937.

Limestone thickets or open forest, 300 meters or less; Petén (type from Uaxactún, *H. H. Bartlett* 12740). British Honduras.

A shrub of 1.5–4 meters, the branchlets thick, pubescent with mostly sub-appressed, ochraceous hairs; stipules setaceous, 5 mm. long; leaves on slender petioles 11 cm. long or less, membranaceous, ovate or elliptic-ovate, 10–25 cm. long, 4–13 cm. wide, acuminate, rounded and usually shallowly and narrowly cordate at the base, coarsely crenate, palmately 5-nerved, at first finely velutinous-pubescent on both surfaces, glabrate in age; flowers monoecious, the staminate spikes axillary, 5–16 cm. long; pistillate spikes terminal, 10–12 cm. long, many-flowered, the bracts reniform-cordate, 5–6 mm. long, 6–8 mm. wide, very shallowly dentate, glandular-pilose, in fruit 9 mm. long and 16 mm. wide, with about 10 acute teeth; ovary sparsely hirsute; capsule 5 mm. long, very sparsely pilose or almost glabrous; seeds smooth, 4 mm. long.

***Acalypha persimilis* Muell. Arg.** Linnaea 34: 25. 1865. *Chum-pito*.

Moist thickets, dry rocky slopes, on sandbars along streams, or a weed in waste ground, 200–1,375 meters; Jalapa; Jutiapa; Santa Rosa; Escuintla; Huehuetenango. Southern Mexico; Greater Antilles.

An erect annual, 50 cm. high or less, usually branched, sometimes simple, the stems densely pubescent at first; leaves membranaceous, on slender petioles 2–7 cm. long, ovate, 3–7 cm. long, 2.5–4.5 cm. wide, acute or short-acuminate, rounded and usually more or less cordate at the base, closely and finely serrulate, 5-nerved at the base, thinly pubescent when young, in age glabrate, punctulate-scabrous; flowers monoecious, the staminate spikes axillary, 2 cm. long or less, slender-pedunculate; pistillate spikes terminal and in the upper leaf axils, the



terminal ones 3–4 cm. long, in fruit about 5 mm. thick, many-flowered, often lax; pistillate bracts reniform-orbicular, 4–5 mm. broad, rather shallowly 19–21-dentate, the teeth narrowly triangular, scabrous and sometimes pilose, 1-flowered; styles short, 3–4-lacinulate; capsule 3 mm. broad, papillose-hirtous; seeds 2 mm. long, rugose-tuberculate.

**Acalypha phleoides** Cav. Icon. Pl. 6: 42. *pl.* 569, *f.* 2. 1801.  
*Hierba del cáncer; Hierba del estómago* (fide Aguilar).

Usually in moist or dry, open, grassy, pine-oak forest, often in rocky places or in open fields or hillsides, 750–2,100 meters; Jalapa; Santa Rosa; Guatemala; Sacatepéquez; Quiché; Huehuetenango. Mexico.

A perennial herb, usually from a thick woody root, the stems 50 cm. long or less, often numerous, erect to procumbent, puberulent or hirsute, little branched; petioles mostly less than 1 cm. long; leaf blades ovate or elliptic, 2–4 cm. long, 1–3 cm. wide, acute or obtuse, usually obtuse at the base, crenate-serrate, generally very finely so, 3–5-nerved, pilose or glabrate, punctate-scabrous; spikes androgynous, terminal and axillary, staminate above, or the axillary spikes often wholly staminate; terminal spikes 2–9 cm. long, the pistillate portion usually dense; pistillate bracts 1–2-flowered, suborbicular, 6–8 mm. long, coarsely 5–7-dentate, the teeth broadly triangular, acute, hispidulous or pubescent; ovary hirsute above, the styles purple-red, 6–8-lacinulate; capsule 2 mm. long; seeds subglobose, 1.5–2 mm. long, fuscous in age.

**Acalypha Poirerii** Spreng. Syst. 3: 879. 1826. *A. yucatanensis* Millsp. Field Mus. Bot. 1: 371. 1898.

Moist thickets, 200–500 meters; reported by Pax and Hoffmann as collected in Guatemala by Friedrichsthal, the locality not indicated. Southern Mexico; tropical South America.

An erect annual, generally 50 cm. high or less, slender, branched, the stems hirsute or pilose; leaves thin, on slender petioles 4 cm. long or shorter, rhombic-ovate to oblong-ovate, 3–6 cm. long, acute or acuminate, rounded at the base, crenate-serrate, thinly or densely pilose with soft spreading hairs; spikes androgynous, terminal and axillary, the upper ones very dense, oblong, chiefly pistillate, the staminate portion very small and hidden among the pistillate bracts, the lower spikes staminate, with 1–2 pistillate bracts at the base; pistillate bracts 7 mm. broad, 7–9-fid for one-fifth their length, 1-flowered, densely pilose or hirsute; styles simple; capsule 2 mm. broad, hirsute and tuberculate near the apex; seeds narrowly ovoid, foveolate-puncticulate.

**Acalypha polystachya** Jacq. Pl. Hort. Schoenbr. 2: 64. *pl.* 246. 1797. *A. Matudai* Lundell, Contr. Univ. Mich. Herb. 4: 10. 1940 (type from Chiapas).

Moist thickets or fields, sometimes on sandbars along streams, or a weed in cultivated ground, 400 meters or less; Zacapa; Suchitpéquez; San Marcos; Huehuetenango. Mexico; Costa Rica.

An erect annual, the stems somewhat succulent, a meter high or less, stout, mostly simple, often fistulous, puberulent when young; leaves on very slender petioles 4-12 cm. long, thin, ovate or broadly ovate, about 10 cm. long and 6-9 cm. wide or often smaller, acute or abruptly short-acuminate, broadly rounded at the base, finely and closely serrate, thinly pilose on the upper surface or glabrate, somewhat paler beneath, glabrate, punctate, palmately 3-5-nerved; flowers monoecious, the staminate spikes axillary, 4 cm. long or less, slender, dense; pistillate spikes mostly terminal, in fruit as much as 15 cm. long and 1 cm. broad, dense or often interrupted below; pistillate bracts 9-11-parted nearly to the base, the segments almost setaceous, sparsely stipitate-glandular, 1-flowered, in fruit 1 cm. long; ovary glabrous, the styles 2-4-fid; capsule 4-5 mm. in diameter; seeds ovoid, almost 3 mm. long, acute, scrobiculate-roughened.

Called "equilite" in Veracruz. It is reported from Chiapas that the plant is sometimes eaten, presumably as a pot herb.

***Acalypha pseudoalopecuroides*** Pax & Hoffm. Pflanzenreich IV. 147, xvi: 86. 1924.

Moist brushy slopes or in quebradas, 200-500 meters; Zacapa. Southern Mexico; Honduras.

Plants annual, 50 cm. high or less, erect, usually with numerous spreading branches, the stems densely pilose and glandular-hirsute, often villous at the base; leaves on slender petioles 1-2 cm. long, thin, ovate or broadly ovate, 2-4.5 cm. long, 1.5-3 cm. wide, acute or acuminate, rounded and often shallowly cordate at the base, crenate, 5-nerved at the base, sparsely or densely long-pilose on both surfaces, glabrate in age, puncticulate, usually more or less glandular-pilose; flowers monoecious, the staminate spikes terminal, 1 cm. long, slender, pedunculate; pistillate spikes axillary, 1.5-2.5 cm. long, 1 cm. broad, pedunculate, very dense, usually unisexual, many-flowered; pistillate bracts shallowly about 7-dentate, the teeth acute, densely glandular-pilose; ovary long-pilose, the style short, simple; capsule pubescent, 2.5 mm. broad; seeds 1.5 mm. long.

This has been reported from Honduras as *A. Poirerii* Spreng. Although *A. Poirerii* and *A. pseudoalopecuroides* are placed far apart in their monograph by Pax and Hoffmann, because of the disposition of the inflorescences, the two plants are almost exactly alike in general appearance.

***Acalypha Schiedeana*** Schlecht. Linnaea 7: 384. 1832.

Moist or dry thickets on hillsides or along streams, often in rocky places, 200-1,350 meters; Zacapa; Chiquimula; Jalapa; Baja Verapaz; Guatemala; Huehuetenango. Southern Mexico.

A slender, much-branched shrub 1-3 meters high, the branchlets densely pubescent or glabrate; leaves thin, on slender petioles 1-5 cm. long, broadly ovate to lance-ovate, 5-13 cm. long, acute or acuminate, often abruptly so, usually rounded at the base and often cordate, crenate-dentate, varying from densely and softly pubescent to almost glabrous, 3-5-nerved at the base; stipules setaceous,

1 cm. long or less; staminate spikes axillary, 3 cm. long or less, slender, sessile, dense; pistillate spikes terminal, pedunculate, 3-10 cm. long, usually dense and many-flowered; fruiting bracts 5-10 mm. broad, truncate, 7-11-dentate, the teeth triangular or lanceolate, acute, 1-flowered, pubescent and stipitate-glandular, sometimes glabrate; ovary hirsute, muricate; styles 5-10-lacinulate; capsule 3 mm. broad; seeds broadly ovoid, 1.5-2 mm. long.

*Acalypha septemloba* Muell. Arg. was described from Guatemala on the basis of *Friedrichsthal* 1354, and is reported from the same country by Pax and Hoffmann. The type actually came, according to the original label, from Cartago, Costa Rica.

*Acalypha setosa* A. Rich. in Sagra, Hist. Cuba 3: 204. 1850. *Corrimiento* (Petén).

Moist or wet thickets, often a weed in waste ground or in fields, 900 meters or less; Petén; Alta Verapaz; Zacapa; Santa Rosa; Escuintla; Sololá. Southern Mexico; British Honduras; Honduras; West Indies; northwestern South America.

An erect annual, usually 75 cm. high or less, simple or sparsely branched, the young stems puberulent or pilose; leaves thin, on slender petioles 2-7 cm. long, ovate or broadly ovate, 3-10 cm. long, acute or abruptly short-acuminate, obtuse or rounded at the base and often shallowly cordate, finely and closely serrulate, 3-5-nerved at the base, thinly pilose or hirsute when young but in age glabrate, rough-punctulate; flowers monoecious, the staminate spikes axillary, short, about 1 cm. long, pedunculate; pistillate spikes terminal and in the uppermost leaf axils, the terminal ones 3-6 cm. long, dense or lax and interrupted, in fruit 5 mm. broad; fruiting bracts 5-6 mm. long, 7-13-parted almost to the base, 1-flowered, scaberulous, the lobes setaceous-filiform, eglandular; ovary hirtellous, the styles 4-6-lacinulate; capsule 2 mm. broad, pilose; seeds 1 mm. long, smooth.

Called "gusanillo" and "tarco" in Salvador.

*Acalypha Skutchii* I. M. Johnston, Journ. Arnold Arb. 19: 120. 1938. *Oreja de venado*.

Moist or wet, mixed forest, mostly in quebradas, 1,200-2,000 meters; Quezaltenango (type from Volcán de Zunil, A. F. Skutch 981); San Marcos. Oaxaca; Chiapas.

A simple or branched shrub or small tree, 1.5-6 meters high, the branches stout, strigillose or glabrate; leaves mostly on very long, slender petioles, these often 15 cm. long; leaf blades oblong to lanceolate or broadly ovate, 10-20 cm. long, 3-12 cm. wide, abruptly acuminate or long-acuminate, narrowly obtuse to broadly rounded at the base, crenate-serrate, strigillose when young but in age almost wholly glabrous, slightly paler beneath, penninerved or rather conspicuously 3-nerved at the base, the lateral nerves 7-10 pairs; stipules 10-18 mm. long; spikes unisexual, the pistillate ones terminal, with a very stout rachis, 10-20 cm. long, short-pedunculate, the bracts rather distant, strigillose, in fruit 3-5 mm.

long, deeply 7-11-lobate; styles purple-red, lacinulate; ovary strigose; capsule 5-6 mm. broad.

This shrub is a common one in many of the damp quebradas in the mountains of the Occidente. The leaves exhibit a good deal of variation in outline and venation, so much so that two species may be represented, but the inflorescences seem to be uniform in the several forms. Closely related to this species is *A. laxiflora* Muell. Arg., which is reported from Veracruz and Cuba. While very similar in foliage and other characters to *A. Skutchii*, it seems essentially different (according to a photograph of the type) in its slender flexuous staminate spikes.

***Acalypha subviscida*** Wats. Proc. Amer. Acad. 21: 440. 1886.

Mostly in pine-oak forest, 1,900-2,050 meters; Chimaltenango; Huehuetenango. Mexico.

An erect or suberect perennial, herbaceous throughout or sometimes suffrutescent below, simple or branched, usually much less than a meter high but sometimes as much as 1.5 meters, the stems densely pubescent and stipitate-glandular; leaves on slender petioles 1-6 cm. long, broadly ovate to lance-ovate, thin, 3-9 cm. long, acuminate, rounded and usually somewhat cordate at the base, crenate, palmate-nerved at the base, thinly or densely and softly pubescent, usually stipitate-glandular beneath on the nerves; flowers monoecious, the terminal spikes androgynous or wholly pistillate, 15 cm. long or less, dense, sessile; axillary spikes staminate or pistillate or androgynous, solitary or 2-3-nate, the staminate sometimes 9 cm. long, slender, dense, the pistillate ones 5-7 cm. long; pistillate bracts rather lax, in fruit 6-8 mm. broad, reniform, 8-15-crenate, densely pubescent and stipitate-glandular, 2-4-flowered; styles subpalmately 3-7-lacinulate; capsule 2 mm. broad, pubescent, stipitate-glandular, muricate; seeds 1 mm. long, blackish gray, almost smooth.

***Acalypha tenuicauda*** Pax & Hoffm. Pflanzenreich IV. 147, xvi: 149. 1924.

Moist or wet thickets or mixed forest, often in second growth, 700-2,000 meters; Escuintla (type from Los Diamantes, Barranco del Cucunya, *Seler* 2508); Suchitépéquez; Sololá; Quezaltenango; San Marcos. Chiapas.

A slender shrub 1-4.5 meters high, the branchlets fulvescent-pilose or tomentose at first, soon glabrate; leaves on slender petioles 6-16 cm. long, thin, ovate to rounded-ovate or elliptic-ovate, mostly 10-20 cm. long and 6-15 cm. wide, long-acuminate or caudate-acuminate, obtuse to rounded and subcordate at the base, closely and finely serrate, palmate-nerved at the base, thinly pilose or hirsute or almost glabrous; stipules 8-12 mm. long, triangular-lanceolate, subulate-acuminate, sparsely stipitate-glandular on the margins; flowers monoecious, the spikes axillary, the staminate 5-6 cm. long, short-pedunculate, dense, many-

flowered, 2-3 mm. thick; pistillate spikes slender-pedunculate, often 15 cm. long, dense or usually lax, sparsely pilose; bracts in fruit about 3 mm. long and 6 mm. broad or somewhat larger, broadly reniform, subemarginate at the apex, shallowly about 11-dentate, sparsely stipitate-glandular, the teeth triangular-lanceolate, acuminate; styles pinnately 10-15-lacinulate; capsule 2 mm. broad, verrucose, sparsely pilose.

*A. tacanensis* Lundell (Contr. Univ. Mich. Herb. 4: 11. 1940), described from Volcán de Tacaná, Chiapas, is probably a synonym of this species, although we have seen no material of it. It is described as having larger pistillate bracts, as much as 6.5 mm. long.

***Acalypha trachyloba* Muell. Arg. Flora 55: 25. 1872.**

Moist or wet, mixed or oak, usually dense forest, or in moist or wet thickets, 1,800-3,100 meters; Guatemala; Sacatepéquez; Chimaltenango; Sololá; Huehuetenango; Quezaltenango; San Marcos. Southern Mexico.

A slender shrub, commonly 1-3 meters high, erect or often more elongate and subsucculent, the young branches densely fulvescent-pilose; leaves thin, on slender petioles 1-5 cm. long, broadly ovate or elliptic-ovate, mostly 5-14 cm. long, usually caudate-acuminate, rounded and often shallowly cordate at the base, coarsely crenate-dentate, villous-pubescent on both surfaces, often very densely so, especially beneath, or in age sometimes glabrate, 5-nerved at the base; stipules 5 mm. long, linear, reflexed; flowers monoecious, the spikes axillary, the staminate slender, 7-11 cm. long, sessile or subsessile, dense, tomentulose; pistillate spikes very short in anthesis, borne on long slender peduncles, in fruit 1.5-3 cm. long, very dense, many-flowered, often as broad as long and head-like; fruiting bracts 1-1.5 cm. long, cleft almost to the base into 7-9 stiff, linear or subulate segments, these densely stipitate-glandular; ovary hirtellous and muricate; styles pilose, pectinately dissected; capsule 3 mm. in diameter, tuberculate, hispid; seeds smooth, almost 2 mm. long.

A common shrub in the central and western highlands.

***Acalypha triloba* Muell. Arg. Linnaea 34: 23. 1865. *Hierba del cáncer.***

At 2,500-2,900 meters; Huehuetenango (near San Juan Atitán, Sierra de los Cuchumatanes, *Steyermark* 51959). Mexico(?).

An erect perennial herb almost a meter high, simple or probably sometimes branched, densely hispid almost throughout with long spreading stiff hairs; leaves thin, on long slender petioles, ovate, 5-10 cm. long, acuminate, rounded at the base and often shallowly cordate, crenate-dentate, 3-nerved at the base; flowers monoecious, the spikes axillary and terminal, the staminate ones axillary, about 5.5 cm. long and borne on a peduncle of the same length, slender, interrupted below; pistillate spikes terminal and in the upper leaf axils, subsessile, 5-9 cm. long or shorter, very dense; fruiting bracts 2-3-flowered, 3-lobate to the middle or more deeply, long-ciliate, eglandular, the terminal lobe longer than the others,

triangular-lanceolate, acute, the lateral lobes subquadrate, truncate; ovary hirsute, the styles slender, 5-8-lacinulate, purple-red, showy, the central portion long-pilose; seeds foveolate-punctulate.

This species was described as coming from Mexico, but the labels of the type and other specimens do not indicate any definite locality. The Guatemalan collection cited was obtained in a region through which either Sessé or Mociño or possibly both are known to have passed, and it is quite possible that the type was collected in Guatemala rather than Mexico. In general appearance this species is remarkably like some species of *Urtica*.

***Acalypha unibracteata*** Muell. Arg. *Linnaea* 34: 160. 1865. *Tornillo* (Petén).

Moist or wet, mixed forest or in moist or dry thickets, 200-1,650 meters; Petén; Alta Verapaz; Baja Verapaz; Santa Rosa; Guatemala; Sacatepéquez. Southern Mexico; Salvador.

A slender shrub 1-2 meters high, erect, the young branches fulvous-villosulous, in age brown or reddish brown; leaves thin or in age thick and firm, short-petiolate or the petioles sometimes slender and elongate, lance-ovate to lance-oblong, mostly 2-5 cm. long and 1-3 cm. wide, acuminate or narrowly long-acuminate, obtuse to cordate at the base, crenate-serrate, pilose when young but in age often glabrate, palmate-nerved; stipules small, setaceous-subulate; spikes axillary, unisexual, the staminate 1-1.5 cm. long, pedunculate, grayish-puberulent; pistillate spikes usually on very long, almost filiform peduncles, generally reduced to a single bract; pistillate bracts at anthesis 2 mm. wide, accrescent in age, 1-flowered, reniform-ovate, 9-11-laciniate to about the middle, the segments lanceolate; ovary slightly muricate, pubescent, the styles pectinately about 9-lacinulate.

This and *A. leptopoda* are very closely related, and not always satisfactorily separable. Called "pie de paloma" in Salvador; "chilibtux" (Yucatan, Maya). In Yucatan the slender stout branches are utilized for making baskets and bird cages.

***Acalypha villosa*** Jacq. *Sel. Stirp. Amer.* 254. *pl.* 183, *f.* 61. 1763. *A. flagellata* Millsp. *Field Mus. Bot.* 2: 417. 1916 (type from Yucatan).

Wet to rather dry thickets, frequently in second growth, often on limestone, 1,000 meters or less; Petén; Alta Verapaz; Santa Rosa; Guatemala; Quiché. Southern Mexico; British Honduras; Honduras; Salvador; Costa Rica; Panama; tropical South America.

A shrub 1.5-4 meters high, sparsely branched, the young branches stout, sparsely or densely pubescent; leaves thin, on long slender petioles, ovate to broadly triangular-ovate, mostly 10-20 cm. long and 5-12 cm. wide, usually long-acuminate, generally rounded at the base, often subcordate, crenate, palmate-

nerved, sparsely or densely pilose or almost wholly glabrous; stipules subulate; flowers monoecious, but the branches often unisexual; staminate spikes 3–13 cm. long, dense, short-pedunculate, sometimes with a few pistillate flowers at the base, pubescent; pistillate spikes 3–11 cm. long or longer, very lax, usually simple, sometimes branched, the rachis filiform, pubescent; pistillate bracts minute, with 2 or more flowers, these pedicellate; ovary strongly muricate, otherwise glabrous; styles short, 5–10-lacinulate; capsule 2.5 mm. in diameter, muricate; seeds subglobose, smooth, scarcely 1 mm. long.

Called “tapa-camino” in Veracruz.

*Acalypha Wilkesiana* Muell. Arg. in DC. Prodr. 15, pt. 2: 817. 1866. *Capa del rey*; *Pastor* (Petén).

Perhaps native of the southern Pacific region, now grown for ornament in most tropical and subtropical regions; planted very commonly in Guatemala, at low and middle elevations, most abundant in the lowlands.

Usually a shrub of 1–3 meters, the young branchlets tomentulose or pilose, soon glabrate; leaves rather firm, on long slender petioles, broadly ovate, 10–20 cm. long, short-acuminate, broadly cuneate or very obtuse at the base, crenate-serrate, 5-nerved at the base, often lustrous, deep green with usually pink or pale red margins, often spotted with pink or dull red or purple; flowers monoecious, the spikes axillary; pistillate bracts 1-flowered, sparsely puberulent, 9–13-dentate; ovary puberulent; styles pectinately 11–15-lacinulate.

Called “manto de Jesús” in Salvador. This is one of the most plentiful ornamental shrubs everywhere in the lowlands, thriving with little or no attention, and sometimes persisting around the sites of former dwellings. It is common in most of the cemeteries of the tierra caliente. It is used abundantly for hedges, especially those in the Pacific bocacosta enclosing coffee plantations.

#### ADELIA L.

*Reference*: F. Pax, Pflanzenreich IV. 147, vii: 64–71. 1914.

Shrubs or small trees, pubescent or usually soon glabrate, the branchlets often spinescent; leaves alternate, sometimes crowded on the branchlets, membranaceous or chartaceous, entire, short-petiolate, penninerved, usually barbate beneath in the axils of the nerves, pellucid-puncticulate; flowers dioecious, apetalous, small, axillary, the staminate short-pedicellate, the pistillate long-pedicellate; staminate calyx closed in bud, ovoid, in anthesis valvately 4–5-parted; stamens 8–17, free in bud, in age connate into a short or elongate column, the anthers versatile, dorsifixed near the base, the cells parallel, longitudinally dehiscent; extra-staminal disk usually annular, rarely of 5 glands; pistillate sepals 5–7, narrow, reflexed in anthesis, the disk annular, pubescent, adnate to the calyx; ovary generally 3-celled, the styles free or nearly so, lacinate; ovules 1 in each cell; capsule 3-lobate, pubescent, separating into 2-valvate cocci that separate from

a persistent central column, the endocarp crustaceous; seeds subglobose, smooth, gray, not carunculate; endosperm carnose, the cotyledons broad, flat.

About 10 species, all American and chiefly in tropical America. Two others are known from southern Central America.

**Adelia barbinervis** Schlecht. & Cham. *Linnaea* 6: 362. 1831.

Moist or rather dry thickets or thin forest, sometimes in second growth thickets, 350 meters or less; Petén; Alta Verapaz; Izabal; Retalhuleu; Huehuetenango. Mexico; British Honduras; Salvador.

A shrub or tree, sometimes 9 meters high, with a trunk as much as 20 cm. in diameter, the trunk round, short, the branches spreading, stiff and stout, the small ones often spinose, villosulous-pubescent or in age glabrous or nearly so; leaves on petioles 2–6 mm. long, obovate or obovate-lanceolate, mostly 4–9 cm. long and 2–3.5 cm. wide, cuspidate-acuminate to obtusely acute, narrowed below to a narrow subobtuse base or more often attenuate, chartaceous, deep green and glabrous above, penninerved, paler beneath, pubescent along the costa or at least barbate in the axils of the nerves, the lateral nerves 5–7 pairs; staminate flowers greenish or whitish, few or numerous in each axillary fascicle, the pedicels 3–7 mm. long, the pistillate pedicels 12 mm. long or in fruit as much as 2 cm. long, pubescent; staminate sepals 5, ovate-lanceolate, almost 2 mm. long, pubescent; stamens 8–11, the filaments pilose at the base; pistillate sepals 6–7, linear-lanceolate, acute, 2–3 mm. long; ovary densely hirsute; capsule pubescent, shallowly 3-lobate, the cocci somewhat carinate dorsally, 7 mm. long, 11 mm. broad; seeds globose, lustrous, 4 mm. in diameter.

Known in Salvador by the names “tintorillo,” “macagiuite(?),” and “espino blanco”; “chau” (Yucatan, Maya). In the case of the Salvadorean name “macagiuite” and the statement that the pulverized seeds are applied to the hair to make it soft and sleek, there is probably a confusion with *Trichilia*, which bears this name in Guatemala and is used for this purpose. The wood of *A. barbinervis* is said to be whitish throughout, slightly fragrant when fresh; probably no use is made of it unless as firewood.

### ALCHORNEA Swartz

*Reference:* F. Pax, *Pflanzenreich* IV. 147, vii: 220–253. 1914.

Shrubs or trees, the indument of simple or stellate hairs; leaves alternate, 2-stipulate, on long or short petioles, membranaceous or coriaceous, more or less dentate or subentire, usually with 2 glandular spots beneath at the base, penninerved or palmate-nerved; flowers apetalous, monoecious or dioecious, usually in unisexual spikes, these simple or paniculately branched, the staminate spikes commonly axillary, the pistillate terminal; staminate bracts several-flowered, the pistillate 1–3-flowered; staminate calyx globose in bud and closed; in anthesis valvately 2–5-parted; stamens 8 or rarely fewer, the filaments connate at the very base; anthers oblong, dorsifixed, the cells parallel, longitudinally dehiscent;



pistillate sepals 3-6, usually 4; ovary 2-3-celled, the styles free or short-connate, usually simple; ovules solitary in each cell; capsule 2-3-coccous or subglobose, the cocci 2-valvate, separating from the persistent central axis; seeds not carunculate, the endosperm carnose, the cotyledons broad, flat.

Species about 45, widely dispersed in the tropics of both hemispheres. Two or three others are known in southern Central America.

Leaves mostly 8-11 cm. long, entire or nearly so, those of sterile branches often crenate-serrate..... *A. integrifolia*.

Leaves mostly 12-20 cm. long, all or most of them conspicuously crenate-dentate. *A. latifolia*.

*Alchornea integrifolia* Pax & Hoffm. Pflanzenreich IV. 147, vii: 237. 1914.

Wooded swamps, 1,400-1,500 meters; endemic; Alta Verapaz (type from Cobán, *Tuerckheim* 103).

A shrub or tree, sometimes 7 meters high, the branches with pale ochraceous bark, the young ones glabrous; leaves coriaceous, on petioles 1.5-4.5 cm. long, oblong or ovate-oblong, mostly 7-12 cm. long and 3-6 cm. wide, somewhat narrowed to the obtuse or rounded apex, obtuse or rounded at the base, entire or those of sterile branches sometimes crenate, glabrous above, almost glabrous beneath but with a few minute stellate hairs, with 2-4 glandular spots at the base, or these sometimes very obscure, 3-nerved at the base, the costa emitting 4-6 lateral nerves above the base; pistillate spikes 4-6 cm. long, solitary in the leaf axils, simple, the rachis minutely stellate-pubescent; bracts 1 mm. long, triangular, acute, 1-2-flowered, the flowers sessile, 2-bracteolate; sepals 4, ovate, acute, 2 mm. long, sparsely pilose, ciliate; ovary 2-3-celled, densely stellate-pilose; styles 2-3, short-connate, 5-9 mm. long.

We have found this tree only in the large swamp east of Tactic, probably the type locality, where it is common, growing among or near the great sphagnum mounds. All the trees found were sterile.

*Alchornea latifolia* Swartz, Prodr. Veg. Ind. Occ. 98. 1788. *Carretón*; *Cajetón*; *Tem* (Alta Verapaz).

Moist or wet, mixed forest, sometimes on limestone, often abundant along steep slopes of barrancos, 1,400 meters or less; Petén; Alta Verapaz; Izabal; Jutiapa; Escuintla; Guatemala; Sololá; Suchitepéquez; Huehuetenango; Quezaltenango. Southern Mexico; British Honduras to Salvador and Costa Rica; West Indies.

A tree, sometimes 20 meters high with a trunk 45 cm. or more in diameter, the crown rounded or irregular, the bark deep gray or light brown, the inner bark dark reddish, the branchlets minutely stellate-puberulent or almost glabrous; leaves subcoriaceous, on stout petioles 4-10 cm. long, ovate or elliptic, sometimes very broadly ovate, mostly 12-25 cm. long and 6-18 cm. wide, abruptly short-acuminate to obtuse, generally obtuse or rounded at the base, crenate-

dentate, 3-nerved from the base, the costa emitting several lateral nerves above the base, glabrous above, 2-4-glandular beneath at the base, when young sparsely and very minutely stellate-puberulent beneath, often densely pubescent in the axils of the nerves; staminate spikes paniculate, slender, 7-20 cm. long, laxly many-flowered, the pistillate spikes simple or branched, 10-20 cm. long, solitary or geminate, the rachises minutely stellate-puberulent, the bracts triangular, acute, scarcely 1 mm. long, the staminate bracts 5-8-flowered, the pistillate 1-3-flowered; staminate flowers subsessile, 2-bracteolate, 4 mm. broad, the 2 sepals concave, ovate, acute, glabrous; stamens 8, connate at the base; pistillate sepals 4, ovate, acute, 1 mm. long; ovary usually 2-celled, sometimes 3-celled, puberulent; styles 6-20 mm. long; capsule 7 mm. high, 10 mm. broad, didymous, dark red or brown-red, glabrate; seeds echinate, 5 mm. in diameter.

Called "canelito" in Honduras; "pochote," "pochotón," "tambor," "tepeachote" (Salvador); "carne de caballo" (Veracruz); "fiddle-wood" (British Honduras). The wood in this genus is pale brown, light, soft, and perishable. Little or no use is made of it in Guatemala. Large trees often are left standing in the coffee plantations of the lower Pacific slopes. A probable synonym of this species is *A. similis* Muell. Arg., described from Oaxaca. We have seen type material, which seems to differ in no respect from the material we have referred here.

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*Aleurites Fordii* Hemsley, the Chinese wood-oil or tung-oil tree, and *A. moluccana* (L.) Willd., the candlenut or varnish tree, are sometimes planted in Guatemala, especially around the capital, as curiosities or for experimental purposes. The former has ovate-cordate, sometimes 3-lobate leaves, pubescence of simple hairs, and rather showy, pink or white flowers; the latter has large ovate-acuminate leaves, pubescence of stellate hairs, and white flowers. *A. Fordii* has been planted on a rather large scale along the Gulf coast of the United States for its abundant seeds, from which is obtained tung oil of commerce, used in preparation of paints and other manufactures.

### AMANOA Aublet

Trees or shrubs, glabrous; leaves alternate, penninerved, coriaceous, entire, short-petiolate; stipules intrapetiolar, sometimes connate; flowers monoecious, petaliferous, glomerate-fasciculate in the axils of leaves or bracts, minutely bracteate or the bracts sometimes rather large and foliaceous, sometimes arranged in strobiliform dichasia, the flowering branches sometimes simulating racemes or panicles; staminate sepals 5, subequal, firm, imbricate; petals 5, short, scale-like, unguiculate; disk extrastaminal, deeply lobate, sometimes small; stamens 5, inserted on a thick receptacle, episepalous, the filaments free, generally short, the anthers ovoid, introrse; ovary rudiment columnar, 3-lobate at the apex; pistillate sepals usually

narrower than the staminate ones; ovary subglobose, 3-celled, the 3 stigmas sessile, carnose, disk-like; ovules geminate in each cell; capsule drupe-like, indurate in age, often muriculate, separating into 2-valvate cocci, 3-seeded or by abortion 2-1-seeded; seeds smooth, emarginate at the base, not carunculate, the testa crustaceous; endosperm thin or none; cotyledons carnose, plane on the inner side, subtrigonus, the radicle short.

Ten species, 3 of them African, the others in tropical America. Only one is known in continental North America.

***Amanoa potamophila*** Croizat, Amer. Midl. Nat. 29: 475. 1943.

Moist or wet, mixed forest, at or little above sea level, often along stream banks; Izabal. British Honduras, the type from seacoast, Cattle Landing, British Honduras, *W. A. Schipp* 1204.

A glabrous shrub or tree, sometimes 12 meters high with a trunk 25 cm. or more in diameter, the smaller branches light brownish or grayish, with large leaf scars; leaves coriaceous, on petioles 1 cm. long or usually shorter, elliptic-oblong to obovate-oblong or elliptic, 6-19 cm. long, 3-8 cm. wide, narrowed to an obtuse apex or abruptly obtuse-acuminate, rounded to broadly cuneate at the base, entire, with about 10 pairs of lateral nerves; inflorescences spike-like, as much as 9 cm. long, often leafy, the flowers sessile, subtended by rather large, coriaceous, ovate bracts; pistillate buds broadly ovoid, 4-5 mm. long; pistillate sepals coriaceous, oblong-ovate, 6 mm. long, obtuse; fruiting pedicels thick and ligneous, about 1 cm. long; columella stout, angulate, 1.5 cm. long, the valves of the capsule ligneous, 2 cm. long, 2-3 mm. thick; seeds brownish-marmorate, smooth, lustrous, broadly somewhat obcordate, about 14 mm. long and 11 mm. broad, the large hilum sub-central.

Called "swamp icaco" in British Honduras. This has been reported from the region as *A. grandiflora* Muell. Arg., a closely related species of northern South America, which seems to differ constantly in its considerably larger seeds. Croizat states that *A. potamophila* "amply differs from this (*A. grandiflora*) and other species of the genus in the range and several characters, such as the length of the pedicel, the thickness of the epicarp and the size of the seed." "Different range" is scarcely a specific character, in spite of the fact that it is often invoked to bolster species of weak characters; of the other characters the only one that holds is the size and form of the seed, but this does seem to be a constant and probably valid difference. The wood in this genus is reddish to purplish brown, moderately or very dense, and difficult to work. In the Amazon region it is sometimes used for heavy and durable construction.

**ASTROCASIA** Robinson & Millspaugh

Slender shrubs or small trees, glabrous or nearly so; leaves on long slender petioles, membranaceous, alternate, entire; flowers small, dioecious, petaliferous,

fasciculate in the leaf axils, on long filiform pedicels; staminate sepals 5, imbricate, widely spreading in anthesis, the petals erect or ascending; disk cupular, 5-crenate; stamens 10, the filaments connate into a slender column, this expanded at the apex into a disk, the anthers ellipsoid, sessile, horizontally dehiscent; ovary rudiment none; fruit capsular, 3-coccos, shallowly 3-sulcate, elastically dehiscent; seeds pale dull brownish, irregular trigonous-globose, smooth, not strophiolate.

Two other species have been described from Mexico.

***Astrocasia phyllanthoides*** Rob. & Millsp. Bot. Jahrb. 36, Beibl. 80: 20. 1905. *Chinchín* (Petén).

Moist or dry thickets, often on limestone, 200 meters or less; Petén; Retalhuleu. Yucatan Peninsula of Mexico; British Honduras.

A glabrous shrub or small tree, sometimes 7 meters high but usually 2-3 meters high, the trunk as much as 15 cm. in diameter, the branches very slender but stiff, grayish; petioles very slender and unequal, 2-6 cm. long, glandular at the apex; leaf blades mostly broadly ovate or rounded-ovate, 12 cm. long and 8 cm. wide or usually much smaller, obtuse at the apex, obtuse to almost rounded at the base, often broadly cuneate, green above, very pale and whitish beneath, penninerved or somewhat 3-nerved or 3-plinerved at the base; staminate pedicels filiform, mostly 1-1.5 cm. long, the calyx 4 mm. in diameter; sepals herbaceous, orbicular, the petals oblong; pistillate pedicels often 4 cm. long, slender but rather stiff; capsule brownish, about 8 mm. long, minutely papillose; seeds smooth, slightly lustrous, 5 mm. long.

The Maya names in Yucatan are recorded as "cayuc" and "pix-toncax." It is probable that the genus *Astrocasia* should be combined with *Phyllanthus*. In general appearance the species of *Astrocasia* are similar to certain species of *Phyllanthus*, and it is questionable whether the technical flower characters supposed to separate the two genera actually exist.

### BERNARDIA Adanson

*Reference:* F. Pax, Pflanzenreich IV. 147, vii: 21-45. 1914.

Shrubs or small trees, the pubescence of simple or fasciculate hairs; leaves alternate, petiolate or subsessile, dentate, penninerved or sometimes 3-nerved at the base, usually rather thick, with 2 glandular spots at the base of the blade; stipules small; flowers monoecious or dioecious, apetalous, the staminate in axillary, short or elongate spikes, small, usually several in each bract; pistillate flowers mostly aggregate in a terminal few-flowered inflorescence, or sometimes in the axils of the uppermost leaves, sometimes in racemiform spikes, the bracts coriaceous, concave; staminate calyx closed in bud, globose, in anthesis 3-4-parted; stamens 4-22, the filaments short, free, the anthers erect, the cells distinct, subglobose; pistillate sepals 4-6, subtended by sepal-like bracts; disk annular or of separate glands; ovary 3-celled, the styles short, distinct at the base, 2-parted, the lobes smooth or lacerate; ovules solitary in each cell; capsule tridymous, the 2-valvate

cocci separating from the persistent columella, the endocarp crustaceous; seeds prismatic-trigonal, not strophiolate, more or less carinate dorsally, the testa crustaceous; endosperm carnosous, the cotyledons broad, flat.

About 35 species, all American and chiefly in tropical regions.

Style branches not lacinate; staminate spikes mostly equaling or little shorter than the leaves. Leaves glabrous beneath or nearly so . . . . . *B. interrupta*.

Style branches lacinate; staminate spikes short, much shorter than the leaves and often shorter than the petioles.

Leaves glabrous beneath or nearly so, mostly oblong-lanceolate or oblanceolate-oblong but sometimes broader . . . . . *B. oblanceolata*.

Leaves densely pubescent beneath, at least when young, the pubescence sometimes sparse in age but always conspicuous.

Leaves very scabrous on the upper surface, minutely stellate-pubescent beneath . . . . . *B. yucatanensis*.

Leaves not or very slightly scabrous on the upper surface, densely and softly stellate-pubescent beneath with coarse hairs . . . . . *B. mollis*.

***Bernardia interrupta*** (Schlecht.) Muell. Arg. *Linnaea* 34: 171. 1865. *Acalypha interrupta* Schlecht. *Linnaea* 7: 386. 1832.

Thin forest or thickets, on limestone, little above sea level; Petén. Southern Mexico; British Honduras.

A shrub or tree, sometimes 10 meters high with a trunk as much as 20 cm. in diameter, the branches minutely stellate-puberulent, the bark gray and smooth, the inner bark orange; leaves membranaceous, on unequal petioles 1.5–10 cm. long, ovate or obovate to lanceolate, mostly 7–20 cm. long and 4–10 cm. wide, acuminate, acute to almost rounded at the base, crenate-dentate, penninerved but definitely 3-nerved at the base, green and almost glabrous above, paler beneath, very minutely and sparsely stellate-puberulent or almost glabrous, with 4–6 plate-like glands near the base; flowers dioecious, the staminate spikes axillary, 4–18 cm. long, floriferous almost to the base, the bracts 2 mm. long, ovate, 5–7-flowered, the pedicels 3–4 mm. long; pistillate spikes terminal, many-flowered, 6–7 cm. long, the bracts ovate, 4 mm. long, 1-flowered, the flowers sessile; staminate sepals 3, oblong, 1.5 mm. long, oblong, apiculate, the stamens usually 12; pistillate sepals 4–5, ovate, long-acuminate, tomentose, the outer ones 3–4 mm. long; ovary densely fulvous-sericeous, the 3 style branches not lacinate; capsule about 8 mm. long and 12 mm. broad, deeply 3-coccos; seeds 8–9 mm. long, 6–7 mm. broad, slightly verruculose.

Called "waika ribbon" in British Honduras.

***Bernardia mollis*** Lundell, *Contr. Univ. Mich. Herb.* 4: 12. 1940.

Dry or moist thickets, 2,500 meters or less; Retalhuleu; Quezaltenango; San Marcos. Chiapas, the type from Volcán de Tacaná, *E. Matuda* 2966.

A shrub or tree 1.5–6 meters high, or reported as sometimes a tree of 12–15 meters with a trunk 25 cm. in diameter, the young branches stout, densely fulvous-

tomentose; leaves on petioles 4 cm. long or shorter, chartaceous, ovate or elliptic, mostly 5–13 cm. long and 3–7 cm. wide, acuminate, rounded or obtuse at the base, crenate-serrate, sparsely stellate-pilous above or almost glabrous in age, the veins often more or less impressed, softly and usually densely stellate-pilose beneath, penninerved but also 3-nerved at the base; flowers dioecious, the staminate spikes axillary, 2.5–5 cm. long, stout, dense, the rachis stellate-tomentulose; bracts broadly ovate, apiculate, 2 mm. long, 3–5-flowered, the pedicels 3 mm. long or less; sepals 3, ovate or elliptic, 3.5 mm. long; stamens 22–24; capsule very densely stellate-hirsute when young with spreading fulvous hairs, 12 mm. long or more; style branches conspicuously lacinate.

***Bernardia oblanceolata*** Lundell, Contr. Univ. Mich. Herb. 4: 13. 1940. *B. mollis* var. *lanceifolia* Lundell, loc. cit. (type from Volcán de Tacaná, Chiapas, *E. Matuda* 2978).

In forest or thickets, 1,500–2,500 meters; Huehuetenango (Cerro Huitz, *Steyermark* 48656); doubtless also in San Marcos. Chiapas, the type from Siltepec.

A shrub or tree 4–6 meters high, the trunk as much as 20 cm. in diameter, the branches minutely stellate-puberulent or almost glabrous, in age fuscous; leaves on petioles 2 cm. long or less, chartaceous, mostly oblanceolate to oblong-obovate or oblong-lanceolate, 4–11 cm. long, 1.5–3.5 cm. wide, acuminate, obtuse at the base, irregularly glandular-serrate, penninerved and also 3-nerved at the base, deep green above and in age almost glabrous, much paler beneath, minutely stellate-puberulent but soon glabrate, bearing 1–4 glands beneath at the base of the blade; staminate inflorescences axillary, spike-like, 4.5 cm. long or shorter, few-flowered, short-pedunculate, the bracts very broadly ovate, 3 mm. long, 3–6-flowered, the pedicels 2.5 mm. long or less; staminate sepals 3, ovate-elliptic, 4 mm. long, acute, appressed-pubescent; stamens about 15; pistillate inflorescences terminal, short, only the basal flower fertile; sepals 5, broadly ovate, 2.5–3 mm. long; ovary fulvous-tomentose, the styles lacinate; capsule fulvous-tomentose, 13–17 mm. long; seeds about 11 mm. long and 8 mm. broad.

***Bernardia yucatanensis*** Lundell, Contr. Univ. Mich. Herb. 4: 14. 1940.

Moist or rather dry, open forest or in thickets, sometimes on limestone, 1,500 meters or less; Petén (type from La Libertad, *Lundell* 3355); Chiquimula. Campeche.

A shrub or tree, sometimes 12 meters high but usually lower, the young branches densely stellate-tomentose with somewhat fulvous hairs, the older ones fuscous or dirty brown; leaves on petioles 3 cm. long or less, chartaceous, lance-oblong to ovate or sometimes rounded-ovate, mostly 4–15 cm. long and 2–6 cm. wide or sometimes wider, somewhat narrowed to the acute or obtuse apex, obtuse or rounded at the base, grayish when dried, chartaceous, irregularly crenate-dentate, when young stellate-tomentose on both surfaces, in age scabrous above and very rough to the touch, the veins and nerves often impressed, paler beneath, in age densely and finely stellate-puberulent or sometimes glabrate, penninerved

and also 3-nerved at the base, bearing a few plate-like glands beneath near the base of the blade; staminate inflorescence spike-like, axillary, 2 cm. long or less, stout, densely stellate-tomentose, rather few-flowered; bracts broadly ovate, 2.5 mm. long, 1-3-flowered, the pedicels 1.5 mm. long; staminate sepals generally 3, obovate-elliptic, 3 mm. long, glabrous within; stamens 23-25.

The plant is variable in foliage, if all the collections we have referred here are conspecific. While extreme variations seem distinct from *B. mollis*, some of the material is more or less intermediate between them, and it is somewhat questionable whether *B. yucatanensis* and *B. mollis* are really different species. Further, the three species listed here, besides *B. interrupta*, are all closely related to one another and to *B. mexicana* Muell. Arg., and it is doubtful whether, when ample material has accumulated, all can be distinguished.

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*Breynia disticha* Forster (*Phyllanthus nivosus* W. G. Smith), sometimes called Snowbush in English, native of the Pacific islands, is planted occasionally for ornament in Guatemala, at low and middle elevations, but it is uncommon. It is a shrub of 1-2 meters, in general appearance like a species of *Phyllanthus*. Its small broad leaves, rounded at the apex, are handsomely variegated or spotted with white.

### CAPERONIA St. Hilairé

*Reference:* F. Pax, Pflanzenreich IV. 147, vi: 27-49. 1912.

Annual or sometimes perennial herbs, usually growing in wet places, often in shallow water, hispid, often glandular, rarely glabrate; leaves alternate, short-petiolate, 2-stipulate, narrow, serrate, generally penninerved, the lateral nerves prominent beneath, slender, straight or nearly so; flowers small, greenish, monoecious or rarely dioecious, petaliferous, racemose or spicate, the inflorescences pedunculate, the flowers solitary within the bracts, the staminate flowers in the upper part of the inflorescence, the few pistillate ones in the lower part; disk none; staminate sepals 5, valvate, the 5 petals affixed to the androphore within the calyx, imbricate, usually unequal; stamens 10 and 2-seriate, the anthers ovoid, longitudinally dehiscent; ovary rudiment cylindric, entire or 3-dentate at the apex; pistillate sepals 5, often accrescent in fruit, imbricate, equal or unequal; petals usually narrower than those of the staminate flower, sometimes much reduced; ovary sessile, 3-celled, the style short, free or nearly so, palmate-laciniate; ovules solitary in each cell; capsule tridymous, hispid or echinate, separating into 2-valvate cocci; seeds subglobose, not carunculate; endosperm carnosé, the cotyledons broad, flat.

About 35 species, in the tropics of America and Africa. One other species is known from Panama.

- Pubescence of the young stems of closely appressed hairs; stems conspicuously fistulose-thickened.....*C. castaneifolia*.  
 Pubescence of the young stems wholly or partly of spreading, usually gland-tipped hairs.....*C. palustris*.

**Caperonia castaneifolia** (L.) St. Hil. Hist. Pl. Brésil 245. 1824. *Croton castaneifolius* L. Sp. Pl. 1004. 1753.

In shallow water at the margins of lakes or ponds, 450–1,400 meters; Jalapa; Jutiapa. Southern Mexico; British Honduras; Honduras; Nicaragua; West Indies; South America.

An erect annual, a meter high or less, simple or sparsely branched, the larger stems fistulose and transverse-septate, as much as 12 mm. or probably even more in diameter, the younger stems appressed-setulose, the older ones glabrous or nearly so; leaves on petioles 0.5–4.5 cm. long, the lower ones elliptic or ovate, 5–16 cm. long, 3–8 cm. wide, obtuse at each end or sometimes acute at the apex, crenate-dentate, the upper leaves lanceolate to linear-lanceolate, sharply serrate, glabrate above, somewhat paler beneath, strigose on the nerves; stipules broadly ovate, acuminate, 5 mm. long; racemes spike-like, with the peduncle 3–7.5 cm. long, bearing below 1–4 pistillate flowers, interrupted; bracts ovate, acuminate, 1.5 mm. long, the pedicels 1–1.5 mm. long; staminate sepals lanceolate, acute, green, 2 mm. long; petals white, spatulate-obovate, longer than the sepals; stamens 10; pistillate sepals ovate, in fruit 4–5 mm. long, setulose, the petals lance-obovate; ovary densely covered with fusiform glands; capsule 7–8 mm. broad, 4 mm. high, 3-sulcate, muricate; seeds foveolate, 2–3 mm. in diameter.

This is much less common in Central America than the following species.

**Caperonia palustris** (L.) St. Hil. Hist. Pl. Brésil 245. 1824. *Croton palustris* L. Sp. Pl. 1004. 1753. *Caperonia pubescens* Blake, Contr. U. S. Nat. Herb. 24: 12. 1922 (type from Cristina, Izabal, S. F. Blake 7574).

Moist or wet thickets or fields, or more often in ditches or marshes or at the margins of lakes, 1,000 meters or less; Petén; Izabal; Zacapa; Jutiapa; Escuintla; Retalhuleu; Huehuetenango. Southern Mexico; Honduras and Salvador to Panama; West Indies; tropical South America.

Plants annual, generally less than a meter high, erect or decumbent, the stems rather stout but not or scarcely fistulose, simple or branched, sparsely or densely glandular-setose with spreading broad-based hairs, often also hirsute with spreading eglandular hairs; leaves on petioles 3–25 mm. long, the lower ones elliptic to ovate or oblong, 7–12 cm. long, mostly obtuse, rounded or obtuse at the base, the upper leaves on short petioles, lance-ovate to almost linear, obtuse to long-attenuate at the apex, serrate, densely pilose to almost glabrous; stipules lanceolate, acuminate, 3–5 mm. long; racemes spike-like, with the peduncle 4–10 cm. long, interrupted, bearing near the base 1–5 pistillate flowers; bracts ovate, acuminate,



1.5 mm. long, the flowers almost sessile; staminate sepals 5, lanceolate, acute, 1-1.5 mm. long; petals whitish, slightly longer than the sepals, spatulate-lanceolate, obtuse; stamens 10; pistillate sepals 5, obovate, acuminate, unequal, in fruit 5 mm. long, glandular-ciliate and glandular-setulose, the petals spatulate-lanceolate, acute or obtuse, shorter than the sepals; ovary densely covered with fusiform glands; capsule 6-7 mm. broad, 5 mm. high, muricate; seeds 2-3 mm. long, ovoid, foveolate.

The author of *C. pubescens* remarks that it is "well distinguished by its pubescence," a statement that is only partially correct. Unfortunately, there appears to be no distinguishing character except the quantity of pubescence, which scarcely is a specific character. The Guatemalan material of *C. palustris* is conspicuously variable in pubescence, leaf shape, and length of petioles, but hardly more so than material from the West Indies and South America.

### CLEIDION Blume

*Reference:* F. Pax, Pflanzenreich IV. 147, vii: 288-298. 1914.

Trees or shrubs, usually almost glabrous, the indument, if any, of simple hairs; leaves alternate, petiolate, generally dentate, penninerved, bearing 2 or more glandular spots on the lower surface at or near the base; stipules caducous; flowers monoecious or usually dioecious, apetalous; staminate flowers glomerate or fasciculate in interrupted spikes, these axillary, mostly elongate; staminate flowers small, pedicellate, the pistillate in simple or branched racemes or solitary and long-pedicellate in the leaf axils; disk none; staminate calyx globose or ovoid in bud, in anthesis valvately 3-4-parted; stamens 35-80, densely crowded on a convex or conic receptacle; anthers peltately attached dorsally, 4-celled, the connective produced above the cells; pistillate sepals 3-4, imbricate; ovary usually 3-celled, the styles elongate, filiform, commonly short-connate below, deeply 2-fid; ovules solitary in each cell; capsule large or small, 2-3-dymous, separating into 2-valvate cocci, or by abortion 1-coccous; seeds subglobose, not carunculate; endosperm carnosous, the cotyledons broad, flat.

About 20 species, in the tropics of both hemispheres, but mostly in the Old World. One or two other species are known from southern Central America.

Petioles 1 cm. long or less; leaf blades membranaceous, broadest above the middle.

*C. nicaraguense.*

Petioles mostly 2-3.5 cm. long; leaf blades chartaceous, broadest at or near the middle.....*C. oblongifolium.*

**Cleidion nicaraguense** Hemsl. Biol. Centr. Amer. Bot. 3: 130. 1883.

Wet mixed forest, at or near sea level; Izabal (between Dartmouth and Morales, *Steyermark* 39052). Nicaragua; Costa Rica.

A shrub or small tree, usually 5 meters high or less, the branches very slender, hirtellous when young, pale in age, the bark light gray; petioles 5–11 mm. long, hirtellous; leaf blades oblong-oblongeolate, mostly 10–18 cm. long and 4–6.5 cm. wide, narrowly long-attenuate or caudate-acuminate, gradually narrowed to the narrow base, the base itself obtuse, coarsely crenate-serrate, bright green above, somewhat paler beneath, puberulent on the nerves and costa, the lateral nerves about 8 pairs, excurrent into the teeth; stipules narrow, acute, 3–5 mm. long; staminate flowers fasciculate-racemose, the racemes 2.5 cm. long or less, few-flowered, axillary, the flowers pilose, white or greenish white, 5–6 mm. in diameter, short-pedicellate; sepals 3; stamens about 35, the filaments filiform, the connective minutely penicillate at the apex.

This plant is known only from staminate material, and its proper generic position is uncertain.

**Cleidion oblongifolium** (Standl.) Croizat, Journ. Arnold Arb. 24: 166. 1943. *Alchornea oblongifolia* Standl. Carnegie Inst. Wash. Publ. 461: 66. 1935.

Moist or wet, mixed forest, about 1,350 meters; Quezaltenango (Finca Pirineos, below Santa María de Jesús); Petén (type from Camp 35, British Honduras boundary, 750 meters, *W. A. Schipp S-279*). British Honduras, on limestone.

A tree 8–15 meters high, glabrous throughout, the trunk 15–45 cm. in diameter, the bark rough, not fissured; leaves chartaceous, on petioles 2–3.5 cm. long, narrowly oblong or lance-oblong, 16–24 cm. long, 4.5–7 cm. wide, short-acuminate with an acute tip, slightly narrowed to the acute base, crenate-serrate almost to the base, densely and minutely punctulate, paler beneath, penninerved, the lateral nerves about 11 pairs; staminate spikes laxly few-flowered, axillary, solitary or binate, shorter than the petioles, the bracts very broadly ovate, the flowers sessile or on very short, thick pedicels, globose in bud, glabrous; pistillate inflorescence axillary, about equaling the petioles, few-flowered, the pedicels scarcely 1.5 mm. long; sepals 4, linear-oblong, 1.5 mm. long; young capsule 3-coccos, sparsely pilose with minute appressed simple hairs, the styles bifid, with long slender branches.

### CNIDOSCOLUS Pohl

*References:* Rogers McVaugh, The Mexican species of *Jatropha* (with special reference to possible sources of "chilte" rubber, pp. 1–23). illus. Issued by the Rubber Development Corporation, July, 1943; The genus *Cnidocolus*: Generic limits and intrageneric groups, Bull. Torrey Club 71: 457–474. 1944.

Herbs, shrubs, or trees, usually abundantly armed with long stiff stinging hairs; leaves alternate, usually long-petiolate and palmately lobate, sometimes pinnately lobate (not in Central American species); flowers usually small and white, in dichotomous, generally long-pedunculate cymes, monoecious, apetalous; sepals of the staminate flower petaloid, united usually for half their length; petals

none; stamens in 2 or more verticels, more or less monadelphous; ovary usually 3-celled, the styles connate at the base; ovules solitary in the cell; fruit capsular, the seeds carunculate.

About 50 species, all in tropical America. Probably only the following ones grow in Central America. By most authors the genus has been united with *Jatropha*, but it has excellent claims to separate status in both flower and foliage characters. The long stiff hairs that cover almost all parts of the plants sting the flesh much worse than most nettles, the pain often being excruciating and persistent for hours, sometimes with the accompaniment of swelling and blistering. They are probably the most painful of all the stinging plants of Central America, and all animals naturally leave them strictly alone. The technical characters used by Pax and some other authors are difficult to understand, and probably were not understood by the authors themselves, who had copied them from earlier writers. Those used by McVaugh for separating the species are much better, but at best the species are closely related and not always easy to recognize. Some of the Mexican species have been found to contain a kind of rubber, which is used locally, but in Central America, so far as we know, no use is made of the plants.

Glands at the apex of the petiole several, slender, elongate, finger-like.

Stamens, at least the outer ones, with filaments distinct to the base; plants herbaceous; leaves mostly lobate less than halfway to the base, the lobes broad, not lobate, without gland-tipped hairs on the margins. . . . *C. urens*.

Stamens all monadelphous; plants usually more or less woody, often large shrubs or small trees; leaves mostly lobate to below the middle, the lobes narrow, usually lobate, with conspicuous gland-tipped hairs or setae along the margins. . . . *C. Souzae*.

Glands at the apex of the petiole small, cushion-like or papilliform.

Pistillate perianth tubular below, falling off as a whole; seeds mostly 12-13 mm. long or larger. Plants densely armed with stinging hairs. . . *C. tubulosus*.

Pistillate perianth divided nearly or quite to the base, the lobes falling off separately; seeds (so far as they are known) 6-10 mm. long.

Base of the leaf blade (between the basal lobes) acute and decurrent, the lobes very broad and somewhat overlapping; plants unarmed or nearly so and almost glabrous. . . . *C. Chayamansa*.

Base of the leaf blade not at all narrowed or decurrent, truncate or broadly cordate; plants usually armed with stinging hairs but sometimes unarmed.

Filaments of the outer (lower) stamens shorter than the anthers or equaling them; seeds 6-8 mm. long; pistillate flowers 6-8 mm. long.

*C. aconitifolius*.

Filaments of the outer stamens about twice as long as the anthers; seeds 9-10 mm. long; pistillate flowers 8-12 mm. long. . . . *C. multilobus*.

**Cnidocolus aconitifolius** (Mill.) I. M. Johnston, Contr. Gray Herb. 68: 86. 1923. *Jatropha aconitifolia* Mill. Gard. Dict. ed. 8.

no. 6. 1768. *J. Papaya* Medik. Bot. Beob. 194. 1783. *J. aconitifolia* var. *Papaya* Pax, Pflanzenreich IV. 147: 101. 1910. *Chaya*; *Chayo*; *Copapayo*; *Chichicaste*.

Moist or dry thickets or open forest, often in open rocky places, most often seen in hedges, where planted, 1,300 meters or less; Petén; Alta Verapaz; Chiquimula; Jutiapa; Santa Rosa; Escuintla; Suchitupéquez; Retalhuleu; said to be planted in Quezaltenango, and doubtless to be found in many of the other departments not listed here. Southern Mexico; British Honduras to Salvador and Costa Rica (chiefly or wholly in cultivation).

A shrub or small tree, generally 3-5 meters high, with a thick pale trunk; petioles 10-20 cm. long or sometimes shorter, usually glabrous in Guatemalan forms except at the apex, there setose-hispid; leaf blades very variable in form, mostly 10-20 cm. long, shallowly or deeply 3-7-lobate, cordate at the base, rather thick and fleshy when fresh, glabrous or nearly so and normally without stinging bristles, the lobes acute to acuminate, often deeply lobate, but the leaves of cultivated forms often merely angulate-lobate or very irregularly and often shallowly 3-4-lobate; stipules lanceolate, deciduous; flowers white; staminate sepals glabrate or minutely puberulent, white or greenish, usually less than 1 cm. long; stamens 10, monadelphous; pistillate sepals free, spatulate, 6-9 mm. long; ovary pubescent; capsule bearing few or numerous bristles.

In Salvador sometimes called "chaidra," "chaira," "copapayo," and "papayillo"; "chay," "tziminchay," "tzah" (Yucatan). The cultivated plants are almost free of stinging hairs, and it seems likely that the almost glabrous form may have resulted from long years of selection, since people wishing plants for cultivation for food would naturally have preferred those without painful stinging bristles. In Central America most of the plants are seen in cultivation in dooryards or in hedges about dwellings, but some of the clearly wild plants seem to represent the same species. The leaves, when young and tender, are cooked and eaten like spinach and other pot herbs. Their use is rather widespread, but they can not be considered a very common vegetable, and we have never seen the leaves in market. Certainly the available supply of them is not very great in Central America. This plant has been reported from British Honduras and elsewhere as *Jatropha tubulosa* Muell. Arg., a species that is not definitely known from British Honduras.

**Cnidoscolus Chayamansa** McVaugh, Bull. Torrey Club 71: 466. 1944. *Chaya*.

In hedges, about 250 meters; Retalhuleu (near Retalhuleu); doubtless also in other parts of the country. Yucatan Peninsula

of Mexico; British Honduras (type from Honey Camp, *C. L. Lundell* 494); cultivated in southern Florida and in Cuba.

A stout shrub about 2 meters high, glabrous or nearly so, bearing few stinging hairs or none; petioles usually much shorter than the leaf blades, the glands 2 or 1, ovoid, convex; leaf blades truncate-cordate, broader than long, 3-lobate to below the middle, the lobes flabellate, often 2-lobate, coarsely undulate-dentate, glabrous except on the margins; inflorescences 2-5 cm. broad, the peduncles 10-25 cm. long, the flowers numerous, white; pistillate flowers 9-10 mm. long, cleft almost to the base, puberulent outside; staminate flowers 6-7 mm. long, tubular below; stamens 10.

The leaves of this species are eaten like those of *C. aconitifolius*. McVaugh quotes a letter from Prof. Augusto Pérez Toro of Mérida, Yucatán, which would lead one to suppose that in Yucatan only this species is used for food, but that is not true as regards Central America, where *C. Chayamansa* is rare, but *C. aconitifolius* is rather common and is used frequently as a green vegetable. The present species has been in cultivation in southern Florida for 20 years, and in Cuba still longer, having been introduced to that island from Yucatan. Its leaves have been found to contain considerable amounts of vitamin C. It is of some interest that *C. Chayamansa* was obtained by Sessé and Mociño, probably in the Yucatan region, some 150 years ago.

**Cnidoscolus multilobus** (Pax) I. M. Johnston, Contr. Gray Herb. 68: 86. 1923. *Jatropha multiloba* Pax, Pflanzenreich IV. 147: 107. 1910. *Chichicaste de caballo*.

Moist or dry thickets, 900 meters or lower; Alta Verapaz; El Progreso; Jutiapa; Suchitepéquez. Eastern and southern Mexico.

A shrub or small tree of 3-6 meters; leaves long-petiolate, glabrous at maturity or nearly so, with abundant stinging hairs on the veins and petioles; leaf blades mostly broader than long, as much as 30 cm. wide and 25 cm. long, rounded-cordate at the base, generally 5-lobate to the middle or more deeply, the lobes obovate, coarsely dentate; inflorescence long-pedunculate, densely furnished with slender brownish stinging hairs; staminate flowers 12-15 mm. long, almost glabrous to densely tomentose; pistillate perianth 8-12 mm. long, divided nearly or quite to the base, usually densely pubescent outside; capsule densely furnished with stinging hairs; seeds brown, 9-10 mm. long, the caruncle flat or somewhat curled, 2 mm. wide, more or less narrowed at the base and not cordate.

**Cnidoscolus Souzae** McVaugh, Bull. Torrey Club 71: 468. 1944. *Chaya cimarrona*; *Sac* (Maya; both names used in British Honduras).

Moist or wet thickets, at or little above sea level; British Honduras. Yucatan Peninsula of Mexico.

A stout coarse shrub or herb, commonly 2 meters high, the thick branches densely covered with long stinging hairs, otherwise glabrous; leaves long-petiolate, the petioles covered with long stinging hairs; leaf blades 10–15 cm. long, 12–20 cm. wide, lobate to the middle or more deeply, truncate or cordate at the base, somewhat pilose on both surfaces, especially on the veins, with soft white sharp-pointed hairs, the lobes oblong or ovate, serrate and often lobate; glands 2–4 at the apex of the petiole, slender and finger-like, 1.5–3 mm. long, enlarged and glandular at the apex; inflorescences long-pedunculate, armed with numerous stinging hairs, the peduncles 20–30 cm. long, the cymes dense and many-flowered, 4–5 cm. broad; pistillate flowers 8–9 mm. long, divided almost to the base, the perianth minutely puberulent on both surfaces; staminate flowers 8–10 mm. long, densely puberulent outside; capsule oval to globose, broadly rounded at each end, 8–9 mm. long, armed with stinging hairs; seeds about 7 mm. long, the caruncle white or pale yellowish, 1.5–2.5 mm. wide, not at all or scarcely cordate.

This species may be recognized by the combination of glabrous or nearly glabrous leaf blades with gland-tipped setae along their margins, and the long slender glands at the apex of the petiole.

**Cnidoscolus tubulosus** (Muell. Arg.) I. M. Johnston, Contr. Gray Herb. 68: 86. 1923. *Jatropha tubulosa* Muell. Arg. Linnaea 34: 212. 1865. *J. cordifolia* Pax, Pflanzenreich IV. 147: 107. 1910 (type from Santa Rosa, Santa Rosa, Heyde & Lux 3474). *C. cordifolius* I. M. Johnston, loc. cit. *Chichicaste*.

Moist or dry thickets, often on rocky slopes, 200–1,450 meters; Zacapa; Chiquimula; Santa Rosa; Escuintla; Guatemala; Sacatepéquez. Central and southern Mexico; Salvador; Colombia.

Usually a shrub of 1.5–4.5 meters, the stems and petioles abundantly armed with long stinging bristles; leaves long-petiolate, commonly abundantly and softly pubescent even at maturity, the lower surface with few or numerous stinging hairs; leaf blades as wide as long or wider, often 20–30 cm. wide, openly rounded-cordate at the base, mostly 5-lobate to the middle or lower, the lobes oblong to obovate, usually cuspidate-acuminate, sinuate-dentate or subentire; inflorescences long-pedunculate, dense and many-flowered, the peduncles densely beset with long stinging bristles, the branches tomentose; staminate flowers 12–15 mm. long, densely tomentose; pistillate calyx 10–15 mm. long, lobate to about the middle, densely pubescent outside; capsule sparsely setose; seeds brown, 12–13 mm. long, the caruncle flat or curled, 1–1.5 mm. wide, not cordate.

This plant is all too plentiful in some parts of Guatemala, Sacatepéquez, and other departments, where it frequently forms dense clumps or small thickets.

**Cnidoscolus urens** (L.) Arthur, Torreya 21: 11. 1921. *Jatropha urens* L. Sp. Pl. 1007. 1753. *J. herbacea* L. loc. cit. *J. urens* var. *herbacea* Muell. Arg. in DC. Prodr. 15, pt. 2: 1101. 1866. *Chichicaste*; *Chichicaste de caballo*; *Chichicaste de burro*.

Brushy, moist or dry, often rocky slopes, sometimes in moist or wet fields or thickets, occasionally in sandy places, 500 meters or less; Zacapa; Chiquimula. Mexico; Honduras to Panama; West Indies.

A shrub of 2 meters, or frequently herbaceous throughout and a meter high or lower; petioles equaling or longer than the blades, usually densely short-pilose, armed with numerous long spreading stinging bristles; leaf blades mostly 10–15 cm. long, usually cordate at the base, 3–5-lobate to the middle or more deeply, usually abundantly pubescent on both surfaces and generally armed with numerous long yellowish stinging bristles, the lobes mostly ovate or obovate or rounded, acute or cuspidate-acuminate, sometimes obtuse, subentire or variously dentate or shallowly lobate; stipules small, lacinate-dentate; cymes long-pedunculate, few-many-flowered, pubescent and setose; staminate calyx white, 1 cm. long or shorter, densely tomentulose and bearing few or numerous stinging hairs, lobate to the middle; stamens 8–10; ovary puberulent and setose; capsule 10–12 mm. long, usually bearing many long stinging white setae; seeds grayish, somewhat compressed, 8 mm. long.

### CODIAEUM Jussieu

*Reference:* F. Pax, Pflanzenreich IV. 147, iii: 23–30. 1911.

Shrubs or trees, glabrous or nearly so; leaves alternate, petiolate, coriaceous or thick-membranaceous, penninerved, entire, undivided or rarely lobate; flowers mostly monoecious, the staminate petaliferous, the pistillate apetalous, in elongate racemes, the racemes solitary or binate in the upper leaf axils, unisexual or rarely with 1–2 pistillate flowers in the staminate racemes, the flowers small and inconspicuous, the staminate fasciculate within the bracts, the pistillate solitary; staminate sepals generally 5, imbricate, the petals small or minute; glands of the disk 5–15, free; stamens 15–30 or more, inserted on a slightly elevated receptacle, the filaments free, the anthers erect; ovary 3-celled, the styles distinct, recurved, simple, the ovules solitary in each cell; capsule globose or tridymous, separating into 2-valvate cocci; seeds carunculate, the testa lustrous, crustaceous; endosperm carnose, the cotyledons broad, flat.

Six species, in the Malayan region and the Pacific islands. One species is widely cultivated for ornament in tropical countries.

**Codiaeum variegatum** (L.) Blume, Bijdr. Fl. Ned. Ind. 606. 1825. *Croton variegatus* L. Sp. Pl. ed. 3. 1424. 1763. *Crotón*; *Pon* (Cobán).

Native of the Malayan region and the Pacific islands; grown for ornament in most tropical regions, and often in hothouses in the north; planted abundantly in the lowlands of Guatemala, and less frequently at middle or even higher elevations.

A shrub or small tree; leaves lustrous, on petioles 1–4 cm. long, exceedingly variable in shape and coloring, ovate-oblong or obovate-oblong to elliptic, spatu-

late, or linear, often shallowly lobate or crispate, penninerved, green or variously colored with white, yellow, pink, red, or purple.

Sometimes called "laurel" in Honduras; "cintillo" (Veracruz). This well-known ornamental plant of the tropics is abundant everywhere in the Guatemalan lowlands, being much grown in hedges or as an ornamental shrub. In the Pacific bocacosta there are many long roadside hedges bordering the fincas and coffee plantations. The plant grows easily and thrives with little or no attention. It is sometimes found more or less naturalized, probably about the sites of former dwellings. The shrub is grown commonly in the warmer parts of the United States, especially in Florida, where it is known by the name Croton, although it is not closely related to plants of that genus.

### CROTON L.

Trees, shrubs, or herbs, the indument usually of stellate hairs or of scales; leaves mostly alternate, often with 2 sessile or stipitate glands at the base or at the apex of the petiole, petiolate, entire or dentate, rarely lobate, usually 3-several-nerved from the base, sometimes penninerved; flowers spicate or racemose, monoecious or rarely dioecious, the staminate in the upper part of the inflorescence, the pistillate flowers below, or the two sexes sometimes mixed together; pistillate flowers solitary under each bract or sometimes with 2-3 staminate ones, the bracts small; petals usually present in the staminate flowers, often absent or rudimentary in the pistillate ones; staminate sepals usually 5, valvate or subimbricate, the disk represented by glands opposite the sepals; stamens 5-many, mostly 10-16, the filaments inflexed in bud, erect in anthesis; receptacle usually pilose; pistillate sepals often unequal, the disk annular or of glands; ovary 3-celled, the styles 1-many times bifid or parted; ovules solitary in each cell; capsule separating into 3 bivalvate cocci; seeds smooth, with a small caruncle.

About 700 species, in both hemispheres, most numerous in tropical regions, only a few species reaching the temperate zones. Other species besides those listed here are found in southern Central America, especially in Costa Rica. The genus has received little serious attention in recent years, so far as North American species are concerned, and the status of many names is still uncertain.

Plants herbaceous throughout, usually annual.

Leaves deeply palmate-lobate..... *C. lobatus*.

Leaves entire or dentate, never lobate.

Leaves entire..... *C. punctatus*.

Leaves dentate.

Stems densely and coarsely hispid; leaves green beneath..... *C. hirtus*.

Stems stellate-pilose with short hairs; leaves pale beneath.

Leaves acute or acuminate, usually more or less cordate at the base.

*C. trinitatis*.



- Leaves mostly very obtuse, at the base obtuse or subacute. *C. glandulosus*.  
Plants shrubs or trees.
- Leaves without glands at the base of the blade or at the apex of the petiole; pubescence all of closely appressed scales or scale-like hairs, sometimes none.
- Leaves acute or rarely obtuse at the base, penninerved. . . . . *C. glabellus*.
- Leaves cordate to very obtuse at the base, palmate-nerved.
- Leaves densely covered on the upper surface with minute appressed hairs, obtuse or rounded at the apex, mostly about 2 cm. wide. *C. punctatus*.
- Leaves glabrate on the upper surface, usually acute or acuminate, much larger.
- Ovary and fruit smooth, densely lepidote. . . . . *C. guatemalensis*.
- Ovary and fruit tuberculate, stellate-hispidulous. . . . . *C. reflexifolius*.
- Leaves with glands at the base of the blade or at the apex of the petiole, the glands sometimes (rarely) very small and hard to see, but the pubescence then of relatively coarse, stellate hairs.
- Leaves densely ciliate with long gland-tipped hairs. . . . . *C. ciliatoglandulosus*.
- Leaves not glandular-ciliate.
- Leaves rounded or very obtuse at the apex, less than twice as long as broad and often as broad as long.
- Leaves subentire, densely stellate-tomentose beneath. . . *C. payaquensis*.
- Leaves very coarsely dentate, green and glabrate beneath. . . . *C. repens*.
- Leaves acute or acuminate, or, if rarely subobtuse, much longer than broad.
- Lowest bracts of the inflorescence embracing both pistillate and staminate flowers.
- Stipules ovate or lanceolate. . . . . *C. draco*.
- Stipules subulate or setaceous.
- Leaf blades more or less cordate at the base, usually conspicuously so. . . . . *C. callistanthus*.
- Leaf blades rounded at the base, not at all cordate. *C. verapazensis*.
- Lowest bracts of the inflorescence embracing only pistillate flowers.
- Leaves wholly or chiefly penninerved, the lowest nerves not more conspicuous than the upper ones.
- Leaves coarsely crenate. . . . . *C. jutiapensis*.
- Leaves entire or very finely and evenly serrate.
- Leaves glabrous on the upper surface. . . . . *C. Cortesianus*.
- Leaves pubescent on the upper surface.
- Leaves pseudovercillate at the base of the inflorescence; pistillate flowers crowded at the very base of the inflorescence. . . . . *C. adspersus*.
- Leaves not pseudovercillate; pistillate flowers not crowded or, if so, forming an elongate spike.
- Leaves obtuse at the base, small, mostly 3.5-6 cm. long.  
*C. fragilis*.
- Leaves broadly rounded or shallowly cordate at the base, mostly 9-16 cm. long or larger.
- Glands of the leaves very small and inconspicuous or none.  
*C. axillaris*.
- Glands at the base of the leaves large and conspicuous.  
*C. xalapensis*.

Leaves palmate-nerved at the base, the lower nerves much more conspicuous than the upper ones.

Pistillate sepals densely covered with very long, gland-tipped hairs.  
Leaves glabrate.....*C. glandulosepalus*.

Pistillate sepals without gland-tipped hairs, or these very small and inconspicuous.

Pedicels equaling the fruiting calyx, this reflexed in age.

*C. pyramidalis*.

Pedicels usually shorter than the fruiting calyx, this not reflexed.

Leaves entire or finely and evenly serrate or dentate, often cordate at the base.

Inflorescences many-flowered, mostly 10-20 cm. long.

*C. xalapensis*.

Inflorescences relatively few-flowered, mostly 5 cm. long or shorter.

Leaves mostly oblong to oblong-ovate.....*C. axillaris*.

Leaves ovate or rounded-ovate.

Ovary and capsule long-pilose and densely stellate-tomentulose; leaves rounded or subcordate at the base.....*C. lasiopetaloides*.

Ovary and capsule merely stellate-tomentulose, without long spreading hairs; leaves conspicuously cordate at the base.....*C. limnocharis*.

Leaves coarsely and unevenly crenate, dentate, or serrate, not at all or very obscurely cordate at the base.

Glands at the base of the leaf blade sessile...*C. quercetorum*.

Glands of the leaf blades or petioles conspicuously stipitate.

Leaves practically glabrous on the upper surface, the indument of minute appressed scales without appreciable branches.....*C. Lundellii*.

Leaves thinly or rather densely pubescent on the upper surface, except sometimes in age, the hairs with easily visible branches.

Petioles finely stellate-pilose, the branches of the hairs all of about the same length.....*C. pagiveteris*.

Petioles finely stellate-tomentulose and also pilose with longer spreading hairs.

Columella of the capsule 6-7 mm. long...*C. jalapensis*.

Columella of the capsule about 3 mm. long.*C. lotorius*.

**Croton adpersus** Benth. Pl. Hartweg. 51. 1840. *C. botryocarpus* Croizat, Field Mus. Bot. 22: 445. 1942 (type from Jalapa, Jalapa, Standley 77519). *Granadito amarillo*; *Tomatillo de sensontile*; *Hierba de chucho*.

Moist thickets or dry open rocky slopes, 1,100-2,000 meters; Jalapa; Guatemala; Chimaltenango; Huehuetenango. Southern Mexico.

A slender shrub 2-3 meters high, the young branches and petioles densely stellate-hispidulous or tomentose; leaves membranaceous, on slender petioles 1 cm. long or less, the petiole bearing at the apex 2 conspicuous cylindrical glands; leaves alternate, but those at the base of the inflorescence numerous, crowded, and subverticillate, ovate to lance-ovate, mostly 3-6 cm. long and 1.5-2.5 cm. wide, acute or acuminate, rounded at the base or obscurely cordate, finely serrulate or subentire, sparsely and minutely stellate-pilosulous above or in age practically glabrous, grayish or green beneath, at first stellate-tomentose, in age usually glabrate, penninerved or the basal nerves sometimes more conspicuous; inflorescences solitary or clustered at the ends of the branches, mostly 5-6 cm. long, the pistillate flowers crowded at the base of the spike, the upper portion staminate, slender, the flowers soon deciduous; pistillate sepals in fruit 1.5-2 mm. long, linear, entire; staminate flowers subglobose, the sepals glabrous outside or sparsely stellate-puberulent; capsule about 6 mm. long, glabrate in age, when young densely stellate-tomentose and usually bearing a few long slender spreading hairs; seeds ellipsoid, 4 mm. long, brown.

Sometimes called "cuahuilotillo" in Mexico. The several Guatemalan collections that have been referred to *C. botryocarpus* seem to be in no way distinguishable from Mexican material determined at Kew as *C. adspersus*, and they match well a photograph of the type specimen of the latter species.

**Croton axillaris** Muell. Arg. *Linnaea* 34: 126. 1865.

Dry or moist, brushy hillsides, 400-1,600 meters; Chiquimula; Sacatepéquez; Huehuetenango. Nicaragua, the type from Granada.

A branched shrub about 3 meters high, the branches densely stellate-tomentose with rather close, often blackish hairs; leaves on rather slender petioles 1-3 cm. long, lance-oblong or ovate-oblong, 5-13 cm. long, 2-6 cm. wide, acute to long-acuminate, rounded to subcordate at the base, entire or practically so, sparsely or densely stellate-pilosulous with very short spreading hairs on both surfaces, sometimes grayish-tomentose beneath, usually green on both surfaces, penninerved or sometimes rather conspicuously 5-nerved at the base; inflorescences axillary and terminal, the axillary ones staminate, dense, sessile; bracts setaceous, 1-flowered; staminate calyx depressed-globose, the petals lance-obovate, dorsally glabrous, sericeous within; stamens about 11; staminate calyx 3 mm. broad; pistillate flowers and fruit unknown.

The only authentic representation of this species that we have seen is a photograph of the type, formerly in the Berlin herbarium. Croizat has referred to the species *Steyermark* 51069 from Huehuetenango, and there are available a number of sterile collections apparently conspecific.

**Croton callistanthus** Croizat, *Journ. Arnold Arb.* 21: 84. 1940.

*Llora-sangre*.

Wet to rather dry thickets, often in second growth, 300–1,800 meters; known only from Guatemala, but to be expected in Chiapas; Retalhuleu; Sololá; Quezaltenango (type from Colomba, *A. F. Skutch* 2025); Quiché.

A large shrub or a small tree, often 7–13 meters high, the trunk as much as 18 cm. or more in diameter, usually slender, the branches rather few and stout, the young branches stout, very densely tomentose and somewhat tuberculate because of the very unequal, many-branched, stellate, fulvous hairs; leaves very large, the slender petioles mostly 8–16 cm. long, with 2–3 large glands at or near the apex; leaf blades membranaceous, broadly ovate or triangular-ovate, as much as 30 cm. long and 18 cm. wide but mostly smaller, acuminate or long-acuminate, rather deeply cordate at the base, irregularly and finely dentate or subentire, palmate-nerved at the base, green above, much paler beneath, thinly or rather densely covered with minute many-branched hairs, in age often glabrate; inflorescences at or near the ends of the branches, sometimes 70 cm. long but mostly shorter, with very numerous, dense or remote flowers, the flowers glomerate, the lower bracts with both pistillate and staminate flowers, the upper flowers all staminate; pistillate flowers on pedicels 5–6 mm. long, the sepals lepidote-tomentose, broadly ovate, 2 mm. long in anthesis; ovary 3 mm. broad, densely covered with a coarse stellate orange-brown tomentum; staminate flowers slender-pedicellate; capsule about 4 mm. long, finally glabrate, densely verruculose.

The leaves have a fetid odor resembling that of *Lantana* foliage. The sap, as in other closely related species, is blood-red on exposure to the air. This species has been confused with *C. panamensis* Muell. Arg. and *C. draco*, to both of which it is closely related. The taxonomy of this group of *Croton* species is very imperfectly understood at present, for lack of critical attention. The plant is widely distributed in Guatemala.

***Croton ciliatoglandulosus*** Ortega, Hort. Matr. Dec. 51. 1797. *Comemano*; *Hoja de sierra*; *Hierba mala*; *Copalito* (fide Aguilar); *Ciega-vista*; *Chirca*.

Moist or dry thickets, often in dry rocky places, sometimes in sandy river bottoms, 200–1,150 meters; Baja Verapaz; El Progreso; Zacapa; Chiquimula; Jalapa; Jutiapa; Escuintla; Guatemala; Quiché; Huehuetenango. Mexico; Honduras and Salvador; Cuba.

An erect shrub, seldom more than a meter high but sometimes as much as 2.5 meters, often densely branched, the slender branches densely stellate-pilose; stipules dissected into numerous long, slender, almost filiform, gland-tipped divisions; leaves thin and soft, on long slender petioles, rounded-ovate, mostly 3–6 cm. long, abruptly acute or acuminate, rounded or subcordate at the base, subentire, very conspicuously ciliate with long slender spreading gland-tipped hairs, palmate-nerved, green above and usually glabrate, usually pale beneath and densely and softly stellate-pilose; inflorescences short, rather few-flowered, densely stellate-pilose, the flowers solitary, short-pedicellate; pistillate sepals

spatulate-lanceolate, glandular-ciliate, accrescent in age; capsule 7 mm. long, glabrate; seeds lead-colored, undulate-costate.

Sometimes called "ciega-ojo" in Honduras. The plant is easily recognized among all Central American species of *Croton* by the very numerous long gland-tipped hairs and the conspicuous gland-tipped divisions of the stipules. When taken in the hand all parts of the plant are extremely viscid, clinging to the skin and leaving a large amount of an unpleasant and sticky substance. This material is said to be very dangerous if in contact with the eyes, causing severe irritation and inflammation, and on this account people leave the bushes strictly alone and warn strangers against handling them. It is stated that cattle are sometimes permanently blinded after feeding on the foliage. The plant has a strong and extremely unpleasant odor.

***Croton Cortesianus* HBK. Nov. Gen. & Sp. 2: 83. 1817.**

At about 800 meters; Huehuetenango (between Santa Ana Huista and Nentón, *Steyermark* 51381). Southern Mexico, the type from Campeche.

A shrub or small tree as much as 6 meters high, the branches stellate-pilose with often blackish hairs; leaves firm-membranaceous, on slender petioles 3 cm. long or shorter, these without apical glands, or the glands very small and inconspicuous; leaf blades mostly lance-oblong and 4-12 cm. long, acute or acuminate, obtuse or rounded at the base, very minutely and closely serrulate or almost entire, green and glabrous on the upper surface, rather thinly or densely stellate-tomentose beneath with grayish or sometimes fuscous hairs; inflorescences terminal, mostly 5 cm. long or less, usually very dense, the pistillate flowers numerous, densely crowded in the lower part of the raceme, the staminate portion of the inflorescence often very short, sometimes elongate; staminate petals fimbriate-ciliate below; capsule stellate-hirsute, about 5 mm. long; seeds smooth.

***Croton draco* Schlecht. Linnaea 6: 360. 1831. *Sangre de drago*; *Sangre de perro*; *Llora-sangre*; *Calelú* (Huehuetenango).**

Moist or wet thickets or forest, frequently in second growth, often on very steep sides of barrancos, 600-1,600 meters; Alta Verapaz(?); Guatemala(?); Retalhuleu; Quezaltenango; San Marcos; Huehuetenango. Southern Mexico.

A large shrub or a tree, rarely 20 meters high with a trunk 50 cm. in diameter, the bark smooth, light brownish or grayish, the branches densely tomentose with ochraceous or brownish, very unequal, tubercle-like stellate hairs; leaves large, the rather stout petioles mostly 12 cm. long or shorter, with conspicuous glands at the apex; leaf blades thin, broadly ovate or deltoid-ovate, mostly 8-20 cm. long, acute to abruptly caudate-acuminate, shallowly cordate at the base or broadly rounded, minutely serrulate or subentire, palmate-nerved at the base, green above

and thinly stellate-pubescent or glabrate, usually rough to the touch, beneath grayish or whitish and often very densely stellate-tomentose; racemes mostly at the ends of the stout branches, sometimes 60 cm. long, with very numerous, dense or often remote flowers, the lower bracts subtending both staminate and pistillate flowers; stamens 15-25; capsule about 5 mm. long, very finely and closely tuberculate-tomentulose; seeds lustrous, oval, olivaceous brown, 3 mm. long, somewhat rugulose or almost tuberculate.

This, like the other related species, is not very well understood, and it quite possibly includes *C. callistanthus*. The shrubs or trees of this alliance are common and conspicuous in the mountains of the Occidente of Guatemala, often occurring in abundance on the steep slopes of the barrancos in the lower parts of the vast gorge of the Río Samalá.

***Croton fragilis* HBK.** Nov. Gen. & Sp. 2: 75. 1817. *C. sericeus* Schlecht. Linnaea 5: 85. 1830.

Moist or dry, brushy, rocky hillsides; El Progreso; Chiquimula(?); Guatemala(?); Huehuetenango. Southern Mexico; Honduras(?); northwestern South America.

A shrub 2.5 meters high or less, the young branches densely stellate-pilose with whitish or grayish hairs; leaves membranaceous, on petioles 1.5 cm. long or shorter, the petiole usually with 2 glands at the apex, these conspicuous or hidden under the pubescence; leaf blades ovate or elliptic-ovate, mostly 3-5 cm. long, acute or acuminate, obtuse at the base, entire or serrulate, penninerved, finely stellate-pubescent on the upper surface, usually densely stellate-tomentose beneath; inflorescences mostly terminal, short and rather few-flowered, dense, the pistillate flowers subsessile, the staminate slender-pedicellate; stipules subulate; pistillate sepals ovate-lanceolate, not accrescent; stamens about 15; ovary densely stellate-tomentose.

This is another species that is poorly understood at the present time, and when ample material can be assembled and studied critically, it seems probable that the South American plant and that of Mexico and Central America will be found distinct. The Maya name in Yucatan is reported as "tanche."

***Croton glabellus* L.** Sp. Pl. ed. 2. 1425. 1763. *C. Eluteria* Swartz, Prodr. Veg. Ind. Occ. 100. 1788. *C. nitens* Swartz, loc. cit. *C. perobtusius* Lundell, Phytologia 1: 405. 1940 (type from Tabasco). *Fruta de chacha*; *Paujil* (fide Aguilar); *Perescuch* (Petén, Maya); *Canoh* (reported as the Quecchí name); *Caché* (Alta Verapaz).

Moist or wet, mixed forest or thickets, sometimes in second growth, growing on plains or hillsides, 1,000 meters or less, mostly at 500 meters or lower; Petén; Alta Verapaz; Izabal; Suchitpequez;

Retalhuleu; San Marcos; Huehuetenango; Quiché. Southern Mexico; British Honduras to Panama; West Indies; northern South America.

A large shrub or a tree, often flowering when only 2-3 meters high but commonly a tree of 6-12 meters, the trunk sometimes 30 cm. or more in diameter, the young branchlets covered with closely appressed, brown scales; leaves on eglandular petioles 1-3 cm. long, firm-membranaceous, mostly elliptic-oblong or lance-oblong, sometimes broader, mostly 5-16 cm. long, usually abruptly acuminate or caudate-acuminate, sometimes obtuse or even narrowly rounded at the apex, usually subacute or obtuse at the base, entire, penninerved, bearing appressed brown scales on both surfaces, these usually very few on the upper surface but often dense on the lower surface; racemes simple or branched, axillary, generally shorter than the leaves, dense or interrupted, the flowers whitish, somewhat fragrant; pedicels of the staminate flowers 2 mm. long, in the pistillate flowers 6 mm. long; staminate sepals ovate-triangular, stellate-pubescent, petals spatulate, pellucid-punctate; capsule oblong-globose, lepidote, tuberculate, 7-10 mm. long; seeds brown, smooth.

Maya names in Yucatan are "cuxub," "cocche," and "chuts"; "copalchi" (Tabasco); "wild cinnamon" (British Honduras); "cas-carilián," "lián," "barenillo" (Honduras). A very common small tree in many parts of the Guatemalan lowlands. *C. perobtusus* is a leaf form in which the leaves are very obtuse or rounded at the apex, a character in which there is much variation.

***Croton glandulosepalus*** Millsp. Field Mus. Bot. 2: 419. 1916.

British Honduras (Maskall Pine Ridge, *P. H. Gentle* 1170). Yucatan Peninsula of Mexico.

A slender branched shrub, the older branches gray or whitish, the young branchlets rather densely stellate-pilose; leaves thin, eglandular, on slender petioles 2-3 cm. long, lance-ovate to oblong-lanceolate, mostly 5-11 cm. long, gradually or abruptly acuminate or long-acuminate, rounded or obtuse at the base, entire, 3-nerved from the base, when young thin and very finely stellate-pubescent, in age almost wholly glabrous, paler beneath; stipules setaceous, 5-14 mm. long; racemes slender, dense or somewhat interrupted, terminal, mostly 4-7 cm. long; staminate flowers short-pedicellate, the sepals stellate-tomentulose, ovate, the petals glabrous or nearly so; stamens 10; pistillate flowers on short thick pedicels, few, the sepals ovate-lanceolate, fleshy, densely covered with reddish glands terminating in long slender hairs; ovary densely stellate-tomentulose; capsule 6 mm. long; seeds brown, smooth, 4 mm. long.

This species may be recognized at once by the very dense covering of long-stalked glands on the pistillate sepals.

***Croton glandulosus*** L. Syst. ed. 10. 1275. 1759.

Dry grassy hillsides or on sandbars along streams, 200-1,250 meters; reported, perhaps in error, from Petén; Zacapa; El Progreso;

Quiché. Southern United States; Mexico; West Indies; tropical South America.

An erect annual, mostly 50 cm. high or less, usually branched, the stems stellate-pilose with appressed hairs; leaves long-petiolate, with 2 saucer-shaped glands beneath at the base of the blade; leaf blades oblong-ovate to ovate or elliptic, 2-3.5 cm. long, rounded or very obtuse at the apex, obtuse at the base, coarsely dentate or crenate, stellate-pilose on both surfaces; stipules linear, 2 mm. long, deciduous; racemes short and few-flowered, 2 cm. long or less, the flowers subsessile; staminate sepals 2 mm. long, the petals slightly longer; stamens 10; pistillate sepals unequal, spatulate, 3 mm. long, accrescent in age; ovary hirsute; capsule 5-6 mm. long, glabrate or with a few stellate hairs; seeds 4 mm. long, bearing dorsal rows of minute pits.

**Croton guatemalensis** Lotsy, Bot. Gaz. 20: 353. *pl.* 25. 1895.  
*C. eluterioides* Lotsy, op. cit. 352. *pl.* 25 in part. 1895 (type from Santa Rosa, Dept. Santa Rosa, *Heyde & Lux* 3470). *Copalchí*; *Zicché* (Petén); *Quina* (fide Tejada).

Wet to dry thickets or rather thin, mixed forest, often on rocky hillsides, 1,800 meters or less, mostly at rather low elevations, often planted for hedges or as windbreaks in coffee plantations; Petén; Alta Verapaz; Baja Verapaz; Chiquimula; Santa Rosa (type from Santa Rosa, *Heyde & Lux* 3035); Escuintla; Guatemala; Sacatepéquez; Chimaltenango; Suchitepéquez; Retalhuleu; Quiché; Quezaltenango. Southern Mexico; Honduras and Salvador and perhaps farther southward.

A rather slender shrub or tree, sometimes 8 meters high, usually lower, usually densely appressed-lepidote throughout with whitish to brownish scales; leaves firm-membranaceous, mostly on long slender petioles, or the petioles sometimes short, eglandular; leaf blades ovate to broadly triangular-ovate, mostly 7-15 cm. long, acuminate to long-acuminate, shallowly cordate or truncate at the base, entire, palmate-nerved at the base, green on the upper surface and in age often almost glabrate, sparsely or very densely lepidote beneath, often silvery and whitish; racemes axillary, often very numerous, usually much shorter than the leaves, many-flowered, the flowers often remote, almost sessile, densely lepidote; sepals ovate, acute; petals ovate-lanceolate, ciliate, glabrous; stamens about 15; ovary densely lepidote; capsule subglobose, about 8 mm. long, very densely lepidote, sometimes obscurely tuberculate.

Known in Yucatan by the Maya names "chul" and "chulche"; "copalchín" (Oaxaca). This shrub or small tree is very common in many parts of Guatemala, but especially on the Pacific plains and foothills, where often it forms thickets of wide extent. It and *C. reflexifolius* are much planted for hedges or windbreaks around coffee plantations that are exposed to the wind. The plant of Guatemala and southern Mexico has been referred generally to



*C. niveus* Jacq., a species of northwestern South America and southern Central America (Costa Rica; Panama), which may be distinct. For a discussion of the subject see Croizat, Field Mus. Bot. 22: 447. 1942. That author thinks that *C. eluterioides* may be a distinct species, but this seems highly improbable, since both it and *C. guatemalensis* were described from the town of Santa Rosa, where they probably were growing in coffee plantations. The bark of this and related species of *Croton* is said to have a bitter taste, and on that account it inevitably found application in local medicine as a "remedio" for intermittent fevers. The bark is said to have been exported formerly to Europe for medicinal purposes.

***Croton hirtus* L'Hér.** Stirp. Nov. 17. 1784. *C. glandulosus* var. *hirtus* Muell. Arg. in DC. Prodr. 15, pt. 2: 684. 1866.

Open fields or hillsides, 900 meters or less; Petén; Suchitepéquez; Huehuetenango. Southern Mexico; Honduras to Panama; West Indies; tropical South America.

An erect, rather stout annual, commonly 60 cm. high or less, simple or usually branched, the stems and petioles yellow-hispid with long stiff hairs; leaves membranaceous, long-petiolate, rhombic-ovate, often broadly so, 3-7 cm. long, obtuse or acute, rounded or obtuse at the base, coarsely crenate, 3-5-nerved from the base, with 2 long-stipitate glands at the base, stellate-hirsute or in age glabrate; stipules linear, 3-5 mm. long; racemes 1-several at the ends of the branches, 1.5-3 cm. long, the flowers subsessile; bracts linear, with conspicuous stipitate glands; staminate sepals elliptic, acute, stellate-hispidulous, the petals slightly longer; stamens about 10; pistillate sepals unequal, lanceolate or spatulate, 3-4 times as long as the capsule; ovary hirsute; capsule 3-4 mm. long, globose, hirsute; seeds 2.5-3 mm. long, with a small caruncle.

***Croton jalapensis* Croizat,** Field Mus. Bot. 22: 449. 1942.

Moist or dry thickets, 1,300-2,500 meters; Jalapa (type from Jalapa, Standley 76414); Guatemala; Huehuetenango; endemic.

A shrub or small tree 2-6 meters high, densely branched, the young branches densely stellate-hispidulous; leaves on petioles 2-2.5 cm. long, firm-membranaceous, ovate or broadly elliptic-ovate, 5-11 cm. long, acuminate or long-acuminate, rounded or obtuse at the base, coarsely and irregularly serrate, green above, sparsely stellate-pubescent or glabrate, rough to the touch, paler and often ochraceous beneath, densely stellate-pubescent, 3-5-nerved at the base; petiole bearing at the apex 2 conspicuous stipitate glands; racemes short or usually elongate and as much as 11 cm. long; pistillate flowers remote, almost sessile; ovary densely covered with a yellowish or pale orange, stellate indument; capsule 9 mm. long, stellate-tomentulose, the columella 5 mm. long; seeds 5.5 mm. long, carunculate, rugose-costate.

It is worthy of mention that *C. jalapensis* and *C. xalapensis* HBK. were named for two towns having the same name, Jalapa

in Guatemala and Jalapa in Veracruz, *C. xalapensis* when the old Spanish spelling of certain geographic names was still in vogue. However, since the two species names differ in their initial letter and appear very different to northern European ears, if not to Spanish ones, both may be retained in the genus.

***Croton jutiapensis* Croizat, Field Mus. Bot. 22: 450. 1942.**

Moist or dry, brushy, often rocky plains and hillsides, 300–900 meters; Zacapa; Chiquimula; Jalapa; Jutiapa (type from Jutiapa, *Standley* 74971); Huehuetenango. Honduras.

A shrub 1–3 meters high, the branches rather stout, when young stellate-hispid with ochraceous or ferruginous hairs, in age ferruginous or fuscous; leaves thick-membranaceous, on thick petioles 1.5 cm. long or less, the petiole with 2 stipitate glands at the apex; leaf blades ovate to ovate-lanceolate, mostly 4–11 cm. long, acute or acuminate, usually somewhat narrowed to the base, the base itself broadly cuneate to subcordate, coarsely and unequally serrate or crenate, penninerved, softly stellate-pubescent on the upper surface, paler and densely velutinous-tomentose beneath, the nerves usually very prominent beneath, the lateral nerves about 6 pairs; inflorescences mostly terminal and shorter than the leaves, lax and rather few-flowered; pistillate sepals unequal, in fruit as much as 12 mm. long, spatulate or linear; ovary densely hispid-tomentose.

***Croton lasiopetaloides* Croizat, Field Mus. Bot. 22: 450. 1942.**

Open oak forest, about 2,000 meters; endemic; Huehuetenango (type from mountains west of Aguacatán, on the road to Huehuetenango, *Standley* 81219).

A shrub 1–1.5 meters high, the branches slender, laxly stellate-tomentose at first; petioles 1–2 cm. long, with 2 small obscure glands at the apex; leaf blades membranaceous, broadly ovate or orbicular-ovate, 5–8 cm. long, 3.5–7 cm. wide, acute or abruptly short-acuminate or sometimes broadly obtuse, rounded at the base and often subcordate, stellate-pubescent above at first, soon glabrate and green, densely and softly stellate-tomentose beneath, whitish or grayish, minutely denticulate or almost entire, about 5-nerved at the base; inflorescences terminal, solitary 5.5 cm. long or less, the flowers subsessile; staminate calyx densely stellate-pilose, globose in bud; pistillate sepals 2 mm. long, stellate-tomentose; ovary whitish-hispidulous; capsule subglobose, densely and closely stellate-tomentulose and sparsely long-pilose, the columella 6 mm. long; seeds oval, very lustrous, castaneous, 4 mm. long.

***Croton limnocharis* Croizat, Field Mus. Bot. 22: 451. 1942.**

Moist or dry, brushy, often rocky plains and hillsides, 300–1,400 meters; endemic; Zacapa; Chiquimula; Jutiapa (type from Jutiapa, *Standley* 75215).

A shrub or small tree, 2–4 meters high or perhaps larger, the young branchlets very densely and closely stellate-tomentulose with whitish hairs, in age cinnamom-

eous; petioles slender, 2.5 cm. long or shorter, with 2 sessile saucer-shaped glands at the apex; leaf blades thin, ovate or broadly ovate, 6–13 cm. long, 3–7.5 cm. wide, abruptly acuminate or long-acuminate, shallowly but conspicuously cordate at the base, obscurely undulate-denticulate or almost entire, 5-nerved at the base, green on the upper surface and almost glabrate but with scattered minute stellate hairs, pale beneath and closely stellate-tomentose; stipules minute and deciduous; inflorescences terminal, very short, few-flowered; pistillate flowers few, short-pedicellate, the sepals triangular, 1–1.5 mm. long; ovary whitish-tomentulose; capsule subglobose, 7 mm. long, at first densely and minutely stellate-tomentulose but the tomentum easily removed and the capsule often glabrate; seeds 4.5 mm. long, smooth.

**Croton lobatus** L. Sp. Pl. 1005. 1753. *Malva* (Suchitepéquez).

Open fields or moist thickets, frequently a weed in cultivated or waste ground, often on sandbars along streams, 400 meters or less; Petén; Alta Verapaz; Izabal; Zacapa; Escuintla; Suchitepéquez. Southern Mexico; British Honduras to Salvador and Panama; West Indies; South America; tropical Africa.

An erect branched annual, usually 75 cm. high or less, the stems green, when young thinly stellate-hispidulous; stipules subulate; leaves on slender eglandular petioles 3–10 cm. long, digitately and deeply 3–5-lobate, membranaceous, sparsely stellate-pubescent or almost glabrous, green, the segments oblanceolate, acuminate or caudate-acuminate, narrowed below, 3–5.5 cm. long; inflorescences terminal or axillary, 10 cm. long or less, usually remotely flowered; staminate flowers short-pedicellate, the sepals elliptic, glabrous, the petals lanceolate or oblanceolate, glabrous; stamens 10–13; pistillate flowers subsessile, the sepals linear or lanceolate, acute, with a few gland-tipped hairs on the margins; ovary stellate-pubescent and pilose; capsule 8 mm. long, stellate-pubescent and setose, becoming glabrate; seeds 5 mm. long.

A weedy plant, seldom plentiful in Central America.

**Croton litorius** Croizat, Journ. Arnold Arb. 26: 185. 1945. *Sanalotodo*.

Known only from the type, Huehuetenango, between Santa Ana Huista and forest of Rancho Lucas, 800–900 meters, *Steyermark* 51332.

A shrub 1.5 meters high, the branches laxly cinereous-tomentulose; leaves on slender petioles 1–2 cm. long, ovate, grayish green, acuminate, rounded at the base, glabrate above, grayish-tomentose beneath, 2.5–5 cm. long, 1.5–3 cm. wide, 3–5-plinerved, obtusely dentate or duplicate-dentate; petiole bearing at the apex 2 stipitate glands, the stipules acute or setaceous; spikes slender, about 10 cm. long; staminate perianth 1.5–2 mm. broad, the stamens few; pistillate perianth 1.5–2 mm. long, subcampanulate, hispidulous, cleft almost to the base; ovary globose, hispidulous.

**Croton Lundellii** Standl. Carnegie Inst. Wash. Publ. 461: 67. 1935. *C. petensis* Lundell, Phytologia 1: 406. 1940 (type from Aguada Tigre-Yaxha road, Petén, *C. L. Lundell* 4128).

Open forest or thickets, 1,500 meters or less; Petén; Guatemala; Huehuetenango(?). Campeche, the type from Tuxpeña.

A shrub or small tree, the branches rather stout, when young densely appressed-stellate-lepidote, soon glabrate; petioles stout, 1.5–3 cm. long, bearing at the apex 2 large crateriform glands; leaf blades chartaceous or firm-membranaceous, oblong or ovate-oblong, mostly 7–11 cm. long and 3–5 cm. wide, somewhat narrowed to the obtuse apex, rounded or very obtuse at the base, irregularly sinuate-crenate or doubly serrate, appressed-stellate-lepidote above at first, soon glabrate, pale beneath or often almost silvery, densely appressed-lepidote, in age often glabrate, 3-nerved at the base; racemes as much as 20 cm. long, usually long-pedunculate, lax, many-flowered; pistillate flowers remote, solitary or fasciculate, sessile; staminate calyx densely stellate-lepidote; capsule 5–6 mm. long, stellate-lepidote, smooth; seeds blackish brown or almost black, lustrous, almost 5 mm. long.

The inflorescences are sometimes fantastically distorted by large insect galls.

**Croton pagiveteris** Croizat, Journ. Arnold Arb. 21: 85. 1940. *Copalchi*.

On limestone hillsides, 800–900 meters; endemic; Huehuetenango (type from Pueblo Viejo, *Seler* 2776; collected also near Santa Ana Huista); Baja Verapaz(?).

A shrub 3 meters high, the young branches densely ochraceous-tomentose with stellate hairs, in age reddish brown; petioles slender, 2–5.5 cm. long, bearing 2 conspicuous stipitate glands at the apex; leaf blades firm-membranaceous, ovate or elliptic-ovate, mostly 6–12 cm. long and 3–7 cm. wide, acute or short-acuminate, rounded or broadly cuneate at the base, remotely and inconspicuously crenate-serrate or serrulate, stellate-puberulent above at first but in age green and almost glabrate, paler beneath and stellate-tomentulose, 5-nerved at the base; racemes terminal, 13 cm. long or less, pedunculate, interrupted, the flowers glomerate or solitary; pistillate flowers almost sessile, the sepals 1.5 mm. long, erect, triangular; ovary ochraceous-tomentulose; staminate flowers globose in bud, short-pedicellate, tomentulose.

*Croton ortholobus* Muell. Arg. (Flora 55: 9. 1872) was described as coming from Guatemala, but the plant actually was collected by Friedrichsthal at Cartago, Costa Rica.

**Croton payaquensis** Standl. Journ. Wash. Acad. Sci. 14: 97. 1924. *Hierba mala*.

Moist or dry, brushy, often rocky plains and hillsides, sometimes along rocky stream beds, 400–1,500 meters; Zacapa; Chiquimula;

Jalapa; Jutiapa. Salvador, the type from Cerro de la Olla near Chalchuapa; Honduras.

A stout shrub, usually only 30–60 cm. high, with few branches, the stems very densely stellate-tomentose with mostly appressed, fulvous or yellowish hairs; stipules subulate, entire, caducous; petioles stout, 0.5–7 cm. long, the glands small and inconspicuous or none; leaf blades oblong-ovate to oval or suborbicular, 2.5–10.5 cm. long, 1.6–8.5 cm. wide, rounded at the apex, sometimes emarginate, broadly rounded or subcordate at the base, thick and flannel-like, entire or nearly so, 5-nerved at the base, very densely stellate-tomentose on both surfaces with a fulvous tomentum, in age sometimes glabrate and green above; inflorescences mostly terminal, sometimes 6 cm. long and many-flowered but usually very short and few-flowered, the flowers short-pedicellate; staminate flowers subglobose in bud and 1–1.5 mm. in diameter, petaliferous, densely stellate-tomentose; stamens about 8; pistillate calyx stellate-pubescent, the sepals lance-oblong, acute, subequal; capsule sparsely stellate-puberulent, the columella 4 mm. long; seeds almost black, very lustrous, 4 mm. long, nearly smooth.

Called “friega-plato” in Salvador. This low shrub is very common in some hilly regions of the Oriente.

**Croton punctatus** Jacq. Coll. Bot. 1: 166. 1786.

Usually on sandy sea beaches; British Honduras; doubtless occurring on the coast of Izabal. Southeastern United States; Mexico; Honduras to Panama; northern South America.

Plants probably perennial, erect or diffuse, a meter high or less, sometimes suffrutescent below, the stout stems densely appressed-stellate-pubescent, brownish; leaves thick, on long stout eglandular petioles, elliptic to ovate or oblong, 1–5 cm. long, rounded or obtuse at the apex, rounded at the base, entire, very densely and finely stellate-pubescent with subappressed hairs, these often brown, at least in part; flowers monoecious or dioecious; staminate racemes rather few-flowered, interrupted, 1–2 cm. long, the pedicels 2–4 mm. long; petals none or rudimentary; stamens about 12; pistillate racemes about 1 cm. long and 1–3-flowered; sepals equal, cuneate or oblong; petals none; capsule depressed-globose, 5–8 mm. high; seeds 6 mm. long, dark or variegated, the caruncle large, substipitate.

The Maya name in Yucatan is reported as “zac-chunum”; “hierba de jabalí” (Yucatan). This is a characteristic strand plant, but it is not common in Central America.

**Croton pyramidalis** Donn. Smith, Bot. Gaz. 35: 7. 1903.  
*Hediondilla* (Huehuetenango).

Moist or wet, mixed forest, 450 meters or less; Alta Verapaz (type from Río Dolores near Cubilgüitz, *Tuerckheim* 7974); Huehuetenango. Southern Mexico; British Honduras; Honduras.

A large shrub or a tree, sometimes 12 meters high, the bark thin, rather smooth, yellowish brown or grayish, the young branches slender, very densely

lepidote with brownish or silvery scales; petioles slender, 3-7 cm. long, 2-glandular at the apex; leaf blades firm-membranaceous, oblong-ovate to broadly ovate, 10-20 cm. long and 5-13 cm. wide, abruptly long-acuminate or short-acuminate, broadly rounded or shallowly cordate at the base, entire or nearly so, bright green above and glabrous or nearly so, very densely appressed-lepidote beneath and usually silvery, sometimes brownish in age; racemes solitary or often forming large unisexual panicles, these sometimes 20 cm. long, openly branched, the flowers pedicellate; staminate calyx 4 mm. long, the sepals ovate, glabrous within; petals equaling the calyx, villosulous outside; stamens about 15; ovary densely lepidote; capsule globose, 5.5 mm. in diameter; seeds lustrous, black, rugulose.

Called "sangre de grado" in Honduras; "cascarillo blanco" (Veracruz). The wood is whitish. This is perhaps the plant reported by Hemsley from Guatemala as *C. Billbergianus* Muell. Arg.

***Croton quercetorum*** Croizat, Field Mus. Bot. 22: 452. 1942.

Known only from the type, Jalapa, mountains about Chahuite, northwest of Jalapa, moist oak forest, 1,650 meters, *Standley* 77460.

A shrub or tree as much as 8 meters high, the young branches densely covered with a very close, uneven, fulvous, stellate tomentum; petioles slender, 2.5-3.5 cm. long, bearing about 4 patelliform glands at the apex; leaf blades ovate-elliptic or ovate, mostly 7-14 cm. long, acuminate or long-acuminate, rounded or obtuse at the base, coarsely and unevenly dentate, thick-membranaceous, 5-nerved at the base, green above, glabrate, sparsely stellate-puberulent, rather rough to the touch, somewhat paler green beneath and similarly pubescent; stipules 15 mm. long or less, persistent; inflorescences terminal, simple, 20 cm. long or less; pistillate flowers almost sessile, the sepals triangular, 4 mm. long, stellate-tomentose; capsule 12-14 mm. long, densely and finely stellate-tomentulose; seeds 10 mm. long, costate-rugulose.

***Croton reflexifolius*** HBK. Nov. Gen. & Sp. 2: 68. 1817. *Copal-chí*; *Hoja amarga*.

Dry to wet thickets or thin forest, on plains or hillsides, sometimes on limestone, 1,500 meters or less; Petén; El Progreso; Jutiapa; Suchitépéquez; Huehuetenango. Southern Mexico; British Honduras to Salvador and Costa Rica.

A shrub or small tree, commonly 2-8 meters high, the branches slender, at first densely appressed-lepidote, grayish or brownish; leaves on long slender eglandular petioles, ovate to broadly triangular-ovate, mostly 8-15 cm. long, usually cuspidate-acuminate, broadly rounded to truncate or shallowly cordate at the base, entire, thick-membranaceous or chartaceous, 3-5-nerved at the base, usually green and almost glabrous above, beneath very densely lepidote with closely appressed scales, somewhat ferruginous or silvery; stipules small, ovate; racemes many-flowered, dense or somewhat interrupted, most of them wholly staminate, the flowers sessile or short-pedicellate, the racemes thus spike-like, commonly 4-8 cm. long; staminate sepals lance-ovate, the petals lance-obovate, pubescent; stamens about 10; pistillate flowers few, in age long-pedicellate, the

sepals 3 mm. long, not accrescent; ovary stellate-pubescent and sometimes pilose; capsule almost or fully 1 cm. long, muricate or almost echinate; seeds smooth.

Sometimes called "sasafrás" in Salvador, a name derived from one of the languages of the Indians of the eastern United States and applied properly to a quite different tree of the Lauraceae (*Sassafras*). It would be interesting to learn how this name of remote origin reached Central America (it is sometimes used also in South America). Unless mature capsules are present, it is difficult to separate this species from *C. guatemalensis* and *C. niveus* Jacq., and one wonders whether there is any important or essential difference between these supposed species. The distribution data given here for *C. reflexifolius* and *C. guatemalensis*, as represented in Guatemala, are not wholly dependable, since few of the numerous available specimens bear mature fruit. However, since the two forms are alike in almost every character, this is scarcely of practical importance. The dry leaves of these two species are sold commonly in the markets as *remedios*, to be used in home treatment of malaria, inflammation, and other affections, and as a tonic. In Salvador the bark is used for flavoring some alcoholic beverages. The leaves have a strong aromatic odor. The Maya name in Yucatan is recorded variously as "perexcutz," "pereschuch," and "pelezcutz."

**Croton repens** Schlecht. *Linnaea* 19: 237. 1847. *Tostoncillo*; *Tostón*; *Chacotote* (Izabal).

Dry rocky brushy fields and hillsides, often in open pine forest or in savannas, 1,500 meters or less; Petén; Alta Verapaz; Izabal; Chiquimula; Jalapa; Jutiapa; Santa Rosa; Guatemala (Fiscal). Southern Mexico; British Honduras; Honduras; Salvador.

Plants a meter high or usually lower, arising from a hard woody root, the stems slender, tough, often several, simple or branched, woody throughout or nearly so; petioles slender or stout, 2 cm. long or usually much shorter, with 2 conspicuous glands at the apex; leaf blades rather thick, broadly ovate to suborbicular, generally 2-5 cm. long, mostly rounded or very obtuse at the apex, broadly rounded or usually subcordate at the base, very coarsely and irregularly dentate or duplicate-dentate or sometimes shallowly lobate, 5-nerved at the base, thinly stellate-puberulent on both surfaces, very rough to the touch; racemes mostly terminal, usually much shorter than the leaves, few-flowered; staminate calyx densely stellate-pilosulous, the petals lanceolate, pilose at the apex; pistillate sepals somewhat accrescent, lance-ovate, obtuse or subacute, densely stellate-pubescent, spreading in age; capsule 5-6 mm. long, finely tuberculate, pilose with long spreading white hairs.

One of the characteristic low plants of open pine or oak forest in the mountains and foothills of eastern Guatemala.

**Croton trinitatis** Millsp. Field Mus. Bot. 2: 57. 1900. *C. Miquelensis* Ferguson, Rept. Mo. Bot. Gard. 12: 48. 1901. *C. tragioides* Blake, Contr. U. S. Nat. Herb. 24: 12. 1922 (type from Lago de Izabal, Izabal, *S. F. Blake* 7854). *C. Miquelianus* Lanjouw in Pulle Fl. Surinam 2: 38. 1932.

Moist or wet fields or open pine forest, often a weed in cultivated ground, especially banana plantations, or in waste ground about settlements, 300 meters or less; Alta Verapaz; Izabal. Southern Mexico; British Honduras to Panama; West Indies; tropical South America.

An erect annual a meter high or usually lower, usually sparsely branched, slender, the branches stellate-pilous or glabrate; petioles 2–10 mm. long, with 2 stipitate glands at the apex or on the base of the blade; leaf blades ovate or deltoid-ovate, 2–4 cm. long, acute, usually shallowly cordate at the base, coarsely crenate, green above, thinly long-pilose or almost glabrate, paler beneath, stellate-pilose; stipules subulate; racemes axillary or terminal, 1–2 cm. long, the bracts triangular, 2-lobate at the base, the flowers short-pedicellate; staminate flowers 4–5-parted, the sepals ovate-triangular, pilose outside; stamens 8–10; pistillate sepals often unequal, stellate-pubescent, the petals rudimentary, subulate; ovary hirsute; capsule 3–4 mm. long; seeds dark olive-gray, lustrous, 3 mm. long, finely and obscurely impressed-punctulate in longitudinal lines.

Called “quema-nariz” in Honduras; “wild sage” (British Honduras).

*Croton Tuerckheimii* Donn. Smith is *Olmediella Betschleriana* (Goepf.) Loes. of the family Flacourtiaceae.

**Croton verapazensis** Donn. Smith, Bot. Gaz. 54: 242. 1912.

Brushy dry rocky hillsides, about 1,600 meters; Baja Verapaz (type from Santa Rosa, *Tuerckheim* II.2297); Jalapa. Endemic.

A tree of 6–9 meters, the branchlets densely stellate-tomentulose; petioles long and slender, with 2 stipitate glands at the apex; leaf blades membranaceous, broadly ovate or rounded-ovate, 8–16 cm. long, 7–12 cm. wide, acute or acuminate, broadly rounded at the base, minutely and inconspicuously denticulate or almost entire, 5-nerved at the base, sparsely and very finely stellate-pubescent on both surfaces or glabrate above, only slightly paler beneath; racemes terminal, about 12 cm. long, the lowest bracts embracing both staminate and pistillate flowers, the pedicels 5 mm. long or often much shorter; stamens about 15; pistillate sepals 2.5 mm. long, oblong-ovate, the petals rudimentary; staminate petals oblong-elliptic, 2.5 mm. long; capsule stellate-pubescent, 1 cm. long; seeds 5 mm. long, fuscous, slightly rugose.

**Croton xalapensis** HBK. Nov. Gen. & Sp. 2: 85. 1817. *C. pseudoxalapensis* Croizat, Journ. Arnold Arb. 21: 85. 1940 (type from Siguatepeque, Dept. Comayagua, Honduras—given in the



original publication erroneously as "Dept. of Comaguaya, vicinity of Siguatepec"). *C. pseudoxalapensis* var. *cobanensis* Croizat, op. cit. 86 (type from Cobán, Alta Verapaz, *Tuerckheim* II.1015). *Drago*; *Chirca*; *Llora-sangre*.

Moist or wet thickets, 2,000 meters or less, most frequent at low elevations; Baja Verapaz; El Progreso; Jutiapa; Santa Rosa; Guatemala; Huehuetenango. Southern Mexico; British Honduras to Costa Rica and Panama.

A shrub or small tree 1-6 meters high, sparsely or densely branched, the branches stout, densely ochraceous-tomentose with stellate hairs or in age glabrate; petioles 2-3 cm. long, with 2 conspicuous glands at the apex; leaf blades ovate or oblong-ovate, mostly 9-20 cm. long, long-acuminate or cuspidate-acuminate, rounded and cordate at the base, usually shallowly so, serrulate or subentire, membranaceous, essentially penninerved but the basal nerves often conspicuous, the lateral nerves about 10 pairs; racemes 25 cm. long or less, with very numerous flowers, dense or often interrupted; pistillate flowers on very short pedicels, the sepals triangular-acute, 3.5 mm. long; ovary densely yellowish-tomentose; staminate flowers short-petiolate; capsule subglobose, sparsely or rather densely stellate-puberulent, the columella about 5 mm. long.

Called "pela-nariz" in Honduras. This has been reported from Guatemala as *C. panamensis* Muell. Arg. To the synonymy of *C. xalapensis* probably belong *C. Aguilarii* Lundell (*Phytologia* 1: 401. 1940; type from La Libertad, Petén, *M. Aguilar* 463) and *C. asteroides* Lundell (op. cit. 402; type from Vaca, El Cayo District, British Honduras, *P. H. Gentle* 2218).

### DALECHAMPIA L.

*Reference*: F. Pax, *Pflanzenreich* IV. 147, xii: 3-56. 1919.

Plants woody or almost wholly herbaceous, usually twining and scandent, rarely erect shrubs, glabrous or with pubescence of simple hairs, the hairs sometimes stinging; leaves alternate, petiolate, undivided or 3-5-lobate or digitately 3-5-foliolate, 2-stipulate, generally 2-stipellate at the apex of the petiole; flowers monoecious, apetalous, terminal or axillary, sometimes fasciculate, surrounded by 2 large, often colored bracts, the inflorescence with 3 pistillate flowers below and numerous or few staminate flowers above, the flowers short-pedicellate, the inflorescences sometimes wholly staminate and dichasial; staminate calyx in bud globose and closed, in anthesis valvately 4-6-parted; disk none; stamens 15-30 or more, inserted on a convex receptacle or on a column, the filaments short; anthers erect, generally didymous, longitudinally dehiscent; pistillate sepals 5-12, imbricate, narrow, mostly pinnatifid, usually accrescent and indurate after anthesis and surrounding the capsule like an involucre; disk none, or rarely annular; ovary 3-celled, the styles connate into a long column, the ovules solitary in each cell; capsule usually tridymous, separating into 2-valvate cocci, these separating from a persistent columella, the endocarp crustaceous or ligneous; seeds globose, not carunculate; endosperm carnose, the cotyledons broad and flat.

About 90 species, mostly in tropical America, a few in tropical Africa and southern Asia. At least one other species is found in southern Central America.

Plants erect shrubs; leaves simple, undivided, obovate-oblong or oblanceolate-oblong, attenuate to the base. . . . . *D. spathulata*.

Plants scandent, the stems mostly or wholly herbaceous; leaves usually cordate at the base, often deeply lobate or digitately compound.

Leaves simple, not lobate, or compound leaves sometimes mixed with the simple ones.

Leaves not uniform, some of them simple and undivided, others digitately 3-foliolate. . . . . *D. heteromorpha*.

Leaves uniform, all simple and unlobed.

Bracts pink. . . . . *D. Schippii*.

Bracts green.

Leaves glabrous beneath or nearly so; stems and petioles puberulent or glabrate; bracts merely dentate. . . . . *D. laevigata*.

Leaves rather densely and finely pubescent beneath; stems and petioles hirsute; bracts shallowly laciniate-lobate. . . . . *D. Friedrichsthali*.

Leaves deeply lobate or digitately 3-foliolate, in one species the leaves partly 3-foliolate and partly undivided.

Leaves dimorphous, some of them 3-foliolate, others simple and undivided. . . . . *D. heteromorpha*.

Leaves uniform, all lobate or digitately compound.

Leaves 3-foliolate.

Leaflets glabrous beneath or nearly so except on the veins. . . . . *D. panamensis*.

Leaflets densely velutinous-pilosulous beneath. . . . . *D. molliuscula*.

Leaves simple, deeply lobate.

Involucral bracts green, deeply 3-lobate. . . . . *D. scandens*.

Involucral bracts cream-colored, shallowly 3-dentate at the apex. . . . . *D. tiliifolia*.

### **Dalechampia Friedrichsthali** Muell. Arg. Flora 55: 45. 1872.

Moist thickets, 240 meters; Retalhuleu (near Retalhuleu, Standley 88554). Nicaragua; Panama.

A small herbaceous vine, the slender stems puberulent and also hirsute with long spreading fulvous hairs; leaves on petioles 8 cm. long or less, ovate or broadly ovate, 7-13 cm. long, 5-8.5 cm. wide, abruptly acute or cuspidate, deeply and narrowly cordate, the basal lobes often overlapping, denticulate, palmate-nerved, pilose above, more densely pubescent beneath with short hairs; stipules linear-lanceolate, 8-12 mm. long, reflexed; inflorescences terminal or axillary, the involucral bracts as much as 3 cm. long, broadly ovate, green, cuspidate-acuminate, 5-nerved, incised-dentate near the apex and usually shallowly 3-lobate; stamens about 30; pistillate sepals 5-6, lance-ovate, acuminate, multidentate, after anthesis indurate and as much as 1.5 cm. long; ovary tomentulose; style column slender, 1 cm. long, very slightly dilated at the apex; cocci of the capsule 8 mm. long, minutely puberulent; seeds 4 mm. in diameter, mottled with white and fuscous.

The type locality has been stated as "Guatemala," but the locality is the San Juan River, and presumably that of Nicaragua, where Friedrichsthal is known to have collected.

*Dalechampia guatemalensis* Gandoger, Bull. Soc. Bot. France 66: 286. 1920. This species scarcely is properly published, being mentioned only in a brief key separating three American species proposed by Gandoger, but not formerly described. It is said to be based upon a Tuerckheim collection from Alta Verapaz. This collection is probably *Tuerckheim* 7978, which is *D. panamensis* Pax & Hoffm., published in 1919.

***Dalechampia heteromorpha*** Pax & Hoffm. Pflanzenreich IV. 147, xii: 26. 1919.

Moist or wet thickets, at or little above sea level; Izabal (Quiriguá, *Standley* 23711, 24242). British Honduras; southern Mexico (Veracruz); Costa Rica.

A twining herb, the stems densely pilose; leaves heteromorphous, simple or 3-foliolate, on petioles 3 cm. long or shorter; leaflets of the compound leaves sessile or short-petiolulate, oblanceolate or lance-oblong to obliquely ovate-oblong, acuminate, denticulate, puberulent on the veins, reticulate-veined beneath, chartaceous or membranaceous; simple leaves oblong-ovate to broadly ovate, acute or obtuse, deeply cordate at the base, short-petiolate; stipules triangular-lanceolate, reflexed, 3-4 mm. long; inflorescences short-pedunculate, the involucrel bracts green, 2.5 cm. long and wide, deltoid-ovate, acute, cordate at the base, denticulate, puberulent on the veins, 5-nerved; pistillate sepals 10, pinnately parted, long-pilose, not capitate-glandular; ovary pubescent; style column clavate, shallowly lobate at the apex; capsule puberulent, 6 mm. high.

This has been reported from British Honduras as *D. Schottii* Greenm., a species of the Yucatan Peninsula of Mexico that is to be expected in British Honduras and Petén.

***Dalechampia laevigata*** Standl. Field Mus. Bot. 4: 312. 1929.

Moist or wet thickets, 360 meters or less; Alta Verapaz (Pancajché, *Standley* 70756). British Honduras; Atlantic coast of Honduras.

A small herbaceous vine, the stems sparsely whitish-pubescent; stipules linear-lanceolate, 4-6 mm. long; leaves simple, on petioles 2-6.5 cm. long, ovate to broadly ovate or oblong-ovate, 7-16 cm. long, 3.5-10 cm. wide, obtuse and apiculate or acute or acuminate, truncate or shallowly cordate at the base, palmately 3-5-nerved, obsoletely and remotely serrulate or subentire, firm-membranaceous, minutely puberulent above on the nerves, minutely pilosulous beneath on the nerves, between them minutely and sparsely strigillose or almost glabrous; involucrel bracts green, membranaceous, broadly rounded-ovate, about 2 cm. long

and 3 cm. wide, obtuse, repand-denticulate, almost glabrous; pistillate sepals about 7, pinnately parted, densely hispid, in fruit 1 cm. long or more; ovary densely puberulent; style column filiform, slightly dilated at the apex; capsule depressed-globose, deeply 3-lobate, minutely puberulent, 1 cm. broad; seeds globose, 4 mm. in diameter, smooth, brownish.

**Dalechampia molliuscula** Blake, *Contr. U. S. Nat. Herb.* 24: 12. 1922.

Moist or wet thickets, 300 meters or less; endemic; Izabal (type from Quebradas, *S. F. Blake* 7547; collected also at other localities in the same general region).

Stems and petioles densely whitish-pilosulous or puberulent; leaves 3-foliolate, or sometimes 5-foliolate, on petioles 3 cm. long or shorter, the stipules subulate, 2.5–4 mm. long; leaflets abruptly contracted into a very short petiolule or sessile, the lateral ones obliquely ovate or lanceolate, acute or acuminate, broadly rounded at the base on the outer side, acute on the inner side, crenate-serrulate, sparsely or densely pilosulous above, in age glabrate, beneath very densely velutinous-pilosulous; terminal leaflet elliptic to oblong-lanceolate, 5–8 cm. long, 2–3.5 cm. wide, acute at the base; peduncles solitary in the leaf axils, about 1 cm. long; involucre bracts green, orbicular-ovate, in fruit 2 cm. long and 2.5 cm. wide, 3-lobate almost to the middle, 5-nerved, densely pubescent like the leaves; pistillate sepals 12, in fruit 8 mm. long, linear, pinnate-laciniate, hispid; capsule 9 mm. broad, sparsely setose, the style column slightly dilated at the apex, 7 mm. long; seeds globose, 3 mm. long, dull grayish with 5 lighter-colored lines.

**Dalechampia panamensis** Pax & Hoffm. *Pflanzenreich* IV. 147, xii: 19. 1919. *D. scandens* var. *trisecta* Donn. Smith, *Bot. Gaz.* 13: 199. 1888 (type from San Juan Mixtán, Escuintla, *J. D. Smith* 2079). *Guachipi* (fide Aguilar).

Moist or wet thickets or forest, sometimes in rather open, rocky forest, 1,400 meters or less; Petén; Alta Verapaz; Izabal; Santa Rosa; Escuintla; Guatemala; Retalhuleu. Southern Mexico (Oaxaca); Honduras; Costa Rica; Panama.

A small or rather large, herbaceous vine, the stems slender, puberulent or almost glabrous; leaves on petioles 3–5.5 cm. long, 3-foliolate; stipules linear, 6 mm. long or less; leaflets short-petiolulate or sessile, 9–12 cm. long, 1.5–3.5 cm. wide, the middle ones lanceolate or oblong-lanceolate, the lateral ones obliquely ovate-oblong, all the leaflets acutely acuminate, acute at the base, or the lateral ones broadly rounded on the outer side, subentire or remotely denticulate, membranaceous, puberulent on the nerves, elsewhere glabrous or nearly so; inflorescences axillary, short-pedunculate, the peduncles mostly 1.5 cm. long or less; involucre bracts green, about 1.5 cm. long and slightly wider, in fruit accrescent and as much as 3 cm. long and 4 cm. wide, 3-lobate, the lobes short, acute, glandular-dentate, 5-nerved; stamens about 24; pistillate sepals about 10, pinnatifid-laciniate, capitate-glandular, in fruit 1 cm. long, whitish-hispid; ovary short-pubescent; style column

clavate, funnelform-dilated at the apex; capsule 8 mm. broad, appressed-pubescent; seeds globose, 3 mm. in diameter, gray, mottled with whitish and blackish.

**Dalechampia scandens** L. Sp. Pl. 1054. 1753.

Moist or dry thickets, often in hedges or second growth, 1,800 meters or less, chiefly at low elevations; Zacapa; Jutiapa; Santa Rosa; Escuintla; Guatemala; Sacatepéquez; Retalhuleu; probably in all the Pacific coast departments. Mexico; British Honduras to Salvador and Panama; West Indies; South America; tropical Africa and Asia.

A large or small vine, herbaceous or often somewhat woody below, the stems usually densely fulvous-hirsute; leaves simple, on petioles 2–12 cm. long, 3–14 cm. long and wide, membranaceous or chartaceous, deeply cordate at the base, 3-lobate to the middle or more deeply, denticulate or subentire, usually densely short-pilose on both surfaces, more densely so and paler beneath, the lobes oblong-elliptic or oblong-ovate, short-acuminate to obtuse and mucronate, the middle one narrowed at the base; stipules broadly lanceolate or ovate, reflexed, 2–10 mm. long; inflorescences axillary, the peduncles short or elongate; involucrel bracts pale green, 5-nerved, 1.5–3 cm. long and wide, cordate at the base, 3-lobate to the middle or more deeply, glandular-denticulate or fimbriate-ciliate, densely pilose; stamens 20–27; pistillate sepals 7–10, pinnate-lobate, capitate-glandular, white-setose, in fruit 5–12 mm. long; ovary pubescent; style column cylindric or clavate, somewhat dilated at the apex; capsule 7–10 mm. broad, pilose; seeds globose, 2.5–4 mm. in diameter, mottled with whitish and brown, smooth.

Called "bejuco de pan" in Salvador; the Maya names in Yucatan are recorded as "xmoolcoh" and "xmolcoh," signifying "puma foot." The stiff hairs covering the inflorescences in this and other species penetrate the skin and flesh readily, causing intense irritation.

**Dalechampia Schippii** Standl. Field Mus. Bot. 11: 133. 1932.

Open pine forest, at or little above sea level; British Honduras (type from Sarawee, *W. A. Schipp* S-181).

A small twining vine, herbaceous or somewhat frutescent, the stems pilose with short, spreading or somewhat reflexed hairs; stipules lanceolate, 3 mm. long; leaves on petioles 3–6 mm. long, chartaceous, oblong or lance-oblong, 3.5–6 cm. long, 1.2–2.5 cm. wide, obtuse to short-acuminate, subcordate at the base, remotely and obscurely serrulate or more coarsely serrate near the apex, densely and softly short-pilose on both surfaces, much paler beneath, 3-nerved, the veins prominent and closely reticulate beneath; peduncles axillary, solitary, usually longer than the subtending leaves; involucrel bracts pink veined with salmon, ovate-rounded, 2–2.5 cm. long and wide, shallowly 3-lobate at the apex, sinuate-denticulate, velutinous-pilosulous; capsule 5 mm. long, puberulent; seeds globose, 3 mm. in diameter.

**Dalechampia spathulata** (Scheidw.) Baill. Etud. Euphorb. 487. 1858. *Cremophyllum spathulatum* Scheidw. Bull. Acad. Brux. 9,

pt. 1: 23. 1842. *D. Roezliana* Muell. Arg. in DC. Prodr. 15, pt. 2: 1233. 1866. *D. Roezliana* var. *viridis* Muell. Arg. op. cit. 1234.

Dense wet mixed forest, 350 meters or less; Petén; Alta Verapaz; Izabal. Southern Mexico; British Honduras; Atlantic coast of Honduras; Costa Rica; Peru.

A simple shrub 30–90 cm. high, bearing few or numerous leaves, the young branches sparsely pubescent, glabrate in age; leaves on petioles 2–10 mm. long, obovate-spatulate or oblanceolate, 13–25 cm. long, 4.5–8 cm. wide, acuminate, usually abruptly so, cuneate-attenuate to the base, the base itself narrow and very obtuse or subcordate, glabrous or somewhat puberulent beneath along the costa, penninerved, entire or sometimes dentate toward the apex; stipules 8–10 mm. long, ovate, acute, stiff, striate; inflorescences axillary, on short slender peduncles, the involucrel bracts 2.5–4 cm. long and almost as wide, ovate or rounded-ovate, pink, dark red, or green, acute or acuminate, denticulate, 3-nerved; stamens about 15; pistillate sepals 6, linear-lanceolate, 1 mm. long; ovary pubescent; style column slender, 5–10 mm. long; capsule tridymous, 5–6 mm. long, 9 mm. broad, puberulent; seeds globose, muriculate, white.

In habit this is altogether unlike other Central American species. It has been introduced into cultivation in hothouses of Europe, but is not sufficiently decorative to merit cultivation.

### **Dalechampia tiliifolia** Lam. Encycl. 2: 257. 1786.

Moist or wet thickets, 800 meters or less; reported from Petén; Alta Verapaz; Izabal. Southern Mexico; British Honduras; Costa Rica; Panama; South America.

A small or large vine, herbaceous or somewhat frutescent, the stems rather stout, densely fulvous-pilose or tomentose; leaves long-petiolate, simple, membranaceous, 7–17 cm. long and wide, shallowly or rather deeply cordate at the base, 3-lobate to the middle or lower, denticulate, pubescent above on the veins or glabrate, usually densely pubescent beneath, the lobes elliptic or ovate-oblong, acute or obtuse, the middle one narrowed at the base, the outer ones angulate or rounded at the base; inflorescences terminal or on short few-leaved branches, the involucrel bracts creamy white, 3–6 cm. long and wide, broadly ovate or rounded, rounded at the base, shallowly 3-dentate at the apex, subentire, 7–9-costate, fulvous-tomentose; pistillate sepals about 12, pinnate-laciniate, hispid, not capitate-glandular, in fruit 1.5 cm. long, plumose-hispid with stinging hairs; ovary hispid; style column dilated and 3-lobate at the apex; capsule 11 mm. broad, verruculose, hirsute; seeds globose, 5 mm. in diameter, greenish gray, mottled with blackish.

### **DALEMBERTIA** Baillon

*Reference:* F. Pax, Pflanzenreich IV. 146, v: 268–270. 1912.

Herbs or shrubs, sometimes at least with tuberous roots, glabrous or with pubescence of simple hairs; leaves alternate, long-petiolate, entire, dentate, or

lobate, membranaceous, 3-7-nerved at the base; flowers monoecious, apetalous, the spikes bisexual, pedunculate, the staminate flowers numerous, 3 inside each bract, pedicellate; pistillate flowers few at the base of the spike or subsolitary on a distinct branch, solitary within the bracts; disk none; staminate sepal 1, subcochleate at the apex; stamen 1, enclosed in the sepal, the anther longitudinally dehiscent; ovary rudiment none; pistillate sepals 3, imbricate, 2-glandular at the base; ovary 3-celled, the styles connate at the base into a column, recurved above, simple; ovules solitary in each cell; capsule tridymous, the 2-valvate cocci separating from a persistent columella, the endocarp hard; seeds globose, not carunculate, the testa crustaceous.

Four species in Mexico, one of them extending into Guatemala.

**Dalembertia triangularis** Muell. Arg. *Linnaea* 34: 218. 1865.

Rocky barranco slopes, 1,300-2,400 meters; Huehuetenango (regions of Cuilco and San Ildefonso Ixtahuacán). Southern Mexico, the exact locality unknown.

A slender shrub about 3 meters high, the branches terete, sordid-tomentose at first, the flowering branchlets subumbellate at the apex of the stem; petioles slender, 3 cm. long or less, villous-pilose; leaf blades triangular-ovate or triangular-lanceolate, 4-7 cm. long, 2-4.5 cm. wide, narrowly long-acuminate, shallowly cordate or truncate at the base, obscurely repand-dentate, usually shallowly and obscurely 3-lobate or somewhat hastate, thinly or rather densely villous-pilose or in age glabrate, somewhat paler beneath; staminate spikes dark red, conic-ovoid, 1 cm. long, very densely many-flowered, tapering to the apex, sessile; pistillate flowers axillary, solitary, the slender pedicels as much as 7 cm. long, often curved; capsule deeply 3-lobate, 12 mm. broad, sparsely pubescent or glabrous; seeds globose, grayish brown.

### DITAXIS Vahl

*Reference:* F. Pax, *Pflanzenreich* IV. 147, vi: 51-77. 1912.

Shrubs or herbs, annual or perennial, the pubescence usually abundant, consisting wholly or chiefly of malpighiaceous hairs (appressed and attached by the middle); leaves alternate, short-petiolate, entire or dentate, membranaceous, 3-nerved at the base, the stipules small; flowers monoecious or rarely dioecious, petaliferous, the racemes mostly bisexual, pistillate below, staminate above, often greatly abbreviated and congested; bracts small, 1-flowered, the flowers short-pedicellate or subsessile, the pedicels often reflexed in fruit; staminate calyx ovoid in bud and closed, valvately 5-parted in anthesis; petals 5, entire, equaling or longer than the calyx, adnate to the androphore or almost free; disk of 5 glands; fertile stamens 2-verticillate, usually 10, with or without filiform staminodia, the filaments short, the anthers ovate, longitudinally dehiscent by introrse slits; ovary rudiment none; pistillate sepals 5, the petals 4 or 5, entire, equaling or shorter than the sepals; ovary subsessile, 3-celled, the styles free or connate at the base, 2-fid; ovules solitary in each cell; capsule tridymous, the 2-valvate cocci separating from a persistent columella; seeds not carunculate, subglobose, often reticulate or foveolate; endosperm carnose, the cotyledons broad, flat.

Species about 45, in tropical and subtemperate America. At least one other species is found in southern Central America.

**Ditaxis guatemalensis** (Muell. Arg.) Pax & Hoffm. Pflanzenreich IV. 147, vi: 59. 1912. *Argyrothamnia guatemalensis* Muell. Arg. Linnaea 34: 145. 1865 (type collected in "Guatemala" by Friedrichsthal).

Moist or dry thickets, open rocky places, sometimes in thin forest, rarely a weed in cafetales, 1,500 meters or less, chiefly at 500 meters or lower; Alta Verapaz; Zacapa; Sacatepéquez. Southern and western Mexico; Salvador; Honduras.

Plants annual, perhaps sometimes more enduring and suffrutescent at the base, erect, branched, 75 cm. high or less, the branches ascending, angulate, whitish-sericeous when young; leaves grayish green, on very short petioles, ovate to lanceolate, 1.5–8.5 cm. long, acute or obtuse, acute to rounded at the base, inconspicuously serrulate or subentire, densely whitish-strigose when young, in age glabrate, often somewhat purplish, 3-nerved at the base; stipules narrow, 1 mm. long; racemes very short, the flowers subglomerate, the rachis very short, bearing a single pistillate flower and 3–8 staminate ones, the flowers sessile; staminate sepals 5, lanceolate, acuminate, 4 mm. long, pilose on both surfaces; petals rhombic-ovate to lanceolate, acute, equaling the calyx, pilose outside; stamens 10 and 2-seriate, accompanied by 3 small staminodia; pistillate sepals 5, linear-lanceolate, 6–7 mm. long, acuminate, the petals narrowly lanceolate, acuminate, shorter than the sepals; ovary densely strigose, the styles connate almost to the middle, pilose, bifid almost to the middle; capsule 4 mm. broad, depressed, densely pilose; seeds globose, reticulate, 2–2.5 mm. in diameter.

Called "pericón" in Salvador. *D. tinctoria* (Millsp.) Pax & Hoffm., which probably is synonymous, is called "tinta roja" in Yucatan, where it is used to give a rose-pink dye. Many plants of this genus impart a purple or reddish stain to the sheets of paper between which they are dried.

#### DRYPETES Vahl

*Reference:* F. Pax, Pflanzenreich IV. 147, xv: 229–279. 1922.

Trees or shrubs; leaves alternate, short-petiolate, coriaceous, penninerved, entire or dentate, generally unequal at the base, 2-stipulate; flowers dioecious, apetalous, fasciculate in the leaf axils or at defoliate nodes; staminate sepals 4–5, strongly imbricate, broad and concave, often unequal, ciliate; stamens 3–12 or more, the filaments free, the anthers large, mostly introrse, the cells parallel; disk central, plane or with an elevated margin, the margin often lobate or lacinate; ovary rudiment small or none; pistillate calyx similar to that of the staminate flower; hypogynous disk annular or rarely none; ovary 1–3-celled, the styles mostly very short, the stigmas dilated, reniform-discoïd; ovules geminate in each cell; fruit drupaceous, globose or ovoid, subcarnose, in age coriaceous or subcrustaceous,



the endocarp coriaceous to osseous, the fruit by abortion sometimes 1-seeded; seeds not carunculate, the endosperm carnosous, the cotyledons broad, flat.

Species about 140, in the tropics of both hemispheres. No others are known from Central America.

Pedicels densely pubescent when young; fruit 2-2.5 cm. long; leaves mostly 14-20 cm. long . . . . . *D. Brownii*.

Pedicels glabrous; fruit about 1 cm. long; leaves mostly 7-12 cm. long.  
*D. lateriflora*.

***Drypetes Brownii*** Standl. Trop. Woods 20: 20. 1929. *Bulhop* (Petén, fide Lundell; Maya?).

Common in climax forest, 550 meters or less; Petén. British Honduras (type from Hillbank, *C. S. Brown* 38).

A tree as much as 15 meters high with a trunk 15-20 cm. in diameter, glabrous throughout except in the inflorescence; leaves coriaceous, on short stout petioles 3-6 mm. long, oblong to lance-oblong or elliptic-oblong, mostly 14-20 cm. long and 5-8 cm. wide, abruptly acute or short-acuminate, with an obtuse or subacute tip, contracted at the base and cuneate-decurrent, the costa and nerves prominent on both surfaces, the lateral nerves about 10 pairs, irregular, ascending at an acute angle, united remote from the margin; flowers fasciculate in the leaf axils, the pedicels 3-5 mm. long, densely pubescent; sepals 2.5-3.5 mm. long, obtuse, tomentulose, broadly oval, rounded at the apex; anthers short-exserted; ovary densely tomentose; fruit obovoid-globose, 2-2.5 cm. long, very densely ochraceous-tomentose, broadly rounded at the apex; seed oval, almost 1.5 cm. long, ochraceous.

Called "bullhoof" and "bullhoof macho" in British Honduras. The wood is yellowish brown, often with reddish brown streaks; hard, heavy, strong, somewhat brittle, medium-textured, fairly straight-grained, not difficult to work, finishes smoothly, is not durable. It is suitable for implements and tool handles.

***Drypetes lateriflora*** (Swartz) Krug & Urban, Bot. Jahrb. 15: 357. 1892. *Schaefferia lateriflora* Swartz, Prodr. Veg. Ind. Occ. 329. 1787. *D. crocea* Poit. Mém. Mus. Paris 1: 159. 1815. *D. lateriflora* var. *guatemalensis* Pax & Hoffm. Pflanzenreich IV. 147, xv: 255. 1922 (type from Teosinte, Santa Rosa, *Heyde & Lux* 4414).

Moist or wet, mixed forest, usually on limestone, 850 meters or less; Petén; Santa Rosa. Southern Mexico; British Honduras; Salvador; West Indies.

A tree, 10 meters high or less, with a trunk as much as 25 cm. in diameter, the branchlets sparsely puberulent or glabrous; leaves coriaceous, on petioles 7-10 mm. long, lanceolate to lance-ovate or ovate, mostly 7-12 cm. long and 2-4 cm. wide, acute or short-acuminate, acute to very obtuse at the base and usually asymmetric, entire, glabrous, the lateral nerves about 8 pairs; flowers densely

fasciculate, the pedicels 3–5 mm. long, glabrous; staminate flowers 3 mm. broad, the usually 4 sepals ovate, puberulent, ciliate; stamens generally 4, exserted; disk and ovary pubescent, the ovary 2-celled; drupe subglobose, 1 cm. long, densely tomentulose.

Called "mula" in Salvador.

## EUPHORBIA L.

Annual or perennial herbs, shrubs, or small trees, with milky sap; leaves alternate or opposite, or only the upper leaves opposite, sometimes verticillate, usually membranaceous, entire or dentate, rarely lobate; inflorescences consisting of one pistillate flower and several staminate ones enclosed in a calyx-like cup-shaped involucre or cyathium; involucre campanulate, sometimes oblique, with 4–5 lobes and as many or fewer glands outside the lobes and alternate with them, the glands often with petal-like, white or colored, spreading appendages; staminate flower consisting of a single stamen, geniculate with the pedicel and soon deciduous, usually without a calyx; anther cells generally globose; bractlets within the involucre linear or setaceous, often lanate; pistillate flower with or without a minute 3-lobate calyx; ovary sessile at the apex of the pedicel, 3-celled, 3-ovulate; styles 3, free or somewhat united, often bifid; capsule of three 2-valvate cocci, these separating at maturity from the central persistent axis (columella), ventrally dehiscent; seeds with or without a caruncle, with a thin crustaceous testa; cotyledons broad, flat.

One of the largest genera of plants, comprising about 1,500 species, widely dispersed in temperate and tropical regions, but most numerous in the tropics. A very few species besides those listed here are represented in southern Central America. The tropical species, aside from a few isolated groups, have not received monographic attention in recent years, and the nomenclature in the genus as a whole is in a confused state. Most of the Central American and Mexican species are represented in the Herbarium of Chicago Natural History Museum by authentic material, and there is little or no uncertainty as to the proper application of most of the names used here. It is probable, however, that some of them may be antedated by names proposed for the same species in remote parts of their range, particularly in South America or the West Indies.

- A. Leaves all alternate, or the lowest ones, at least, alternate, and the upper ones opposite or verticillate. (In *E. scabrella*, most of leaves present may be opposite.)

Plants armed with spines; plants cultivated or rarely naturalized.

Inflorescences sessile or nearly so, greenish yellow, inconspicuous; spines stout, scarcely 5 mm. long; branches deeply angulate. . . . *E. neriiifolia*.

Inflorescences slender-pedunculate, showy, red; spines long and slender, mostly about 1.5 cm. long; branches obtusely if at all angulate. . . *E. splendens*.

Plants unarmed; native plants.

- Leaves very large, most of them 30 cm. long or longer, entire. Shrubs.  
*E. elata.*
- Leaves much smaller or, if large, coarsely dentate.  
 Glands of the involucre without petal-like appendages, naked, sometimes with crescent-like horns.  
 Plants tall shrubs, commonly 1-3 meters high; leaves of the inflorescence large, usually bright red, and very conspicuous; leaves entire or lobate. . . . . *E. pulcherrima.*
- Plants herbaceous, or rarely low shrubs, generally much less than a meter high; leaves of the inflorescence green or, if colored, small and not conspicuous.  
 Inflorescence usually umbel-like; stipules none; involucre in open cymes, each involucre with 4 glands and entire or dentate lobes.  
 Leaves closely and minutely serrulate, about 7 mm. long, crowded.  
*E. trichotoma.*
- Leaves entire, much larger, usually spreading.  
 Plants annual; leaves rounded at the apex. . . . . *E. Peplus.*  
 Plants perennial.  
 Leaves rounded or very obtuse at the apex. . . . . *E. Steyermarkii.*  
 Leaves acute or acuminate. . . . . *E. orizabae.*
- Inflorescence not umbel-like; stipules gland-like; involucre in small cymes, each involucre with a single gland or rarely 4 glands and fimbriate lobes.  
 Glands of the involucre sessile.  
 Leaves mostly ovate or panduriform, variously dentate or lobate.  
*E. heterophylla.*
- Leaves linear or nearly so, almost or quite entire.  
*E. heterophylla* var. *graminifolia.*
- Glands of the involucre short-stipitate. . . . . *E. dentata.*
- Glands of the involucre with petal-like appendages, these often large, white, and conspicuous, sometimes much reduced.  
 Plants annual.  
 Leaves of the inflorescence linear or lance-linear. . . . . *E. Francoana.*  
 Leaves of the inflorescence orbicular or nearly so.  
 Stems densely glandular-pilose, at least above. . . . . *E. astroites.*  
 Stems usually glabrous, sometimes sparsely short-pilose with eglandular hairs. . . . . *E. ocymoides.*
- Plants perennial.  
 Leaves very small, only 4-6 mm. long. . . . . *E. macropodoides.*  
 Leaves much larger.  
 Capsule pubescent, very densely so when young.  
 Leaves acute at the base, fleshy. . . . . *E. lancifolia.*  
 Leaves rounded or very obtuse at the base, thin. . . . . *E. Oerstediana.*
- Capsule glabrous from the first.  
 Floral leaves white, the white leaves sometimes very small but usually conspicuous. . . . . *E. scabrella.*  
 Floral leaves green.  
 Larger stems conspicuously angulate, flexuous or somewhat zigzag. . . . . *E. ephedromorpha.*

Larger stems terete, neither flexuous nor zigzag.

Involucres glabrous or pubescent with appressed hairs, the lobes entire or nearly so.....*E. graminea*.

Involucres densely pilose with short spreading hairs, the lobes incised-dentate.....*E. guatemalensis*.

A. Leaves all opposite or verticillate.

Plants trees or shrubs. Leaves large, entire, mostly verticillate.

Floral leaves white, conspicuous.....*E. leucocephala*.

Floral leaves green, inconspicuous.

Involucres glabrous.....*E. Schlechtendalii*.

Involucres pubescent.

Appendages of the involucre cleft into 2 narrow lobes; leaves oblong-ovate, 1-3 cm. wide.....*E. chiapensis*.

Appendages of the involucre very shallowly or not at all lobate; leaves orbicular or rounded-ovate.

Plants erect; leaves mostly 5-8 cm. wide.....*E. cotinifolia*.

Plants scandent or subscandent; leaves less than 2 cm. wide.

*E. verapazensis*.

Plants herbaceous, annual or perennial, low. Leaves often dentate, usually small.

Leaves entire.

Leaf blades not oblique at the base; involucre mostly solitary in the forks of the branches.....*E. chaculana*.

Leaf blades conspicuously oblique at the base; involucre axillary.

Plants erect; leaves thick and succulent, mostly 8-12 mm. long.

*E. buxifolia*.

Plants prostrate; leaves relatively thin, smaller.

Stems densely and finely pubescent.....*E. Seleri*.

Stems glabrous.....*E. serpens*.

Leaves dentate or serrulate, sometimes only near the apex, but the teeth there usually evident under a lens.

Plants glabrous throughout or usually so, the pubescence, if any, very inconspicuous, never of long spreading hairs, the capsule glabrous.

Plants prostrate.....*E. Blodgettii*.

Plants normally erect.

Leaves linear or lance-linear or very narrowly oblong.

Leaves mostly 2-3 cm. long.....*E. hysopifolia*.

Leaves mostly 1-1.5 cm. long.....*E. cumbrae*.

Leaves oblong to oval or broadly obovate.

Seeds black or gray, often with paler angles; capsule 2-2.2 mm. in diameter.....*E. brasiliensis*.

Seeds dark red or reddish; capsule 1.5 mm. in diameter.

*E. glomerifera*.

Plants usually conspicuously pubescent on the stems and sometimes on the leaves, the stems densely pubescent or sometimes only with sparse long spreading hairs; capsule usually pubescent, often very densely so, sometimes only on the angles, or rarely glabrous in plants having long spreading hairs on the stems.

Appendages of the involucre large, conspicuous, and petal-like, usually reddish.

Plants erect, suffrutescent below. . . . . *E. cuchumatanaensis*.

Plants prostrate, herbaceous.

Appendages of the involucre densely pubescent. . . . . *E. densiflora*.

Appendages of the involucre glabrous.

Transverse ridges of the seeds very blunt, mostly 5, the sulci between them almost closed and very inconspicuous. *E. dioica*.

Transverse ridges of the seeds rather sharp-edged, commonly 6 or more, the sulci between them conspicuous and somewhat open. . . . . *E. rutilis*.

Appendages of the involucre much reduced and narrow, not petaloid.

Involucres numerous, in usually crowded or subglobose, pedunculate cymes. . . . . *E. hirta*.

Involucres in small axillary clusters, not in conspicuous pedunculate cymes, the clusters sessile, or the flowers sometimes in lax open cymes.

Stems prostrate, lying flat on the ground and often forming dense mats.

Leaves densely pubescent.

Stems and leaves densely hirsute with very long, rather stiff, spreading hairs. . . . . *E. villifera*.

Stems and leaves velutinous-pilosulous or pilose with short, not stiffly spreading hairs.

Leaves thinly pilose with long weak hairs; upper leaves acute. *E. velleriflora*.

Leaves densely and finely velutinous-pubescent; upper leaves rounded at the apex.

Involucre densely tomentulose; appendages subentire, broader than the gland. . . . . *E. pantomalaca*.

Involucre glabrous to puberulent; appendages crenulate, about as wide as the gland. . . . . *E. prostrata*.

Leaves glabrous.

Capsule densely pubescent all over with short, appressed or incurved hairs. . . . . *E. thymifolia*.

Capsule pilose only on the angles with rather long, spreading hairs. . . . . *E. prostrata*.

Stems erect or ascending, rarely procumbent, never lying flat on the ground or forming mats.

Stems glabrous, or puberulent or pilose with very short hairs; capsule densely pubescent with short hairs. Plants annual. *E. hypericifolia*.

Stems long-hirsute throughout or at least below the nodes or at the nodes; capsule glabrous or sparsely pilose with long hairs.

Leaves finely and evenly serrate from the apex almost to the base, mostly oval, the upper leaves not or scarcely narrowed. *E. anychioides*.

Leaves obscurely dentate, usually dentate only near the apex, mostly triangular-ovate, the upper leaves much reduced.

Involucres glabrous outside or bearing only a few scattered hairs; leaves very sparsely long-pilose or glabrate.

*E. villifera.*

Involucres densely long-pilose; leaves very densely pilose with very long, spreading, white hairs, these almost as long as the breadth of the leaves.....*E. senilis.*

**Euphorbia anychioides** Boiss. Icon. Euphorb. 12. 1856. *Golondrina; Pocul* (Huehuetenango).

Open pine-oak forest, sometimes in rocky places, 1,500–2,500 meters; Jalapa; Chimaltenango; Huehuetenango. Mexico; Honduras.

Plants usually perennial from a slender or thick, hard, woody root, usually erect or ascending, the stems often numerous, slender, often much-branched, sparsely or densely pilose with rather weak, long or short, more or less spreading hairs; leaves short-petiolate, mostly oval or rounded-oval, chiefly 8–15 mm. long, rounded at the apex, obliquely rounded at the base, rather thick, often tinged with red, paler beneath, finely and almost regularly serrate from the apex nearly to the base, thinly pilose on both surfaces with rather long, weak hairs or glabrate; stipules minute, 2–3-parted with setaceous segments; involucres very small, mostly solitary in the uppermost leaf axils, pedicellate, campanulate, reddish, glabrous, the appendages of the glands transverse-oblong, pink or dark red, shallowly and irregularly dentate; capsule glabrous or sparsely pilose with weak spreading hairs; seeds ovoid-tetragonous, irregularly rugulose.

A characteristic and rather common plant of the dry, oak and pine forests at middle and rather high elevations.

**Euphorbia astroites** Fisch. & Mey. Ind. Sem. Hort. Petrop. 10: 44. 1845.

Wet to dry thickets, 450–1,000 meters; Jutiapa; Santa Rosa; Escuintla. Southern Mexico.

A slender erect annual about 30 cm. high, usually much-branched, the branches green or greenish, usually glabrate below, densely short-pilose above with spreading gland-tipped hairs; lower leaves alternate, the upper ones opposite or verticillate, on rather long, filiform petioles, orbicular or ovate-orbicular, sometimes broader than long, very thin, entire, 1–2 cm. long or many of the leaves smaller, rounded or very obtuse at the apex, truncate or broadly rounded at the base, thinly pilose with very slender, subappressed hairs; stipules obsolete; involucres terminal, pedicellate, green, hirtellous, the lobes ovate, 4–5-dentate, the glands concave, the appendages 3-parted; seeds reddish brown, ellipsoid, tuberculate.

This is very closely related to *E. ocymoidea*, of which it may be only a variety.

**Euphorbia Blodgettii** Engel. ex Hitchc. Rept. Mo. Bot. Gard. 4: 126. 1893.

Sandy fields or usually on sea beaches; British Honduras; Florida; southern Mexico; West Indies.

Plants annual, prostrate, glabrous, the stems 10–40 cm. long, often much-branched and forming mats; leaves opposite, rather distant, somewhat fleshy, oblong or oblong-oval, 4–14 mm. long, obtuse or rounded at the apex, rounded-oblique at the base, conspicuously or obscurely serrulate, at least near the apex; stipules triangular, acute, ciliate; involucre solitary in the upper leaf axils, campanulate, short-pedicellate, glabrous outside, the lobes triangular; glands 4, short-stipitate, orbicular to ovate, the appendages almost as broad as the glands, entire or 2–3-crenate; capsule glabrous; seeds ovoid-tetragonous, pinkish or brownish, the angles prominent, the sides slightly transverse-rugose.

**Euphorbia brasiliensis** Lam. *Encycl.* 2: 423. 1786. *Golondrina*; *Pie de paloma*.

Moist or rather dry, open or brushy plains or hillsides, frequently in rocky places, on sandbars, or a weed in waste or cultivated ground, sometimes in pine-oak forest, 2,200 meters or less; Petén; Alta Verapaz; Izabal; Zacapa; Chiquimula; Jutiapa; Santa Rosa; Escuintla; Guatemala; Sacatepéquez; Chimaltenango; Retalhuleu; San Marcos; Huehuetenango; doubtless in all or most of the other departments. Southern United States; Mexico; British Honduras to Salvador and Panama; West Indies; South America.

An annual, usually erect and 15–50 cm. high, sometimes decumbent or almost prostrate, the stems usually branched, often densely so, slender, glabrous or nearly so; leaves short-petiolate or almost sessile, mostly oblong, sometimes lance-oblong, ovate, or obovate, 1–3.5 cm. long, rounded to subacute at the apex, obliquely rounded at the base, serrulate, especially toward the apex, glabrous or nearly so, the leaves of the inflorescences smaller and narrower; stipules small, ciliate; cymes axillary, lax, small, the involucre few, mixed with linear bracts, small, campanulate, glabrous; glands of the involucre oblong or orbicular, the appendages rather conspicuous, white, transversely elliptic; capsule glabrous, 2 mm. in diameter; seeds trigonous, black or gray, with 2–3 transverse ridges.

Called “wild pisabed” and “chicken-weed hembra” in British Honduras. This is one of the most common weedy plants of the lowlands of Central America, abundant in many places. This species often has been keyed from its close relatives as having terminal inflorescences but, as Kostermans correctly states, the inflorescences are axillary, just as in its near relatives.

**Euphorbia buxifolia** Lam. *Encycl.* 2: 421. 1788.

On or near sea beaches; British Honduras (Stann Creek, *W. A. Schipp* S-58); Florida; Yucatan Peninsula of Mexico and on the coastal islands; Panama; West Indies; northern Central America.

Plants erect, usually 50 cm. high or less, glabrous, succulent, herbaceous or suffrutescens below, the branches usually numerous and suberect; leaves opposite, short-petiolate, ovate to broadly oblong, 8–14 mm. long, subacute, obliquely cordate at the base, entire, often involute; involucre mostly clustered at the ends of the branches, campanulate, 1.5 mm. long, pedicellate, the glands transverse-oblong, the appendages reduced to an obscure line; capsule 2 mm. broad, glabrous; seeds white, ovoid-tetragonous, 1 mm. long, the angles very obtuse, irregularly transverse-ridged.

The plant usually is confined to the vicinity of sea beaches and apparently is rare in Central America.

*Euphorbia canariensis* L. Sp. Pl. 450. 1753. An arborescent plant, cactus-like in habit, a native of the Canary Islands. Several individuals of what are believed to be this species are in cultivation in La Aurora Park, Guatemala, where they attract much attention because of their large size and fantastic form.

***Euphorbia chaculana*** Donn. Smith, Bot. Gaz. 27: 441. 1899.

Open grassy slopes, 1,600–2,700 meters; endemic; Huehuetenango (type from Chaculá, *Seler* 3128).

Plants perennial, erect or diffuse, 8–17 cm. high, arising from a radish-shaped tuberous root 2 cm. long and 1 cm. thick, sparsely pubescent, the stems slender, trichotomous, simple or much-branched; stipular glands none; leaves on very short petioles, linear-oblong, obtuse at each end, 1–1.5 cm. long, 3–5 mm. wide, opposite, cartilaginous-marginate, 1-nerved, sparsely pubescent, the petioles 1 mm. long; pedicels 7–12 mm. long, usually equaling the subtending leaves, solitary; involucre campanulate, glabrous, the appendages oval, entire or erose; capsule glabrous, 3 mm. high; seeds 2 mm. long, oval-tetragonous, rugose.

***Euphorbia chiapensis*** Brandeg. Univ. Calif. Publ. Bot. 6: 54. 1914. *Flor de pascua* (Huehuetenango).

Brushy hillsides or in pine-oak forest, 1,500–2,000 meters; Chiquimula; Jalapa; Huehuetenango. Chiapas; Oaxaca.

Plants 2 meters high or less, woody throughout or at least below, glabrous except in the inflorescences; leaves opposite or verticillate, sometimes very numerous at a node, thin, green above, pale beneath, the very slender petioles often almost as long as the blades; leaf blades ovate to lance-ovate, 3–6 cm. long, obtuse, rounded or broadly cuneate at the base, entire; involucre in terminal and axillary, leafy cymes, these umbellate at the ends of the branches, the cymes glabrous or somewhat pubescent; involucre 1 mm. high, pedicellate, puberulent, the 5 glands oblong, the appendages cleft into 2 linear or narrowly oblong lobes; styles 2-parted; capsule glabrous, 2.5 mm. broad; seeds subglobose, glaucous-gray, densely and coarsely obtuse-tuberculate.

***Euphorbia cotinifolia*** L. Amoen. Acad. 3: 112. 1756. *Hierba mala*.



Moist or dry, brushy hillsides, common or abundant in roadside hedges in many regions, 1,200–2,400 meters; Alta Verapaz; Jalapa; Santa Rosa; Guatemala; Sacatepéquez; Chimaltenango; Sololá; Quiché; Quezaltenango; San Marcos. Southern Mexico; Nicaragua; Costa Rica; Panama; northern South America.

A shrub or small tree, mostly 9 meters high or less, with a rounded crown, the trunk often thick, covered with whitish, almost smooth bark, the branches glabrous or nearly so; leaves deciduous, opposite, the petioles very slender, often equaling the blades; leaf blades rounded-ovate or orbicular, entire, 5–14 cm. long, broadly rounded at each end, glabrous or sparsely pubescent beneath, pale beneath; involucre in dense terminal cymes, usually forming large leafy panicles, white and rather showy, broadly campanulate, pubescent or glabrate; appendages of the glands white or cream-colored, broader than long, crenate; young capsules densely pubescent, at least on the angles.

Sometimes called “mala mujer” in Mexico, and “Barrabás” in Costa Rica. This is a very common shrub or small tree in many parts of the Guatemalan mountains, but it is almost confined to hedgerows. It is especially abundant about Antigua, where it may be found in almost every hedge. Although it is difficult to decide whether the plant is really native in Guatemala, or comes from another region, it is hard to understand why it should have been introduced, since the abundant milky sap causes blisters and inflammation of the skin and is much dreaded. One gets the impression that the trees are left in hedges because it is dangerous to cut them, the milk issuing rapidly and in large amounts whenever the bark is cut. However, the trees are very solid and do make good living fence posts. They shed their leaves during the dry season and are quite bare for a long time. It is said that the foliage is eaten only by goats, the sap causing severe blisters in the mouths of other animals. It is stated that the plant is an important source of honey, blooming when other flowers are scarce and providing a yellow honey of good flavor. The milk is reported to have been used for criminal poisoning by some Central American Indians, and in South America it supplies one of the barbascos or fish poisons. The seeds are reported to have drastic purgative properties, a property common in many genera of this family.

***Euphorbia cuchumatensis*** Standl. & Steyer. Field Mus. Bot. 23: 169. 1944.

Known only from the type, Huehuetenango, Sierra de los Cuchumatanes, between Nentón and Las Palmas, 800–1,200 meters, Steyermark 51646.

An erect shrub 20-30 cm. high, densely and often intricately branched, frutescent below, herbaceous above, the root thick and ligneous, the older stems fuscous, terete, the young ones pilose with spreading, white, almost straight hairs, the internodes longer than the leaves; leaves small, on petioles scarcely more than 1 mm. long, opposite, pale when dry, rather thick, obliquely deltoid-ovate or ovate-oval, 5-10 mm. long, 3.5-7 mm. wide, very obtuse or rounded at the apex, sometimes subacute, obliquely subcordate or rounded at the base, inconspicuously undulate-denticulate near the apex or often almost entire, softly pilosulous on both surfaces with spreading whitish hairs; involucre numerous, axillary or terminal, solitary, short-pedunculate, densely pilosulous, broadly turbinate, acute at the base, the appendages white, glabrous, suborbicular, 1 mm. in diameter, broadly rounded at the apex, spreading, conspicuous; capsule 2 mm. broad, pubescent; seeds plump, brownish ochraceous, somewhat thickened along the angles, the sides almost smooth.

A well-marked species, noteworthy for the erect frutescent habit, grayish, densely pubescent leaves, and the conspicuous white appendages of the involucre. It is to be expected in southern Mexico, but we have been unable to place the plant with any of the very numerous species described from Mexico.

**Euphorbia cumbrae** Boiss. Icon. Euphorb. 16. 1856.

Dry open slopes, about 250 meters; Zacapa (along Río Motagua west of Teculután, *Steyrmark* 29205). Mexico.

A very slender, erect, glabrous annual, mostly 25 cm. high or less, sparsely or much-branched, the ultimate branches almost filiform and the lower ones scarcely 1 mm. thick; leaves opposite, on very short petioles, pale beneath, narrowly lance-oblong, mostly 1-1.5 cm. long, obtuse or subacute, very oblique at the base, obscurely serrulate near the apex; stipules 2-4-fid; involucre very small, subsessile in the forks of the branches and in the uppermost leaf axils, campanulate, glabrous within, the lobes subulate; glands suborbicular, concave, the appendages rather conspicuous, entire, white or pink; styles short, 2-parted; capsule scarcely 2 mm. broad, glabrous; seeds tetragonus, reddish, almost or quite smooth.

**Euphorbia densiflora** (Klotzsch & Garcke) Klotzsch in Peters, Reise Mossamb. 94. 1862. *Anisophyllum densiflorum* Klotzsch & Garcke, Tricocc. 28. 1859. *Chamaesyce densiflora* Millsp. Field Mus. Bot. 2: 391. 1914. *Golondrina*.

Moist, open or brushy fields and hillsides, frequently in waste or cultivated ground, sometimes on limestone, 2,050 meters or less; Petén; El Progreso; Zacapa; Jutiapa; Santa Rosa; Guatemala; Sacatepéquez; Chimaltenango; Retalhuleu; Quiché; Huehuetenango. Mexico; Honduras to Panama.

Annual or perennial, usually much-branched from the base, prostrate and often forming dense mats, the root often ligneous, sometimes fibrous, the stems densely pilose or villous with rather long, spreading, whitish hairs, often dark

red, usually very densely leafy; stipules subulate-aristate; leaves almost sessile, broadly oblong or ovate-oblong, mostly 1-1.5 cm. long, conspicuously oblique, obtuse or rounded at the apex, very oblique at the base, denticulate, crisp-pilose on both surfaces, usually densely so, often tinged or spotted with red; involucre axillary, densely crowded near the ends of the branches and in the leaf axils, campanulate, pilose, the lobes broad, fimbriate; glands large, flat, the appendages whitish to dark red, pilose on both surfaces, erose-dentate; style 3-parted, the branches bifid for half their length; capsule densely pubescent; seeds ovoid, slightly tetragonous, pinkish, the sides convex, rugose.

From the state of New Mexico far southward into South America the name "golondrina" is applied commonly to all or most species of *Euphorbia* of the group *Chamaesyce*, particularly to the prostrate plants. Perhaps on account of their conspicuous milky sap, they are much used in Central America and Mexico in domestic medicine. This custom seems to be widespread, and the senior author remembers that in his childhood days the plants were sometimes used in decoction for treating affections of children as far north as the state of Missouri. This species has been reported from Guatemala as *E. adenoptera* Bertol., a species of Florida and the Greater Antilles. The species of this alliance were treated monographically by Millspaugh (Field Mus. Bot. 2: 383. 1914).

***Euphorbia dentata* Michx. Fl. Bor. Amer. 2: 211. 1803.**

Open or brushy plains and hillsides, frequently on sandbars along streams or a weed in cultivated fields, 200-2,000 meters; Zacapa; Chiquimula; Jalapa; Guatemala; Retalhuleu; Huehuetenango. Widely distributed in the United States and Mexico.

An erect, rather stout annual, mostly 40 cm. high or less, simple or branched, the branches erect or ascending, villous or pilose; stipules glanduliform; lower leaves alternate, the upper opposite, slender-petiolate, or those at the base of the inflorescence sessile or nearly so; leaf blades broadly ovate to lanceolate, 1-7 cm. long, usually acute or acuminate, acute at the base, coarsely dentate, villous or pilose, paler beneath; involucre clustered at the ends of the branches, oblong-campanulate, 3 mm. high, 3-5-lobate, bearing 1-4 yellowish short-stipitate glands, these not appendaged; capsule glabrous or minutely pubescent, 4-5 mm. broad; seeds obovoid or ovoid-globose, gray, inconspicuously 4-angulate, irregularly tuberculate.

***Euphorbia dioica* HBK. Nov. Gen. & Sp. 2: 53. 1817. *Chamaesyce dioica* Millsp. Field Mus. Bot. 2: 384. 1914. ?*E. bryophylla* Donn. Smith, Bot. Gaz. 56: 62. 1913 (type from Santa Rosa, Baja Verapaz, O. F. Cook 225). *Golondrina*; *Ilama* (Chimaltenango).**

Brushy plains or hillsides, sometimes on sandbars along streams, 1,800 meters or less; Baja Verapaz(?); Zacapa; Chiquimula; Guate-

mala; Chimaltenango; Retalhuleu. Mexico; Honduras; Nicaragua; Dominican Republic.

Plants usually or at least sometimes perennial, much-branched from the base, prostrate and forming mats, mostly 30 cm. long or less, the stems densely pilose with spreading hairs, usually very densely leafy; stipules subulate, pilose; leaves opposite, on very short petioles, oblong or ovate-oblong, 3–8 mm. long, obtuse or subacute, oblique-cordate at the base, denticulate, pilose on both surfaces or glabrate, especially above; involucre usually very numerous and densely crowded in the leaf axils, pink or red, pyriform-globose, the lobes minute, lanceolate; glands in 2 pairs, the appendages conspicuous and petal-like, unequal; capsule pubescent; seeds triangular-obovoid, pinkish gray, transversely 4-sulcate.

**Euphorbia elata** Brandeg. Univ. Calif. Publ. Bot. 6: 55. 1914.

Dense, moist or wet, mixed forest, 1,200–2,000 meters; Izabal (Cerro San Gil); Suchitépéquez (Volcán de Santa Clara); Quezaltenango (Finca Pirineos). Chiapas.

A stout glabrous shrub 2.5–3.5 meters high, the branches thick, densely leafy at the ends, grayish; leaves alternate, almost sessile or on somewhat elongate, broad, marginate petioles, rather succulent when fresh, oblanceolate, mostly 30–45 cm. long and 6–9 cm. wide, obtuse or abruptly subacute, long-attenuate to the base, the lateral nerves obsolete or very obscure, deep green above, paler beneath; cymes axillary, long-pedunculate, cymose-corymbiform, often much longer than the leaves, the bracts large and foliaceous, soon deciduous, the thick pedicels 5–8 mm. long; involucre campanulate, 9 mm. broad, the lobes rounded, lacerate; glands 5, orbicular; capsule glabrous, 1.5 cm. long; seeds subglobose, 6–7 mm. in diameter, fuscous, smooth or nearly so.

**Euphorbia ephedromorpha** Bartlett, Proc. Amer. Acad. 43: 54. 1907; Bull. Torrey Club 38: 343. f. 1–3. 1911.

Brushy rocky hillsides, often in ravines, 120–650 meters; endemic; Zacapa (type from Gualán, *C. C. Deam* 232; collected also at other localities); Chiquimula.

Plants perennial, herbaceous or somewhat suffrutescent near the base, the stems wing-angulate, pale green, flexuous, sometimes 1.5 meters long, leafless during the dry season, glabrous, usually pendent from banks or subscaudant over low shrubs; leaves on long slender petioles, alternate, ovate or broadly ovate, 2–4.5 cm. long, obtuse or acute, usually rounded at the base, paler beneath, entire, thinly pilose, especially beneath, or almost glabrous; stipular glands minute; involucre cymose, the cymes lax, axillary on old branches, expanding before the leaves, densely glandular-pilose; involucre narrowly obconic, 3 mm. long, pedicellate, the 5 lobes very short, flabelliform, laciniate; glands 5, the appendages white, oblong or subspatulate, entire, rounded at the apex; capsule 2 mm. long; seeds pinkish gray, ovoid, foveolate.

**Euphorbia Francoana** Boiss. Icon. Euphorb. 22. 1856.

Wet thickets or open places; Alta Verapaz (Panjaché, *W. C. Muenscher* 12561). Southern Mexico.

An erect annual, about 50 cm. high or lower, usually much-branched, the branches ascending, slender, somewhat angulate, inconspicuously pubescent or almost glabrous; leaves alternate or the upper ones opposite, very thin, green above, paler beneath, on long, very slender petioles, broadly rhombic-ovate to lanceolate, mostly 3-6 cm. long, obtuse to acute, cuneate to almost rounded at the base, thinly pubescent with very slender hairs or glabrate, the leaves of the inflorescence small and narrower, attenuate into a long slender setiform tip; stipules minute, gland-like; involucre very small, slender-pedicellate, axillary, short-turbinate, the lobes truncate, 3-4-dentate, the glands transverse-ovate, the appendages purplish, biparted, the segments oblong, subacute, twice as long as the glands; capsule sparsely short-pilose; seeds ovoid-rounded, subacute, coarsely pitted.

Apparently very rare in Guatemala, and perhaps introduced at the single known locality, where the plant was found along the railroad tracks.

**Euphorbia glomerifera** (Millsp.) Wheeler, Contr. Gray Herb. 127: 78. 1939. *Chamaesyce glomerifera* Millsp. Field Mus. Bot. 2: 377. 1913. *Partilla* (Suchitépéquez).

Open or brushy fields and hillsides, often a weed in waste or cultivated ground, 700 meters or less; Petén; Zacapa; El Progreso (type from El Rancho, W. A. Kellerman 8053); Escuintla; Suchitépéquez. Southern United States; Mexico; British Honduras to Panama; West Indies; South America.

A slender erect annual, usually glabrous throughout or nearly so, 75 cm. high or less, simple or usually branched, the stems often tinged with dark red or purple; stipules small, ovate, dentate and ciliate; leaves on very short petioles, oblong to oval or obovate, mostly 1.5-3 cm. long, rounded or very obtuse at the base, very oblique at the base, serrate, pale beneath; inflorescences cymose, axillary, pedunculate, usually dense and many-flowered; involucre turbinate, very small, glabrous outside, hirtellous within, the lobes lance-triangular, lacerate-dentate; glands small, suborbicular, short-stipitate, the appendages white or reddish, orbicular or ovate; capsule glabrous, 1.5 mm. broad; seeds ovoid-tetragonous, dark red or reddish, the angles conspicuous, the sides irregularly rugose.

Called "chicken-weed" and "wild pisabed" (British Honduras); "golondrina," "pela-tripa" (Veracruz). This is the plant to which the name *E. hypericifolia* has been applied by most authors. According to Wheeler, *E. hypericifolia* L. of the Linnaean Herbarium is really the plant that has been known commonly as *E. lasiocarpa* Klotzsch, and on technicalities, at least, should replace the latter (see Contr. Gray Herb. 127: 73 et seq. 1939). It would seem that among the many names that have been published for these closely related species an earlier one than that of Millspaugh could be found for this common and widespread, weedy plant but Wheeler, apparently, found no earlier one. The name *E. glomerifera* has at least

the virtue of clarity, for the type is an excellent and unmistakable specimen. The Maya name in Yucatan is recorded as "toplanxiu." It and related species are eaten commonly by horses and other stock.

***Euphorbia graminea*** Jacq. Sel. Stirp. Amer. 151. 1763. *Lechetrezna* (fide Aguilar); *Escorpión-xiu* (Petén).

Wet to dry thickets or open forest, often in pine-oak forest, frequently a weed in waste or cultivated ground, 2,300 meters or less; Petén; Alta Verapaz; El Progreso; Izabal; Zacapa; Jalapa; Santa Rosa; Escuintla; Guatemala; Sacatepéquez; Chimaltenango; Retalhuleu; Quezaltenango; Huehuetenango. Southern Mexico; British Honduras to Costa Rica; northern South America.

A perennial herb, erect or decumbent or procumbent, usually 50 cm. high or less, the stems slender and weak, green, usually more or less pilosulous with spreading or crisped hairs, often glabrate, dichotomous; stipules minute, subulate; lower leaves alternate, the upper ones opposite, on long slender petioles, very thin, entire, broadly ovate to oblong or lanceolate, very variable in shape even on the same plant, acute to rounded at the apex, cuneate to rounded at the base, mostly 1-7 cm. long, thinly or rather densely pilosulous or crisp-pubescent, often almost glabrous; involucre very small, pedicellate in the forks of the branches and in small lax terminal cymes, appressed-pubescent or sometimes glabrous, the lobes ovate, fimbriate; glands 2-4, transverse-ovate, the appendage obovate, white or yellowish white, broader than the gland, entire or nearly so; capsule glabrous, small; seeds tuberculate.

The Maya name in Yucatan is recorded as "onobcax." This is presumably the plant that has been reported from Huehuetenango as *E. montereyana* Millsp. In Guatemala this species is highly variable in pubescence and leaf shape, and it may well be that the ample material represents more than a single species, but it is not obvious how the forms are to be separated. In this group a great number of species have been described, based upon apparently inconsequential characters. The nomenclature is consequently involved, also the taxonomy, and it is impossible to make a satisfactory disposition of the forms until this special group has been monographed with great care. In some parts of Guatemala this plant is reported to be poisonous to stock. Some of the specimens from Huehuetenango approach *E. biformis* Wats., a Mexican plant with tuberous roots. Guatemalan material has been referred to the related *E. xalapensis* HBK., which is very close to *E. graminea*, and rather doubtfully distinct.

***Euphorbia guatemalensis*** Standl. & Steyerl. Field Mus. Bot. 23: 119. 1944. *Lechetrezno blanco*; *Pie de niño*.

Moist or dry, open or brushy, often rocky hillsides or banks, 1,050–2,200 meters; endemic; Zacapa; Jalapa; Jutiapa; Santa Rosa; Guatemala; Chimaltenango (type collected along road between Chimaltenango and San Martín Jilotepeque, *Standley* 80907).

A perennial herb, the stems erect or often elongate and sprawling on the ground or pendent from banks, sometimes subscaudent and a meter long or more, terete, not jointed, greenish, sparsely or densely pilose with soft weak hairs; stipules minute, gland-like; leaves alternate, thin-membranaceous, entire, paler beneath, on very slender petioles 1–2.5 cm. long, broadly ovate or rounded-ovate, 2.5–4.5 cm. long, 1.5–4 cm. wide, obtuse or rounded at the apex, rounded at the base and usually very narrowly subpeltate, thinly and laxly pilose or glabrate on both surfaces; inflorescence consisting of a long lax leafy panicle bearing very numerous small involucre, the slender branches sometimes flexuous; involucre cymose, slender-pedicellate, 2 mm. long, turbinate-campanulate, densely pilose with spreading hairs; glands 5, the appendage broadly oblong, strigillose outside, subtruncate at the apex, lacinate-dentate or obtuse-dentate; capsule glabrous, 2.5 mm. broad; seeds pale, deeply foveolate.

***Euphorbia heterophylla*** L. Sp. Pl. 453. 1753. *Viborana*; *Hierba mala de chibola*; *Copal* (fide Morales); *Flor de pascua de monte*; *Echúa* (Izabal, fide Blake); *Pastorcita*.

Wet to dry, open or brushy plains and hillsides, a common weed in cultivated ground, 1,700 meters or less, most common at low elevations; Petén; Alta Verapaz; El Progreso; Izabal; Zacapa; Jutiapa; Santa Rosa; Escuintla; Guatemala; Sacatepéquez; Chimaltenango; Quiché; Suchitupéquez; Retalhuleu; Quezaltenango; San Marcos; Huehuetenango; probably in most of the other departments. Southern United States; Mexico; British Honduras to Salvador and Panama; West Indies; South America.

An erect annual, sometimes a meter high but usually half as high or lower, simple or sparsely branched, almost glabrous or somewhat pubescent; leaves mostly alternate, the upper ones opposite, slender-petiolate, highly variable on the same plant, mostly oblong-lanceolate to ovate or frequently panduriform, sometimes suborbicular, entire or irregularly dentate, paler beneath, those subtending the inflorescence often red or pink at the base; involucre mostly crowded at the ends of the branches, the lobes fimbriate; glands usually solitary, concave, not appendaged; capsule 6 mm. broad, glabrous; seeds ovoid, pointed, grayish, 2 mm. long, minutely and irregularly tuberculate in transverse lines.

Called "redhead" (British Honduras); "chilamatillo," "hierba del duende" (Salvador); "hoboncax" (Yucatan, Maya). One of the common weedy plants of the Central American lowlands, widely distributed and common but seldom abundant locally, the plants scattered and often solitary in a given locality. The milky latex is used in domestic medicine. The plant is a highly variable one in

pubescence, leaf shape, and color of the floral leaves. Numerous segregates have been proposed in this group, and some authors recognize as species *E. cyathophora* Murr. and *E. geniculata* Ortega, whose claims to specific status are not well supported. The most conspicuous variant is the following:

***Euphorbia heterophylla* var. *graminifolia*** (Michx.) Engelm. in Torr. Bot. Mex. Bound. 190. 1859. *E. graminifolia* Michx. Fl. Bor. Amer. 2: 210. 1803. *Pascua*; *Pascua miniatura*.

Savannas or grassy hillsides, sometimes in thickets or on limestone, or a weed in cultivated ground, 1,000 meters or less; Alta Verapaz; Zacapa; Santa Rosa; Guatemala; Suchitepéquez; Huehuetenango. British Honduras. Ranges with the typical form.

Differing from the typical variety only in the shape of the leaves, which are all or mostly linear or linear-lanceolate.

***Euphorbia hirta* L.** Sp. Pl. 454. 1753. *E. pilulifera* of many authors, perhaps not of Linnaeus. *Golondrina*; *Coliflorcito* (Jutiapa); *Hierba de paloma*; *Cocmachpín* (Cobán, Quechí); *Sábana de la Virgen* (fide Aguilar).

Wet to dry, open or brushy fields and hillsides, an abundant weed of waste and cultivated ground, 2,500 meters or less, most abundant at or little above sea level; Petén; Alta Verapaz; Izabal; Zacapa; Chiquimula; El Progreso; Jutiapa; Santa Rosa; Escuintla; Guatemala; Sacatepéquez; Suchitepéquez; Retalhuleu; Quezaltenango; San Marcos; Huehuetenango; probably in all the departments. Florida; Mexico; British Honduras to Salvador and Panama; West Indies; tropical South America.

An annual, generally erect or ascending, sometimes prostrate, usually densely pubescent almost throughout with appressed or spreading, often yellowish and multicellular hairs, the stems mostly 40 cm. long or less, generally dichotomous; leaves opposite, on very short petioles, ovate to oblong-lanceolate, asymmetric, 1-3 cm. long, often blotched with dark red, acute, very oblique at the base, serrate above the middle; stipules small, aristiform, pubescent; involucre small, very numerous, mostly in dense head-like cymes, these pedunculate in the leaf axils; lobes of the involucre triangular, densely long-ciliate, the glands 4, stipitate, the appendages small and inconspicuous; capsule pubescent; seeds salmon-pink, ovoid-tetragonous, with acute angles, the sides transverse-rugose.

The Maya name in Yucatan is "xanabmucuy"; "tianguis" (Yucatan); "chicken-weed" (British Honduras). One of the most abundant weeds of the Central American lowlands, usually found everywhere about dwellings, in dooryards, and in streets. Like



other weedy species of the genus, this varies considerably in habit, leaf form, and other characters, but the species as a whole is well marked and usually may be recognized at a glance. It has been stated that this plant harbors the organisms causing the characteristic tropical ulcers on children's legs, but this is denied by others who have investigated the matter. The plant is one of the common domestic remedies for a variety of minor ailments. The milk-like latex is applied to cauterize granulated eyelids and as a remedy for itch and other cutaneous affections.

***Euphorbia hypericifolia*** L. Sp. Pl. 1: 454. 1753. *Euphorbia lasiocarpa* Klotzsch, Nov. Act. Acad. Nat. Cur. 19: Suppl. 1. 414. 1843. *Golondrina*; *Golondrina blanca*; *Chibolita*; *Cangrejo blanco*.

Dry to wet, open or brushy plains and hillsides, often a weed in cultivated ground, frequently in rocky places, 1,300 meters or less; Petén; Chiquimula; Jalapa; Jutiapa; Santa Rosa; Guatemala; Quiché. Southern Mexico; Salvador to Panama; West Indies; South America.

An erect annual, sometimes almost a meter high, usually lower, branched, the branches slender, terete, usually pale, finely pubescent; leaves opposite, on very short petioles, oblong or oval-oblong, pale, 1-4 cm. long, obtuse or rounded at the apex, oblique at the base, finely and closely serrulate, short-pilose on both surfaces with very slender, pale hairs; stipules triangular, 1 mm. long; involucre in small dense terminal cymes, pubescent, narrowly campanulate, 1-1.5 mm. long, the lobes triangular; appendages of the glands white, suborbicular, conspicuous, entire or shallowly lobate; capsule almost 2 mm. long, usually very densely pubescent or tomentulose; seeds ovoid-tetragonous, glaucous-brownish, shallowly rugose.

According to Wheeler (Contr. Gray Herb. 127: 73. 1939), the proper name for this species is *E. hypericifolia* L. That name has been applied previously very generally to a common weedy plant of tropical America, *E. glomerifera*.

***Euphorbia hyssopifolia*** L. Syst. ed. 10. 1048. 1759. *E. stenomeris* Blake, Contr. U. S. Nat. Herb. 24: 13. 1922 (type collected between Los Amates and Izabal, Izabal, *S. F. Blake* 7776). *Golondrina*.

Open, wet or moist, grassy places, frequently in lowland pine forest or savannas, 1,400 meters or less; usually at low elevations; Petén; Izabal; Huehuetenango. Florida; Mexico; British Honduras; Costa Rica; Panama; West Indies; South America.

An erect annual, 50 cm. high or usually lower, glabrous throughout or nearly so, simple or sparsely branched, the stems often dark reddish, slender and stiff,

the ultimate branches almost filiform; stipules deltoid, lacerate-lobate; leaves opposite, on very short petioles, linear to oblong-linear or lance-linear, mostly 2-3 cm. long or more, serrulate, at least toward the apex, paler beneath, acute or obtuse, oblique at the base; cymes terminal, few-flowered; involucre short-pedicellate, glabrous, the lobes triangular, mostly entire; glands minute, stipitate; capsule glabrous; seeds ovoid-tetragonous, black or olivaceous, 1 mm. long, the angles rounded, often white-edged, the sides transverse-rugose.

**Euphorbia lancifolia** Schlecht. *Linnaea* 7: 143. 1832. *Ixbut*; *Sapillo*; *Isbut*.

Wet to rather dry thickets, sometimes in pine forest or in open fields, 600-1,900 meters; Alta Verapaz; Izabal; Santa Rosa; Guatemala; Sacatepéquez; Quezaltenango; San Marcos; Quiché; Huehuetenango. Southern Mexico; British Honduras; Honduras.

A perennial herb, somewhat fleshy and succulent, the stems terete, pale greenish, glabrous or nearly so, ascending or procumbent or prostrate, sometimes greatly elongate, as much as 2 meters long or more, and subscandent; leaves alternate, on very short, stout petioles, mostly rhombic-lanceolate and 5-9 cm. long, acute or acuminate, acute at the base, entire, green and glabrous above, pale beneath and inconspicuously and sparsely pilosulous or glabrate, the lateral nerves obsolete; involucre in small, almost naked, terminal cymes, campanulate-turbinate, 4-lobate, glabrous, the lobes obovate, fimbriate, the glands transverse-ovate, the appendage semiorbicular, crenulate, white or whitish.

This plant is well known in Guatemala, and even outside the borders of the country, by the name "ixbut," which probably is of Quechí derivation. It is said to double the quantity of milk given by cows that eat it. An infusion or decoction of it often is given to nursing women to increase their flow of milk, and it is claimed that it will cause the milk to flow after it has ceased normally, or even in women who have not given birth to a child. Rather curiously, it is claimed in Cobán that the plants often cause the death of cattle and horses eating them, and this may be the result of inherent properties of the seeds. In Guatemala the plant often is planted as a curiosity or for medicinal use in regions where it does not grow wild, and we have seen it in cultivation in other countries of Central America. It seems always to be assumed that the plant comes from Cobán or Verapaz, but as a matter of fact it is plentiful in many parts of Guatemala.

**Euphorbia leucocephala** Lotsy, *Bot. Gaz.* 20: 350. *pl.* 24. 1895. *Pascuas*; *Flor de pascua*; *Flor de leche*.

Moist or dry, open or brushy, often rocky plains or hillsides, often on cliffs, frequently in pine-oak forest, 600-2,000 meters; El

Progreso; Zacapa; Chiquimula; Jalapa; Baja Verapaz (fide Clover); Jutiapa; Guatemala; Chimaltenango; Quiché; Huehuetenango (type from Cuilco, *W. C. Shannon* 305). Southern Mexico; Salvador.

A slender erect shrub 1.5–4 meters high, the stems disarticulating at the nodes when dry, green, angulate, glabrous; leaves mostly verticillate, on long, slender, almost filiform petioles, obovate to oblong, elliptic-oblong, or oblong-lanceolate, 8 cm. long and 3.5 cm. wide or usually smaller, obtuse or rounded at the apex and apiculate, obtuse or broadly cuneate at the base, often tinged with red, deciduous, usually glabrous above, more or less pilose beneath; inflorescences thinly pilose, cymose, the cymes rather dense, umbellate at the ends of the branches, the bracts spatulate, white, obtuse, 1–1.5 cm. long; involucre campanulate, almost sessile, pilose, the lobes transverse-oblong, ciliate; glands 5, transverse-oblong, the appendages white, petaloid, ovate, obtuse, entire, glabrous; capsule glabrous, 5 mm. long.

Called "pascuita" in Salvador; "punopuno," "flor de niño," "flor de pascua" (Chiapas). The inflorescences are large and showy because of the abundance of white bracts, which often are tinged with pink and remain for a long time on the branches. Bunches of the flowering branches are much used as decorations in houses and churches. The bushes are conspicuous even from a great distance, blooming, as they do, at a season when other flowers are scarce.

***Euphorbia macropodoides*** Rob. & Greenm. Amer. Journ. Sci. 50: 164. 1895. *Chapup* (Huehuetenango).

Grassy, moist or wet, alpine meadows, 3,000–3,700 meters; Totonicapán (Desconsuelo); Huehuetenango (Sierra de los Cuchumatanes). High mountains of Oaxaca.

A low, somewhat succulent perennial, mostly 5–8 cm. high, arising from a rather large tuber, this fusiform or in age irregular, as much as 3.5 cm. in diameter; stems usually several, erect, dichotomous, glabrous or nearly so; leaves mostly alternate or the upper ones opposite, very small, slender-petiolate, orbicular to short-oblong, 4–6 mm. long, rounded at the apex and the subequal base, regularly but obscurely serrulate, sparsely pilosulous or glabrous; involucre solitary in the forks of the branches or in the leaf axils, sparsely puberulent or almost wholly glabrous, slender-pedicellate; glands 5, reniform, the appendages greenish, obtuse; capsule glabrous; seeds ovoid, gray, 2 mm. long.

Evidently an alpine plant (it was collected in Oaxaca at 3,000 meters), not found in Guatemala by either of the authors.

***Euphorbia neriifolia*** L. Sp. Pl. 451. 1753. *Tirabuzón; Tuno de San Antonio*.

Said to be a native of the East Indies; much planted for hedges or for ornament in Guatemala, especially in the Oriente, particularly

common in Zacapa and Jutiapa, grown chiefly in the warmer regions, but frequent about Guatemala and at other localities of middle elevation.

A stout shrub commonly 1-2 meters high, with few or numerous branches, these deeply 5-angulate, the angles bearing clusters of short sharp dark-colored spines, leaves, and inflorescences; leaves thick and fleshy, deciduous in age, glabrous, alternate, on short marginate petioles, obovate-oblong, 8-12 cm. long or larger, rounded at the apex, long-attenuate to the base, entire, the lateral nerves obsolete; involucre small, greenish, in small dense sessile cymes, mostly borne in the upper leaf axils, hemispheric, the lobes large, ovate, fimbriate on the margin; glands transverse-ovate.

Called "tuna francesa" in Salvador. The sap is said to be poisonous, but in Guatemala it is used as a remedy for hemorrhoids. This is one of the commonest hedge plants in the Oriente of Guatemala. It is a very solid, cactus-like plant, and serves well for a hedge, although it has no pretensions to beauty.

**Euphorbia ocymoidea** L. Sp. Pl. 453. 1753. *Flor de pascua* (Huehuetenango).

Wet to dry, open or brushy hillsides or fields, often in pine-oak forest, 600-2,000 meters; Alta Verapaz; Baja Verapaz; Zacapa; Chiquimula; Jalapa; Jutiapa; Guatemala; Sacatepéquez; Chimaltenango; Huehuetenango. Southern Mexico; British Honduras; Honduras; Costa Rica.

A slender erect annual, 50 cm. high or usually lower, commonly much-branched, the stems pale green, generally glabrous; leaves small, alternate or the upper ones opposite, on very long, filiform petioles, very thin, entire, orbicular or rounded-ovate, the larger ones about 1 cm. long, rounded at each end, paler beneath, entire, sparsely pubescent with weak slender hairs or almost glabrous, the smaller leaves often broader than long; stipules obsolete; involucre small, pedicellate, solitary in the forks of the branches and clustered at the ends of the branchlets, usually pubescent outside, the lobes ovate, fimbriate-dentate; glands transverse-ovate, the appendage 3-4-parted, with subulate divisions; capsule very small, thinly hirtous; seeds small, ovoid, tuberculate.

A slender weak plant that withers as soon as the rains cease. Central American material has been referred to *E. adiantoides* Lam. and confused with *E. astroites* Fisch. & Mey., also with *E. Armourii* Millsp., which is doubtfully distinct. The Maya name in Yucatan is reported as "cambal-sac-chacah."

**Euphorbia Oerstediana** (Klotzsch & Garcke) Boiss. in DC. Prodr. 15, pt. 2: 59. 1862. *Poinsettia Oerstediana* Klotzsch & Garcke, Monatsber. Akad. Berlin 1859: 253. 1859. *E. enalla* Brandeg. Univ.

Calif. Publ. Bot. 6: 54. 1914 (type from Chiapas). *E. tetradenia* Brandeg. loc. cit. as syn. *Ixbut de cabra*; *Mielilla*.

Moist or wet thickets or open or dense forest, sometimes in pine forest, 2,500 meters or less; Petén; Alta Verapaz; El Progreso; Zacapa; Chiquimula; Santa Rosa; Escuintla; Guatemala; Sacatepéquez; Chimaltenango; Sololá; Quiché; Quezaltenango; Huehuetenango. Nicaragua; Costa Rica; West Indies; northern South America.

A perennial herb, erect or ascending, the stems often several from a single root, simple or generally branched, mostly 50 cm. high or less, glabrous or pilose; stipules obsolete; lower leaves alternate, the upper ones opposite, slender-petiolate, thin, broadly ovate to oblong or lanceolate, 2-8 cm. long, acute or obtuse, rounded or obtuse at the base, entire, glabrous or often rather densely pilose beneath, usually ciliate; involucre chiefly in small, lax or dense, terminal cymes, slender-pedicellate, narrowly campanulate, pubescent, 2.5 mm. long, the lobes subtruncate, fimbriate; glands with small, whitish or greenish appendages; capsule 3-4 mm. in diameter, sparsely or densely pilosulous with weak pale hairs; seeds ovoid-globose, coarsely punctate or tuberculate, grayish.

***Euphorbia orizabae*** Boiss. in DC. Prodr. 15, pt. 2: 147. 1862.

Open or brushy hillsides, or often in open or rather dense forest of oak, pine, or *Abies*, 1,900-3,000 meters or even higher; Chimaltenango (Volcán de Acatenango); Quiché; Huehuetenango; Totonicapán; Quezaltenango; San Marcos. Mountains of southern Mexico.

An erect perennial herb, generally 75 cm. high or less, sometimes a stiff shrub of 1.5 meters, glaucous-green, the stems slender, glabrous or usually minutely puberulent or pilosulous above, simple or usually branched, umbellately branched at the ends; leaves mostly alternate, those at the base of the inflorescences opposite or verticillate, short-petiolate or sessile, narrowly lanceolate, mostly 2-6 cm. long, acute or subacute, attenuate to the base, entire, glabrous, thick, the lateral nerves obsolete; involucre in umbellate leafy-bracteate cymes, campanulate, glabrous outside, pubescent within, the lobes ovate, ciliate; glands truncate, obscurely bicornute; capsule depressed-globose, glabrous; seeds obscurely punctate.

This has been reported from Guatemala as *E. campestris* Cham. & Schlecht., a Mexican species. It is widely scattered in the mountains of the Occidente but seldom occurs in abundance, and is a rather rare plant.

***Euphorbia pantomalaca*** Standl. & Steyerl. Field Mus. Bot. 23: 120. 1944.

Known only from the type, Dept. Baja Verapaz, Sierra de las Minas, opposite El Rancho (Dept. El Progreso), *W. A. Kellerman* 5175.

A perennial herb, arising from a thick woody root, the stems numerous, prostrate, densely leafy, dichotomous-branched, terete, densely and softly pilosulous, the hairs short, spreading, white; leaves opposite, almost sessile, obliquely oval or oval-ovate, 5–9 mm. long, rounded or very obtuse at the apex, very oblique at the base, thick, obtusely denticulate near the apex or subentire, densely and finely velutinous-pilosulous on both surfaces; involucre axillary, almost sessile, campanulate, densely white-tomentulose, scarcely 1 mm. long; glands small, transverse-oval, deep red, the appendage paler, subentire, broader than the gland; young capsules short-exserted, densely white-tomentulose; styles hirtous.

**Euphorbia Peplus** L. Sp. Pl. 456. 1753. *E. chamaepeploides* Lotsy, Bot. Gaz. 20: 351. 1895 (type from San Martín Jilotepeque, *Heyde & Lux* 3481).

A weed in moist shaded ground, mostly about dwellings, sometimes in flower beds or coffee plantations, 1,500–1,900 meters; Sacatepéquez; Chimaltenango; Huehuetenango. Native of Europe and Asia, introduced and naturalized in various regions of America.

A glabrous annual, erect or ascending, 30 cm. high or less, often much-branched, the branches erect, terete, greenish; leaves mostly alternate, those at the base of the inflorescence verticillate, slender-petiolate, entire, broadly obovate to oblong-obovate, 1–2 cm. long, rounded at the apex, acute at the base, thin; bracts of the inflorescence broadly ovate or deltoid-ovate; involucre subsessile, campanulate, less than 2 mm. long; glands 4, crescentic, not appendaged, prolonged into slender horns; capsule 2–3 mm. broad, glabrous; seeds oblong-ovoid, whitish, subterete, with 1–4 transverse rows of conspicuous pits.

The plant is rare and local in Guatemala, but it may have been imported from Spain long ago. It is strange that so well known a plant should have been described as a new species by Lotsy, but it merely illustrates the credulity of European and many American botanists regarding supposed deep differences that separate temperate and tropical floras, and the seriousness with which they face international boundary lines.

**Euphorbia prostrata** Ait. Hort. Kew. 2: 139. 1789.

Open moist soil, 200 meters or less; Petén (Uaxactún). South-eastern United States; Mexico; British Honduras; West Indies; South America; Old World.

Plants annual or perhaps sometimes perennial, prostrate, much-branched, forming mats, the stems slender, compressed, densely short-pilose, mostly 15 cm. long or less; leaves opposite, subsessile, oblong or broadly obovate, 4–7 mm. long, rounded or very obtuse at the apex, oblique at the base, serrulate, pubescent on both surfaces or glabrate; stipules broadly deltoid, ciliate; involucre axillary, glabrous to puberulent, very small, the lobes elongate-triangular, ciliate; glands 4, transverse-oval, the appendages about as wide as the glands, crenulate; capsule

pilose on the angles with spreading white hairs, elsewhere glabrous; seeds pink, ovoid-tetragonous, closely transverse-ridged.

Called "chicken-weed" in British Honduras. For this plant L. C. Wheeler recently proposed (*Rhodora* 43: 265. 1941) to substitute the name *Euphorbia Chamaesyce* L., but in error. For a later discussion of the subject see Croizat, *Bull. Torrey Club* 72: 312-318. 1945.

*Euphorbia pulcherrima* Willd. ex Klotzsch, *Allg. Gartenz.* 2: 27. 1834. *Poinsettia pulcherrima* Graham, *Edinb. New Phil. Journ.* 20: 412. 1836. *E. erithrophylla* Bertol. *Fl. Guat.* 419. 1840 (type collected in Guatemala by Velásquez). *Flor de pascua*; *Pascua*; *Guacamayo* (Santa Rosa).

Native probably of southern Mexico and perhaps also in Guatemala; abundantly cultivated for ornament in Guatemala everywhere from middle or even rather high elevations down to the coasts; observed as perhaps wild in moist or wet, wooded ravines in Jalapa, Santa Rosa, and Huehuetenango. Grown for ornament in most civilized tropical regions.

A shrub, commonly 1-4 meters high, with few stout branches, the branches terete, glabrous; leaves alternate or the upper ones opposite or verticillate, on long slender petioles, membranaceous, usually broadly ovate or panduriform but frequently entire, mostly 12-20 cm. long, acute or acuminate, broadly cuneate at the base, paler beneath, not dentate, glabrous or sometimes pubescent beneath; leaves of the inflorescence large, brilliant red; involucre green and yellow, cymose-corymbose, on stout pedicels, campanulate, hirtous within, the lobes broad and short, lacinate; gland 1, not appendaged.

The floral leaves are usually of a brilliant red but sometimes they are pale pink, or of a dull, dirty unattractive red shade, or rarely white or pale yellow (forma *lutea* Standl., the "pascua amarilla" of Salvador). This is one of the favorite and most showy ornamental shrubs of Guatemala, planted around almost every dwelling from the coasts far up into the mountains. The plants, of course, do not thrive in regions where there is heavy frost, and it is said they do not grow at Quezaltenango, but there may well be some in protected places. There are many bushes in the bleak mountains of Huehuetenango, although there they are sometimes cut down by frost. Many of the little white houses on the bare hills of this region have growing beside them a single large bush of "flor de pascua," which in December is visible from a long distance, and blazes with color so as to suggest a bonfire. Often no other ornamental plant grows around these isolated dwellings, and one is tempted to wonder if the plant may not have had formerly, or perhaps even now, some

religious significance. The name "flor de pascua" ("Christmas flower") is given everywhere in Central America to this shrub because it is most brilliant about Christmas time. Sometimes it begins to "flower" in October in some regions, and may persist into March, but after middle January the bushes usually look ragged and far from attractive. The inflorescences are used everywhere for decorations, especially on altars, but they are unsatisfactory for this purpose, since they wilt rapidly unless placed in water. The plant is well known in the United States under the name "Poinsettia," and is grown in vast quantities in hothouses for sale in pots at Christmas time, many of the plants so sold being merely unrooted branches set in pots, in which condition they often remain fresh for a long time if carefully watered. The name "Poinsettia," incidentally, a former generic name for the plant, was given in honor of Joel R. Poinsett, United States minister to Mexico, who "discovered" the plant there in 1828, and introduced it into cultivation in the North. Few people have had a more gorgeous plant species named for them. It seems to be uncertain where the Poinsettia is native, and in Central America it usually is confined to hedges and gardens. However, we have found it in several departments of Guatemala, as indicated above, in localities where it appeared to be a native plant, remote from any dwelling, and in places where it seemed improbable that any dwelling had ever been. It was growing in rather dense forest in quebradas, on very steep, rocky banks or cliffs, and this may be its native habitat. It is of course possible but not very probable that the plant had been introduced by birds, or that it had been planted about some former shrine, but this seems unlikely. The scarlet bracts are said to give a red coloring principle. In Guatemala the milk is sometimes used as an emetic, also as a remedy for toothache, or as a depilatory, and poultices of the leaves are applied to relieve body pains. The shrub grows readily from cuttings, and in the tropics it thrives with little or no care, often covered with drying clothes or used as a perch by the household chickens.

**Euphorbia rutilis** (Millsp.) Standl. & Steyerm. Field Mus. Bot. 23: 120. 1944. *Chamaesyce rutilis* Millsp. Field Mus. Bot. 2: 385. 1914.

Known in Guatemala only from the type, growing in sand along the railroad, Fiscal, Guatemala, 1,110 meters, *C. C. Deam* 6189. Yucatan Peninsula of Mexico.

Plants annual or perhaps also perennial, prostrate and forming mats, the stems 40 cm. long or less, much-branched, the stems compressed, densely white-



pilose; leaves opposite, almost sessile, oblong to broadly ovate-oblong, 5–8 mm. long, very obtuse or subacute, oblique at the base, serrate, glabrous or glabrate above, pilose beneath; stipules subulate-setaceous, pilose; involucre axillary, short-campanulate, pubescent outside, glabrous within, the lobes broadly deltoid, ciliate; glands transverse-oval, concave, the appendages dark red or reddish, glabrous, crenulate; ovary densely pubescent; capsule densely pubescent; seeds ovoid, buff, the sides transverse-rugose, with about 4 sulci, these broad and open, the ridges narrow and rather sharp-edged.

Closely related to *E. dioica* and rather doubtfully distinct.

**Euphorbia scabrella** Boiss. in DC. Prodr. 15, pt. 2: 55. 1862.  
*E. microappendiculata* Lotsy, Bot. Gaz. 20: 349. 1895 (type from Laguna de Ayarza, Santa Rosa, Heyde & Lux 3850). *Flor de pascua* (Huehuetenango); *Tuhonón* (Cobán, Quechí); *Quilete de leche*; *Ojo de tabano*.

Wet to moist or dry, open or brushy, often rocky hillsides or fields, sometimes pendent from cliffs, frequently in pine or oak forest, 800–2,100 meters; Alta Verapaz; Baja Verapaz; El Progreso; Zacapa; Chiquimula; Jalapa; Santa Rosa; Guatemala; Sacatepéquez; Chimaltenango; Huehuetenango; Quezaltenango; San Marcos. Southern Mexico.

A perennial herb, erect, decumbent, or sometimes procumbent, the stems a meter long or usually half as long or less, branched, rough-hirtellous, pilosulous, or glabrate, slender, green; lower leaves alternate, the upper ones opposite, slender-petiolate, very variable in form, broadly ovate to linear, entire, mostly 7 cm. long or shorter, obtuse or acute, rounded to acute at the base, thin, deep green above, pale beneath, thinly pilose on both surfaces or glabrate; stipular glands small and inconspicuous; bracts of the inflorescence small or rather large, spatulate or obovate, pure white, conspicuous; involucre in small lax terminal cymes, pedicellate, turbinate, pubescent, glabrous in the throat, the lobes orbicular, fimbriate; glands 2–4, concave, the appendage oblong; capsule glabrous, small; seeds tuberculate.

A very common plant in many parts of Guatemala, often somewhat weedy, in general appearance like *E. graminea*, from which it is not always sharply differentiated. It may well be that more than one species is represented by the material we have referred here, but, as remarked under *E. graminea*, the taxonomy of this group of species must remain obscure and unsatisfactory until the group has been monographed with great care. To *E. scabrella* probably belong Guatemalan collections that have been referred to *E. arenaria* HBK.

**Euphorbia Schlechtendalii** Boiss. Cent. Euphorb. 18. 1860.  
*E. Friedrichsthali* Boiss. in DC. Prodr. 15, pt. 2: 61. 1862 (type said to have been collected in Guatemala by Friedrichsthal). *E. ad-*

*inophylla* Donn. Smith, Bot. Gaz. 47: 261. 1909 (type from Salvador).  
*Huailintám* (Huehuetenango).

Dry or moist, brushy, often rocky hillsides, 300–2,300 meters; Alta Verapaz; El Progreso; Zacapa; Santa Rosa; Quezaltenango; Huehuetenango. Southern Mexico; Salvador to Costa Rica.

A shrub 1–2.5 meters high or larger, often much-branched, glabrous outside the inflorescence or nearly so, the branches brown or pale brown, readily disarticulating at the nodes; leaves thin, entire, on long, almost filiform petioles, verticillate, broadly ovate to suborbicular, 1–3 cm. long, rounded or very obtuse at each end, paler beneath; involucre in small cymes, terminal and axillary, short-pedicellate, hemispheric, glabrous, the lobes obovate, short-fimbriate; glands broad, the appendage entire, whitish.

Called “caraño” and “pascuita” in Salvador; “boxchacah,” “zacchacah” (Yucatan, Maya).

**Euphorbia Seleri** Donn. Smith, Bot. Gaz. 27: 441. 1899.

Known only from the type, Chaculá, Huehuetenango, 1,600 meters, *Seler* 3127.

Perennial from a rather thick, hard root, the stems prostrate, dichotomously much-branched, densely pubescent, 10–15 cm. long; stipules setiform, 1 mm. long; leaves opposite, distichous, almost sessile, broadly ovate, 5–7 mm. long, thick and somewhat fleshy, obtuse, entire, subcordate and unequal at the base, finely pubescent when young, glabrate in age; involucre short-pedicellate, solitary in the upper leaf axils, campanulate, sparsely pubescent or almost glabrous, the lobes triangular-subulate, short-ciliate; glands 4, transverse-oval, yellowish, the appendages white, obovate, entire; capsule almost glabrous; seeds reddish, ovoid, rugulose.

**Euphorbia senilis** Standl. & Steyerl. Field Mus. Bot. 23: 120. 1944.

Known only from the type, Dept. Huehuetenango, dry slopes between San Ildefonso Ixtahuacán and Cuilco, 1,350–1,600 meters, *Steyerl* 50739.

A perennial herb, arising from a long perpendicular woody root, the stems numerous, slender, flexuous, prostrate, laxly dichotomous, densely hirsute with long spreading white hairs; stipules small, the segments almost setaceous, hirsute; leaves opposite, almost sessile, broadly ovate or very broadly oval, often almost quadrangular, chiefly 5–7 mm. long and almost as wide, very obtuse or broadly rounded at the apex, obliquely subcordate at the base, thick, obsolete undulate-dentate or often entire, densely hirsute on both surfaces with very long, spreading, white, slender but stiff hairs; involucre small, in the upper leaf axils, densely white-hirsute, scarcely 1 mm. long; glands red-purple, transverse-oval, the appendages narrow, entire, red-purple; capsule almost 2 mm. broad, deeply sulcate, glabrous or with a few long hairs; seeds obtusely tetragonous, glaucous, almost smooth, the sides flat or slightly concave.

Closely related to *E. villifera*, but very different in appearance because of the unusually dense indument of long spreading stiff hairs.

***Euphorbia serpens* HBK. Nov. Gen. & Sp. 2: 52. 1817.**

Moist or wet fields or along lake margins, 500 meters or less; Petén; Jutiapa; Retalhuleu. United States; Mexico; British Honduras; northern South America.

Plants annual or sometimes perennial, the stems prostrate and forming mats, much-branched, glabrous throughout, as much as 30 cm. long; leaves short-petiolate, ovate-orbicular to broadly oblong, 2-7 mm. long, entire; stipules small, lacerate; involucre short-pedicellate, solitary in the leaf axils, 1 mm. long, the lobes deltoid; glands transverse-oblong, ochroleucous, the appendages little wider than the glands, white, glabrous, usually crenate; capsule glabrous, 1.2 mm. long; seeds ovoid, with rounded angles, white or brownish.

***Euphorbia splendens* Bojer ex Hook. Bot. Mag. pl. 2902. 1829. *Corona de Cristo*.**

Native of Madagascar, but grown commonly for ornament or as a curiosity in other regions of the earth, out of doors in the tropics and in hothouses in the North; a rather common garden or pot plant of Guatemala.

A shrub, often or usually scandent, glabrous or nearly so, the branches thick, dark reddish brown, densely armed with long stout spines; leaves small, thin, obovate or oblong-spatulate, entire, obtuse or rounded at the apex, narrowed to the base, short-petiolate; cymes produced in the upper leaf axils, long-pedunculate, the bracts bright red, petal-like, showy; involucre campanulate, the lobes broadly ovate, fimbriate; glands fleshy, red, transverse-ovate; seeds ovoid, tuberculate.

The name "crown-of-thorns" often is given to this plant in the United States.

***Euphorbia Steyermarkii* Standl. Field Mus. Bot. 23: 121. 1944. *Contra-rotura*.**

On rocks in dense forest, 200-2,200 meters; endemic; Zacapa (type collected near Zacapa, *Standley* 74673); Chiquimula; Huehuetenango.

An erect perennial herb about 30 cm. high, glabrous throughout, the stems several, simple or sparsely branched, the branches subterete, about 5 mm. thick, sometimes subangulate, rather sparsely leafy; leaves on stout petioles 1 cm. long or less, somewhat fleshy, entire, deep green above, paler beneath, alternate, those at the base of the inflorescence ternate, the blades obovate, rhombic-obovate, or rounded-elliptic, 5-6.5 cm. long, 2.5-4.5 cm. wide, very obtuse or rounded at

the apex, cuneate at the base, penninerved, the lateral nerves obscure; stipules obsolete; inflorescence terminal, umbelliform, small, with few branches, much shorter than the leaves, the bracts green, cordate-orbicular or reniform, sessile, 8-14 mm. broad, broadly rounded at the apex; involucre few, sessile at the ends of the branches among the leaves and hidden by them, glabrous, broadly campanulate, 2 mm. long, the lobes short, obovate, fimbriate-dentate; glands 5, not appendaged, suborbicular, spreading, entire; capsule long-exserted, the pedicel stout, suberect.

**Euphorbia thymifolia** L. Sp. Pl. 454. 1753. *E. rubrosperma* Lotsy, Bot. Gaz. 20: 349. 1895 (type from Santa Rosa, Santa Rosa, Heyde & Lux 4271). *Golondrina*.

Moist, grassy or brushy fields or hillsides, often a weed in waste or cultivated ground, frequent on sandbars along streams, 1,000 meters or less; Petén; Izabal; Zacapa; Jalapa; Jutiapa; Santa Rosa; Escuintla; Suchitepéquez; Retalhuleu; Quezaltenango; San Marcos. Mexico; British Honduras to Salvador and Panama; West Indies; South America; Old World tropics.

A prostrate annual, the numerous stems much-branched and forming mats, pubescent; leaves opposite, on very short petioles, oblong, 10 mm. long or less, rounded or very obtuse at the apex, oblique at the base, serrulate, sparsely pubescent or glabrous; stipules 1 mm. long, lacerate; involucre very small, mostly solitary in the leaf axils, puberulent or glabrate, the lobes triangular, ciliate; glands small, the appendages narrow or none, very inconspicuous; capsule puberulent throughout with subappressed or incurved, short hairs, 1 mm. long; seeds oblong, tetragonous, reddish, transverse-rugose.

Called "chicken-weed" in British Honduras. One of the commonest small weedy plants of the Central American lowlands.

**Euphorbia trichotoma** HBK. Nov. Gen. & Sp. 2: 60. 1817.

British Honduras (on beaches, Freshwater Cay, *W. A. Schipp* 929); southern Florida; Quintana Roo; Cozumel Island; Cuba.

A glabrous perennial, herbaceous or suffrutescent below, usually branched from the base, the stems simple or branched, erect or ascending, widely dichotomous above, very densely leafy; leaves sessile or nearly so, alternate, glaucescent, cuneate or oblong, 5-12 mm. long, minutely denticulate; inflorescences umbellate or often greatly reduced; involucre campanulate, 2 mm. high, sessile or nearly so; glands obreniform, 1 mm. broad, yellow; capsule 4 mm. broad, depressed; seeds subglobose, 1.5 mm. long, white or pale gray, smooth.

**Euphorbia velleriflora** (Klotzsch & Garcke) Boiss. in DC. Prodr. 15, pt. 2: 40. 1862. *Anisophyllum velleriflorum* Klotzsch & Garcke, Abh. Akad. Berlin 1859: 28. 1860.

Dry soil, about 300 meters; El Progreso (El Rancho, *W. A. Kellerman* 7841). Southern Mexico.

A prostrate annual, or perhaps sometimes perennial, the stems slender, much-branched, terete, densely pilose with short soft weak hairs; leaves opposite, almost sessile, ovate to ovate-oblong, 8 mm. long or shorter, the upper ones usually acute, the lower obtuse, very oblique at the base, inconspicuously denticulate, thinly pilose on both surfaces with slender weak hairs; stipules 3-6-fid, the segments setaceous; involucre solitary in the leaf axils or somewhat crowded at or near the ends of the branches, almost sessile, cylindric-turbinate, hirtellous outside and in the throat, the lobes obovate, fimbriate; glands transverse-oblong, purplish, the appendage equally broad or narrower; capsule white-hirsutulous; seeds oblong, subacute, tetragonous, obscurely reticulate-rugose.

The single Guatemalan collection was determined by Millspaugh. It agrees moderately well with type material of *E. velleriflora*, but possibly it represents a distinct species.

***Euphorbia verapazensis*** Standl. & Steyerm. Field Mus. Bot. 23: 121. 1944.

Known only from the type, Río Chiacté, Alta Verapaz, 480 meters, *C. L. Wilson* 272.

A scandent shrub, glabrous outside the inflorescence, the stems articulate, subterete, greenish, with elongate internodes; stipules none; leaves opposite or ternate, thin-membranaceous, entire, the filiform petioles 8-15 mm. long; leaf blades orbicular or oval-orbicular, 15-20 mm. long, 10-17 mm. wide, broadly rounded or broadly emarginate at the apex, rounded or very broadly cuneate at the base, somewhat paler beneath, the lateral nerves evident but not elevated, divergent at a wide angle; involucre arranged in small pedunculate cymes, these scarcely longer than the petioles, ternate at the nodes; involucre short-pedicellate, sparsely strigillose, almost 2 mm. long, acute at the base, the pedicels and branches of cymes thinly strigillose; glands transverse-oval, the appendage whitish, glabrous, broader than the gland, obtusely denticulate, shallowly 2-lobate at the apex.

***Euphorbia villifera*** Scheele, *Linnaea* 22: 153. 1849. *E. villifera* var. *nuda* Engelm. ex Boiss. in DC. Prodr. 15, pt. 2: 45. 1862. *E. siguatepequensis* Standl. Field Mus. Bot. 4: 313. 1929 (type from Siguatepeque, Honduras).

Open, often rocky fields or hillsides, most common in oak-pine forest, frequently on limestone, generally in rather dry situations, 200-2,100 meters; El Progreso; Zacapa; Chiquimula; Jalapa; Jutiapa; Quiché; Huehuetenango. Texas; Mexico; Honduras.

Annual or perennial, usually erect and much-branched, the stems often several and interlaced, usually branched, thinly hispid throughout with long spreading stiff hairs, or sometimes glabrate, the branches very slender, often almost filiform, often dark red; leaves opposite, almost sessile, ovate or broadly ovate, or the upper ones narrower and revolute, mostly 8 mm. long or less, obtuse to acute, cordate and very oblique at the base, subentire but usually with several conspicuous coarse

teeth, often undulate; stipules lanceolate, 2-3-fid, hispidulous; involucre small, solitary in the forks of the branches and in the upper leaf axils, pedicellate, turbinate-campanulate, very sparsely hispidulous or often glabrous, the lobes ovate; glands concave, the appendage white or reddish, entire, broader than the gland; capsule glabrous or nearly so; seeds ovoid-tetragonous, obscurely rugulose.

A variable plant as represented in Guatemala, but probably all the material referred here represents a single species. The typical plant is abundantly or sparsely hispid; in var. *nuda* the plants are glabrous or practically so. Both are represented in Guatemala. Several species have been described in this group, most of which probably will have to be reduced to synonymy under *E. villifera*, or perhaps some earlier name that we have overlooked. The plants in age usually turn dark red and are then rather conspicuous in the grassy places where they grow. They are especially plentiful in the dry, oak and pine forests of the mountains of Huehuetenango.

There have been reported from Guatemala two other species, *E. stictospora* Engelm. (Río Negro, *Heyde & Lux* 3483) and *E. hirtula* Engelm. (Río Negro, *Heyde & Lux* 3483c). Neither of these species is to be expected in Guatemala, and we do not know what the proper determination of these collections may be.

### GARCIA Rohr

*Reference:* F. Pax, Pflanzenreich IV. 147, i: 14-15. 1910.

Trees; leaves alternate, without stipules, petiolate, firm-membranaceous, penninerved, entire; flowers rather large, 1-3 at the ends of the branches, monoecious, petaliferous; staminate calyx membranaceous, globose in bud, valvately ruptured in anthesis into 2-3 segments; petals 8-12, narrow, sericeous, longer than the calyx; glands of the disk free or connate at the very base, glabrous; stamens numerous, inserted on a convex pilose receptacle, the filaments free; pistillate calyx like the staminate, caducous, the petals fewer than in the staminate flower; hypogynous disk deeply lobate; ovary 3-celled, the style very short, the stigmas thick, reflexed, emarginate-bifid; ovules solitary in each cell; capsule large, separating into 2-valvate cocci, the endocarp somewhat ligneous; seed globose, not carunculate.

The genus consists of a single species.

**Garcia nutans** Rohr, Skrivt. Naturh. Selsk. Kjoebenhavn 2: 217. *pl.* 9. 1792.

In forest at base of bluff, 300-500 meters; Alta Verapaz (west of Cubilgüitz, *Steyermark* 44974). Western and southern Mexico; Salvador; Costa Rica; West Indies; Colombia; Venezuela.

A tree about 9 meters high, the branchlets, petioles, and lower leaf surface finely puberulent at first, soon glabrate; leaves on slender petioles 2-5 cm. long,

oblong or oblong-obovate, mostly 10–15 cm. long and 4–6 cm. wide, abruptly acuminate or short-acuminate, acute or obtuse at the base; cymes 1–3-flowered, on a very short peduncle, the pedicels almost twice as long as the calyx; flowers nutant; calyx 5 mm. long, pubescent; petals lanceolate, acute, 8–12 mm. long, whitish-sericeous, purplish within; filaments villous to the middle; ovary pubescent; capsule glabrous, 3-coccos, 2.5 cm. broad; seeds 12 mm. in diameter.

Called “huevo de gato” in Salvador. The wood is pale brown, of medium density, rather fine-textured, not difficult to work.

### GYMNANTHES Swartz

*Reference:* F. Pax, Pflanzenreich IV. 147, v: 81–88. 1912.

Glabrous trees or shrubs; leaves alternate, short-petiolate, coriaceous or subcoriaceous, penninerved, entire or remotely glandular-denticulate, 2-stipulate; flowers usually monoecious, apetalous, small, green, the spikes terminal or axillary, solitary or fasciculate, commonly bisexual; staminate flowers 3-nate in the axils of the bracts, these usually adnate to the rachis, the pistillate flowers few at the base of the spike, or sometimes in separate spikes, solitary within the bracts; disk none; staminate calyx obsolete or rudimentary, usually of 1–2 minute sepals; stamens 2–6, generally 3, the filaments free or connate only at the base; ovary rudiment none; pistillate flower naked or with 2–3 minute sepals; ovary 3-celled, sessile in the calyx or borne on a gynophore; styles free or connate only at the base, simple, recurved; ovules solitary in the cell; capsule tridymous, separating into 2-valvate cocci, smooth, the columella persistent; seeds subglobose, carunculate, the testa crustaceous; endosperm carnosous, the cotyledons broad, flat.

Species about 11, all in tropical America and mostly in the West Indies. Only two are known from Central America.

Leaves with conspicuous glands on the margins at the base of the blade, mostly 12–20 cm. long, abruptly acute or acuminate. . . . . *G. guatemalensis*.  
Leaves without glands on the margins, mostly 5–14 cm. long and obtuse.

*G. lucida*.

***Gymnanthes guatemalensis*** Standl. & Steyermark. Field Mus. Bot. 23: 122. 1944. *Cacho de venado*.

Moist or wet, mixed forest, 1,300–1,500 meters; endemic; Quezaltenango (type collected in quebrada between Finca Pirineos and Finca Soledad, lower southern slopes of Volcán de Santa María, Steyermark 33501); San Marcos (Volcán de Tajumulco).

A large shrub or a small tree, 6 meters high or more, glabrous except in the inflorescence, the branches slender, ochraceous, lenticellate, the young ones angulate, green, rather densely leafy; leaves large, on stout petioles 7–12 cm. long, coriaceous, oblong-oblongeolate or narrowly oblongeolate, 11–20 cm. long, 3.5–7 cm. wide, abruptly and shortly acute or acuminate with an obtuse tip, gradually cuneate-attenuate to the acute base, appressed-crenate-serrate, the margin bearing several large glands near the base of the blade, the veins prominu-

lous and laxly reticulate on both surfaces, the lateral nerves about 11 pairs; staminate spikes 3.5–5 cm. long, floriferous almost to the base, many-flowered, the rachis densely puberulent; bracts broadly ovate, sessile, obtuse, puberulent, 3-flowered, the flowers on rather long pedicels, the sepal broadly ovate; stamens 3–5 in the middle flower, 3 in the lateral ones.

**Gymnanthes lucida** Swartz, Prodr. Veg. Ind. Occ. 96. 1788.  
*Pij* (Maya).

In thickets or forest on limestone, at or little above sea level; Petén; Baja Verapaz (?; at 1,500 meters). Yucatan Peninsula of Mexico; British Honduras; West Indies.

A glabrous shrub or tree, sometimes 10 meters high, the stiff slender branches grayish; leaves on petioles 6–10 mm. long, coriaceous, lustrous, oblong-obovate or oblong-oblancoolate, 5–14 cm. long, 2.5–4 cm. wide, obtuse or often narrowed to a narrow obtuse tip, obtuse to attenuate at the base, often highly variable in size and shape, subentire or somewhat crenate-serrate, often 2-glandular at the base, paler beneath, the lateral nerves very slender, numerous, ascending at a narrow angle, the veins prominent-reticulate; flower spikes about 3 cm. long, bisexual, densely many-flowered, red-brown, becoming yellowish green; bracts ovate, obtuse, puberulent, subcochleate-incurved, the staminate ones 3-flowered; staminate sepal 1, broadly ovate; pistillate sepals scale-like, scarcely 1 mm. long; stamens 3–5 in the middle flower, 2–3 in the lateral ones; ovary borne on a rather long gynophore; pistillate pedicels in fruit 1.5–2 cm. long or more, the gynophore as much as 1 cm. long; capsule about 7 mm. long and 9 mm. broad, globose-tridymous, obscurely verruculose; seeds blackish brown, globose, 4–5 mm. in diameter, the caruncle pale.

Called “false lignum-vitae” in British Honduras. The heartwood is variegated in olive and dark brown, sharply demarcated from the white sapwood, hard, heavy, strong, its specific gravity 1.10–1.20, fine-textured, not difficult to work, takes a high polish, is durable. Some use is made of the wood in the West Indies, but probably not in Central America. It is sometimes imported into the United States for use as backs of mirrors and brushes, walking sticks, umbrella handles, and veneers for marquetry.

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*Hevea brasiliensis* Muell. Arg., the rubber tree, native of the Amazon basin, is commercially by far the most important plant of the Euphorbiaceae, being the source of almost all rubber of commerce. It has been planted experimentally on a small scale in Guatemala, particularly in the lowlands of Alta Verapaz and Izabal, and in Suchitapéquez; occasional trees may be found elsewhere, grown more or less as curiosities. Most of the *Hevea* rubber of commerce has been obtained from vast plantations in the East Indian region.



## HIERONYMA Allemão

Trees or large shrubs, the indument mostly of closely appressed scales, simple hairs also sometimes present; leaves alternate, petiolate, penninerved, entire; stipules small or large, early deciduous; flowers dioecious, apetalous, racemose or paniculate, short-pedicellate, the bracts minute; inflorescences axillary, the staminate large, the pistillate ones shorter and less branched; staminate calyx campanulate, 3-6-dentate, the teeth slightly imbricate; glands of the disk 5, alternate with the sepals; stamens 3-6, borne upon the sepals, the filaments free; anthers exerted, the cells pendulous, longitudinally dehiscent; ovary rudiment small; pistillate calyx like that of the staminate flower, the hypogynous disk entire or lobulate; ovary generally 2-celled, the styles short, shallowly 2-parted, reflexed; ovules geminate in each cell; fruit drupaceous, often by abortion 1-celled, 1-seeded, the exocarp thin, the endocarp osseous; seed not carunculate, the endosperm carnose, the cotyledons broad, flat.

About 20 species, in tropical America. One other Central American species is found in Costa Rica. The generic name was written originally *Hyeronima*.

Leaves almost glabrous beneath, with only a few scattered, very remote scales.  
*H. oblonga*.

Leaves densely lepidote beneath, the scales close together and persistent.

Leaves of fertile branches mostly 6-16 cm. wide, the scales of the lower surface not crowded and overlapping; lower lateral branches of the inflorescence equaling the terminal branch.....*H. alchorneoides*.

Leaves of fertile branches mostly 3-5 cm. wide, the scales of the lower surface crowded and overlapping; lateral branches of the inflorescence usually few, much shorter than the terminal branch.....*H. guatemalensis*.

**Hieronyma alchorneoides** Allemão, Diss. in Trab. Vell. Rio Janeiro. ill. 1848.

Moist or wet, mixed forest, 900 meters or less; Petén; Alta Verapaz; Izabal. British Honduras, along the Atlantic coast to Panama; tropical South America.

A tree, commonly 12-15 meters high, the trunk 30 cm. or more in diameter, the young branches densely lepidote; leaves large, on petioles 2-7 cm. long, membranaceous or subcoriaceous, broadly elliptic to elliptic-orbicular, mostly 9-20 cm. long and 6-16 cm. wide, abruptly acute or short-acuminate, rounded at the base, very sparsely lepidote and green above, densely lepidote beneath, brownish when dried, often pilose along the nerves and costa, the lateral nerves 7-10 pairs; stipules petiolate, about 1 cm. long or often much larger on juvenile branches, ovate-rounded, subacute, soon deciduous; panicles densely lepidote, often 15 cm. long, usually with numerous branches, the pistillate smaller than the staminate and less branched, the flowers short-petiolate, cream-colored; calyx cupular, 3-5-dentate, pubescent; ovary lepidote; fruit ovoid-globose, 4-5 mm. long, black at maturity.

Called "curtidor" in Honduras, the bark used there for tanning leather. The trunks are often buttressed at the base. The strong

durable timber is used in some regions for fence posts, railway cross-ties, bridge timbers, miscellaneous construction, and furniture. The sapwood is pinkish white, the heartwood very dark brown or reddish brown, rather hard and heavy, its specific gravity 0.70–0.80; texture medium or coarse, sometimes uneven; not easy to cut or split; finishes smoothly.

**Hieronyma guatemalensis** Donn. Smith, Bot. Gaz. 54: 241. 1912; Pax, Pflanzenreich IV. 147, xv: f. 5. 1922. *Tem* (fide Aguilar).

Dense or wet, mixed forest, or in forest of pine or *Liquidambar*, sometimes in wooded swamps, 1,300–2,600 meters; Alta Verapaz (type from Cobán, *Tuerckheim* 423); Zacapa; Guatemala(?); Huehuetenango. Mountains of Costa Rica.

A tree, usually 7–12 meters high, the branches very densely lepidote; leaves on petioles 2–4 cm. long, obovate or oblong-obovate, mostly 7–12 cm. long and 3–7 cm. wide, abruptly short-acuminate, cuneate at the base, green above, sparsely lepidote and somewhat rough to the touch, very densely lepidote beneath with crowded, often overlapping scales, the lateral nerves about 7 pairs; stipules small, narrow, caducous; panicles densely lepidote, sparsely branched, short-pedunculate, 11 cm. long or shorter, the branches stout, the pedicels 1 mm. long; staminate calyx 2 mm. broad, 5-lobate to the middle, densely lepidote, the lobes acute.

**Hieronyma oblonga** (Tulasne) Muell. Arg. Linnaea 34: 66. 1865. *Stilaginella oblonga* Tulasne, Ann. Sci. Nat. III. 15: 248. 1851.

Dense wet mixed forest, at or little above sea level; British Honduras; southern Mexico; Costa Rica; tropical South America.

A tree, commonly about 10 meters high, the branchlets densely lepidote at first, glabrate in age; leaves on slender petioles 1–2 cm. long, thick-membranaceous, obovate to oblong or obovate-oblong, mostly 6–15 cm. long and 3–6 cm. wide, abruptly short-acuminate, acute at the base, green above, almost glabrous, lustrous, somewhat paler beneath, sparsely and inconspicuously lepidote, appearing glabrous, the lateral nerves 5–7 pairs; stipules cochleate, 6 mm. long; panicles 3–10 cm. long, with few branches, densely lepidote, the pedicels 1 mm. long or less, the flowers whitish; staminate calyx shallowly 5-dentate, lepidote; ovary glabrous; fruit red, 3–5 mm. long, ellipsoid, subacute at each end.

### HIPPOMANE L. Manchineel

*Reference:* F. Pax, Pflanzenreich IV. 147, v: 261–263. 1912.

Glabrous trees with copious milky latex; leaves alternate, long-petiolate, coriaceous, subentire or denticulate, penninerved, 2-stipulate; flowers monoecious, apetalous, in terminal spikes, greenish, the rachis thick; bracts small, peltate-glandular on each side at the base; staminate flowers 8–many in each bract, sessile, the pistillate flowers solitary within the lowest bracts of the spike or often

lacking; disk none; staminate calyx small, shallowly 2-3-fid, the lobes imbricate; stamens 2, the filaments connate into a short column, the anthers longitudinally dehiscent; ovary rudiment none; pistillate calyx small, deeply 3-fid; ovary 6-9-celled, the style short, connate at the base, spreading above, simple; ovules solitary in the cells; fruit drupaceous, large, apple-like, indehiscent, yellow or reddish, the endocarp very thick, osseous, sinuous-rugose, 6-9-celled; seeds not carunculate, the cotyledons broad, flat.

The genus consists of a single species.

**Hippomane Mancinella** L. Sp. Pl. 1191. 1753. *Manzanillo*.

Frequent on sandy beaches of both coasts, growing only at the inner edge of the beaches, and found nowhere else; Retalhuleu; doubtless in all the coastal departments. Southern Florida; southern and western Mexico; British Honduras and Salvador to Panama; West Indies; northern South America (Colombia, Venezuela).

A glabrous tree, in some regions as much as 18 meters high with a trunk 90 cm. in diameter, in Central America generally much smaller, the branches spreading, forming a rounded crown, the bark thin, scaly, grayish or reddish brown; leaves on petioles 3-5 cm. long, the petioles slender, 1-glandular at the apex; leaf blades ovate or oval-ovate, 5-10 cm. long, abruptly acute or short-acuminate, obtuse or rounded at the base or often emarginate, green and lustrous above, somewhat paler beneath, rather conspicuously reticulate-veined but the venation not or scarcely elevated; flower spikes 5-13 cm. long, stout, laxly flowered, usually bearing 1-2 pistillate flowers at the base; bracts very broadly ovate, entire; staminate calyx scarcely 1 mm. long, the lobes denticulate; pistillate calyx 3 mm. long, the lobes acuminate from an ovate base; fruit globose or depressed-globose, 2.5-3.5 cm. broad, smooth.

The usual English name is "manchineel," a corruption of the Spanish term *manzanillo* ("little apple"), and the specific name has the same derivation. The tree is one of the most publicized ones of Middle America, and has received much more notice than it deserves. Growing upon the sea beaches, it naturally was about the first plant to greet the Spaniards, who promptly gave it the name *Manzanillo*, because the yellow and red fruit resembles a small apple. Always seeking and expecting in the New World the plants of the Old, they assumed they had found wild apples, and sampled the fruit, sometimes, it is reported, with fatal results. The milky sap is poisonous if taken internally, and upon contact with the skin causes severe inflammation in some persons. Others are apparently immune to the external effects of the juice. Smoke from the burning wood is dangerous to the eyes. It is reported that the latex was used by the Caribs for poisoning arrows. The early Spaniards had such unfortunate experiences with the tree that they gave it a dark reputation indeed, claiming that a person who even sat beneath a

tree would be blinded or would die, statements long ago proved false. It is possible that people resting or passing beneath the trees during rain might be harmed. The wood is lustrous yellowish brown with markings of brown and black, and has long been used in some parts of tropical America, mostly in the West Indies, for making good furniture. It has a specific gravity of 0.60–0.68 and weighs 38–43 pounds per cubic foot; of fine and uniform texture; easy to work and finishes smoothly; high in durability. The wood must be handled with great care, even when dry.

### HURA L. Sandbox

*Reference:* F. Pax, Pflanzenreich IV. 147, v: 271–274. 1912.

Large trees, glabrous, the trunk covered with short hard conic prickles and resembling a grater; leaves alternate, long-petiolate, 2-stipulate, broad, more or less cordate, crenate-serrate, penninerved; flowers rather large, monoecious, apetalous, the staminate spikes terminal, pedunculate, oblong, thick, the flowers sessile, solitary within the bracts; bracts membranaceous, at first enclosing the buds and closed, irregularly ruptured at maturity; pistillate flowers solitary in the uppermost leaf axils or at the base of the staminate spike, stout-pedicellate; disk none; calyx eglandular, the staminate short-cupular, with a truncate margin, denticulate; stamens usually numerous, the filaments continuous with the connective, united into a thick column, the anthers longitudinally dehiscent; ovary rudiment none; pistillate calyx coriaceous, broadly cupular, truncate, entire, laxly surrounding the ovary; ovary 5–20-celled, the styles connate into a long column, radiately spreading at the apex, simple; ovules solitary in each cell; capsule large, somewhat depressed, the cocci verticillate, ligneous, elastically separating from the persistent columella; seeds laterally compressed, large, not carunculate, the testa crustaceous; endosperm carnose, the cotyledons orbicular, flat.

One other species is known, *H. crepitans* L., occurring in Central America in Costa Rica and Panama, and found also in the West Indies and tropical South America.

**Hura polyandra** Baill. *Etud. Euphorb.* 543. 1858. *Jabillo*; *Tetereta*; *Caquibach* (Quechí); *Jaguilió* (Quiché, fide Tejada); *Haba*; *Arbol del diablo*.

Usually on forested plains or on dry, often rocky, thinly forested hillsides, 1,200 meters or less; often found in cleared pastures, about dwellings, or along roadsides; El Progreso; Zacapa; Chiquimula; Jutiapa; Santa Rosa; Quiché; Huehuetenango; doubtless in several other departments, and probably in all the lowland areas. Mexico, and extending southward, mostly along the Pacific slope, to Costa Rica.

A giant tree, often 30 meters high or more, with a trunk a meter or more in diameter, the trunk usually straight and regular and free of branches usually for a great height, the branches and trunk densely covered with short, very sharp, hard prickles, the crown broad and spreading, the bark grayish or pale brownish; leaves on petioles 8–15 cm. long, rounded-ovate, thick-membranaceous, 11–20 cm. long and wide, rather deeply and narrowly cordate at the base, cuspidate-acuminate or cordate-acuminate, coarsely crenate-serrate, the lateral nerves conspicuous beneath, elevated, connected by faint transverse veins; staminate spikes long-pedunculate, 5–8 cm. long, with a thick rachis, the flowers whitish or reddish; stamen column as much as 15 mm. long, the anthers in 8–10 verticels; fruit depressed-globose, 8–10 cm. broad, about 15-celled; seeds much compressed, brown, 3 cm. long.

The name used in Yucatan is “solimanche,” a combination of Spanish and Maya. This is one of the four or five largest trees of Central America, reaching its best development on the plains or in the foothills of the Pacific coast, where it often occurs in great abundance, and in some regions is a dominant tree. This species has been reported from Guatemala as *H. crepitans* L., but the latter is not known to extend north of Costa Rica, although it might conceivably extend to Guatemala. In *H. crepitans* the stamens are in only 2–3 verticels, while in *H. polyandra* the verticels are numerous, this difference being a very conspicuous one when flowers of the two species are compared. The two species can not be separated by foliage alone. The milk-like latex exuding copiously from the cut bark or from the broken stems or leaves is caustic upon the skin, in some persons producing blisters and intense inflammation. This latex, mixed with meal or sand, is much used in Mexico as a barbasco or fish poison, and the same use may be made of it along the Pacific coast of Central America. The seeds are known to be dangerously poisonous, but in Guatemala the pulverized kernels sometimes are administered in small doses to human beings as a purgative and to expel intestinal parasites. It is unnecessary to state that such use is dangerous. They are used in the Oriente of Guatemala to poison noxious animals. In Honduras it is claimed that a person who sleeps under one of the trees *amanece muerto*, or that at the least the whole body will be covered with blisters. The first portion of this statement is undoubtedly untrue, and there probably is little basis for the second part. The name “jabillo” or “jabilla” is a derivative of *Haba*, the Spanish name for the horse bean, *Vicia Faba*, given because there is some resemblance between the seeds of the two plants. An aldea of the Department of Guatemala bears the name “Javilla.” The dry leaves of this tree, which often cover the ground during the dry season, are eaten by cattle.

The fruit of the sandbox is curious in appearance and structure, somewhat resembling a diminutive pumpkin or cantaloupe, with the cocci arranged like the sections of an orange. When thoroughly dry, the fruit explodes elastically with great force and a loud report, scattering the seeds to some distance. The force of the explosion is great enough to burst small boxes in which the fruits may have been stored, or to cause wounds if they strike any part of the body. The dry fruits were sometimes used in early days in the British West Indies as containers for fine sand with which letters were dried or "blotted," hence the customary name of sandbox. The seeds apparently are a favorite food of the brilliantly colored macaws of Central America. Sandbox wood varies in color from lustrous creamy white to yellowish brown or olive-gray; it is light and soft, medium-textured, more or less woolly, the specific gravity 0.36-0.44; weight 23-27 pounds per cubic foot; easy to cut, takes stains and glues well. It is used in Central America to some extent for construction.

### JATROPHA L.

Herbs, shrubs, or trees; leaves alternate, petiolate or sessile, simple and entire or often palmate-lobate, glabrous or pubescent, often with glands of various kinds; stipules small and inconspicuous or setaceously dissected, sometimes indurate and spinose; flowers small, usually monoecious, petaliferous, in dichotomous cymes; sepals of the staminate flowers more or less connate at the base, imbricate; petals 5, contorted-imbricate, free; disk entire or 5-glandular; stamens usually 8-10, in 2 or more verticels, monadelphous, the outer 5 epipetalous; staminodia present and filiform or none; calyx and corolla of the pistillate flower like those of the staminate flower; ovary 2-3-celled, rarely 4-5-celled; styles connate at the base, entire or 2-fid; ovules solitary in the cells; fruit capsular, the seeds carunculate.

Species about 115, in tropical regions of both hemispheres. Probably all the Central American ones are included in the following enumeration.

Leaves peltate; stipules indurate and spine-like.....*J. podagrica*.

Leaves not peltate; stipules not spinose.

Petioles bearing numerous long-stalked glands; plants herbaceous; leaves lobate to the middle or more deeply.....*J. gossypifolia*.

Petioles without stipitate glands; plants shrubs or trees; leaves entire or only very shallowly lobate.

Leaf blades rounded at the base; corolla bright red and showy...*J. hastata*.

Leaf blades cordate at the base; corolla whitish, small and inconspicuous.

Leaves entire.....*J. Gaumeri*.

Leaves shallowly angulate-lobate.....*J. Curcas*.

**Jatropha Curcas** L. Sp. Pl. 1006. 1753. *Piñón*; *Tempate*; *Yupur*, *Tempacte* (fide Tejada), *Sakilté* (Quecchí).

Moist or dry thickets on plains and hillsides, most plentiful in hedges and often planted for living fence posts, 1,500 meters or lower, most common at low elevations; Petén; Alta Verapaz; El Progreso; Izabal; Zacapa; Jalapa; Jutiapa; Santa Rosa; Escuintla; Sacatepéquez; Suchitépéquez; Retalhuleu; San Marcos; Huehuetenango; probably in all or most of the other departments. Mexico; British Honduras to Salvador and Panama; West Indies; South America; cultivated and sometimes naturalized in the Old World tropics.

A shrub or small tree, sometimes 8 meters high but usually lower, the bark pale and almost smooth; leaves long-petiolate, the slender petioles about as long as the blades; leaf blades rounded-ovate in outline, mostly 7–16 cm. long and of about the same width, openly cordate at the base or sometimes truncate, shallowly 3–5-lobate or angulate, not dentate, palmately 5–7-nerved from the base, almost glabrous but more or less pilose beneath on the nerves, at least near the base of the blade; cymes small, dense, long-pedunculate, many-flowered, the bracts lanceolate or linear; sepals ovate-elliptic, 4 mm. long, glabrous; petals whitish, oblong-obovate, almost free, densely pilose within, in the staminate flower twice as long as the sepals, in the pistillate flower almost equaling the sepals; stamens 8, the outer filaments free, the inner ones connate; ovary glabrous; capsule 2.5–4 cm. long, 2–3-celled, ellipsoid; seeds about 2 cm. long and 1 cm. broad, pale, oblong-ellipsoid, with conspicuous black lines.

Maya names reported from Yucatan are “*xecalche*” and “*sicilte*.” This is one of the best-known and most common plants of the lowlands of Central America where it is planted abundantly for hedges and living fence posts, principally because it is not eaten by stock of any kind. The shrub may not be native in Guatemala, since it is found principally in hedges, but if not, doubtless it has been in cultivation for a long time. In Mexico it has long been used as a host plant for certain lac-producing scale insects known by the name *Axi* or *Axin*, and it is quite probable that the same use may have been made of the shrub in Guatemala. The lac thus produced is highly esteemed as varnish for finishing guitars and other articles of wood. In Guatemala an infusion of the leaves is used commonly by some of the Indians for setting the dyes of cotton and perhaps other textiles. The milky sap is applied commonly to wounds or sores, to hasten healing, and it is placed in cavities in teeth to relieve toothache. About Cobán the heated leaves sometimes are applied to the breasts of nursing women in the belief that this increases the flow of milk. The properties of the large and rather well-flavored seeds are well known in Guatemala and other parts of Central America. When the seeds are pressed they yield a large amount

of clear oil that is used locally for making soap and for illumination. This oil, or the whole seed, has drastic purgative properties, and if the seeds are eaten the results sometimes are dangerous or even fatal, at least in the case of small children. Some years ago the United States Department of Agriculture not very wisely attempted to introduce the plant into cultivation in Florida, as it had been found that the kernels of the seeds after very thorough roasting are of good flavor and may be eaten without harm. However, some persons were made very sick by eating only partially roasted seeds. Since the seeds are dangerous when taken as food, their use for this purpose is to be avoided. The shrub sheds its leaves during the dry months and has little to recommend it as a hedge plant.

***Jatropha Gaumeri*** Greenm. Field Mus. Bot. 2: 256. 1907.

In thickets, at or little above sea level; Petén (Carmelita, *F. E. Eglér* 42-270); Zacapa(?). Yucatan Peninsula of Mexico; British Honduras.

A shrub or small tree, sometimes 8 meters high with a trunk 30 cm. in diameter, the branchlets thick; leaves long-petiolate, the slender petioles mostly 4-14 cm. long, glabrous; leaf blades firm-membranaceous, broadly ovate or rounded-ovate, 5-18 cm. long and 5-15 cm. wide, acute or abruptly acuminate, deeply cordate to subtruncate at the base, palmately 7-nerved, entire, glabrous above, more or less pubescent beneath along the nerves near the base of the blade; inflorescences cymose, pedunculate, many-flowered, glabrous or nearly so, the bracts triangular-ovate, acute, the flowers sessile, whitish or cream-colored; calyx 2-3 mm. long, glabrous, 5-lobate; corolla 6-7 mm. long, tubular for two-thirds its length, glabrous outside, the 5 lobes erect or slightly spreading, rounded at the apex; stamens 8, included; capsule oblong-globose, 15-18 mm. long and broad; seeds oblong, 13 mm. long, 11 mm. broad, slightly roughened.

Known in British Honduras by the names "wild physic nut," "piñón," and "pomolché" (Maya). A single sterile collection from Zacapa has leaves like those of this species, but much smaller than in Yucatan specimens. They are densely and softly pilose beneath. It is quite possible that the Zacapa plant is a distinct and undescribed species.

***Jatropha gossypifolia*** L. Sp. Pl. 1006. 1753.

Moist or dry fields or thickets, frequently on sand or gravel along streams, 200-400 meters; Zacapa; Chiquimula; in the Jardín Botánico, Guatemala, where planted or perhaps an accidental weed. Southern Mexico; Honduras and Salvador to Panama; West Indies; South America; western Africa (introduced?).



Plants probably annual, usually herbaceous throughout, sometimes suffrutescent below, usually a meter high or less, branched; stipules dissected into numerous gland-tipped filiform divisions; leaves long-petiolate, membranaceous, the petioles bearing numerous branched hairs with gland-tipped divisions; leaf blades 7–15 cm. long and wide, cordate at the base, deeply 3–5-lobate, more or less pubescent or glabrous, the lobes acute or acuminate, denticulate, glandular-ciliate; flowers small, greenish, in small pedunculate cymes, the bracts linear-oblong, glanduliferous on the margins; sepals ovate, glandular-ciliate, pubescent outside, 5–7 mm. long; petals 5, obovate, purple, somewhat longer than the sepals; stamens usually 8; ovary pubescent; capsule 1 cm. in diameter, 3-sulcate, glabrate; seeds oblong, brown, carunculate.

Called "frailecillo" in Salvador. The seeds contain an oil having drastic purgative and emetic properties.

*Jatropha hastata* Jacq. Stirp. Sel. Amer. 256. *pl.* 173, *f.* 54. 1763.

Native of Cuba; cultivated in Petén, and possibly at times becoming naturalized; planted also in Panama and perhaps elsewhere in Central America.

A slender shrub, glabrous or somewhat pubescent on the young parts; leaves on long slender petioles, membranaceous, variable in shape, mostly ovate or oblong-ovate, sometimes panduriform or hastate-lobate, mostly 8–14 cm. long, abruptly acuminate, rounded at the base, somewhat paler beneath, palmate-nerved at the base, penninerved above; cymes long-pedunculate, corymbiform, many-flowered, the bracts linear-lanceolate, entire; staminate sepals ovate, obtuse, 3 mm. long; petals 10–12 mm. long, oblong, obtuse, bright red; ovary glabrous.

*Jatropha multifida* L. is said to be cultivated sometimes in Guatemala and probably is, although we have not seen it. In habit it is similar to *J. podagrica*, but the long-stalked leaves are epeltate and divided almost to the base into numerous narrow segments which are again lobate.

*Jatropha podagrica* Hook. Bot. Mag. *pl.* 4376. 1848. *Ruibarbo*; *Capa de rey*.

Cultivated commonly for ornament in gardens at low and middle elevations; native on dry rocky hillsides, in open places or in dense forest, 200–700 meters; Zacapa; Chiquimula. Apparently native also in Honduras, and perhaps in Quiché, Guatemala; cultivated widely for ornament in tropical America.

Plants erect, usually 60 cm. high or less, sometimes as much as 1.5 meters when growing wild, generally with a short thick woody stem armed with short sharp-pointed, spine-like bases of the stipules, the basal part of the stem greatly enlarged and suggesting the top of a turnip, the more slender portion of the stem usually 20 cm. long or shorter; leaves large, few, deciduous during the driest

months, long-petiolate, the petioles mostly 10-18 cm. long; leaf blades sub-orbicular in outline, peltate near the middle, green above, very pale beneath, glabrous, shallowly or deeply 3-5-lobate, 10-25 cm. long and wide, the lobes very broad, rounded at the apex and often abruptly short-acuminate; stipules glanduliferous at first, becoming much indurate in age; cymes rather dense and many-flowered, glabrous, on stout peduncles 35 cm. long or shorter, the flowers small, brilliant red; staminate sepals 2 mm. long, entire, glabrous, rounded-ovate; petals spatulate, glabrous, 6 mm. long, obtuse; stamens 6-8; ovary glabrous; capsule about 15 mm. long and almost as broad, 3-sulcate; seeds 11 mm. long, fuscous, smooth.

This plant is seen rather infrequently in gardens of Guatemala and other parts of Central America, where it attracts attention because of the large peltate leaves, the small but showy, bright red flowers, and especially because of the turnip-like base of the stem, suggesting a turnip only half buried in the soil. The name "ruibarbo" ("rhubarb") is applied to it generally, and the plant is said to have been used as a drug in Europe under the name "Guatemalan rhubarb." So far as we know, no medicinal use is made of it in Guatemala. The plant is certainly native on the very dry, rocky hills about the divide on the road between Zacapa and Chiquimula. The dry hills of eastern Guatemala and adjacent Honduras are apparently the only known native habitat of this curious and much cultivated plant, which has reached many distant parts of tropical America.

### JULOCROTON Martius

Annual or perennial herbs or shrubs, abundantly pubescent; leaves alternate, petiolate, 2-stipulate, usually denticulate or crenate, generally 3-5-plinerved; inflorescence terminal, bisexual, densely spicate-racemose, the flowers 2-bracteolate, the pistillate ones at the base of the spike; bracts 1-flowered, dentate; staminate sepals imbricate, the pistillate sepals imbricate and usually very unequal, the outer ones usually with dorsal glands or appendages; petals 5; disk more or less developed; stamens mostly 11, the anthers refracted in bud, dehiscent by longitudinal slits; ovary of the pistillate flower 3-celled, the 3 styles connate below, dichotomous; ovary rudiment none; ovules 1 in each cell; fruit capsular, the 2-valvate cocci separating from the persistent columella; seeds carunculate.

In general appearance the plants are exactly like some species of *Croton*, and it would perhaps be more rational to unite them with that genus. About 30 species, in tropical America, mostly in South America. One other species is known from Central America, *J. decalobus* (Muell. Arg.) Benth., which was described as a plant of Guatemala but is rather a native of Costa Rica.

Plants annual; inflorescences densely clustered at the ends of the branches; leaves grayish or silvery when dried..... *J. argenteus*.

Plants frutescent; inflorescences mostly solitary; leaves brownish when dried. *J. conspurcatus*.

**Julocroton argenteus** (L.) Didrichs. Pl. Mus. Univ. Hafn. 42. 1857. *Croton argenteus* L. Sp. Pl. 1004. 1753.

Wet to dry fields or thickets, often in dried mud about former pools, sometimes a weed in waste ground, 1,200 meters or less; Jutiapa; Escuintla; Retalhuleu; Huehuetenango. Mexico; British Honduras; Salvador to Costa Rica; northern South America.

An erect annual, usually less than a meter high, sparsely or much-branched above and sometimes branched from the base, covered throughout with a whitish or silvery pubescence of fine, dense, closely appressed hairs, the branches terete or obtusely angulate, dichotomous or trichotomous above, the leaves appearing verticillate at the forks of the branches, elsewhere alternate, on long slender petioles or the upper ones subsessile; stipules setaceous; leaf blades 5-nerved, broadly ovate or rhombic-ovate or the upper ones oblong-ovate, mostly 4–8 cm. long, obtuse or subacute, obtuse to subcordate at the base, rather thick, obscurely undulate-dentate or entire, usually silvery on both surfaces but sometimes green above; racemes short and often head-like, usually numerous and crowded at the ends of the branches and subtended by large leaves; staminate flowers slender-pedicellate, in bud 1.5 mm. in diameter; pistillate sepals lance-obovate, acuminate, incised-dentate above, 6–7 mm. long; style branches twice divided; capsule 4 mm. long, stellate-tomentulose; seeds 3 mm. long, lustrous, smooth, minutely carunculate, fuscous and somewhat mottled.

During the wet months this plant grows commonly in fields on the Pacific plains, but it soon withers after the rains cease, being found then only occasionally and usually in dry mud where there were shallow pools during earlier months. There it usually is associated with *Glinus* and one or more species of *Heliotropium*.

**Julocroton conspurcatus** (Schlecht.) Klotzsch in Wiegmann. Archiv 7: 193. 1841. *Croton conspurcatus* Schlecht. Linnaea 7: 380. 1832. *J. triqueter* var. *conspurcatus* Muell. Arg. in DC. Prodr. 15, pt. 2: 705. 1862. *J. montevidensis* var. *guatemalensis* Muell. Arg. op. cit. 703 (type said to have been collected in Guatemala by Friedrichs-thal). *Colipavo*.

Wet or dry thickets or forest, about 1,000–1,600 meters; Alta Verapaz; Chiquimula; Santa Rosa; Sacatepéquez; Quiché. Southern Mexico.

A branched shrub, commonly 3 meters high or less, the branches densely stellate-pilose with mostly fulvous or brownish hairs, these often loose and spreading but sometimes more or less appressed; leaves membranaceous or thicker, the lower ones long-petiolate, the upper ones on shorter petioles, ovate-lanceolate to ovate, mostly 5–14 cm. long, long-acuminate to acute, rounded at the base, 3-nerved at the base, penninerved above, denticulate or almost entire, minutely stellate-scaberulous and green on the upper surface, very rough to the touch, densely stellate-pubescent or tomentose beneath, the pubescence usually rather

lax and spreading; flower spikes strobile-like, narrowly ovoid or oblong, short-pedunculate, mostly 2–3 cm. long, very dense and many-flowered, densely and coarsely stellate-tomentose with mostly brownish hairs; bracts triangular-ovate, pinnatisect; pistillate sepals incised-lacerate.

This plant has been reported from Guatemala as *J. triqueter* (Lam.) Baill.

### MABEA Aublet

*Reference:* F. Pax, Pflanzenreich IV. 147, v: 26–42. 1912.

Shrubs or trees with milky sap, often sarmentose or somewhat scandent, the branches generally very slender; leaves alternate, mostly oblong, entire or denticulate, penninerved, short-petiolate, often glaucous beneath; indument of branched hairs, usually scant; flowers monoecious, apetalous, the racemes terminal, many-flowered, sometimes paniculately branched, the bracts generally with 2 conspicuous glands; staminate flowers numerous, mostly ternate within the bracts, often umbellate or spicate; pistillate flowers few at the base of the raceme, pedicellate, solitary within the bracts; staminate calyx small, globose in bud, open long before anthesis, 3–5-lobate, the lobes broad, slightly imbricate; stamens 10–70, rarely 2–3, inserted on a convex receptacle, the anthers almost sessile, extrorse, longitudinally dehiscent; ovary rudiment none; pistillate sepals 5, rarely 6 or 3, often very unequal, imbricate; ovary 3-celled, the styles connate to form an elongate column, free above and simple; ovules solitary in each cell; capsule globose or somewhat tridymous, separating into 2-valvate cocci, the endocarp hard; seeds ovoid, carunculate, the testa crustaceous, smooth; endosperm carnose, the cotyledons broad, flat.

Species about 30, in tropical America, all much alike and difficult to distinguish. One other species is recorded from Panama.

Lateral nerves of the leaves united remote from the margin to form a distinct but irregular collective nerve; seeds about 7 mm. long and 5 mm. broad.

*M. occidentalis.*

Lateral nerves of the leaves irregularly joined close to the margin, not forming a distinct collective nerve; seeds about 9 mm. long and 7 mm. broad.

*M. excelsa.*

*Mabea excelsa* Standl. & Steyerl. Field Mus. Bot. 23: 123. 1944.

Moist or wet forest or thickets, 200–850 meters; endemic; Santa Rosa; Retalhuleu; Quezaltenango (type collected near Colomba, A. F. Skutch 2008). Chiapas.

A tall glabrous tree as much as 30 meters high with a trunk 65 cm. in diameter, the bark close, slightly flaky, cinnamon-colored, the branches very slender, terete, green when young; leaves chartaceous, on slender petioles 6–12 mm. long, narrowly oblong or lance-oblong, 8–13 cm. long, 2–4 cm. wide, narrowly long-acuminate or abruptly acuminate, acute to rounded at the base, slightly lustrous above, glaucescent beneath, the lateral nerves about 17 pairs, divergent at a wide angle, almost straight, irregularly joined close to the margin; fruiting pedicels 18 mm.

long, stout; columella 1 cm. long, thickened at the base and apex; capsule 1.5 cm. long, very densely but minutely tomentulose, the valves hard and ligneous; seeds thick, scarcely compressed, olivaceous, lustrous, smooth, 9 mm. long and 7 mm. broad, the caruncle 1.5 mm. long.

*Mabea occidentalis* Benth. in Hook. Journ. Bot. 6: 364. 1854.  
*M. belizensis* Lundell, Field & Lab. 13: 4. 1945 (type from British Honduras, Toledo District, upper reaches of Golden Stream, *P. H. Gentle* 4595).

Moist or wet thickets or forest, at or little above sea level; Izabal. Chiapas and Tabasco; British Honduras, along the Atlantic coast to Panama; southward to the Amazon Valley.

A shrub or small tree, 8 meters high or less, the trunk as much as 8 cm. in diameter, glabrous outside the inflorescence or practically so, the branches usually very slender; leaves chartaceous or coriaceous, on petioles 5–6 mm. long, oblong to elliptic-oblong or lance-ovate, mostly 6–14 cm. long and 3–6 cm. wide, cuspidate-acuminate or caudate-acuminate, obtuse or rounded at the base and often somewhat oblique, obscurely denticulate or almost entire, green and lustrous above, very glaucous beneath, the lateral nerves 11–14 pairs; panicles about 10 cm. long and 1.5–3 cm. broad, lax, the staminate branches 4–5 mm. long, umbellately 3-flowered, bearing very large and conspicuous glands near the base, the pedicels rufous-tomentulose, the flowers dark red or purple; staminate sepals semiorbicular, obtuse, the pistillate triangular-ovate, acuminate, 3 mm. long; stamens about 25; ovary tomentulose; style column almost 2 cm. long, the capsule slightly 3-sulcate, 1.5 cm. long, densely tomentulose; seed brown, smooth, 7 mm. long, 5 mm. broad, with a small caruncle.

Reported from Guatemala as *M. montana* Muell. Arg. It is stated (from British Honduras) that this plant—presumably the milky sap—causes irritation and itching of the skin.

### MANIHOT Adanson

*References:* F. Pax, Pflanzenreich IV. 147, ii: 21–99. 1910. Leon Croizat, A study of *Manihot* in North America, Journ. Arnold Arb. 23: 216–225. 1942.

Shrubs, trees, or often herbs, usually glaucescent and glabrous or nearly so; leaves alternate, petiolate, sometimes peltate, undivided or often deeply lobate, the lobes entire or lobate, the stipules generally small; flowers rather large, monoecious, apetalous, racemose or paniculate, the inflorescences terminal or arising in the uppermost axils, simple or sparsely branched, with 1–few pistillate flowers at the base, the pedicels often elongate; bracts small or large, entire or dentate; staminate calyx sometimes colored, campanulate, shallowly or deeply 5-fid, the lobes imbricate or contorted; stamens 10 and 2-verticillate, the filaments free, the anthers dorsifixed, longitudinally dehiscent; ovary rudiment none or small; pistillate calyx like that of the staminate flower, the hypogynous disk entire or lobate; ovary 3-celled, the styles short-connate at the base, variously dilated or

lobate; ovules solitary in each cell; capsule separating into 2-valvate cocci; seed carunculate, the testa crustaceous; cotyledons broad and flat.

About 130 species, all in tropical America, the great majority of them Brazilian. One or two additional species may occur in southern Central America.

Leaves peltate; trees or large shrubs with woody stems. . . . . *M. Glaziovii*.

Leaves not peltate; stems herbaceous.

Lobes of the leaves entire.

Calyx pubescent inside, glabrous outside.

Ovary 6-angulate, the capsule winged; anthers very short. . . . . *M. esculenta*.

Ovary terete, the capsule not winged; anthers elongate. . . . . *M. dulcis*.

Calyx glabrous within and without. . . . . *M. aesculifolia*.

Lobes of the leaves lobate or sinuate.

Lobes of the leaves linear or at least greatly elongate and narrow, their lateral lobes acute or acuminate. . . . . *M. parvicocca*.

Lobes of the leaves broadest at or near the apex, the terminal portion of the lobe broadly rhombic, the lateral lobes rounded or very obtuse.

Leaves small, the middle lobe 4-6 cm. long; capsule 1 cm. long. *M. ludibunda*.

Leaves large, the middle lobes commonly 7-15 cm. long; capsule 1.5 cm. long. . . . . *M. gualanensis*.

**Manihot aesculifolia** (HBK.) Pohl, Pl. Bras. Icon. & Descr. 1: 55. 1827. *Janipha aesculifolia* HBK. Nov. Gen. & Sp. 2: 107. pl. 109. 1817.

Moist thickets, at or little above sea level; Suchitepéquez; Quiché; San Marcos. Yucatan Peninsula of Mexico; Atlantic lowlands of Honduras.

A coarse herb 1-3 meters high, perhaps sometimes suffrutescent below, glabrous throughout; leaves on petioles 6-12 cm. long, membranaceous, cordate at the base, concolorous or somewhat glaucescent beneath, deeply 5-7-parted, the lobes oblanceolate-oblong or obovate-oblong, 8-15 cm. long, acuminate, narrowed to the base, entire, the outermost lobes very short; stipules caducous; racemes 5 cm. long, or in fruit sometimes much longer, the pedicels arcuate-recurved in fruit, 2-3 cm. long; staminate calyx almost 2 cm. long, 5-fid to about the middle, glabrous, greenish outside; disk and stamens glabrous; ovary glabrous, terete; fruit globose, about 12 mm. high; seeds whitish or grayish, 7-8 mm. long, 7 mm. broad.

The Maya names in Yucatan are reported as "batul" and "chache"; "yuca cimarrona" (Yucatan).

**Manihot dulcis** (J. F. Gmel.) Pax, Pflanzenreich IV. 147, ii: 71. 1912. *Jatropha dulcis* J. F. Gmel. Onom. Bot. 5: 7. 1772-78. *M. palmata* Muell. Arg. in DC. Prodr. 15, pt. 2: 1062. 1866. *Yuca dulce*.

Native of Brazil, but cultivated rather widely in other regions of the tropics for its edible roots; sometimes planted in Guatemala.

Plants with large tuberous roots, herbaceous, commonly 1-2 meters high, more or less puberulent on the young parts but in age almost wholly glabrous; leaves large, long-petiolate, membranaceous, concolorous or glaucescent beneath, deeply 3-13-parted, the lobes lanceolate, oblanceolate, or lance-elliptic, acuminate or acute; stipules narrow, setaceous-acuminate, entire or sparsely lacinate; panicles many-flowered, the bracts small, lanceolate, entire; calyx 12-14 mm. long, glabrous outside, puberulent within in the upper portion, the staminate calyx globose-campanulate, 5-fid almost to the middle; pistillate calyx 5-parted; anthers several times longer than broad; disk and filaments glabrous; ovary terete, slightly costulate; capsule subglobose, not winged, 1.5 cm. long, rugose when dry.

The Maya name in Yucatan is listed as "cicitin." It is stated that the plant does not flower there. This form of cassava has "sweet" roots, that is, they do not possess the poisonous properties characteristic of *M. esculenta*. How extensively the plant is grown in Guatemala we do not know, but it is apparently utilized much less than *M. esculenta*.

*Manihot esculenta* Crantz, Inst. Herb. 1: 167. 1766. *Janipha Manihot* L. Sp. Pl. 1007. 1753. *M. utilissima* Pohl, Pl. Bras. 1: 32. pl. 24. 1827. *Yuca*; *Tzin* (Quechí); *Cassava*.

Presumably native of tropical Brazil and neighboring regions, but now grown widely in other parts of tropical America, also in the Old World tropics; planted commonly and on a rather large scale in the lowlands of Guatemala, and occasionally even at middle elevations.

Plants arising from large tuberous roots, erect, 1-3 meters high, branched, glabrous or nearly so; leaves long-petiolate, membranaceous, green and glabrous above, usually very glaucous beneath, glabrous or minutely puberulent on the nerves, 3-7-parted, the lobes 8-15 cm. long, spatulate-lanceolate or linear-lanceolate, acuminate, gradually attenuate to the base; stipules 5-7 mm. long, triangular-lanceolate, setaceous-acuminate, entire or with 1-2 lacinations; peduncles mostly 5-6 cm. long, slender, equaling the panicle, the bracts linear-lanceolate, entire; staminate pedicels 4-7 mm. long, the pistillate deflexed-spreading, as much as 2.5 cm. long; calyx campanulate, glabrous and pruinose outside, puberulent within in the upper portion, 1 cm. long, 5-parted; disk and filaments glabrous; anthers only 1.2 mm. long, hispidulous at the apex; ovary glabrous, acutely 6-angulate; capsule 1.5 cm. long, subglobose, rugose, narrowly 6-winged.

Sometimes called "yuca amarga" or "yuca brava"; the Maya name in Yucatan is recorded as "tsin" or "tsiim." Yuca or cassava is one of the most important of all food plants, supplying "bread" to most of Brazil and other regions, and useful starches to other parts of the earth, particularly in the form of tapioca. The plant is be-

lieved to have been introduced into tropical North America in precolumbian times, perhaps transported by the Caribs from northern South America to the West Indies and to the mainland. Among the Caribs of the Atlantic coast of Central America cassava is still an important foodstuff, and some of them still use the curious elongate wicker baskets for expressing the juice from the grated root, which is then made into large thin cakes. These are used in place of the maize tortillas eaten as bread in most parts of Central America. Outside the Carib settlements, yuca is used in Central America only as a vegetable, boiled and eaten like sweet potatoes. It is rather heavy and not too easily digestible, coarse and rather hard, and has little to recommend it where other and better starchy foods are available. Yuca is cultivated very extensively in all the warmer parts of Guatemala, in the North Coast, the lowlands of Alta Verapaz and Petén, in the irrigated Motagua Valley and elsewhere in the Oriente, and in the largest amounts on the Pacific plains, where extensive fields of it are planted. The large heavy roots, looking somewhat like sweet potatoes, are transported from the lowlands to the markets of the uplands. A great deal of starch is made from the roots in Guatemala, to be used in starching clothes, also in the preparation of *atol*, especially for invalids, and various desserts. One of the last, much like blanc mange of the United States, is prepared by boiling yuca starch with sugar and the inevitable cinnamon.

As a vegetable yuca must be used with some discretion. There appear to be various races of *M. esculenta*, in some of which the roots are intensely poisonous when raw, while in others they are sweet and harmless. The poisonous property is stated to be hydrocyanic acid, although others report that it is a peculiar principle, manihotoxine. The poisonous property may be removed by expressing the juice or by thorough cooking. If human beings or domestic animals eat the raw roots of the bitter variety, death is likely to ensue within a few hours. The names "yuca" and "cassava" are of Antillean origin, and variants of the latter are "casabe" and "casabi." The Brazilian name is "mandioca." The Nahuatl name of the plant is "quauhcamotl" ("tree potato"). "Yuca," apparently, was the Haitian name for the plant, "casabi" the term for bread made from its roots. In some regions numerous varieties of the cassava plant are recognized by cultivators. In Guatemala marked forms are apparent in some of the plantations, differing in color of the stems and shape of the leaves, but little or no attention is paid



to them. The plants are propagated from cuttings, and are cultivated much like potatoes or any other similar root crop, but they require a longer time for maturity than most similar crops.

**Manihot Glaziovii** Muell. Arg. in Mart. Fl. Bras. 11, pt. 2: 446. 1874.

Native of Brazil, but often planted in other tropical regions as a source of rubber or for shade or as a curiosity; collected near Los Verdes, Santa Rosa, in a hedge remote from dwellings, but probably planted there; sometimes cultivated in Alta Verapaz, but not commercially.

A small tree, usually 10 meters high or less, with a dense crown, glabrous throughout or nearly so; leaves long-petiolate, membranaceous, green above, glaucous beneath, peltate shortly above the base, deeply 3-5-lobate, about 12 cm. long and 16 cm. wide, the lobes oblong-obovate or elliptic, rounded to abruptly short-acuminate at the apex; stipules 4-6 mm. long, lance-ovate, acute, denticulate; panicles 7-9 cm. long, broadly pyramidal, the bracts 2.5 mm. long, lanceolate, the pedicels about 1 cm. long, the flowers nutant; calyx glabrous, campanulate, the staminate 5-fid, 9 mm. long, green tinged with violet; pistillate calyx 5-parted, 1 cm. long; capsule globose, 2 cm. in diameter, not winged; seeds 1.5 cm. long, 1 cm. wide, gray mottled with brown.

This plant is the source of the Ceará rubber of commerce, formerly an article of commercial importance. The trees were planted extensively in the East Indies, but their product was unable to compete with *Hevea* rubber. In Salvador the tree is called "caucho blanco."

**Manihot gualanensis** Blake, Contr. U. S. Nat. Herb. 24: 13. 1922. *Yuca cimarrona*; *Yuquilla*.

Moist or wet thickets, 900 meters or less; Zacapa (type from Gualán, *S. F. Blake* 7688); Chiquimula; Santa Rosa; Huehuetenango. British Honduras; Honduras; Nicaragua.

A coarse herb 1-2 meters high, glabrous throughout or essentially so, the stems stout, often much-branched; leaves on petioles 20 cm. long or less, 30 cm. wide or smaller, membranaceous, about 9-lobate almost to the base, green above, glaucous beneath, the lobes obovate or rhombic-obovate, usually shallowly lobate above the middle and panduriform, acuminate, tapering to the base; panicles about 10 cm. long, many-flowered, glabrous, the flowers nutant, short-pedicellate or the staminate ones in age long-pedicellate; bracts linear-subulate, entire, 2-6 mm. long; pistillate calyx greenish, glaucous, 12 mm. long, the segments lance-oblong, obtuse; ovary subglobose, glabrous; staminate calyx 7 mm. long, glabrous, the lobes oblong, obtuse; stamens glabrous; capsule subglobose, 1.5 cm. long, rugulose, somewhat 5-angulate at the base.

This species was described originally as a shrub, and other species have been characterized in the same manner. As a matter

of fact, all the species enumerated here except *M. Glaziovii* are herbs. Most of them grow luxuriantly during the rainy season but wither when the rains cease, and nothing is seen of them during the long *verano*.

**Manihot ludibunda** Croizat, Journ. Arnold Arb. 23: 219. 1942.  
*Yuca cimarrona*.

On limestone bald knobs (*pelones* or *pajales*), 800–1,400 meters; endemic; Huehuetenango (type from Guaxacaná, C. & E. Seler 2814; collected also between Nentón and Miramar and at San Antonio Huista).

Plants herbaceous, low, glabrous throughout; leaves on long slender petioles, 4–6 cm. long, mostly 5-parted almost to the base, the lobes spatulate-oblong, constricted at about the middle and panduriform, the apex dilated-quadrangular, short-acuminate, the lateral lobes rounded, green above, beneath concolorous or somewhat paler; inflorescences apical or lateral, 3–5 cm. long; staminate flowers on pedicels 7–10 mm. long, the calyx 1 cm. long, the short lobes ovate-acuminate; pistillate sepals 5, lance-elliptic, 4 mm. long; ovary costulate; capsule 1 cm. long, not winged, rugose-tuberculate; seeds 6–7 mm. long and almost as broad, smooth, lustrous, mottled with gray and olive-brown, the caruncle large.

The type material of this was reported once as *M. carthagenensis* (Jacq.) Muell. Arg.

**Manihot parvicocca** Croizat, Journ. Arnold Arb. 23: 219. 1942.

Open or brushy hillsides or plains, 1,200–2,400 meters; Baja Verapaz; Guatemala (Fiscal); Quiché; Huehuetenango. Chiapas, the type from Siltepec; Honduras; Salvador.

Plants apparently perennial, erect, 30–100 cm. high, often much-branched, glabrous throughout; leaves 5–7-lobate almost to the base, long-petiolate, membranaceous, 16 cm. broad or smaller, the lobes unequal, the outermost much shorter and smaller, the middle ones linear or linear-oblong, mostly 10 cm. long or less, long-attenuate, all or most of them with a few small lobes or teeth, these usually acute or acuminate, concolorous or nearly so; inflorescence terminal, 10 cm. long or less, lax, the pistillate pedicels stout in fruit and somewhat refracted; staminate perianth campanulate, 1 cm. long, the lobes ovate-triangular; capsule globose, 8–10 mm. long, the columella 3–4 mm. long; seeds 5–6 mm. long and almost as broad, ochraceous or grayish mottled with olive, the caruncle rather large and conspicuous.

## OMPHALEA L.

*Reference:* F. Pax, Pflanzenreich IV. 147, v: 14–22. 1912.

Shrubs or large trees, sometimes scandent shrubs; leaves alternate, stipulate, penninerved or 3–5-nerved from the base, the petioles 2-glandular at the apex;

flowers small, monoecious, apetalous, cymulose, the cymules staminate, with a single central pistillate flower, disposed in terminal panicles; bracts usually elongate and subfoliaceous, petiolate, the petiole 2-glandular; disk none or obsolete; staminate sepals 4-5, broad, strongly imbricate; stamens 2-3, the filaments connate into a short column, the connective thick and broad, connate to form a peltate pileiform 2-3-lobate mass, the cells peripheral, longitudinally dehiscent; ovary rudiment none; pistillate calyx like that of the staminate flower; ovary 2-3-celled, the style columnar, thick, obtuse or shallowly 2-3-lobate; ovules solitary in each cell; fruit large, somewhat carnose, the endocarp hard, indehiscent or finally separating into 2-valvate cocci; seeds large, almost globose, not carunculate; cotyledons broad, flat.

Fifteen species, 3 in the Old World tropics, the rest American. One other known from Central America (*O. diandra* L.) may well occur in the Atlantic lowlands of Guatemala.

**Omphalea oleifera** Hemsley, Pharm. Journ. Trans. XV. 13: 301. 1882. *Palo de queso*.

Dry, thinly forested hillsides, mostly at 500 meters or less; Jutiapa; Escuintla. Salvador.

A large or medium-sized tree, often 15 meters high or more, with a tall pale trunk and a rounded or spreading crown; leaves very large, on long stout petioles, membranaceous, deciduous, rounded-cordate, often 30 cm. wide and somewhat longer, abruptly acute or short-acuminate from an almost rounded apex, deeply cordate at the base, entire or nearly so, 7-nerved at the base, when young somewhat stellate-puberulent but in age glabrous; flowers monoecious, greenish, in large leafy-bracted panicles, the branches puberulent; bracts oblong, petiolate, as much as 2.5 cm. long, puberulent; sepals 4, decussate, orbicular, ciliate; stamens 2; ovary glabrous; fruit subglobose, green or yellowish, 3 cm. or more in diameter; seeds 3, very large, blackish.

Known in Salvador by the names "hoja de queso," "chirán," "shilán," "palo de jabón," "tambor," and "castañete." The large thin leaves are used there for wrapping cheeses. The young fruits as well as the mature seeds are boiled and eaten, but in case of the seeds it is stated that the embryos must be removed. The seeds are rich in oil, which is used in Salvador for cooking, illumination, and manufacture of soap.

### OPHELLANTHA Standley

Large shrubs or small trees, the pubescence of simple hairs; leaves alternate, slender-petiolate, membranaceous, penninerved, remotely denticulate; stipules 2, small, spinose, persistent; flowers monoecious, long-pedicellate, solitary or fasciculate on axillary spurs; staminate calyx 5-parted, the lobes slightly imbricate; petals 5, distinct, entire, much longer than the calyx, sessile, ciliate; disk large, densely short-hirsute; stamens numerous, 50 or more, irregularly

inserted over the disk, the filaments elongate, filiform, glabrous; anthers small, 2-celled, dehiscent by 2 introrse slits, each cell bearing at the apex a short filiform appendage; ovary rudiment none; pistillate sepals 5, accrescent and foliaceous after anthesis; margin of the disk very shallowly 5-lobate; ovary 2-3-celled, sessile; styles 2-3, very stout, nearly or quite distinct, shortly 2-fid; ovules solitary in each cell; capsule separating into 2-3 bivalvate cocci, the columella persistent; seeds large, not carunculate, smooth or nearly so; endosperm carnose, the cotyledons broad, flat.

One other species is known, ranging from Oaxaca to western Costa Rica. It is to be expected in Guatemala.

**Ophellantha Steyermarkii** Standl. Field Mus. Bot. 23: 123. 1944.

Known only from the type, Dept. Huehuetenango, trail between Santa Ana Huista and Nentón, over Río Azul and La Laguna, 800-900 meters, *Steyermark* 51398.

A tree of 6 meters, the branches slender, terete or brownish, when young pilosulous with lax spreading hairs, the internodes elongate but shorter than the leaves; stipules indurate, spine-like, sharp-pointed, 2-2.5 mm. long; leaves on slender petioles 10-13 mm. long, membranaceous, bright green when dried, lanceolate or lance-oblong, 5-6.5 cm. long, 1.5-2.5 cm. wide, narrowed to the subacute apex, cuneately acute or obtuse at the base, subentire, densely pilose on both surfaces with very slender, pale, spreading hairs, slightly paler beneath, the lateral nerves about 5 pairs; pistillate pedicels in fruit slender, 2.5 cm. long; sepals foliaceous, ovate or oblong-elliptic, about 17 mm. long and 7 mm. wide, narrowed to the obtuse apex, 5-nerved, densely pilosulous on both surfaces, entire; styles shortly connate at the base, the free portion thick, densely appressed-pilosulous, 2-fid to the middle, the ultimate branches very stout; disk densely hirsutulous; capsule 3-celled, subglobose, densely velutinous-pilosulous with spreading hairs, about 12 mm. high; seeds 3, oval, very thick, 8 mm. long, 6 mm. broad, smooth, lustrous, fuscous brown.

The only other species, *O. spinosa* Standl., is called "limoncillo" in Salvador. Occurring there and in Oaxaca, it is confidently to be expected in Guatemala. *O. Steyermarkii* may be only a pubescent form of *O. spinosa*, but it appears to differ definitely from the latter, in which the leaves and other parts are almost glabrous, the scant pubescence consisting of appressed hairs. In the original material of *O. spinosa* the united portion of the styles is much longer and the ovary 2-celled, but the latter character probably is not a constant one.

#### PEDILANTHUS Poiteau

*Reference:* C. F. Millspaugh, The genera *Pedilanthus* and *Cubanthus* and other American Euphorbiaceae, Field Mus. Bot. 2: 353-377. 1913.

Mostly erect shrubs, sometimes herbs, the stems fleshy, green, exuding a copious milk-like latex; leaves alternate, succulent, broad, entire, early deciduous, the plants often leafless; stipules gland-like or none; flowers small, surrounded by a usually shoe-shaped and colored involucre, naked, monoecious; involucre borne in terminal cymes or often in the axils of the uppermost leaves; involucre pedunculate, its tube cleft on the upper side, bifid at the apex of the lower of the 2 lips, with 1 middle and 2 lateral lobes more or less closing the fissure, the tube bearing at the base on the upper side a spur-like appendage, this 2-fid or 2-3-lobate and extending anteriorly above the upper side of the basal part of the tube; flowers pedicellate within the involucre, the staminate numerous, the pistillate solitary, naked or sometimes with linear bractlets at the base; style of the pistillate flower elongate, this finally protruding, usually declinate; stigmas 3, long-connate, often distinct at the apex; ovary 3-celled, the cells 1-ovulate; fruit capsular; seeds not carunculate.

Species 30 or more, mostly in tropical America, a few in tropical Africa. One other Central American species has been described from Nicaragua. The species of this genus are all much alike in general appearance, and separated chiefly by floral characters which, while not difficult to see, are of doubtful significance. The true number of valid species probably is smaller than has been generally recognized.

Involucres rather densely tomentulose.....*P. camporum*.

Involucres glabrous.

Lobe of the appendage at the base of the tube 2-parted. Leaves glabrous.  
*P. macradenius*.

Lobe of the appendage entire.

Leaves glabrous; lobe of the appendage glabrous on the margins or nearly so.  
*P. tithymaloides*.

Leaves pubescent beneath, often densely so; lobe of the appendage conspicuously and usually densely ciliate.....*P. Deamii*.

***Pedilanthus camporum*** Standl. & Steyerm. Field Mus. Bot. 23: 124. 1944.

Known only from the region of the type locality, dry brushy plains, 120 meters or less, between Nueva Linda and Champerico, Retalhuleu, *Standley* 87781.

An erect shrub about a meter high, the stems thick, terete, dark green, when young sparsely tomentulose, soon glabrate; leaves deciduous, not seen; cymes short, dense, clustered at the ends of the branches; bracts small, cucullate, densely ochraceous-tomentose, the peduncles 6 mm. long or less, sparsely tomentulose or glabrate; involucre 8-10 mm. long, 3 mm. wide at the middle, densely tomentulose or puberulent, red and green, glabrous within, cleft along the upper margin to the base, shallowly cleft below, the apices rounded or very obtuse; appendage very small, scarcely more than 4 mm. long, cucullate-dilated at the base, the lip short, liguliform, obscurely retuse; staminate pedicels glabrous, exerted, the pistillate puberulent or tomentulose; ovary densely whitish-tomentulose, the

slender glabrous style 6-7 mm. long; capsule globose-trigonus, 6 mm. long and broad, sparsely puberulent; seeds smooth, dirty brown, 3-3.5 mm. long.

**Pedilanthus Deamii** Millsp. Field Mus. Bot. 2: 356. 1913. *Tithymalus Deamii* Croizat, Amer. Journ. Bot. 24: 704. 1937. *Pie de niño*.

Dry rocky plains or brushy hillsides, 200-1,300 meters; Chiquimula; Jutiapa; Santa Rosa; Guatemala (type from Fiscal, C. C. Deam 6081). Chiapas.

A stiff erect shrub 0.5-1.5 meters high, the branches suberect, stout, fleshy, dark green, tomentulose when young, flexuous; leaves sessile or short-petiolate, fleshy, oblong-ovate to broadly ovate or suborbicular, 4.5-8 cm. long, 2.5-3.5 cm. wide, acute or acuminate, obtuse or cuneate at the base, puberulent or glabrous above, puberulent or pilosulous beneath, often densely so, the costa elevated, thin and wing-like; bracts small and inconspicuous, cucullate; peduncles glabrous, 5-6 mm. long; involucre bright or deep red or rose, about 12 mm. long, glabrous, the upper fissure extending to the appendage, the principal lobes ovate, erose-dentate; appendage small, less than one-third the length of the tube, the lip ligulate, retuse; staminate pedicels puberulent at the apex, the filaments pilose; capsule glabrous; seeds grayish olive, almost 4 mm. long.

This plant sometimes is planted for hedges in the Oriente. In this and other species the costa on the lower surface of the leaf is greatly elevated and projects as a ruffled wing. It is questionable whether *P. Deamii* is more than a pubescent variety of *P. tithymaloides*.

**Pedilanthus macradenius** Donn. Smith, Bot. Gaz. 19: 263. 1894. *Tithymalus macradenius* Croizat, Amer. Journ. Bot. 24: 704. 1937.

Known only from the type, Canibal, Huehuetenango, 950 meters, W. C. Shannon 412.

Plants glabrous outside the inflorescence; leaves obovate-oblong, 10-15 cm. long, 5-7.5 cm. wide, obtuse at each end, on petioles 6 mm. long; cymes arising in the upper leaf axils, the bracts oblong-ovate, longer than the peduncles, as much as 12 mm. long, reddish, pubescent; peduncles pubescent; involucre red, 10-15 mm. long, 6 mm. broad, glabrous outside, pubescent within, the principal segments ovate, acute, pilose at the apex; pedicels glabrous; appendage almost half as long as the tube of the involucre, cleft one-third its length into 2 broadly ovate lobes; capsule depressed-globose, 8 mm. in diameter, the cocci carinate; seeds trigonus-globose.

One sterile collection (*Steyermark* 51103) from Río Trapichillo, Huehuetenango, with the vernacular name "pie de niño" is probably referable here, but the leaves are softly pilose beneath.

**Pedilanthus tithymaloides** (L.) Poiteau, Ann. Mus. Paris 19: 390. 1812. *Euphorbia tithymaloides* L. Sp. Pl. 453. 1753. *Pie de niño*; *Pie de santo* (Petén); *Itamo real*, *Dictamo*, *Tomo real* (fide Tejada).

Dry to wet thickets, mostly at 300 meters or less; often planted in hedges or gardens, and sometimes escaping; Petén; Izabal; Escuintla; Retalhuleu; often planted elsewhere. Mexico; British Honduras to Panama; West Indies; Colombia and Venezuela.

An erect branched shrub 1.5 meters high or less, the branches thick or rather slender, dark green, terete; leaves almost sessile, thick and fleshy, broadly ovate to oblong, 4–7.5 cm. long, acute or obtuse, cuneate to rounded at the base, glabrous; cymes terminal, dense, the bracts ovate, acuminate, slightly longer than the peduncles, caducous; involucre red or pink and green, 11–13 mm. long, glabrous; appendage 4-glandular, the lobe short, linear; staminate pedicels glabrous, the pistillate pubescent; capsule about 7.5 mm. long and 9 mm. broad, the cocci carinate; seeds ovoid, 5 mm. long.

The cultivated plants often have dark red or purple leaves, but many of the plants usually are nearly or quite leafless. They are much planted for low hedges in the lowlands or even at middle elevations in Central America. They make a dense compact growth, and are rather handsome or at least novel in appearance. The abundant milky sap flowing from the broken stems is generally considered poisonous.

#### PERA Mutis

*Reference*: F. Pax, Pflanzenreich IV. 147, xiii: 2–13. 1919.

Trees, the indument lepidote or stellate-lepidote, rarely of simple hairs; leaves alternate, short-petiolate, entire, penninerved; flowers dioecious or rarely monoecious, apetalous, enclosed in globose involucre, these 1–2-bracteolate at the base, open laterally in anthesis or valvate-bifid, usually unisexual; staminate flowers 3–4 perfect ones and a few sterile ones; pistillate flowers 3–4, sometimes with rudimentary central staminate flower; flowers sessile, the involucre fasciculate in the leaf axils; disk none; staminate calyx small, valvate, turbinate, sometimes reduced or none; filaments short and free or longer and connate below, the anthers dorsifixed at or above the base, the cells parallel, longitudinally dehiscent; pistillate flowers naked, the ovary 3-celled, the style very short, the stigma peltate, disk-like or 3-lobate; ovules solitary in each cell; capsule 3-coccos, the cocci 2-valvate, separating from the persistent columella; seeds ovoid or obovoid and compressed, carunculate, the testa black, smooth, lustrous; endosperm carnose, the cotyledons broad, flat.

About 20 species, in tropical America, only two in North America.

Leaves not barbellate beneath in the axils of the nerves, the pubescence wholly lepidote.....*P. arborea*.  
Leaves densely barbellate beneath in the axils of the nerves, also lepidote.  
*P. barbellata*.

*Pera arborea* Mutis, Svensk. Vet. Akad. Handl. Stockholm 5: 299. *pl.* 8. 1784.

Reported by Lundell from British Honduras, Stann Creek, Mullins River-Stann Creek road, in broken ridge, *P. H. Gentle* 3361; Panama; Colombia.

A large or medium-sized tree, sometimes 15 meters high or more, the branchlets terete, densely lepidote at first, glabrate in age; leaves on petioles 1–1.5 cm. long, oblong or obovate-oblong, mostly 7–16 cm. long and 2.5–5 cm. wide, obtuse or acute, rounded to broadly acute at the base, coriaceous, lustrous and glabrous above, slightly paler beneath and sparsely and minutely lepidote; involucre borne mostly at defoliate nodes, lepidote, the staminate 3-flowered, the pistillate 4–5-flowered; staminate calyx turbinate, acutely dentate, the stamens 4–5; ovary glabrous or sparsely lepidote, the stigma 3-lobate; capsule about 12 mm. long and 10 mm. broad, obovoid-globose, undulate-rugulose, very sparsely lepidote; seeds black, lustrous, slightly compressed, acutish at the apex.

The wood in this genus varies in color from light to very dark brown, of fine or coarse texture, of medium or very high density. It is little used except for poles and fuel.

*Pera barbellata* Standl. Field Mus. Bot. 8: 19. 1930.

Mixed forest, 300 meters or less; Petén. Southern Mexico (Oaxaca; Tabasco); British Honduras (type from Mullins River road, *W. A. Schipp* 201).

A tree of 9–20 meters with narrow crown, the trunk round, 40–70 cm. in diameter, tall, the bark chocolate-brown with grayish patches and with small scales, the inner bark deep yellow, the branchlets slender, densely lepidote when young; leaves on petioles 5–7 mm. long, chartaceous, oblong-elliptic or lance-oblong, mostly 4–7 cm. long and 2.5–3.5 cm. wide, acuminate, often abruptly so, with an obtuse tip, usually acute at the base or abruptly contracted, sometimes obtuse, minutely puberulent above on the costa, lustrous, sparsely stellate-lepidote beneath, densely short-barbate in the axils of the nerves, the lateral nerves about 13 pairs; flowers fasciculate in the leaf axils or at defoliate nodes, the fruiting pedicels 2–3 mm. long, densely stellate-puberulent; staminate involucre very small, scarcely more than 3 mm. long, densely lepidote; pistillate involucre globose-obovoid, 6–8 mm. long, very densely stellate-puberulent, rounded at the apex; capsule 8–10 mm. long, densely stellate-puberulent.

Called "palo prieto" in Oaxaca. The sapwood is white to deep yellow, darkening slightly on exposure to air; heartwood well defined, medium brown to chocolate-brown; has a slightly unpleasant odor when first cut. The wood is said to be used in Oaxaca for railroad ties.

## PHYLLANTHUS L.

Mostly herbs or rather small shrubs, rarely trees, variable in habit; leaves small or large, generally alternate, entire, often distichous, the branchlets with



their leaves often simulating compound leaves; flowers small, greenish or whitish, axillary or rarely at defoliate nodes, the staminate mostly numerous and glomerate, subsessile or pedicellate, the pistillate flowers in the same axils or on distinct branchlets, few or solitary; flowers monoecious or rarely dioecious, apetalous, with or without a disk; staminate sepals generally 5 or 6, distinct or short-connate, imbricate, more or less 2-seriate, herbaceous or subpetaloid; stamens mostly 3, the filaments free or connate into a central column; anther cells parallel or divergent, longitudinally dehiscent, sometimes transversely 2-valvate or confluent; ovary rudiment none; ovary 3-many-celled, the styles distinct or connate, entire or usually 2-fid, subulate or dilated; ovules 2 in each cell; fruit capsular, dry or carnose, usually separating into 2-valvate cocci; seeds somewhat 3-angulate, convex dorsally, not strophiolate; endosperm carnose, the cotyledons flat.

Species about 500, in both hemispheres, most numerous in the tropics. Two or three others are known from southern Central America. The genus has not been monographed in recent years, and is in need of critical attention, although the Central American species are not numerous, and rather well understood.

Plants annual or essentially so, the stems soft and herbaceous throughout; leaves less than 2 cm. long, most of them less than 1 cm. long; stems rarely suffrutescent, but the leaves then all less than 1 cm. long.

Leaves very minutely ciliate; ovary minutely tuberculate.....*P. Urinaria*.

Leaves not ciliate; ovary not tuberculate.

Stems conspicuously thickened at the base; plants growing in marshes, often in shallow water.....*P. diffusus*.

Stems not thickened at the base; plants not growing in very wet soil.

Upper parts of the stems conspicuously compressed and 2-edged.

*P. compressus*.

Upper parts of the stems terete or nearly so, not 2-edged.

Branches erect or strongly ascending, the plants somewhat fastigiately branched.....*P. carolinensis*.

Branches spreading or recurved, the plants not at all fastigiately branched.

Capsules about 2 mm. broad; seeds smooth; leaves with very faint and indistinct lateral nerves.....*P. Niruri*.

Capsules about 3 mm. broad; seeds somewhat scaberulous; leaves with 4-5 pairs of distinct lateral nerves.....*P. lathyroides*.

Plants perennial, shrubs or trees, rarely low but then with hard and distinctly woody stems, usually much more than 2 cm. long and often 10 cm. or more.

Flowers in elongate racemes or panicles; fruit large, often very large, often fleshy.

Leaves mostly 3-5 cm. long, almost as wide as long.....*P. acidus*.

Leaves mostly 9-20 cm. long, usually much longer than wide..*P. glaucescens*.

Flowers fasciculate or solitary in the leaf axils.

Leaves very obtuse or rounded at the apex, not at all narrowed to the apex.

Leaves 8-15 mm. wide; sepals obovate.....*P. ferax*.

Leaves mostly 20-30 mm. wide; sepals broadest at or near the base.

*P. micrandrus*.

Leaves acute or acuminate, or rarely narrowed to an obtuse apex.

Capsule 4-celled; staminate flowers with 4 sepals.....*P. nobilis*.

Capsule 3-celled; staminate flowers with 5-6 sepals.

Older branches very rough and thick, sparsely or densely beset with the large persistent indurate stipules, the young branches resembling pinnate leaves.

Leaves glabrous.....*P. Purpusii*.

Leaves densely pilose beneath.....*P. minarum*.

Older branches not much thicker than the young ones, not rough, the stipules usually early deciduous, the young branches not resembling pinnate leaves.

Pistillate flowers densely fasciculate at the base of the pistillate flower; branches conspicuously angulate.....*P. brasiliensis*.

Pistillate flowers solitary, or with 1-2 staminate flowers at their base, the flowers often dioecious.

Leaves chartaceous, acuminate to an obtuse tip.....*P. longipes*.

Leaves thin-membranaceous, acuminate or attenuate to a very acute tip.

Capsule about 7 mm. long.....*P. Austinii*.

Capsule about 3 mm. long.

Petioles glabrous and smooth; leaf blades narrowly rounded at the base.....*P. capillipes*.

Petioles papillose-puberulent; leaf blades acute at the base.  
*P. Bartlettii*.

**Phyllanthus acidus** (L.) Skeels, U. S. Dept. Agr. Bur. Pl. Ind. Bull. 148: 17. 1909. *Averrhoa acida* L. Sp. Pl. 428. 1753. *Cicca disticha* L. Mant. Pl. 1: 124. 1767. *P. distichus* Muell. Arg. in DC. Prodr. 15, pt. 2: 413. 1866. *Grosella*.

Moist or dry thickets, sometimes in second growth, 500 meters or less; Jutiapa (Lago de Güija); Escuintla (San José). Native of India, often planted in other tropical regions, and thoroughly naturalized in some parts of Central America (mostly along the Pacific lowlands) and elsewhere in tropical America.

A shrub or tree, mostly 2-9 meters high, with pale bark, the older branches stout, the young ones very slender, with their leaves resembling pinnate leaves, sometimes deciduous with the leaves; leaves distichous, almost sessile, broadly ovate to suborbicular, mostly 3-6 cm. long, acute to rounded at the apex, rounded or even emarginate at the base, thick and firm, pale beneath, with 6-9 pairs of lateral nerves, glabrous; flowers monoecious, short-pedicellate and axillary or usually in many-flowered, raceme-like panicles; sepals 4 in the staminate flower, obovate, the stamens 4, with free filaments; pistillate sepals elliptic; ovary usually 4-celled, the 4 styles free, reflexed, 2-parted; fruit 1 cm. or more in diameter, green or yellowish, the pericarp fleshy and juicy, very acid, deeply 6-8-sulcate vertically.

Sometimes called "guinda" and "piemento" in Salvador; "wild plum" (British Honduras). English names are "Otaheite gooseberry" and "West Indian gooseberry." The fruit may be as much as 2 cm. in diameter and is distinguished by its usually green coloring

and several vertical ridges. It is intensely acid and somewhat astringent, with a flavor suggestive of a green gooseberry. Little or no use is made of the sour fruit in Central America, but in other regions it is sometimes made into preserves or pickles. The wood is described as rather hard and fine-grained, with a specific gravity of about 0.57. In some parts of Central America this small tree has become thoroughly naturalized, especially in land about ponds and lakes that is inundated during the rainy months but very dry in the dry season.

**Phyllanthus Austinii** Standl. Field Mus. Bot. 22: 38. 1940.

Dense wet mixed forest, at sea level; endemic; Izabal (type from Escoba, across the bay from Puerto Barrios, *Standley* 72868; collected several times in the same region).

A very slender shrub 1-1.5 meters high, sometimes more elongate and even subsucculent, glabrous throughout, the branches terete, greenish or ochraceous, with mostly elongate internodes; stipules greenish, erect, linear-subulate, 2.5-3 mm. long; leaves on petioles 5-17 mm. long, membranaceous, ovate or lance-ovate, 6-10 cm. long, 2-5.5 cm. wide, narrowly long-acuminate, rounded or broadly obtuse at the base, glaucescent beneath, the veins prominent and reticulate on both surfaces, the lateral nerves 5-6 pairs; flowers dioecious, axillary, solitary or few and fasciculate, the staminate pedicels filiform, scarcely more than 4 mm. long, the greenish flowers 3 mm. broad; pistillate pedicels capillary, 2-4 cm. long, flexuous; styles 3, very short, recurved; capsule obovoid-globose, about 8 mm. long, 3-carinate; seeds 3, pale brownish, 4 mm. long, densely and minutely verruculose.

The species was named for Mr. George B. Austin of the United Fruit Company, Puerto Barrios, to whom the authors are deeply obligated for his substantial and courteous assistance in their explorations of Guatemala.

**Phyllanthus Bartlettii** Standl. Carnegie Inst. Wash. Publ. 461: 68. 1935.

Moist or wet forest on limestone, at or little above sea level; endemic; British Honduras (type from river bluffs, El Cayo, *H. H. Bartlett* 11441; collected also at various other localities).

A slender erect shrub a meter high or less, glabrous almost throughout, the older branches ferruginous, terete, the young ones very minutely puberulent or papillose-scaberulous, with short or elongate internodes; leaves on slender petioles 5-8 mm. long, the petioles papillose-scaberulous; leaf blades lance-oblong or ovate-oblong, 5-7.5 cm. long, 1.7-2.8 cm. wide, acuminate or long-acuminate, with an acute or attenuate tip, acute or obtuse at the base, glabrous, membranaceous, somewhat paler beneath, the lateral nerves about 5 pairs, the veins inconspicuous; flowers probably dioecious, the staminate axillary, fasciculate, the filiform pedicels

glabrous, 2-3 mm. long; sepals white, 1.5 mm. long, rounded at the apex, glabrous; stamens 5; pistillate pedicels 2-2.5 cm. long, capillary, axillary, solitary; capsule 4 mm. broad, rather deeply 3-lobate, the columella slightly more than 2 mm. long; seeds 2 mm. long, brown or stramineous, deeply impressed-punctate and somewhat corrugate longitudinally.

**Phyllanthus brasiliensis** (Aubl.) Poir. *Encycl.* 5: 296. 1804. *Conami brasiliensis* Aubl. *Pl. Guian.* 927. *pl.* 354. 1775. *P. acuminatus* Vahl, *Symb. Bot.* 2: 95. 1791. *P. Conami* Swartz, *Prodr. Veg. Ind. Occ.* 28. 1788.

Wet to dry thickets, often in second growth, 1,200 meters or less; Izabal; Zacapa; Jutiapa; Santa Rosa; Escuintla; Chimalteango; Suchitepéquez; Retalhuleu; San Marcos. Mexico; British Honduras to Salvador and Panama; West Indies; tropical South America.

A slender shrub or small tree, mostly 1.5-3 meters high, sometimes taller, the branches slender, spreading, green, angulate, puberulent on the angles; leaves membranaceous, on petioles scarcely more than 2 mm. long, oblong-ovate to rounded-ovate, mostly 2-4.5 cm. long and 1-3 cm. wide, acute or acuminate and mucronulate, usually rounded or very obtuse at the base, minutely ciliolate on the margins, elsewhere glabrous or nearly so, usually pale beneath; stipules small, linear-subulate; flowers very small, greenish white, in dense axillary fascicles, one pistillate, the others staminate, on pedicels 2 mm. long or less; staminate sepals 6, ovate or oblong, the stamens 3; pistillate pedicels about 5 mm. long or in fruit somewhat elongate, the sepals 6; ovary 3-celled, smooth, the styles free, 2-branched, reflexed; capsule green, 3-4 mm. long, 3-sulcate, reticulate-veined; seeds reddish brown, cristate dorsally.

Known in Salvador by the names "pimientillo" and "palo de zope"; "ciruelillo" (British Honduras); "xpibul," "cahyuc," "xpay-hul" (Yucatan, Maya). This is one of the commonest shrubs in second growth thickets in the lowlands of all Central America, often occurring in great abundance. The main branches bear all or most of their lateral branches and leaves in a single plane, in such a manner that they resemble the large fronds of a tree fern.

**Phyllanthus capillipes** Blake, *Contr. U. S. Nat. Herb.* 24: 10. 1922.

Known in Guatemala only from the type, in gravelly places, Quebradas, Izabal, *S. F. Blake* 8614. Atlantic coast of Honduras.

A slender suffrutescent plant scarcely more than 40 cm. high, glabrous throughout, branched, the branches very slender and wiry, glabrous, somewhat flexuous or zigzag; stipules subulate, 1.5 mm. long; leaves membranaceous, on slender petioles 3-13 mm. long, lance-ovate or lanceolate, 3-5.5 cm. long, 1-2 cm. wide, acuminate or attenuate-acuminate, rather narrowly rounded at the base, pale

beneath, with about 6 pairs of lateral nerves; flowers axillary, usually 1 pistillate and 2-3 staminate in each axil, the staminate pedicels 5-7 mm. long, capillary; sepals 5, scarcely 1 mm. long; stamens 5, the anthers vertically dehiscent; pistillate pedicels capillary, 2-3 cm. long, the 5 sepals broadly ovate, subacute, 1-1.3 mm. long, pale-marginate; styles 3, united at the base, 2-parted; capsule 3-celled, glabrous, 3 mm. broad; seeds brownish, curved, 1.8 mm. long, verrucose in about 5 lines.

**Phyllanthus carolinensis** Walt. Fl. Carol. 228. 1788.

Moist or wet fields or thickets, often on open banks or on sand-bars along streams, frequently in cultivated ground, 1,500 meters or less; Petén; Alta Verapaz; Jutiapa; Santa Rosa; Escuintla; Guatemala; Suchitupéquez; Retalhuleu; San Marcos. Southeastern United States; Mexico; British Honduras to Panama; West Indies; northern South America.

Plants annual, erect, 30 cm. high or less, very slender, soft-stemmed, glabrous, rather densely branched from above the base, the branches terete, erect or ascending, densely or rather sparsely leafy; stipules triangular-lanceolate, usually with 1-2 coarse teeth; leaves on petioles 1 mm. long or less, membranaceous, narrowly to broadly obovate, mostly 1-1.5 cm. long and 2-8 mm. wide, sometimes somewhat larger, obtuse or rounded at the apex, cuneate at the base, pale green and usually somewhat glaucous beneath; flowers mostly geminate in the leaf axils, 1 staminate, the other pistillate, the pedicels short, scarcely exceeding the calyx; fruiting calyx 3 mm. broad, persistent, the sepals linear-obovate; ovary smooth; capsule 2 mm. broad, depressed-globose; seeds dark brown, punctulate-scaberulous.

The Maya name in Yucatan is recorded as "cababesinixte."

**Phyllanthus compressus** HBK. Nov. Gen. & Sp. 2: 109. 1817.

Grassy open places or in wet fields, 200-1,000 meters; Zacapa; Jutiapa; Alta Verapaz; reported from Escuintla. Southern Mexico; British Honduras; reported from Peru, and perhaps elsewhere in South America.

Plants annual, rather stiffly erect, mostly 30 cm. high or less, branched from above the base or sometimes simple, the branches erect or strongly ascending, the older ones brownish, the younger ones strongly compressed and 2-edged; stipules cordate at the base and usually produced on one side below the point of insertion; leaves almost sessile, oblong-elliptic or oblong-obovate, mostly 6-14 mm. long, very obtuse or rounded at the apex, acute or obtuse at the base, slightly paler beneath, the lateral nerves inconspicuous; flowers monoecious, on very short pedicels, often subsessile, the pedicels aggregate; calyx 2 mm. broad, the sepals broad, obtuse; capsule 3 mm. broad, 3-celled; seeds brown, very minutely punctulate-scaberulous.

**Phyllanthus diffusus** Klotzsch in Seem. Bot. Voy. Herald 105. 1857.

About pools in forest or in marshes, often in shallow water, at or near sea level; British Honduras; Honduras; Panama; West Indies; tropical South America.

Plants essentially annual but perhaps sometimes more enduring, erect, 50 cm. high or less, the main stem thickened and somewhat fistulose at the base, branched above, the branches very slender, terete, ascending or somewhat spreading, glabrous throughout; stipules small, subulate, scarcely broadened at the base; leaves almost sessile, oblong to obovate or elliptic-oblong, mostly 3–6 mm. long and 2–3 mm. wide, rounded or obtuse at each end, pale green or glaucescent, the lateral nerves inconspicuous; flowers monoecious, solitary or binate in the leaf axils, on very short pedicels; staminate sepals 5–6, ovate or obovate; stamens 3, the filaments connate; pistillate sepals 6, oblong or obovate, green, obtuse or subacute; ovary smooth, the styles short, 2-cleft; capsule 2–3 mm. broad, depressed-globose; seeds brown, with 5–6 obscure dorsal lines and numerous transverse ones on the dorsal surface.

**Phyllanthus ferax** Standl. Field Mus. Bot. 11: 134. 1932.

Moist or dry, rocky, brushy places, on limestone, 300 meters or less; Petén (type from Uaxactún, *H. H. Bartlett* 12157). Yucatan; British Honduras.

A slender glabrous shrub a meter high or less, rather densely branched almost throughout, the branches ferruginous, flexuous, wiry, hard, rather stiffly ascending, abundantly leafy; stipules attenuate from an ovate base; leaves almost sessile, membranaceous, obovate-elliptic or oblong-elliptic, 1.5–3 cm. long, 8–15 mm. wide, rounded at the apex, acute at the base, glaucescent beneath, the lateral nerves inconspicuous; flowers monoecious, solitary or geminate, the pedicels 3 mm. long or less; staminate sepals 6, oblong, obtuse, 1.5 mm. long; pistillate sepals 6, broadly obovate, green, obtuse or rounded at the apex; capsule 3-celled, depressed-globose, 3–3.5 mm. broad; seeds dark brown, smooth, dull.

*Phyllanthus Galeottianus* Baill. was reported from Huehuetenango by Loesener on the basis of *Seler* 2161 and 3000 from Chaculá, the determination by John Donnell Smith. The collections probably are referable to one of the species listed here, but it is possible that they do represent the Mexican *P. Galeottianus*.

**Phyllanthus glaucescens** HBK. Nov. Gen. & Sp. 2: 115. 1817. *P. laxiflorus* Benth. Pl. Hartweg. 89. 1842 (type from "Monte Pineda" near Guatemala, *Hartweg* 612). *Manzana de ratón*.

Moist thickets or mixed forest, 900–2,000 meters; reported from Alta Verapaz; Jutiapa; Santa Rosa; Guatemala; Sacatepéquez; Huehuetenango. Mexico; Salvador.

A glabrous shrub, generally 1.5–3 meters high, sometimes a tree of 9 meters, the branches stout, ferruginous, subterete or somewhat angulate; stipules linear-lanceolate from an ovate base, long-acuminate; leaves on petioles 8–10 mm. long, rounded-elliptic to oblong-elliptic, mostly 9–20 cm. long and 5–11 cm. wide, obtuse to acuminate, usually rounded at the base, deep green above, glaucous beneath, with conspicuous nerves and veins, the areolae densely and minutely venulose; flowers small, pale green, laxly paniculate, monoecious, very numerous, on pedicels 5–10 mm. long; staminate flowers scarcely 2 mm. long; stamens united to form a column, the anthers connate; staminate sepals oblong-elliptic, penninerved, 2.5–4 mm. long, obtuse; styles connate only at the base; capsule 3-celled, depressed-globose, about 5 cm. broad, green, with a thick fleshy pericarp when fresh, this becoming hard when dry; seeds ovoid, brown, 1 cm. long, smooth, pointed at one end, broadly rounded at the other, the raphe 5 mm. long.

The Maya name in Yucatan and British Honduras is “pixtón”; “monkey rattle” (British Honduras). The shrub is rather common in the central region, especially about Antigua. The fruits are very different from those of most plants of the family, somewhat suggestive of a small green apple, and one seeing them for the first time, detached from the plant, is likely to have difficulty in determining their relationship.

*Phyllanthus grandifolius* L. is reported from Pansamalá, Alta Verapaz, on the basis of *Tuerckheim* 1085. We have not seen material of this species from continental North America, and the true determination of the plant is uncertain.

***Phyllanthus lathyroides* HBK.** Nov. Gen. & Sp. 2: 110. 1817. *Sarín de suelo* (fide Aguilar).

Moist or wet thickets or mixed forest, often on open banks, frequently a weed in waste ground, especially in cafetales, 500–1,700 meters; Alta Verapaz; Zacapa; Chiquimula; Santa Rosa; Escuintla; Guatemala; Sacatepéquez; Chimaltenango; Suchitepéquez; Retalhuleu; Quezaltenango. Mexico; Salvador to Panama; West Indies; tropical South America.

A slender annual, usually erect, 50 cm. high or less, glabrous, branched above and sometimes from the base, the branches short, spreading, weak, terete or nearly so; stipules linear-lanceolate; leaves almost sessile, distichous, oblong or oblong-elliptic, mostly 6–14 mm. long and 2.5–6 mm. wide, rounded and obscurely apiculate at the apex, oblique and often subcordate at the base, pale green, glaucescent beneath, the 5–6 pairs of lateral nerves rather conspicuous beneath; flowers monoecious, the pistillate solitary, the staminate solitary or binate, the pedicels 5 mm. long or usually much shorter; staminate sepals 5, broadly ovate, obtuse; stamens 3, connate below; pistillate sepals 5, oblong-obovate, somewhat venose; ovary smooth, the 3 styles 2-cleft; capsule 3 mm. broad, depressed-globose, 3-celled; seeds puncticulate-scabrous, the minute projections in numerous longitudinal rows.

A curious and conspicuous but probably unimportant form of this species is the following: **Phyllanthus lathyroides** f. **decoratus** Standl. & Steyererm. (forma nova. A forma typica speciei non nisi sepalis purpureis differt. Type, *Juvenal Valerio Rodríguez* 3576 from Zamorano, Dept. Morazán, Honduras, in Herb. Chicago Nat. Hist. Mus.). Apparently this is a local form, for search in the herbarium has revealed only two other collections, one collected in Chiquimula (pine forest, Socorro Mountain, *Steyermark* 30979), and one from Siguatepeque, Honduras (*T. G. Yuncker* 5556). The purple-red sepals must be conspicuous in the living plants, which ordinarily are of a pale green throughout.

**Phyllanthus longipes** Steyermark in Standl. Field Mus. Bot. 22: 153. 1940.

Known only from the type, on hillside, El Cayo District, British Honduras, *P. H. Gentle* 2619.

A glabrous tree, the trunk 12 cm. in diameter, the branches slender; leaves on petioles 2.5–4 mm. long, chartaceous, oblong-elliptic or oblong-ovate, 4–8 cm. long, 1–3.5 cm. wide, acuminate with an obtuse tip, acute at the base, glaucescent beneath, the lateral nerves about 8 pairs; flowers apparently dioecious; pistillate flowers axillary, fasciculate, the pedicels filiform, 4.5–5 cm. long; capsule 3-celled, castaneous, smooth, 5 mm. long and broad, deeply emarginate; seeds castaneous, smooth, 4 mm. long.

Noteworthy for the deeply emarginate capsule whose cocci are definitely sulcate longitudinally.

**Phyllanthus micrandrus** Muell. Arg. *Linnaea* 32: 27. 1863. *Chabin-té* (Huehuetenango).

Moist or dry thickets or open forest, often in pine-oak forest, 1,700 meters or less; Petén; Jalapa; Jutiapa; Chimaltenango; Suchitupéquez; Retalhuleu; Huehuetenango; Quezaltenango. Mexico; Venezuela.

A branched shrub 1–2 meters high, glabrous throughout or nearly so, the branches slender, terete, grayish or brownish, the young ones often somewhat angulate; stipules triangular-ovate; leaves membranaceous or somewhat thicker, on petioles 2–3 mm. long, orbicular to rounded-elliptic or ovate-orbicular, mostly 1.5–3 cm. long and 2–3 cm. wide, rounded at the apex or subemarginate, apiculate, rounded or very obtuse at the base; flowers monoecious, fasciculate in the leaf axils, the pedicels capillary, the pistillate ones thickened at the apex; calyx green, 2 mm. long, the sepals oblong-elliptic, obtuse; anthers free; styles short, 2-parted; capsule subglobose, 3 mm. long; seeds 2 mm. long, fuscous, minutely and densely punctulate.

Some of the Guatemalan collections are noteworthy in having the leaves pubescent beneath, and the branches and pedicels also



may be pubescent. Possibly more than a single species is represented by the specimens.

**Phyllanthus minarum** Standl. & Steyerem. Field Mus. Bot. 23: 125. 1944.

Known only from the type, El Progreso, Sierra de las Minas, hills between Finca Piamonte and slopes southeast of the finca, 2,400–2,500 meters, *Steyermark* 43385.

A shrub 1.5–2.5 meters high, the older branches terete, ochraceous, roughened by the persistent indurate stipules, about 12 mm. thick, bearing numerous very large scars left by leaves and branches, the young branches with their numerous leaves simulating a large pinnate leaf, only 2–3 mm. thick, white-villosulous; stipules more or less persistent, ferruginous, in age indurate, at first often reflexed, ovate-triangular or lance-triangular, as much as 8 mm. long, acuminate, subcordate at the base; lowest leaves suborbicular or rounded-deltoid and 1.5–3 cm. long, the principal leaves oblong-ovate or deltoid-oblong, 4.5–7 cm. long, 3 cm. wide, obtuse or subacute at the apex and conspicuously cucullate, broadly rounded at the base or the lowest leaves subcordate, membranaceous, on very short petioles, green above, puberulent on the nerves, pale beneath, densely pilose with hyaline hairs; flowers probably dioecious, the staminate pedicels capillary, flexuous, 2–2.5 cm. long, mostly solitary in the leaf axils, densely pilose; sepals 6, very unequal, the inner ones 5.5 mm. long, oblong-oval, very obtuse, the outer ones 3.5 mm. long, elliptic or ovate, subacute; glands free, about equaling the stamen column, broadly ovate; stamens 3, the filaments connate into a short column, the anthers short, coherent.

The cucullate leaf apices in this plant are curious, but it is uncertain whether they constitute a natural character or are an abnormality.

**Phyllanthus Niruri** L. Sp. Pl. 981. 1753. *Moco coquillo* (fide Aguilar).

Moist or wet thickets or fields, sometimes on open or rocky banks, in cultivated ground, or rarely in forest, 1,600 meters or less, mostly at very low elevations; Alta Verapaz; Izabal; Santa Rosa; Escuintla; San Marcos. Mexico; British Honduras to Salvador and Panama; West Indies; tropical South America; Old World tropics.

A slender glabrous annual 50 cm. high or less, usually erect, generally branched, the branches weak and spreading or even somewhat pendent, terete or obscurely angulate; leaves almost sessile, oblong or obovate-oblong, mostly 6–15 mm. long and 2–6 mm. wide, rounded at each end, membranaceous, the lateral nerves obscure; stipules subulate, with a broad triangular base; flowers monoecious, greenish white, solitary, or one of each sex in the same axil, on very short pedicels; staminate sepals 5–6, ovate or obovate; glands of the disk 5–6, small; stamens 3, the filaments connate; pistillate pedicels 1–2 mm. long, the 6 sepals oblong; ovary smooth;

capsule 1.5–2 mm. in diameter, depressed-globose, 3-sulcate; seeds with 5–6 very fine and inconspicuous longitudinal lines on the dorsal surface.

Both this and *P. lathyroides* are common weeds through most of the lowlands of Central America, at least in moist or wet regions. They are inconspicuous plants and seldom noticed.

**Phyllanthus nobilis** (L. f.) Muell. Arg. in DC. Prodr. 15, pt. 2: 414. 1866. *Margaritaria nobilis* L. f. Suppl. Pl. 4298. 1781. *Cicca antillana* Juss. Euphorb. Tent. pl. 4, f. 13B. 1824. *P. nobilis* var. *antillanus* Muell. Arg. op. cit. 415. *P. nobilis* var. *hypomalacus* Standl. Carnegie Inst. Wash. Publ. 461: 68. 1935. *Mapahuite* (Huehuetenango; probably an erroneous name).

Moist or dry thickets or thin forest, on plains or hillsides, often in second growth, 900 meters or lower; Petén; Alta Verapaz; Chiquimula; Jutiapa; Escuintla; Suchitepéquez; Sololá; Huehuetenango; probably in all the Pacific coast departments. Mexico; British Honduras to Salvador and Panama; West Indies; tropical South America.

A shrub or small tree, sometimes as much as 15 meters high but usually 7 meters or less, the trunk slender, often crooked, as much as 15 cm. in diameter, the crown small and narrow, the bark dark brown, thin, the inner bark deep pink, the slender branches glabrous or pilosulous; leaves on very short petioles, membranaceous, elliptic or lance-elliptic, mostly 6–13 cm. long and 2.5–5 cm. wide, acuminate or cuspidate-acuminate, acute or subacute at the base, mostly glabrous, sometimes puberulent or pilose beneath, green or glaucescent beneath; flowers dioecious, greenish white, the staminate fasciculate along a short peduncle, the pistillate solitary or 2–4-nate in the leaf axils; staminate pedicels slender, 3–5 mm. long, the 4 sepals 2-seriate, rounded or elliptic; stamens 4, the filaments free; pistillate pedicels rather stout, 10–15 mm. long; sepals 4; ovary usually 4-celled, the styles thick, united below, shortly 2-cleft; capsule about 1 cm. in diameter, green, subglobose, the pericarp at first fleshy, in age dry and dehiscent; seeds mostly 4, complanate, trigonous, olivaceous, 3 mm. long.

Called “clawberry” and “ramón macho” in British Honduras; “nistamal” (Salvador); “icinche” (British Honduras, Maya); “xnabalche” (Yucatan, Maya). This is a common weedy shrub in many parts of the Guatemalan lowlands and elsewhere in Central America. The plants are leafless during the dry season. The sapwood is pale yellow, the heartwood brownish, darkening upon exposure, sometimes with a pinkish tinge or almost black. It is little used unless for firewood and minor construction purposes. In the typical form the leaves are glabrous; in var. *hypomalacus* they are sparsely or densely pubescent beneath. The variety is widely distributed with the typical form, and probably is of only minor im-

portance. The fresh seeds are somewhat fleshy and colored dark blue.

**Phyllanthus Purpusii** Brandeg. Univ. Calif. Publ. Bot. 6: 55. 1914.

Steep brushy slopes or in moist mixed forest, 2,100–2,700 meters; Sololá; Suchitepéquez; San Marcos. Chiapas, the type from Cerro del Boquerón.

An erect stout shrub 1.5–3.5 meters high, the main trunk simple or with a few stout branches 1 cm. thick or more, bearing at the apex crowded slender leafy branches that resemble pinnate leaves and are deciduous like leaves, the main stems roughened by the large persistent indurate stipules, the young branches subterete, minutely puberulent, often reddish; leaves crowded and very numerous, almost sessile, oblong-lanceolate, 2–7.5 cm. long, 8–22 mm. wide, long-acuminate or attenuate to a very acute tip, somewhat oblique at the base and rounded or very obtuse, glabrous, membranaceous, usually glaucous beneath; stipules lanceolate, longer than the petioles, often reflexed; flowers probably dioecious, the staminate pedicels 4–6 mm. long, the sepals unequal, the larger ones lanceolate, 5 mm. long, the smaller ones less than half as long; filaments united, the anthers coherent; pistillate pedicels about 2 cm. long, the sepals lanceolate or lance-ovate, as much as 5 mm. long; styles connate only at the base, short-bifid; capsule subglobose, 3-celled, shallowly sulcate, 5 mm. in diameter, smooth; seeds brown, minutely rugulose.

This shrub is common on Volcán de Santa Clara (Suchitepéquez), mostly at about 2,400 meters.

**Phyllanthus Urinaria** L. Sp. Pl. 982. 1753.

Moist thickets or wet fields, at or near sea level; Izabal; perhaps introduced in Central America. British Honduras; Atlantic coast of Honduras; northern South America; Old World tropics.

Plants annual, erect or nearly so, glabrous, 50 cm. high or less, often much-branched, the lateral branches short, rather weak, spreading or ascending, terete, sometimes minutely hispidulous; leaves almost sessile, oblong, 5–18 mm. long, 2–4 mm. wide, rounded to acute and mucronulate at the apex, rounded at the base, membranaceous, glaucescent beneath, minutely ciliolate, the lateral nerves 5–6 pairs, prominent beneath; stipules broad, auriculate, acuminate; flowers monoecious, solitary, subsessile, the pistillate on the lower part of the branchlet, the staminate above; staminate flowers very small, the 6 sepals obovate-elliptic, green; stamens 3, the filaments connate; pistillate sepals 6, oblong, white-marginate, persistent and reflexed in fruit; ovary densely and minutely verruculose, the short styles 2-fid; capsule 2 mm. in diameter, depressed-globose; seeds conspicuously transverse-rugose.

## PLUKENETIA L.

*Reference:* F. Pax, Pflanzenreich IV. 147, ix: 12–17. 1919.

Woody vines; leaves alternate, petiolate, 2-stipulate, 3-nerved or penninerved; flowers monoecious, apetalous, the inflorescences spike-like, with 1-2 pistillate flowers at the base, the upper flowers staminate, the staminate bracts subtending a few-flowered branchlet; staminate calyx in bud globose, in anthesis valvately 4-parted; stamens 12-30, inserted on a conic receptacle, the filaments free, rather stout, the anthers terminal, sometimes more or less cruciately 4-celled; glands of the staminal disk few and minute or none; sepals 4, small; ovary 4-celled, 4-winged, the styles connate into an elongate column; stigmas short, entire or 2-lobate; ovules solitary in each cell; capsule large or medium-sized, dehiscent, the cocci carinate or appendaged; seeds lentiform or globose, not carunculate; cotyledons ovate, 3-nerved at the base.

About 7 species, in tropical America. One other is known from southern Central America (Panama).

**Plukenetia penninervia** Muell. Arg. *Linnaea* 34: 158. 1865.  
*P. angustifolia* Standl. *Field Mus. Bot.* 4: 314. 1929 (type from Lancetilla Valley near Tela, Honduras).

Moist or wet thickets, often in open pine forest, 350 meters or less; Alta Verapaz; Izabal; Retalhuleu. Southern Mexico; British Honduras; Honduras; Venezuela.

A small woody vine, twining, sparsely puberulent on the younger parts but in age glabrous or nearly so outside the inflorescence; leaves on petioles about 1 cm. long, chartaceous or almost coriaceous, often very lustrous, oblong-elliptic to lance-oblong, acuminate or cuspidate-acuminate, rounded to broadly cuneate at the base, with 2 conspicuous glands on the upper surface at the base, penninerved, denticulate or almost entire; racemes sessile, short, few-flowered, hispidulous, the flowers very small, green; stamens 30 or fewer; capsule depressed-globose, deeply 4-lobate, 1-1.5 cm. broad, green, glabrous, the cocci carinate dorsally and obtusely tuberculate at about the middle, the style persistent, thick, 1.5 mm. long.

The Central American material exhibits some variation, but not more than might be expected within a species. It is possible that when more South American material is available for comparison, *P. angustifolia* may be found tenable, since at present it seems to be isolated geographically from *P. penninervia*, but so far as can be determined at present, the two names are synonymous.

### RICINUS L. Castor bean

Tall annuals, herbaceous or becoming somewhat woody, often persisting for more than a single season, glabrous; leaves alternate, long-petiolate, peltate, palmately lobate, the lobes dentate; stipules large, united, covering the buds; flowers monoecious, apetalous, in paniculate racemes at the ends of the branches, the lower flowers staminate, the upper ones pistillate, short-pedicellate; disk none; staminate calyx globose in bud, 3-5-valvate in anthesis; stamens numerous, the filaments repeatedly branched; anther cells subglobose, divaricate, attached

separately to the connective; pistillate calyx spathaceously cleft, caducous; ovary 3-celled, the style spreading, generally 2-cleft; ovules 1 in each cell; capsule splitting into 3 bivalvate cocci, usually echinate, sometimes smooth; seeds large, carunculate; endosperm carnose.

The genus consists of a single species.

**Ricinus communis** L. Sp. Pl. 1007. 1753. *Higuerillo*; *Higuerillo blanco*; *Higuerillo rojo*; *Aceite* (Cobán); *Ixcoch* (Petén, Maya); *Raxten* (Quiché).

Planted commonly and also thoroughly established and often abundant in thickets on plains and hillsides, often in open places, hedges, or about cultivated ground, sometimes plentiful along streams; found from the coasts up to the limit of cultivation, but most plentiful at low elevations; native of the Old World tropics, perhaps of Africa, but now found in all tropical regions; Petén; Alta Verapaz; Izabal; El Progreso; Zacapa; Chiquimula; Jutiapa; Santa Rosa; Escuintla; Guatemala; Suchitepéquez; Retalhuleu; Quezaltenango; San Marcos; Huehuetenango; doubtless found in all the departments.

A coarse stout erect herb or often tree-like and as much as 6 meters high, with a thick trunk, the plants pale and glaucous or often tinged with red or purple; petioles often equaling or exceeding the leaf blades; blades almost orbicular in outline, 10–60 cm. broad, deeply palmate-lobate, the lobes ovate-oblong or lanceolate, acute or acuminate, irregularly glandular-dentate; staminate calyx 6–12 mm. long, the pistillate ones 4–8 mm. long; ovary densely fleshy-tuberculate; capsule 1.5–2.5 cm. long, oval, densely echinate; seeds ellipsoid, somewhat compressed, 10–17 mm. long, smooth, mottled and highly variable in color, or entirely black, conspicuously carunculate.

The Maya name in Yucatan is “coch” or “xcoch.” In Guatemala, as well as elsewhere in Central America, there are recognized two common varieties, the *blanco* and the *rojo*, *colorado*, *negro*, or *morado*. In the former the stems and leaves are rather pale green, in the latter brilliantly tinged with red or purple. On Volcán de Tajumulco two types are found: the large black-seeded kind is used for lubricating oil for machinery, while the smaller, mottled light and dark brown variety is used for medicinal castor oil.

Occasional plants are dark red or dark purple throughout, and consequently very conspicuous. The two forms sometimes grow together, but often one or the other prevails in a region. The plant is important economically as the source of castor oil—“*aceite de ricino*,” “*aceite de castor*,” or “*aceite de palma-Cristi*,” and it is grown on a small scale in Guatemala on this account. Some castor oil is imported into Guatemala, but much is extracted locally in

hand presses, especially at Antigua. Its best-known use is as a purgative medicine, but it is highly esteemed as a lubricant, in soap manufacture, in dyeing and printing cotton goods, and for dressing tanned hides. In India and China silkworms are fed on the leaves. The stems have been utilized for paper making, and the ground seeds from which the oil has been separated are a valuable fertilizer. In Guatemala the oil is sometimes used for illumination, especially in churches. It is placed on food exposed for the purpose of poisoning cockroaches. It is applied by veterinarians to wounds in stock, and employed also to give luster to the hair of people. The leaves moistened with vinegar are applied as poultices to relieve headache, and the oil mixed with turpentine is sometimes administered to expel tapeworms.

### SAPIUM P. Browne

*Reference:* F. Pax, Pflanzenreich IV. 147, v: 199-258. 1912.

Large trees or shrubs, glabrous, with copious white latex; leaves alternate, petiolate, entire or serrate, often glandular, the apex often glandular and with a cucullate inflexed tip, the petiole or the base of the blade usually bearing 2-4 large glands; flowers spicate, monoecious, the spikes terminal, staminate or with pistillate flowers only at the base, the bracts usually with glands on each side of the base; flowers apetalous, the disk wanting; staminate calyx usually 2-fid; ovary generally 3-celled, the cells 1-ovulate; styles free or connate at the base; fruit capsular, globose, pyriform, or trigonous; seeds subglobose, not carunculate.

About 100 species, in tropical regions of both hemispheres. A substantial number of other species is found in southern Central America. Some of the South American species are or have been of some commercial importance as a source of rubber. The woods are light and soft to moderately so, whitish or yellowish, staining readily, easy to work, sawing woolly; they are suitable for packing boxes, interior construction, and paper pulp. The available Guatemalan material of this genus is insufficient and unsatisfactory for study. The species are difficult of separation, being distinguished by minor characters whose value is questionable. It is probable that the number of recognized species is greater than the facts warrant. Until much ampler and better material has been collected, it will be impossible to decide just how many are represented in Central America. The names "chilicuate," "amate de hule," and "cuxchon-que" are reported from Guatemala for trees of this genus whose specific identity is uncertain.

Tip of the leaf blade strongly recurved against the upper surface of the blade.

*S. Schippii.*

Tip of the leaf blade flat, not recurved.

Petioles short, only 5–8 mm. long . . . . . *S. Tuerckheimianum*.

Petioles elongate, mostly 2–3 cm. long or often much longer.

Principal lateral nerves of the leaves mostly 6–10 pairs, remote . . . *S. nitidum*.

Principal lateral nerves of the leaves usually much more numerous and close together.

Lateral nerves of the leaves divergent at an acute angle, or at least strongly ascending; spikes mostly or all lateral . . . . . *S. lateriflorum*.

Lateral nerves of the leaves divergent at almost a right angle; spikes, at least the fertile ones, terminal . . . . . *S. macrocarpum*.

***Sapium lateriflorum* Hemsl. in Hook. Icon. sub pl. 2680. 1901.**

*Chilamate.*

Wet to dry forest, often along stream banks, 1,300 meters or less; Alta Verapaz; Jutiapa; Escuintla; Guatemala; Huehuetenango. Southern Mexico.

A small or large tree, often 15 meters high or more, glabrous throughout, the bark grayish or whitish, the crown spreading, dense, the branches thick, subterete; leaves on petioles 1.5–4 cm. long, the petiole bearing at the apex 2 small conic glands; leaf blades oblanceolate-oblong or elliptic-oblong, mostly 10–20 cm. long and 4–8 cm. wide, on fruiting branches often smaller, obtuse or acute at the apex, the tip flat or nearly so and obtuse, cuneate or obtuse at the base, coriaceous or subcoriaceous, often lustrous, obscurely denticulate or subentire, the lateral nerves usually 11–17, slightly curved, divergent or ascending at an angle of little more than 45 degrees; stipules auriculiform, very small, persistent; flowers dioecious, the staminate spikes slender, 7–9 cm. long, naked at the base, the bracts small, reniform-ovate, denticulate, with a peltate gland on each side at the base, 5–9-flowered; stamens 2, exserted; pistillate spikes axillary or sometimes perhaps terminal, rather few-flowered; capsule borne on a stout pedicel 8 mm. long or shorter, about 1.5 cm. long, very thick and hard; seeds 6–7 mm. long.

In Oaxaca called “palo de la flecha,” probably because the sap was used for poisoning arrows; “amatillo” (Veracruz). This perhaps is the species that has been reported from Guatemala as *S. biglandulosum* var. *Klotzschianum* Muell. Arg. All the local species are much alike, doubtless have the same properties, and no distinction between them is made by the people. All are commonly called “chilamate.” In Guatemala, Salvador, and Honduras the trees have the reputation of being highly poisonous, the copious milky latex causing blisters and inflammation upon the skin. On this account they often are left when land is cleared. In Panama, on the other hand, boys sometimes collect and coagulate the latex, then chew it to prepare bird lime. It is possible that different species differ in their poisonous properties. In the Oriente of Guatemala the latex is used as a barbascos or fish poison.

**Sapium macrocarpum** Muell. Arg. *Linnaea* 32: 119. 1863. *S. mexicanum* Hemsl. in Hook. *Icon. pl.* 2680. 1901. *Matapalo* (probably an erroneous name); *Chilamate*; *Higuerillo*.

Wet to dry forest, often in open fields, frequent along streams, 1,500 meters or less, most common at low elevations; Alta Verapaz; Jutiapa; Santa Rosa; Escuintla; Sacatepéquez; Sololá; San Marcos. Southern Mexico; Salvador.

A small to large, glabrous tree, sometimes 25 meters high, the branches thick, often brown or brownish; petioles mostly 2.5–3 cm. long, sometimes longer, bearing at or near the apex 2 thick subglobose glands; leaf blades oblong-lanceolate or oblong, mostly 10–20 cm. long and 3–6 cm. wide but often larger, obtuse or abruptly acute at the apex, the tip flat, eglandular, obtuse, cuneate or rounded at the base, minutely callous-denticulate, subcoriaceous or coriaceous, the lateral nerves very numerous, divaricate at almost a right angle, curved toward the margin of the blade; stipules scale-like, persistent, small; spikes commonly terminal and solitary, 10–14 cm. long, androgynous, bearing 3–4 pistillate flowers at the base; bracts small, very broadly ovate, entire, with an oval gland at the base on each side, the staminate bracts 9–12-flowered; staminate calyx 2-lobate, the pistillate 3-parted; stamens 2; capsule on a very short pedicel, subglobose, ligneous, when opened 3.5 cm. broad; seeds ovoid, acute, almost 1 cm. long, the aril bright red.

**Sapium nitidum** (Monachino) Lundell, *Amer. Midl. Nat.* 29: 477. 1943. *S. biglandulosum* var. *nitidum* Monachino, *Bull. Torrey Club* 67: 771. 1940. *Palo de tuerto* (Huehuetenango); *Amate* (Huehuetenango, probably an erroneous name).

Moist or wet forest, sometimes in swampy places, 1,700 meters or less; Petén; Izabal; Sololá; Huehuetenango. British Honduras (type from Santa Rosa pasture near El Cayo, *J. B. Kinloch* 340); Atlantic coast of Honduras.

A tree 9–18 meters high, glabrous throughout, the bark thick, light gray, smooth or nearly so, the branches slender or stout, the older ones brown; stipules small, ovate to oblong, persistent; petioles mostly 1.5–3.5 cm. long, bearing 2 short but conspicuous glands at or near the apex; leaf blades obovate to oblong or elliptic-oblong, mostly 8–18 cm. long, obtuse or subacute, the tip flat, obtuse, acute to rounded at the base, obscurely denticulate or practically entire, chartaceous or subcoriaceous, usually lustrous, the lateral nerves remote, commonly 6–10 pairs, arcuate and ascending; spikes terminal, solitary, the staminate slender, as much as 15 cm. long; pistillate spikes many-flowered, short, producing numerous capsules; capsules borne on short thick pedicels, about 8 mm. in diameter, hard and ligneous, 2–3-celled; seeds 6 mm. long and broad, the aril red.

This has been reported from British Honduras as *S. jamaicense* Swartz, a species of doubtful occurrence in northern Central America. Called “leche María” in British Honduras.



**Sapium Schippii** Croizat in Lundell, Amer. Midl. Nat. 29: 477. 1943.

Known only from the type, Forest Home, Toledo District, British Honduras, near sea level, *W. A. Schipp* 1049.

A tree of 18 meters, the trunk 45 cm. in diameter; petioles slender, 2-4 cm. long, bearing at the apex 2 stout-pedicellate, very conspicuous glands; leaf blades elliptic or elliptic-oblong, 6-11 cm. long, 2-4.5 cm. wide, rounded or very obtuse at the base, rounded and abruptly tipped at the apex, the tip bearing a conspicuous gland, recurved upon the upper surface of the blade, subentire, the lateral nerves about 15 pairs, arcuate, divergent at a broad angle; capsule subglobose, ligneous, 9 mm. long, borne on a stout pedicel 6-8 mm. long; seeds 7 mm. long, 5 mm. broad, surrounded by a red aril.

**Sapium Tuerckheimianum** Pax & Hoffm. Pflanzenreich IV. 147, xiv: 61. 1919.

Known only from the type, Cubilgüitz, Alta Verapaz, 350 meters, *Tuerckheim* II.941.

A glabrous tree with slender branches; petioles short, 5-8 mm. long, eglandular; leaf blades lanceolate or oblanceolate, 8-11 cm. long, 2.5-3.5 cm. wide, caudate-acuminate, with a flat tip, cuneate-acute at the base and bearing at the very base on the upper surface 2 patelliform glands, subcoriaceous, entire or obscurely denticulate, the lateral nerves about 15 pairs, curved, ascending at an angle of about 45 degrees; stipules very small, deltoid-auriculiform, caducous; flowers dioecious, the staminate spikes axillary, 4 cm. long, the bracts small, reniform-ovate, acute, with an oblong gland at the base on each side, 5-9-flowered; staminate calyx shallowly 2-lobate; stamens 2 or rarely 3.

We have seen no material of this species.

### SEBASTIANA Sprengel

*Reference:* F. Pax, Pflanzenreich IV. 147, v: 88-153. 1912.

Mostly shrubs or trees; leaves alternate, short-petiolate, often more or less coriaceous, penninerved, serrulate or rarely entire, the stipules small; flowers generally monoecious, apetalous, spicate, the spikes slender, terminal on leafy branchlets or opposite the leaves, rarely axillary, the bracts 2-glandular at the base; disk none; staminate flowers very small, several or solitary within the bracts, sessile or subsessile; calyx small, open before anthesis, usually 3-lobate or 3-parted; stamens commonly 3, the filaments free or connate at the base, the anthers longitudinally dehiscent; pistillate flowers few or solitary at the base of the spike or few in distinct spikes; sepals 3, the ovary usually 3-celled, the styles spreading or revolute, simple, free or rarely connate; ovules solitary in each cell; capsule tridymous or subglobose, smooth or tuberculate, the 2-valvate cocci separating from a central columella; endocarp crustaceous; seeds globose to oblong or cylindric, carunculate, smooth; endosperm carnose, the cotyledons broad, flat.

Species about 75, mostly in Brazil, 3 in the Old World tropics. One other Central American species, a small annual, occurs in Panama.

Bracts of the staminate flowers short-stipitate; lowest teeth of the leaves not glandular.....*S. adenophora*.

Bracts of the staminate flowers closely sessile; lowest teeth of the leaves glandular.

Staminate flowers usually 3 in each bract, the stamens 2-3; capsule generally not more than 6 mm. long and 10 mm. broad; leaves acuminate or narrow-acuminate.....*S. confusa*.

Staminate flowers usually 6-9 in each bract, the stamens 2-6; capsule generally 8-11 mm. long and 10-13 mm. broad; leaves narrowly long-caudate.

*S. longicuspis*.

**Sebastiania adenophora** Pax & Hoffm. Pflanzenreich IV. 147, v: 145. 1912.

Moist or dry forest, at or little above sea level; British Honduras; Yucatan Peninsula of Mexico.

A glabrous tree 5-7 meters high, the trunk 10 cm. or less in diameter; leaves on petioles 3-8 mm. long, chartaceous, oblong-ovate to elliptic-oblong, 4-8 cm. long, 1.5-3 cm. wide, acuminate, obtuse or rounded at the base, this 2-glandular and revolute, the margin finely serrulate; flower spikes terminal on short leafy shoots, bisexual or unisexual, 3-5.5 cm. long, or the pistillate ones shorter, the bisexual ones with 1-3 pistillate flowers at the base; staminate flowers mostly 5 to each bract, the bracts short-stipitate, 2-glandular; sepals lanceolate or ovate; stamens mostly 2, sometimes as many as 5; capsule smooth, 5-6 mm. long, 6-7 mm. broad.

"Chechem blanco," "sacchechem," "canchunup" (Yucatan, Maya). All the local species of this genus are similar in general appearance and their supposedly distinctive characters remain to be confirmed. The milky latex is reported as highly poisonous in contact with the skin, causing irritation and eruption after the fashion of *Rhus radicans*.

**Sebastiania confusa** Lundell, Lloydia 2: 99. 1939.

Dry or moist forest, often on limestone 1,650 meters or less; Petén; Jalapa; Huehuetenango. Tabasco; British Honduras.

A glabrous shrub or tree 1-15 meters high with slender branches, the trunk 20 cm. or less in diameter; leaves firm-membranaceous, lustrous, on slender petioles 4-10 mm. long, lance-oblong to oblong-elliptic, 5-11 cm. long, 2-3.5 cm. wide, acuminate, usually abruptly so, rounded at the base, finely serrate, the basal teeth glandular, the lateral nerves 10-14 pairs; stipules small, ovate; flower spikes terminal on short leafy branchlets, unisexual or bisexual; staminate bracts sessile, broadly ovate, 2-glandular at the base, 3-flowered, the flowers short-pedicellate; sepals 3, ovate, erose; stamens usually 3; capsule smooth, 6 mm. long and 10 mm. broad or smaller; seeds globose, 3 mm. in diameter.

Called "white poison-wood" in British Honduras; "chitzén" (Tabasco). In this genus the heartwood is olive and variegated, the sapwood white; not very attractive, of medium density, fine-textured, easy to work, not highly durable.

**Sebastiania longicuspis** Standl. Field Mus. Bot. 11: 134. 1932. *S. Standleyana* Lundell, Lloydia 2: 97. 1939 (type collected near Vaca, British Honduras, *P. H. Gentle* 2544). *Chechén* (Izabal); *Chechem blanco*, *Icicheh* (Petén, Maya).

Wet or dry forest, on plains or hillsides, often in second growth, generally on limestone, 350 meters or less; Petén; Alta Verapaz; Izabal. British Honduras.

A shrub or a tree, sometimes 40 meters high with a trunk 45 cm. in diameter, glabrous, the trunk straight, the bark smooth, gray; leaves lustrous, membranaceous or chartaceous, on slender petioles 7–15 mm. long, narrowly oblong to oblanceolate-oblong, mostly 7–14 cm. long and 2.5–4 cm. wide, abruptly long-caudate, obtuse or subacute at the base, finely and irregularly serrulate, with glandular teeth near the base, the slender veins prominulous on both surfaces; flower spikes terminal on short leafy branchlets, mostly bisexual, with 1–2 pistillate flowers at the base; staminate flowers mostly 6–9 in each bract, the bracts sessile, lunate, erose, 2-glandular; calyx cupular, laciniate-dentate; stamens 2–6; capsule smooth, 8–11 mm. long, 10–13 mm. wide; seeds subglobose, 4 mm. long.

Known in British Honduras by the names "reventadillo," "white poison," "poison-wood," and "ridge white poison-wood." The specific name was discarded by Lundell (loc. cit.) but reduced to synonymy under *S. Standleyana*, because the type specimen consisted in part of undetermined detached fruits. The specific name, however, clearly pertains to the ample leaf material, whose identity is not questionable. There is no need for the superfluous second name for the tree, since there is no confusion as to its application.

### STILLINGIA Garden

*Reference:* F. Pax, Pflanzenreich IV. 147, v: 180–199. 1912.

Shrubs or perennial herbs, glabrous; leaves alternate or opposite, short-petiolate, glandular-serrate, often 2-glandular at the apex of the petiole, membranaceous to coriaceous, 2-stipulate; flowers monoecious, apetalous, in terminal or rarely axillary spikes, simple, the bracts small and broad, 2-glandular at the base; staminate flowers several or solitary within the bract, subsessile, the pistillate flowers solitary in the lowest bracts, or the spikes often wholly staminate; disk none; staminate calyx small, shallowly and broadly 2-lobate; stamens generally 2, the filaments free, exerted, the anther cells ovoid-globose, longitudinally dehiscent; pistillate calyx 3-parted or rudimentary or none; ovary 2–3-celled, the

style short-connate, undivided; ovules solitary in each cell; capsule usually tridymous, separating into 2-valvate cocci, the base of the pericarp persistent between the cocci, leaving a 3-radiate receptacle, the columella more or less winged, persistent after dehiscence of the capsule, sometimes rudimentary or none; seeds subglobose, carunculate, the testa crustaceous; endosperm carnose, the cotyledons broad, flat.

About 25 species, mostly in tropical America, a few in the Old World and in temperate North America. One other species has been described from Panama.

Leaves ovate, elliptic-ovate, or oblong-ovate, rounded at the base; large shrub or small tree . . . . . *S. cruenta*.

Leaves mostly lanceolate or oblong-lanceolate, generally acute at the base; low shrubs, mostly 1-1.5 meters high.

Leaves small, mostly 3 cm. long or less . . . . . *S. sanguinolenta*.

Leaves larger, mostly 5-10 cm. long.

Staminate bracts 1-flowered, the spikes very slender . . . . . *S. acutifolia*.

Staminate bracts several-flowered, the spikes stout and thick . . . *S. zelayensis*.

***Stillingia acutifolia*** Benth. ex Hemsl. Biol. Centr. Amer. Bot. 3: 135. 1883. *Sapium acutifolium* Benth. Pl. Hartweg. 90. 1842. *Stillingia propria* Brandeg. Univ. Calif. Publ. Bot. 6: 185. 1915 (type from Cerro del Boquerón, Chiapas). *Hierba mala*.

Moist or usually dry thickets or forest, often in rocky places or in pine-oak forest, 900-3,000 meters; Chiquimula; Jalapa; Santa Rosa; Guatemala; Sacatepéquez; Chimaltenango; Sololá (type from Hacienda de Argueta, *Hartweg* 614); Totonicapán; Quezaltenango; Huehuetenango; San Marcos. Chiapas.

A glabrous shrub, usually 1-3 meters high, rarely a tree of 6 meters, sparsely or densely branched, the older branches brown or fuscous, terete; leaves alternate, on stout petioles 3-5 mm. long, ovate-lanceolate to narrowly lanceolate or oblong-lanceolate, mostly 5-14 cm. long and 1-4 cm. wide, narrowly long-acuminate, acute or attenuate at the base, closely and acutely serrate, thick-membranaceous, eglandular at the base, somewhat paler beneath; flower spikes terminal, about 4 cm. long, slender, the bracts broadly triangular, cuspidate-acuminate, spreading in age, 1-flowered; staminate flowers short-pedicellate; staminate calyx 2-lobate, the pistillate calyx obsolete; stamens 2; capsule scarcely 5 mm. long, the receptacle 3 mm. broad, the columella persistent; seeds not carunculate, 3.5 mm. long, gray.

Called "pavil" in Chiapas. The shrub has been reported from Guatemala as *S. aquatica* Chapm. It is abundant in many localities in the central and western highlands, often forming thickets. The plants apparently are not browsed by sheep or goats, and people leave them alone because, as the local name indicates, the copious milky sap is believed to be irritating and poisonous to the skin.

**Stillingia cruenta** Standl. & Steyerm. Field Mus. Bot. 23: 125. 1944.

Known only from the vicinity of the type locality, Santa Rosa, Baja Verapaz, 1,500 meters, on dry brushy rocky hillsides (type, *Standley* 91207).

A glabrous shrub or tree 2-8 meters high, densely branched, the branches grayish brown, densely lenticellate; leaves on slender petioles 7-14 mm. long, coriaceous or chartaceous, elliptic-ovate or oblong-ovate, 4-8 cm. long, 2-3.5 cm. wide, long-acuminate, rounded at the base, lustrous, closely appressed-serrulate, the margins with 2 large glands on each side at the base, paler beneath, the lateral nerves about 6 pairs, prominulous, arcuate; perfect inflorescences not seen, terminal, the rachis thick, the bracts in age spreading and indurate; capsule globose, smooth, scarcely sulcate, about 7 mm. high and broad.

The tree is abundant at the only known locality, and during the dry season is conspicuous because of the brilliant red coloring of the leaves. Among Guatemalan species this is recognizable by the relatively short and broad leaves and by its large size, the other species being normally low shrubs.

Mr. J. D. Rogers, who has just completed a revision of the genus in North and Central America, considers this species more properly placed under *Sapium*.

**Stillingia sanguinolenta** Muell. Arg. *Linnaea* 32: 88. 1863.

At 800-1,200 meters, sometimes on limestone; Quiché; Huehuetenango. Mexico; Honduras.

A stiff shrub, usually about a meter high, often densely branched, the branchlets sometimes reddish; leaves opposite and subalternate, on petioles 1-3 mm. long, oblong-lanceolate or linear-lanceolate, 2-5 cm. long (very small in Guatemalan material), 5-15 mm. wide, acuminate, acute at the base, serrate, membranaceous or chartaceous; spikes 5-6 cm. long or often much shorter, straight and stiff, the bracts broadly ovate, short-acute, the staminate 6-10-flowered, the flowers subsessile; staminate calyx shallowly 2-lobate; pistillate sepals 3, broadly ovate, denticulate; stamens 2; ovary 6-carinate at the apex, the styles connate only at the base; capsule obovoid, subtruncate at the apex, apiculate, subacute at the base, smooth, the receptacle 5-7 mm. broad; seeds 5-6 mm. long, grayish white.

In Guatemalan specimens the leaves are sometimes less than 2 cm. long and the flower spikes very short and dense.

Mr. J. D. Rogers has placed the Guatemalan material as a new species to be described in his forthcoming publication.

**Stillingia zelayensis** (HBK.) Muell. Arg. *Linnaea* 32: 87. 1863. *Sapium zelayense* HBK. Nov. Gen. & Sp. 2: 51. 1817. *Stil-*

*lingia microsperma* Pax & Hoffm. Pflanzenreich IV. 147, v: 187. 1912 (type from Santa Rosa, Heyde & Lux 4265). *Pimientillo* (Jalapa).

Chiefly on rather dry, brushy, rocky hillsides, sometimes in oak forest, 1,200–2,000 meters; Guatemala; Quiché. Mexico; British Honduras (San Agustín); Panama.

A shrub of 1–2.5 meters, much-branched or almost simple, densely leafy, often umbellately branched above, glabrous; leaves alternate or often pseudoverticillate above at the base of the branches, on petioles 2–6 mm. long, ovate-lanceolate to lanceolate or oblong, mostly 4–10 cm. long and 1.5–2.5 cm. wide, acuminate or long-acuminate, acute or attenuate at the base, thick-membranaceous, reticulate-veined, somewhat paler beneath; spikes terminal, 8–12 cm. long, stout, straight, the bracts very broadly triangular, subulate-acuminate, the staminate 7–11-flowered; staminate flowers on very short pedicels, the pistillate sessile; staminate calyx 2-lobate, the 3 pistillate sepals ovate, acute; stamens 2, exerted; ovary subcarinate, the styles very shortly connate; capsule 10–12 mm. long, 15 mm. broad, the receptacle 11 mm. broad; seeds 5–7 mm. long and broad, whitish, smooth.

This has been reported from Guatemala as *S. sylvatica* Muell. Arg. *S. microsperma* was separated on the basis of size of the seeds, those of *S. microsperma* being 5 mm. long, those of *S. zelayensis* 6–7 mm. long, scarcely an important difference even if it existed constantly.

### TETROCHIDIUM Poeppig

*Reference:* F. Pax, Pflanzenreich IV. 147, iv: 29–32. 1912.

Trees, the pubescence of simple or malpighiaceous (appressed and attached by the middle) hairs, usually soon glabrate; leaves alternate, membranaceous, petiolate, stipulate, large, penninerved, entire or dentate, the petiole with 2 conspicuous glands at the apex; flowers small, dioecious or monoecious, apetalous, the racemes axillary, slender, the staminate elongate, simple or branched, the flowers subsessile, glomerate; pistillate and androgynous racemes shorter, simple, sometimes reduced to a single flower; staminate calyx small, 3-parted, the sepals broad, slightly imbricate; disk none; stamens 3, episealous, the filaments very short, in bud connate into a subglobose mass; anthers broad, introrsely and peltately 4-celled; ovary rudiment none or clavate, equaling the stamens; pistillate calyx like that of the staminate flower, the disk cyathiform or of 3 petaloid scales; ovary 2–3-celled, the style short, flat, 2-fid; ovules solitary in each cell; capsule 2–3-dymous, separating into 2-valvate cocci, the endocarp thin-crustaceous; seeds globose, coarsely foveolate, the testa crustaceous; cotyledons broad, flat.

About 12 species, in tropical America. One other is known in southern Central America.

Petioles about 1 cm. long; leaf blades 9–12 cm. long, abruptly short-acuminate; rachis of the staminate inflorescence glabrous. . . . . *T. brevifolium*.

Petioles 2–4 cm. long; leaf blades mostly 10–25 cm. long, rounded or very obtuse at the apex; rachis of the staminate inflorescence pubescent. . . *T. rotundatum*.

**Tetrorchidium brevifolium** Standl. & Steyerm. Field Mus. Bot. 23: 126. 1944.

Known only from the type, Alta Verapaz, in virgin forest, Rubelpec, *C. L. Wilson* 188.

A small tree, glabrous throughout, the branchlets subterete, ochraceous, the young ones scarcely more than 2 mm. thick; leaves on slender petioles 4–10 mm. long, membranaceous, oblong-obovate or obovate-elliptic, 9–12 cm. long, 4–5.5 cm. wide, abruptly short-acuminate, with an obtuse or subacute tip, cuneate-attenuate at the base, entire or nearly so, almost concolorous, the lateral nerves about 6 pairs, very slender and inconspicuous, arcuate; staminate spikes very slender, flexuous, short-pedunculate, 3–7 cm. long, lax and interrupted, the flowers sessile, solitary or few together, green, 3 mm. broad; sepals very broadly ovate, rounded or very obtuse at the apex, ciliolate; stamens 3, the anthers subsessile.

**Tetrorchidium rotundatum** Standl. Trop. Woods 16: 44. 1928. *Canjura negra* (fide Aguilar).

Moist or wet, mixed forest, 300–1,500 meters; Guatemala; Retalhuleu; Quezaltenango. Veracruz and Chiapas; Atlantic coast of Honduras and Nicaragua and perhaps farther southward.

A rather small to large tree, sometimes 30 meters high with a trunk 50–75 cm. in diameter, the crown spreading, the trunk often short, the whole plant glabrous except in the inflorescence, the young branches stout, mostly 5–10 mm. thick, terete, rather densely leafy; bark pitted and greenish gray below, smoother above; petioles slender, 2–4 cm. long, bearing above the middle remote from the blade 2 small, sessile, unequally inserted, orbicular glands; leaf blades obovate-oblong, mostly 10–25 cm. long and 3–10 cm. wide, rounded or very obtuse at the apex, gradually long-attenuate to the base, thick-membranaceous, bright green above, somewhat paler beneath, entire, the lateral nerves about 7 pairs; staminate spikes short-pedunculate, 7–15 cm. long, the rachis densely puberulent, the flowers green, sessile, aggregate in dense, remote or crowded clusters; sepals broadly triangular, 2 mm. long, densely puberulent; capsules mostly 2-celled, didymous, 8 mm. broad.

Called “manteca” in Honduras. The trunk is often supported by high buttresses. The wood is almost white, light in weight, soft, woolly, and perishable. Called “amate blanco” in Chiapas.

## TRAGIA L.

Perennial herbs or rarely woody plants, erect or more often scandent, usually hispid with more or less stinging hairs; leaves alternate, petiolate, mostly palmate-nerved, 2-stipulate; flowers generally monoecious, apetalous, the inflorescences terminal or opposite the leaves, rarely axillary, androgynous, the lower flowers pistillate, the upper staminate, the flowers solitary or rarely cymulose in the axils of the bracts; staminate calyx closed in bud, globose or obovoid, in anthesis

valvately 3-5-parted; glands of the disk developed between the outer stamens, free or somewhat connate with the filaments, usually absent; stamens mostly 3, alternate with the sepals, or by abortion 2-1, sometimes more numerous, the filaments commonly short, more or less connate at the base; anthers oblong, extrorse or introrse, longitudinally dehiscent; pistillate sepals 6, rarely 3, entire, persistent and little accrescent in age, sometimes pinnatifid and accrescent; disk none; ovary 3-celled, the styles connate into a column, simple; ovules solitary in each cell; capsule 3-coccos, depressed, separating into 2-valvate cocci, the endocarp crustaceous; seeds not carunculate, globose; endosperm carnose, the cotyledons broad, flat.

About 125 species, in the tropics of both hemispheres, mostly in tropical America, a few in the Old World tropics and in temperate North America. No others are known in Central America.

Stamens about 40; leaves very large, mostly 8-25 cm. wide. . . . . *T. Bailloniana*.  
Stamens 3; leaves small, mostly 1.5-6 cm. wide.

Anthers extrorse.

Stems scandent and twining. . . . . *T. volubilis*.

Stems erect or nearly so, not twining. . . . . *T. nepetifolia*.

Anthers introrse.

Inflorescence hispidulous, without gland-tipped hairs. . . . . *T. yucatanensis*.

Inflorescence bearing numerous short gland-tipped hairs, also pilosulous.  
*T. mexicana*.

***Tragia Bailloniana*** Muell. Arg. *Linnaea* 34: 178. 1865. *Zuckertia cordata* Baill. *Etud. Euphorb.* 496. *pl.* 4. 1858, not *Tragia cordata* Michx. 1803.

Moist or wet, mixed forest or in thickets, 1,300 meters or less; Huehuetenango; Quezaltenango; to be expected in Izabal. Tabasco; Atlantic lowlands of Honduras.

A small or large, herbaceous or woody vine, hirsute almost throughout with very slender, stiff, spreading hairs; leaves on very long and slender petioles, ovate to rounded-ovate, as much as 25 cm. long and wide, thin-membranaceous, shallowly 3-lobate or undivided, the blades or their lobes undulate-dentate, deeply cordate at the base and 5-nerved, thinly hirsute on both surfaces; stipules herbaceous, triangular-ovate, acuminate, dentate; racemes opposite the leaves, as much as 25 cm. long and many-flowered, bifurcate, one branch staminate, the other pistillate, the bracts lanceolate, acuminate, reflexed, the pistillate ones 1-flowered, the staminate 1-3-flowered, 6 mm. long, hispidulous, the staminate pedicels 9-12 mm. long, the pistillate shorter and stouter; staminate buds pyriform, acute, the sepals acuminate, pubescent; capsule about 8 mm. long, tridymous, densely hirsute.

Because of its very large, broad leaves this plant is very unlike all other North American species of *Tragia*. In Honduras it is sometimes called "chichicaste."



**Tragia mexicana** Muell. Arg. *Linnaea* 34: 181. 1865.

Moist or wet forest or thickets, often on limestone, 350–1,400 meters; Alta Verapaz; Jutiapa; Guatemala. Southern Mexico.

Plants wholly or chiefly herbaceous, twining and scandent, bearing a few stinging hairs, the stems puberulent or incurved-pilosulous; leaves on petioles 1.5–4.5 cm. long, membranaceous, oblong-ovate, 4.5–15 cm. long, 1.5–5 cm. wide, acute or acuminate, shallowly cordate or truncate-cordate at the base, subentire or conspicuous-dentate, 5-nerved at the base, thinly hispidulous or glabrate above, densely puberulent beneath; stipules 5 mm. long or less, lanceolate, acuminate; racemes terminal or opposite the leaves, simple or rarely branched from the base, 8 cm. long or usually much shorter, naked below, bearing at the base 1 or rarely 2 pistillate flowers, the upper flowers staminate, the rachis pubescent and stipitate-glandular; bracts linear-lanceolate, the staminate about 3 mm. long, the pistillate 5 mm. long, the pedicels elongate, the pistillate sometimes 15 mm. long; staminate flowers 4 mm. broad, the 3 sepals ovate, acute; stamens 3, the filaments short, the minute anthers introrse; pistillate sepals 6, ovate, acuminate, in age 5–6 mm. long, reflexed, pubescent and sparsely glandular; ovary densely hispid, the styles connate into a column 4 mm. long, free and reflexed above; capsule 12 mm. broad and 7 mm. high, densely hispid; seeds globose, 5 mm. in diameter, brownish yellow mottled with fuscous.

**Tragia nepetifolia** Cav. *Icon. Pl.* 6: 37. *pl.* 557, *f.* 1. 1801.

Grassy or brushy slopes, 900–1,500 meters; Chiquimula; Huehuetenango. Southwestern United States; Mexico.

Plants perennial from a ligneous root, branched from the base, erect or nearly so, 15–40 cm. high, the stems slender, pubescent and hispidulous with somewhat stinging hairs; leaves on petioles 3–15 mm. long, triangular or triangular-ovate to triangular-linear, 1.5–5 cm. long, 4–15 mm. wide, acute or acuminate, cordate or truncate at the base, coarsely serrate, rather densely hispidulous; stipules 2 mm. long, triangular; inflorescences opposite the leaves, 7–20 mm. long, hispidulous, eglandular, bearing 1 pistillate flower at the base and a few staminate ones above, the staminate bracts small, lanceolate or linear-lanceolate, the pistillate bracts ovate, the pedicels 1 mm. long in anthesis; staminate flowers 1.5–2 mm. broad, the 3–4 sepals ovate, acute; stamens 3, the anthers extrorse, shorter than the filaments; pistillate sepals 6, ovate or lanceolate, unequal, 2 mm. long; ovary strigose-hirsute; capsule 6–7 mm. broad, hispid; seeds globose, 2–3 mm. in diameter, mottled.

This species has been reported from Izabal (Livingston, *Tuerckheim* 8751), but probably incorrectly so.

**Tragia volubilis** L. *Sp. Pl.* 980. 1753. *T. guatemalensis* Lotsy in *Donn. Smith, Bot. Gaz.* 20: 354. 1895 (type from Chicacao, Alta Verapaz, *J. D. Smith* 1763). *Chichicaste de ratón* (Huehuetenango).

Open or brushy slopes and fields, 200–1,400 meters; Alta Verapaz; Zacapa; Chiquimula; Santa Rosa; Huehuetenango. Southern

Mexico; Salvador; Honduras; Costa Rica; West Indies; South America; Africa.

A perennial herbaceous vine, usually not more than 1-2 meters long, the stems very slender, hirsute and often puberulent; leaves thin-membranaceous, on petioles 1-5 cm. long, triangular-ovate to lance-ovate, 3-15 cm. long, 1-5 cm. wide, acute or acuminate, cordate or truncate-cordate at the base, serrate-dentate, hirsute when young, in age glabrate except on the nerves, palmate-nerved; stipules ovate-lanceolate, 3 mm. long; inflorescences lateral, sometimes fasciculate, 2-6 cm. long, bearing 1-2 pistillate flowers at the base, the staminate bracts 1-2 mm. long, lance-ovate, acuminate, 1-flowered, the pedicels 2-3 mm. long; pistillate pedicels 4-5 mm. long or in fruit much elongate; staminate calyx 2 mm. broad, often reddish, the 3 sepals elliptic, acute; stamens 1-3, the filaments short and thick, the anthers extrorse; pistillate sepals 6, linear-lanceolate or ovate-lanceolate, 2 mm. long; ovary hispid, often verrucose or gibbous, the styles somewhat connate; capsule 6-7 mm. in diameter, hispid with stinging hairs; seeds globose, brown, 2 mm. in diameter.

Called "pan caliente" in Salvador. In this and most of the other species the stiff hairs that invest the plants are somewhat stinging, but not strongly so. Some of the capsules of *T. volubilis* are often strangely modified: red, glabrate, and conspicuously tuberculate dorsally, with a large horn-like appendage at the base. Such capsules are found on the same plants with normal capsules, and probably are the result of insect action. For an illustration of this anomaly, see Pflanzenreich IV. 147, ix: f. 14. 1919.

**Tragia yucatanensis** Millsp. Field Mus. Bot. 2: 420. 1916.  
*Granadilla de ratón* (Alta Verapaz).

Moist or dry thickets, 1,000 meters or less; Petén; Alta Verapaz. Yucatan Peninsula of Mexico; British Honduras; Atlantic lowlands of Honduras.

Plants perennial from a somewhat ligneous root, usually scandent and twining, the very slender stems hispidulous and puberulent, herbaceous or suffrutescens below; stipules small, lanceolate or oblong-ovate, green; leaves membranaceous, on petioles 2.5 cm. long or shorter, narrowly lance-oblong to oblong-ovate, 3-6 cm. long, 1.5-4 cm. wide, acute or obtuse, 5-nerved at the base, usually rounded, sometimes shallowly cordate, serrate-dentate, hispid or hispidulous, often densely so; inflorescences opposite the leaves, 3 cm. long or less, hispidulous, eglandular, bearing 1 pistillate flower at the base, the staminate flowers few, the bracts small, lanceolate, acute; staminate flowers short-pedicellate; sepals 3, ovate, acute, glabrous or nearly so, green; stamens 3; pistillate sepals 6, ovate, acute; ovary densely hispid, the style branches recurved; capsule densely white-hispid with stinging hairs, 5-6 mm. long, deeply lobate and depressed; seeds globose, almost 3 mm. in diameter, smooth, mottled with yellow-brown and ochraceous.

The Maya names in Yucatan are recorded as "popox" and "hoo-box"; "ortiguilla" (Yucatan).

## CALLITRICHACEAE

Slender, aquatic or rarely terrestrial herbs, usually glabrous; leaves opposite, without stipules, entire, spatulate or linear; flowers minute, axillary, solitary, sessile or short-pedicellate, perfect or monoecious; perianth none; bracts 2 and sack-like or none; stamen 1, the filament elongate, filiform; anthers cordate, 2-celled, dehiscent by lateral slits; pistil one, 4-celled, the ovules 1 in each cell; styles 2, filiform, papillose for almost their whole length; fruit compressed, emarginate, the apical lobes more or less winged or carinate on the edges, the fruit separating at maturity into 4 compressed 1-seeded carpels; seed anatropous, pendulous; endosperm carnose; embryos straight or slightly curved.

The family consists of a single genus.

## CALLITRICHE L.

With the characters of the family. About 20 species are known, widely distributed in both hemispheres, most plentiful in temperate regions. Only the following are known from Central America.

Plants terrestrial; fruits short-pedunculate.....*C. deflexa*.  
Plants aquatic; fruits sessile.....*C. palustris*.

**Callitriche deflexa** A. Braun in Hegelm. Monogr. Callitr. 58. pl. 3. 1864.

A species widely distributed in tropical and temperate America, represented in North America by the following variety:

**Callitriche deflexa** var. **Austini** (Engelm.) Hegelm. Verh. Bot. Ver. Brandenb. 9: 15. 1867. *C. Austini* Engelm. in Gray, Man. ed. 5. 428. 1867.

Moist or usually wet banks or fields, in shaded or open places, sometimes growing in shallow water, often in mud, sometimes in moist soil of patios or in gardens, 1,200–3,700 meters; Alta Verapaz; Jalapa; Guatemala; Suchitepéquez; Huehuetenango; Quezaltenango; San Marcos. Widely distributed in the United States; Mexico; Honduras; Costa Rica; South America.

Plants prostrate or ascending, often forming dense tufts or small mats, the stems usually 5 cm. long or less; leaves short-petiolate, spatulate or obovate, 3–4 mm. long or sometimes slightly larger, 3-nerved, obtuse, acute at the base; fruit about 0.6 mm. long and twice as broad, deeply emarginate at each end, the lobes with a narrow marginal wing; peduncles shorter than the fruit or slightly exceeding it; styles persistent, not longer than the fruit, spreading or reflexed.

A very small and inconspicuous plant, easily overlooked by collectors, especially when it is growing among larger plants.

**Callitriche palustris** L. Sp. Pl. 969. 1753.

In pools of spring-fed stream, 3,400–3,700 meters; Huehuetenango (near Tojquiá and Tunimá). Widely distributed in both hemispheres, chiefly in temperate or cold regions; unknown elsewhere in Central America but found in Mexico.

Plants usually floating on water or submerged, the stems numerous, very slender, mostly 5–25 cm. long, leafy; submerged leaves linear, 1-nerved, 1–2 cm. long, retuse or bifid at the apex; floating leaves obovate, obtuse to truncate or retuse at the apex, narrowed below into a marginate petiole, dotted with stellate scales; fruit 2-bracteate, oval, 1–2 mm. long and about half as broad, submarginate at the apex, winged only toward the apex or sometimes throughout; styles shorter than the fruit.

**BUXACEAE.** Box Family

Trees or shrubs, rarely herbs; leaves opposite or alternate, commonly entire and coriaceous, without stipules; flowers unisexual, monoecious, rarely dioecious, solitary in the axils of bracts, the terminal often pistillate, the others staminate, in axillary or supra-axillary, lax or dense racemes or spikes; perianth of 4–6 imbricate sepals, or wanting; petals none; stamens free and opposite the sepals, or indefinite; ovary usually 3-celled, the styles simple; ovules 2 or rarely 1 in each cell, pendulous; fruit capsular and loculicidally dehiscent or drupaceous, usually crowned by the 2–3 persistent styles; endosperm more or less carnosous, rarely none.

About 7 genera are known, widely distributed. Only the following genera and species are known from Central America, but one other genus, *Simmondsia*, occurs in Mexico and the southwestern United States.

Fruit capsular; leaves opposite.....*Buxus*.  
Fruit drupaceous; leaves alternate.....*Sarcococca*.

**BUXUS** L.

Shrubs or small trees, usually densely branched, glabrous or pubescent; leaves opposite, subsessile or short-petiolate; bracts often numerous, similar to the sepals but smaller, several of them often without flowers; staminate flowers usually pedicellate; sepals 4, biseriolate; stamens 4, opposite the sepals; pistillate flowers sessile; sepals 6, biseriolate, the outer ones smaller; ovary 3-celled; styles usually distant from one another, somewhat bent outward; capsule 3-horned by the persistent styles; seeds oblong, trigonous, with a small strophiole; endosperm somewhat carnosous; cotyledons oblong, scarcely broader than the radicle.

About 45 species, widely distributed, the majority of them West Indian. Only one is known from Central America, but three occur in Mexico. *Buxus sempervirens* L., the Old World "box" ("Boj"), is rarely planted in Guatemala City and probably elsewhere. It is

an evergreen shrub with small, deep green leaves and a strong distinctive odor, often grown as a hedge plant.

**Buxus Bartlettii** Standl. Field Mus. Bot. 11: 134. 1932.

British Honduras; type from river bluffs, El Cayo, *H. H. Bartlett* 11437; collected several times in this vicinity, and also in forest, Esperanza road; probably extending to Petén.

A dense shrub 1-2 meters high, the young branches subquadrangular, sparsely hispidulous; leaves short-petiolate, rigid, subcoriaceous, pale green when dried, the petioles 2-3 mm. long, sparsely hispidulous or glabrate; leaf blades narrowly lance-oblong, mostly 3-6 cm. long and 7-20 mm. wide, acuminate and spinose-apiculate or subobtusate, acute or attenuate at the base, glabrous, somewhat 3-nerved from the base; inflorescence umbelliform or cyme-like, sessile or on a peduncle 3 mm. long, the flowers numerous, dense, the staminate short-pedicellate, the pedicels 3 mm. long or less; pistillate flower 1, sessile; sepals green, 1.5 mm. long, oblong-ovate, obtuse, ciliolate; stamens exserted; capsule 4 mm. long, bearing at the top 3 long recurved horn-like styles.

It is decidedly questionable whether this can be maintained as distinct from *Buxus lancifolia* Brandege, of San Luis Potosí, but of the latter the available material is too scant to decide the matter.

### SARCOCOCCA Lindley

Glabrous shrubs; leaves alternate, short-petiolate, coriaceous, penninerved; racemes short or somewhat elongate, dense, glomerate in the leaf axils, the staminate and pistillate in different axils, or the pistillate and staminate in the same raceme; disk none; sepals 4, biseriolate; stamens 4, exserted; anthers dorsifixed near the base, oblong; ovary 2-3-celled; ovules 2 in each cell; fruit more or less drupaceous, ovoid, or globose, scarcely horned as in *Buxus*, indehiscent; seeds usually solitary and subglobose.

About 5 species, all the others in Malaysia and southeastern Asia.

**Sarcococca Conzattii** (Standl.) I. M. Johnston, Journ. Arnold Arb. 20: 240. 1939. *Buxus Conzattii* Standl. Field Mus. Bot. 11: 163. 1936. *S. guatemalensis* I. M. Johnston, Journ. Arnold Arb. 19: 121. 1938 (type from Santa Elena, Chimaltenango, 2,700 meters, *A. F. Skutch* 288).

Moist *Cupressus* forest or open oak forest, 2,400-2,900 meters; Chimaltenango (collected also at Chichivac); Guatemala(?); Quiché; Huehuetenango. Oaxaca.

A stout shrub or a small tree, 1.5-6 meters high, olive-green when dried, the branches angulate; leaves on petioles 5-10 mm. long, lanceolate or elliptic, 5-10 cm. long, 1.5-4.5 cm. wide, acute or acuminate, acute or obtuse at the base, very

lustrous above, paler beneath; flowers densely congested in 5-15-flowered inflorescences, these partly long-pedunculate, the uppermost 1-2-flowered pistillate, the others staminate; staminate flowers 2 mm. long or less, pedicellate; pistillate flowers on pedicels 1-5 mm. long; styles 2; fruit white, ovoid, 8 mm. long or larger.

## CORIARIACEAE

Shrubs, often sarmentose, the branchlets angulate, the lower ones opposite or ternate, the upper ones opposite; leaves opposite, 1-5-nerved, entire, 2-ranked, glabrous, small, without stipules; flowers perfect or subpolygamous, very small, greenish; sepals 5, triangular-ovate, imbricate in bud, persistent, spreading, the margins membranaceous; petals hypogynous, shorter than the sepals, triangular, fleshy, carinate within, after anthesis thickened and intruded between the cocci of the fruit; stamens 10, hypogynous, free or 5 of them adherent to the keels of the petals; filaments short, filiform, the anthers rather large, exerted, oblong; gynoecium of 5-10 carpels, these free, oblong, adnate in a whorl about the fleshy conic torus, 1-celled; styles as many as the carpels, free, elongate, stigmatose on all sides; ovules 1 in each cell, pendulous from the apex of the cell, anatropous; fruit of 5-8 cocci included in the accrescent succulent petals, compressed, oblong, the pericarp crustaceous, carinate dorsally and laterally; seed compressed, the testa membranaceous, the embryo ovate, compressed, the cotyledons plano-convex, the very short radicle superior.

The family includes a single genus, with the characters of the family.

## CORIARIA L.

A group of 3-5 species, only one of which is American, the others in the Mediterranean region, Asia, and New Zealand.

**Coriaria thymifolia** Humb. & Bonpl. ex Willd. Sp. Pl. 4: 819. 1805. *Moco de chompipe* (San Marcos); *Moco tinto* (Guatemala).

Mostly on dry brushy hillsides, often on steep cliffs, rarely in forest, 1,200-3,500 meters, mostly plentiful in the Occidente; El Progreso; Jalapa; Escuintla; Guatemala; Sacatepéquez; Chimaltenango; Sololá; Huehuetenango; Quezaltenango; San Marcos. Central and southern Mexico; Costa Rica; Panama; Andes of South America; New Zealand.

A slender shrub, commonly 1-3 meters high, usually recurving, the branches green or in age brownish; leaves all spreading in one plane, closely set, sessile or nearly so, lance-oblong to oblong-ovate, 1-2 cm. long, acute or subacute, somewhat puberulent or almost glabrous, pale green, conspicuously nerved; flowers 2 mm. long, in longer slender racemes, slender-pedicellate, dark red and green, the rachis of the raceme densely puberulent; fruits subglobose, 3-4 mm. in diameter, depressed-globose, dark purple, very juicy.

In the herbarium the slender lateral branches and the distichous leaves suggest a compound leaf. When growing, the branches have a fern-like appearance that is quite distinctive, and it is of interest to note on a label of a specimen from a local collector the term "helecho gigante." The shrub is rather handsome, but it is monotonously abundant in some regions, especially on banks and cliffs along the road in the region of Almolonga and Zunil, where in the dry season the leaves are loaded with dust. In many parts of Guatemala it forms dense thickets, which apparently are molested by no animals. The plant contains a poisonous principle, coriamyrtine, which in animals causes convulsions, increase in respiratory movement and heart action, and finally death by asphyxiation and heart exhaustion. Children have been poisoned in some regions by eating the small fruits, which have a sweet and rather agreeable flavor. In Mexico the plant has been used for poisoning noxious animals. In South America juice of the fruit has been used as a substitute for ink. It writes black, but after a few hours reddens and is then indelible. Other species of *Coriaria* in Europe and elsewhere are known to have the same properties as the American species. *C. myrtifolia* L. of the Mediterranean region is rich in tannin, and is used for tanning skins, while its leaves yield a black dye. In spite of the abundance of this shrub in Guatemala, and its distinctive appearance, the senior author has had little success in finding local names for it. Most persons asked apparently have no knowledge of it, which is strange, considering its undoubted poisonous properties. Near Zunil one Indian said that the fruit "might make you sick." No one seemed to know that it is a dangerously poisonous plant. It is strange that they did not observe that it is not eaten by the sheep and goats that ruthlessly destroy most of the other vegetation.

### JULIANIACEAE

Trees or shrubs with stout resinous branches; leaves alternate, deciduous, unequally pinnate, sometimes 1-3-foliolate, usually crowded at the ends of the branchlets, the leaflets opposite, dentate or crenate, membranaceous; flowers dioecious, small, the staminate numerous, in very slender, pendent, axillary, branched racemes; perianth simple, 6-8-parted, the segments linear, acute; stamens as many as the perianth segments and slightly shorter; pistillate flowers consisting of pistils only, usually 4, collateral, the 2 outer ones usually imperfect and abortive; receptacles small, obscure in anthesis, pedunculate, geminate or solitary, erect, few-dentate at the apex; ovary 1-celled, 1-ovulate, the style 3-parted, exerted from the orifice of the receptacle; fruit indehiscent, with the dilated and compressed pedicel forming a large compressed body winged below, pendulous; wing of the

fruit gradually dilated upward from a cuneate base, often oblique; seed affixed in the base of the cell; embryo horizontal, the radicle elongate, the cotyledons plano-convex, accumbent.

One other genus, with one species, is known in Peru.

### JULIANIA Schlechtendal

*References:* Hemsley & Rose, Diagnoses specierum generis *Juliania*, Schlecht., Americae tropicae, Ann. Bot. 17: 443-446. 1903; Hemsley, Phil. Trans. Roy. Soc. London B. 199: 169-197. pls. 18-24. 1907; Alcocer, Las Julianáceas, Anal. Mus. Nac. Méx. II. 4: 318-327. 1907.

With the characters of the family. Three or four species, all Mexican, one extending into Guatemala. The genus is a somewhat anomalous one, placed by some authors in the vicinity of the Juglandaceae. The habit and foliage of the trees show, however, that there is a very close relationship with the Burseraceae, also with the genus *Rhus*, to both of which the Julianaceae probably are closely related, as (fide Record) is indicated also by the wood structure.

***Juliania adstringens*** Schlecht. Linnaea 17: 746. 1843. *Hypopterygium adstringens* Schlecht. op. cit. 635. 1843. *Amphipterygium adstringens* Schiede ex Schlecht. op. cit. 635. *Caraño*.

Dry rocky brushy hillsides of the Oriente, 200-700 meters; El Progreso; Zacapa; Chiquimula. Southwestern Mexico (Michoacán to Morelos and Oaxaca).

A shrub or small tree, commonly 3-6 meters high, with a broad and rather flat or sometimes narrow crown, the trunk low, usually 20 cm. or less in diameter, dark grayish brown, covered on the larger trees with large conic prickle-like projections similar to those on some species of *Zanthoxylum*, the inner bark pinkish, with milky sap; leaflets 1-7 (usually 1-3 in Guatemalan trees), sessile or nearly so, thin, most of them broadly obovate to suborbicular, 2-7 cm. long, broadly rounded or truncate at the apex, rounded to broadly cuneate at the base, coarsely crenate or serrate, at least above the middle, green and thinly pilose above, paler beneath and usually densely pilose; fruits 2.5-5 cm. long, 1.5-2 cm. wide at the apex, recurved, somewhat corky or spongy, long-attenuate to the base, puberulent or glabrate.

The fruits often are borne in great abundance, in rather dense clusters, and are quite unlike those of any other Central American tree. The leaves show the same type of variation that is found in certain species of *Bursera*, and *Rhus*, i.e., sometimes upon the same branch they vary from 1-foliolate to 3-foliolate (Guatemalan material) or sometimes to leaves having 5-7 leaflets. In 3-foliolate



leaves the lower leaflets often are less than half as large as the terminal one. The bark is astringent and contains tannin, and also yields a red dye. The tree is used in domestic medicine in Mexico, although it is not known to have any definite medicinal properties. The sapwood is white and thin, the heartwood dark brown.

### ANACARDIACEAE. Cashew Family

Shrubs or trees, often with poisonous oil or sap; leaves alternate, very rarely opposite, without stipules, or the lowest leaflets sometimes stipule-like, simple, 1-3-foliolate, or odd-pinnate, usually epunctate; flowers perfect or polygamous, usually regular; calyx with 3-7 lobes or segments, rarely spathaceous or irregularly ruptured, the segments sometimes accrescent; petals generally 3-7, free, sometimes persistent and accrescent; disk usually annular; stamens commonly twice as many as the petals, rarely fewer or of the same number or numerous, inserted at the base of the disk; filaments free, the anthers usually versatile, introrsely dehiscent, eglandular; ovary ovoid, 1-celled, sometimes 2-5-celled, rarely of distinct carpels; styles 1-3; ovules solitary, pendulous or ascending; fruit superior, rarely semi-inferior, sometimes inserted upon fleshy hypocarp formed from the base of the calyx and the pedicel, 1-5-celled, usually drupaceous and indehiscent, sometimes dehiscent, the flesh oily or with caustic sap; seed erect, horizontal, or pendulous; endosperm none or scant; cotyledons commonly plano-convex and fleshy, the radicle short, straight or incurved, superior or inferior.

About 65 genera, widely distributed, chiefly in the tropics. The only other Central American genera are *Campnosperma*, in Panama, and *Mauria*, which ranges as far north as Honduras and may well reach Guatemala.

Leaves simple.

Receptacle of the fruit much enlarged and fleshy, bearing at its apex the reniform nut-like drupe..... *Anacardium*.

Receptacle of the fruit not enlarged, the drupe fleshy, not nut-like. . . *Mangifera*.

Leaves pinnate or 3-foliolate.

Petals none..... *Pistacia*.

Petals present.

Ovary 2-5-celled. Fruit large, plum-like, very juicy, edible..... *Spondias*.

Ovary 1-celled.

Calyx accrescent, membranous, enclosing the fruit. Tall trees with usually dentate or serrate leaflets..... *Astronium*.

Calyx not accrescent, small and inconspicuous, much shorter than the fruit.

Stamens twice as many as the petals.

Styles 3; cultivated trees with small globose red fruit..... *Schinus*.

Style 1; native trees with large, broadly oblong fruit..... *Tapirira*.

Stamens as many as the petals.

Pericarp separating easily from the mature fruit when dry. Shrubs or small trees..... *Rhus*.

Pericarp closely adherent to the mature fruit.

Flowers 3-4-parted; leaflets often dentate or sinuate, densely pilose in Guatemalan species. . . . . *Comocladia*.

Flowers 5-parted; leaflets entire, sometimes glabrous.

Flowers polygamous; leaflets long-petiolulate, glabrous. *Metopium*.

Flowers dioecious; leaflets almost sessile, pubescent.

*Mosquitoxylum*.

### ANACARDIUM L. Cashew

Trees or large shrubs; leaves alternate, petiolate, simple, entire, coriaceous; flowers small, polygamous, in terminal panicles, bracteate; calyx 5-parted, deciduous, the lobes imbricate; petals 5, linear, recurved, imbricate in bud; torus stipe-like, filling the base of the calyx; stamens 8-10, unequal, all or only a few of them fertile, the filaments connate at the base with one another and with the torus; ovary free, sessile, obovoid or obcordate, the style filiform, excentric, the stigma punctiform; ovule lateral, ascending on a very short funicle; nut reniform, umbilicate by a lateral sinus, the hypocarp very large and pyriform, fleshy and juicy; seed reniform, ascending, the testa membranaceous; cotyledons semilunar, the radicle short, uncinata.

About 8 species, in tropical America. One other species, *A. excelsum* (Bert. & Balb.) Skeels, called "espavé" or "espavel," a giant tree with large leaves, is an important forest tree of Costa Rica and Panama. Its bark is said to serve as a fish poison.

**Anacardium occidentale** L. Sp. Pl. 383. 1753. *Marañón*;  
*Jocote marañón*.

Commonly planted in fincas of all the tierra caliente; naturalized in some places, but very doubtfully native, unless perhaps in the northern pine region, mostly at less than 600 meters, occasionally at 1,200-1,800 meters; Petén; Izabal; Baja Verapaz; El Progreso; Zacapa; Chiquimula; Jutiapa; Santa Rosa; Escuintla; Suchitpéquez; Retalhuleu; San Marcos; El Quiché. Southern Mexico; British Honduras to Salvador and Panama; West Indies; South America; naturalized in the Old World tropics.

Usually a small or medium-sized tree of 10 meters or less, with a trunk 30 cm. or less in diameter, sometimes as much as 23 meters tall; leaves petiolate, coriaceous, oblong-obovate to rounded-obovate, mostly 9-15 cm. long, rounded at the apex, acute or obtuse at the base, glabrous; flowers in small or large, terminal panicles, pale green with rose-red stripes; petals linear-lanceolate, 7-8 mm. long, puberulent outside; nut reniform, gray, 2-2.5 cm. long, borne on a large, thick, rather spongy, juicy, red or yellow hypocarp.

This is one of the best-known trees of Central America and of all tropical America, highly prized locally for its edible juicy fruit, usually red in color. What is ordinarily called the fruit is really the

hypocarp, at whose apex the true fruit or nut is borne. It is very astringent when green, but when ripe has an acid flavor that most people find pleasant, although it has a pungency that reminds one faintly of black pepper. It is one of the most common dessert fruits of Guatemala, during its rather brief season, which begins about the end of February on the Pacific coast. Large quantities of the fruits are taken from the lowlands to Guatemala and other cities of the highlands. Great care must be taken to avoid the nut when eating the fruit, since the pericarp of the former contains an oil, cardol, that is acrid and caustic. This oil is driven off by heat when the nuts are roasted, but the fumes may irritate and blister the face and eyes. The roasted kernels of the seeds have an agreeable flavor, and are eaten commonly in Central America, either alone or in candies. Large amounts of the seeds are consumed in the United States, the supply coming mostly from the Old World tropics. From the bark there exudes a gum somewhat like gum arabic that can be employed as varnish, and is used in South America in bookbinding, to prevent attacks of insects. A popular fermented beverage, "vino de marañón," is made from the fruit in Guatemala, and the juice is used to flavor the commercial "aguas gaseosas" (soda pop). The ground seeds are mixed with water to make a beverage called "orchata de marañón." The sap of the tree is used externally in Guatemala in the treatment of cutaneous diseases, but because of its poisonous properties its use is dangerous. We have not noted the tree at Cobán, although probably it is cultivated in some parts of Alta Verapaz. Fruits on sale in the Cobán market were said to come from El Rancho. While the prevailing color of the fruit is bright red, giving it the appearance of a bullnose pepper, pure yellow fruits are seen at times, as at Retalhuleu. While the name "marañón" is much used for the tree and its fruit in all Central America, the current name in Guatemala is "Jocote marañón." The wood is lustrous and grayish, pinkish, or brownish in color; moderately hard and strong, easy to work, not very resistant to decay. It is little used in Central America. In the Cobán region juice from the seeds is used to remove warts.

### ASTRONIUM Jacquin

*Reference:* Fr. Mattick, Die Gattung *Astronium*, Notizbl. Bot. Gart. Berlin 11: 991-1012. 1934.

Large trees; leaves alternate, odd-pinnate, the leaflets opposite, entire or crenate; flowers perfect, polygamous, or dioecious, in small or large, axillary and

terminal panicles, small, bracteate; calyx 5-parted, the segments orbicular, persistent, imbricate, accrescent and scarious in fruit; petals 5, orbicular, imbricate; disk annular, 5-lobate; stamens 5, inserted at the base of the disk, shorter than the petals; ovary free, sessile, 1-celled; styles 3, terminal, short; ovule pendulous from near the apex of the cell; fruit oblong, subterete, rostrate, coriaceous, surrounded by the large accrescent sepals; seed oblong, with membranaceous testa.

About 12 species, in tropical America. Only the following are known from North America.

- Leaflets densely or sparsely pilose on the upper surface, densely velutinous-pilose beneath ..... *A. fraxinifolium*.  
 Leaflets usually quite glabrous on the upper surface, glabrous beneath or sparsely short-pilose on the nerves ..... *A. graveolens*.

***Astronium fraxinifolium*** Schott in Spreng. Syst. Veg. 4, pt. 2. Append. 404. 1827. *Jobillo*; *Culinzis* (Petén, Maya).

Petén hilltop forest, reported as rare. Veracruz; Costa Rica; Brazil; Bolivia; Paraguay.

A small or large tree, the stout young branchlets densely short-pilose, becoming blackish; leaves long-petiolate, the leaflets about 9, petiolulate, oblong or lance-oblong, 5-7 cm. long, acute or short-acuminate, obliquely rounded at the base, obscurely crenate or almost entire; panicles small or large, usually much-branched, the branches sparsely pilose; sepals in fruit narrowly oblong or oblanceolate-oblong, 12 mm. long, stiff, rounded or very obtuse at the apex, glabrous; fruit as long as the sepals, narrowly elliptic-oblong, acute.

It is questionable whether this, so far as specimens from Mexico and Petén are concerned, is more than a form of *A. graveolens*. The wood is light to dark brown or reddish, with black stripes which sometimes predominate; sapwood grayish; hard and heavy, the specific gravity 0.85-1.00; grain straight or roey; rather fine-textured, takes a high polish; has striking and often beautiful figure. The wood is highly esteemed for making fine furniture, and is sometimes exported from Brazil to the United States under the names "zebra-wood" and "kingwood." The darker and heavier grades are employed in Brazil for railway ties.

***Astronium graveolens*** Jacq. Enum. Pl. Carib. 23. 1760. *A. Conzattii* Blake, Contr. Gray Herb. 53: 59. 1918 (type from Oaxaca). *A. Zongolica* Reko, El México Antiguo 1: 157. 1918. *Ronrón*; *Palo obero*; *Jobillo*; *Culinzis* (Petén, Maya); *Ciruelo*; *Quesillo* (Zacapa).

Moist or wet forest, at or little above sea level; Petén; Alta Verapaz; Izabal; Zacapa; Chiquimula; Guatemala; Sololá; Huehue-

tenango. Oaxaca and Veracruz to Yucatan; British Honduras to Salvador and Panama; Colombia to Brazil.

A large tree, sometimes 30 meters high with a trunk a meter in diameter, the crown spreading, the trunk often with high buttresses, the bark moderately smooth, grayish or greenish, with characteristic, light gray, round depressions, the inner bark pinkish or light brown, exuding a thick sticky resin or gum; young branchlets glabrous or nearly so; leaves slender-petiolate, the leaflets mostly 11-15, slender-petiolulate, lanceolate or lance-oblong, mostly 6-10 cm. long, acute to attenuate-acuminate, obliquely rounded at the base, serrate or crenate to subentire, almost glabrous, thin; flowers and fruits like those of *A. fraxinifolium*.

Called "glassy wood" and "palo mulato" in British Honduras; "culimche" (Yucatan, Maya); "ciruelillo," "frijolillo" (Honduras); "gateado" (Veracruz). The sap has a strong, spicy odor. The wood is similar to that described for *A. fraxinifolium*, being suitable for fine furniture. It is reported to be used in Veracruz for gunstocks, furniture, house posts, railroad ties, and bridge timbers. It is said to be susceptible to the attacks of termites.

### COMOCLADIA L.

Small trees with very poisonous sap, this turning blackish on exposure to air, the trunk slender, often simple; leaves mostly crowded at the top of the trunk, alternate, odd-pinnate, the leaflets opposite or subopposite, entire or dentate, the lower ones smaller; panicles axillary, usually shorter than the leaves; flowers minute, crowded, polygamous, sessile or subsessile, 3-4-parted; calyx 3-cleft, persistent, the lobes imbricate; petals reddish, imbricate; disk 3-lobate; stamens inserted in the notches of the disk, free; ovary free, with 3 stigmas; ovule ascending on a basal funicle; fruit drupaceous, oblong-ellipsoid.

About 20 species, the following, 4 described from Mexico, the others West Indian. The Guatemalan species is extremely poisonous, and other members of the genus are also noted for their very poisonous properties, contact with the plant causing swelling of the parts affected and blistering of the skin that sometimes is difficult to heal.

*Comocladia guatemalensis* Donn. Smith, Bot. Gaz. 56: 52. 1913 (type collected between Nentón and Candelaria, Huehuetenango, *O. F. Cook* 59). *C. Engleriana* var. *integra* Loes. Bull. Herb. Boiss. II. 6: 833. 1906 (type from brushy limestone hills, Pueblo Viejo, Quen Santo, Huehuetenango, 1,300 meters, *Seler* 2779). *Pata de pava*; *Chinil-té*; *Solimán*.

Dry brushy rocky hillsides, 700-1,300 meters; endemic; Huehuetenango.

A shrub or small tree; sometimes 15 meters high; leaves petiolate, the leaflets about 15, oval or oblong-oval, subsessile, 9.5 cm. long or smaller, rounded or broadly acute at the apex, retuse at the base, entire, membranaceous, strigillose above, densely ochraceous-tomentose beneath, the lateral nerves 11-14 pairs; panicles tomentose, the fruiting pedicels 2 mm. long; fruit ellipsoid, 1.5 cm. long, 1 cm. broad; seed 1 cm. long, 7 mm. broad.

This may not be distinct from *C. Engleriana* Loes., which is itself probably only a form of *C. mollissima* HBK. Seler states that the hard red wood was formerly used by the Indians for spear shafts and other similar purposes. This species is very poisonous, and the junior author was severely affected by it, as if poisoned by *Rhus radicans*. It is reported that this or some related species is known in nearby Mexico as "shinil."

### MANGIFERA L. Mango

Trees; leaves alternate, petiolate, simple and entire, coriaceous; flowers polygamo-dioecious, bracteate, in terminal, often much-branched panicles, pedicellate; calyx 4-5-parted, deciduous, the sepals imbricate; petals 4-5, spreading, imbricate; disk pulvinar or stipitiform, lobate; stamens 1 or 4-5, inserted on the margin or base of the disk, connate with one another and with the disk, 1-2 of them fertile; ovary free, sessile, 1-celled, compressed, the style lateral, curved, the stigma simple; ovule ascending; fruit drupaceous, subreniform or ovoid, fleshy, often very large, the stone fibrous, often compressed, sometimes 2-valvate; cotyledons plano-convex, often lobate, the radicle inferior, ascending.

About 30 species, chiefly in tropical Asia, one cultivated throughout tropical regions for its edible fruit.

**Mangifera indica** L. Sp. Pl. 200. 1753. *Mango*; *Mang* (Quechí).

Native of southern Asia. Cultivated abundantly in all warmer parts of Guatemala up to about 1,200 meters, and sometimes to an elevation of 1,800 meters, but the trees few above 1,200 meters.

A tree of 10-15 meters, or often considerably taller, with a very dense, spreading crown, the trunk sometimes a meter in diameter, the bark dark brown, the inner bark yellowish brown, exuding a pinkish resin; leaves petiolate, oblong-lanceolate, usually narrowly so, 10-20 cm. long, subcoriaceous, acute or cuspidate-acuminate, narrowed to the base, glabrous; flowers whitish green or yellowish, usually in very large panicles; sepals 2.5 mm. long; petals 5 mm. long; fertile stamens 1-2, but 3-4 staminodia usually present; fruit varying greatly in size, green and yellow, usually tinged with red or pink.

The mango is with little doubt the favorite fruit of the Central American people, at least of those who live in regions where it can be grown, and it is produced everywhere at lower elevations and con-

sumed in enormous quantities. There is scarcely a dwelling of the lowlands that does not have near it at least one tree, and often a grove of them. The large compressed seeds are thrown down where the fruit is eaten, often along roadsides, and apparently they germinate with great facility, so that trees often become thoroughly naturalized remote from dwellings, and have the appearance of being wild. The mango is said to have been introduced into Mexico at the beginning of the eighteenth century, but this is probably an error. The seeds are easily transported, and it is probable that they were brought to Acapulco and Panama from Manila at a much earlier date, by the ships that came from the Philippines. Significantly, in Mexico the best variety is known as "mango de Manila." The trees in Guatemala often attain a huge size, perhaps the greatest to be seen anywhere in Central America, and there are giants about Sacapulas (El Quiché) and in the lower Motagua Valley, while trees of the Pacific lowlands are perhaps not inferior. The fruit begins to ripen at the end (sometimes at the beginning) of February and in early March, and during March and April markets almost everywhere are filled with it, in such great quantities that in the case of the smaller settlements one wonders how such a quantity of fruit can be sold. Most of it is eaten raw, but sometimes it is stewed or made into various desserts. The juice is sometimes fermented to make a delicious beverage called "vino de mango." Numerous varieties of the fruit are recognized in Guatemala, and some of the superior varieties are cultivated. Most of the trees, however, are seedlings, whose fruit sometimes contains much fiber or *estopa*, and often has a decided flavor of turpentine. Mango trees, if protected to some extent from cold, will fruit at 1,800 meters, but they do not produce well in the mountains, and at Antigua, for instance, there are few trees. The young foliage is handsomely tinged with red and purple, and the deciduous leaves usually turn red before falling. The foliage seems to be much attacked by fungi and insects, and usually bears numerous discolored small spots. The mango makes a particularly satisfactory shade tree because of its dense broad crown of deep green leaves. Its wood is soft, brownish gray, with small spots and irregular lines of brown. A decoction of the seeds is used in Guatemala and elsewhere to expel tapeworms and other intestinal parasites. The resin dissolved in water is a domestic remedy for dysentery. The mango is now grown on a rather large scale in southern Florida, where it produces well if the flowers are not injured by cold.

### METOPIMUM P. Browne

Glabrous trees with caustic sap; leaves petiolate, odd-pinnate, the leaflets coriaceous, entire; flowers small, greenish, polygamous, in axillary panicles; sepals 5, imbricate; petals 5, imbricate, longer than the sepals; disk annular; stamens 5, the filaments short, subulate; anthers dehiscent by longitudinal slits; ovary 1-celled, the style short, the stigma 3-lobate; fruit drupaceous, oblong, acute, lustrous, the stone pergamentaceous.

Three species, the others in the West Indies.

**Metopium Brownei** (Jacq.) Urban, Symb. Antill. 5: 402. 1908. *Rhus metopium* L. Syst. Nat. ed. 10. 2: 964. 1759. *Terebinthus Brownei* Jacq. Enum. Pl. Carib. 18. 1760. *Chechem* (Petén, Maya); *Chechem negro*.

Moist or wet forest or thickets, sometimes along seashores, at or little above sea level; Petén; Izabal (near Santo Tomás). Veracruz; Yucatan; British Honduras; Greater Antilles.

A shrub or tree, sometimes 15 meters high, the bark thin, reddish brown; leaves long-petiolate, the leaflets 3-7, on long slender petiolules, suborbicular to obovate, 3-8 cm. long, usually rounded at the apex, sometimes obtuse, very unequal at the base, pale beneath, with conspicuous venation; panicles long-pedunculate, longer or shorter than the leaves; petals yellowish green; fruit orange-yellow at maturity, about 1 cm. long, obtuse at the base, lustrous.

Sometimes called "cabalchechem" or "boxchechem" in Yucatan, also "palo de rosa"; known in British Honduras as "black poison wood" and "Honduras walnut." The wood is rich dark brown streaked with red, hard and heavy, rather fine-textured, not very easy to work, takes a high polish, is strong and fairly durable. The tree is shunned in regions where it is known because of its intensely poisonous properties, similar to those of poison ivy (*Rhus radicans*).

### MOSQUITOXYLUM Krug & Urban. Mosquito wood

Trees; leaves odd-pinnate, the leaflets entire; flowers small, sessile, spicate on the branches of lateral panicles, dioecious, regular, bracteate and 2-bracteolate; sepals 5, free, imbricate, persistent; petals 5, equal, imbricate; stamens 5, inserted on the margin of a fleshy disk, the filaments subulate, the anthers dorsifixed; ovule attached laterally above the base of the cell; style central, short, 3-cleft at the apex; fruit capsular, obliquely oval, laterally compressed, the exocarp thin, not resinous, the endocarp thin, osseous.

A single species.

**Mosquitoxylum jamaicense** Krug & Urban, Notizbl. Bot. Gart. Berlin 1: 78. 1895. *Caoc* (Alta Verapaz); *Pasac macho* (Petén; Maya and Spanish).



Moist or wet forest, 400 meters or less; Petén; Alta Verapaz. Southern Mexico; British Honduras; Costa Rica; Panama; Jamaica.

A large tree of 15-25 meters, the trunk sometimes a meter in diameter, sometimes, apparently, flowering when only a shrub, the trunk straight, almost smooth; leaves large, the leaflets 11-21, oblong or oblong-elliptic, mostly 5-12 cm. long, mostly rounded or obtuse at the apex, oblique at the base, obtuse on one side, acute on the other, petiolulate, coriaceous, deep green and lustrous above, glabrate, hispidulous beneath with subappressed hairs; panicles shorter than the leaves, the flowers white; sepals 1.5 mm. long; fruit scarlet, 7-8 mm. long, apiculate, glabrous.

Called "mosquito wood" in Jamaica, hence the generic name; "bastard mahogany," "wild mahogany," "chichimeca" (British Honduras). The fruits are produced in great abundance, and are said to give the whole crown of the tree a red appearance when ripe. The dehiscence of the so-called capsule is not conspicuous or evident in most dried specimens. The heartwood is pale reddish brown tinged with yellow, the sapwood grayish; hard, heavy, strong, cross-grained, rather fine-textured, not very easy to work, takes a high polish, is only moderately durable. It is used in some regions for construction purposes.

### PISTACIA L. Pistachio

Trees or shrubs with resinous sap; leaves alternate, persistent or deciduous without stipules, 3-foliolate or usually even-pinnate or odd-pinnate; flowers small, dioecious, apetalous, in axillary racemes or panicles, the pedicels bracteate at the base; calyx 5-fid or 5-parted in the staminate flower, the lobes imbricate, the disk annular; stamens 5, very short, the filaments connate at the base with the disk, the anthers large; pistillate calyx with 3-4 lobes or segments, with no disk; ovary sessile, 1-celled, the style short, 3-fid, the stigmas capitate, recurved; ovule suspended from a basal funicle; fruit drupaceous, dry or nearly so, the epicarp chartaceous, the stone osseous; seed compressed, with membranaceous testa; cotyledons usually green, plano-convex, thick; radicle accumbent, superior.

Eight species, in Texas, Mexico, Guatemala, the Mediterranean region, Canary Islands, and eastern Asia. *P. vera* L. of the Mediterranean region furnishes the pistachio nuts (*alfónsigo*; *pistacho*) of commerce, which have edible green kernels, often used for flavoring and coloring candy. They are sometimes on sale in delicatessen stores of Guatemala, being grown on a large scale for export in the Near East. It is planted in the Jardín Botánico of Guatemala. *P. Lentiscus* L. of the same region yields mastic or mastiche, an official drug obtained from a resinous exudate from the branches. This gum is sometimes used to fill cavities in the teeth and chewed to sweeten the breath. It is also used as a varnish. *P. Terebinthus* L. is the Cyprus turpentine tree.

***Pistacia mexicana*** HBK. Nov. Gen. & Sp. 7: 22. *pl.* 608. 1825.  
*P. texana* Swingle, Journ. Arnold Arb. 2: 107. 1920. *Copalillo*  
 (Jalapa).

Dry rocky brushy hillsides, 600–2,200 meters; Baja Verapaz (Santa Rosa); Jalapa (near San Pedro Pinula); Guatemala (Fiscal; Estancia Grande); Quiché; Huehuetenango. Western Texas; Mexico.

A shrub or tree, sometimes 9 meters high; leaflets 11–29, mostly alternate, oblique-oblong, 1–2 cm. long, acute or obtuse, entire, glabrous or nearly so; panicles mostly 5–10 cm. long; flowers very small, reddish, the large anthers more conspicuous than the calyx; fruit rounded, oblique, 3–4 mm. long.

A resin exudes from the branches. The seeds are said to be edible (in Mexico), but they are even smaller than the small commercial pistachio seeds. The young foliage as well as the leaf rachis is often handsomely colored with purple-red. It is somewhat surprising to find in Mexico and Guatemala a single species of this group, for most of its species occur in remote regions.

## RHUS L.

*Reference:* F. A. Barkley, A monographic study of *Rhus* and its immediate allies in North and Central America, including the West Indies, Ann. Mo. Bot. Gard. 24: 265–498. *pls.* 10–26. 1937.

Trees or shrubs, sometimes scandent, often with resinous or caustic sap; leaves alternate, simple, 1–3-foliolate, or odd-pinnate, the leaflets entire or serrate; flowers polygamous, bracteate, in axillary or terminal panicles, the flowers small, green, whitish, or yellowish; calyx small, 4–6-parted, persistent, the segments equal, imbricate; petals 4–6, equal, spreading, imbricate in bud; disk annular; stamens 4–6 or 10, inserted at the base of the disk, free, the filaments subulate; ovary sessile, ovoid or globose, with 3 free styles, these short or elongate; ovule suspended from a basilar funicle; fruit drupaceous, small, dry or slightly fleshy, usually compressed, the putamen coriaceous, crustaceous, or osseous; seed inverted, with membranaceous testa; radicle short, uncinat.

About 150 species, in tropical and temperate regions of both hemispheres. *Rhus vernicifera* DC. and *R. succedanea* L., of eastern Asia, exude from their branches a substance known as lac, which furnishes the most durable varnish known, the lacquer used in finishing fine woodwork, especially of Chinese and Japanese origin. All the known Central American species are included in the following list.

Leaflets 3; plants usually scandent. Fruit glabrous.....*R. radicans*.

Leaflets more than 3.

Fruit glabrous; leaflets mostly 11–15; tree.....*R. striata*.

Fruit pubescent; leaflets mostly 5–11; shrubs or small trees.

Leaflets thick-coriaceous, usually very lustrous on the upper surface and pale beneath.

Young branchlets puberulent or glabrate; leaflets glabrous or nearly so on the upper surface.....*R. Schiedeana*.

Young branchlets hirtellous with spreading hairs; leaflets hirtellous on the upper surface.....*R. vestita*.

Leaflets membranaceous, not or scarcely lustrous on the upper surface, not conspicuously paler beneath.....*R. terebinthifolia*.

***Rhus radicans*** L. Sp. Pl. 266. 1753. *R. Toxicodendrum* L. loc. cit. in part. *Toxicodendron radicans* Kuntze, Rev. Gen. 153. 1891. *Tipachán* (Huehuetenango); *Tripa de chumpipe* (Huehuetenango).

Apparently rare and local, open banks or creeping on tree trunks, about 1,200–2,000 meters; Guatemala (San Juan Sacatepéquez); Quiché (between San Francisco and Cotzal); Huehuetenango. Canada, most of the United States and Mexico; Bermuda; Bahamas.

An erect shrub about a meter high, or with elongate stems creeping along tree trunks, the branchlets pubescent or glabrate; leaves long-petiolate, the 3 leaflets mostly ovate and 5–10 cm. long, acute or acuminate, entire or irregularly serrate or dentate, glabrate above, glabrate or pubescent beneath, thin; panicles axillary, short; sepals 1 mm. long; petals oblanceolate, glabrous, 3 mm. long; fruit whitish at maturity, glabrous; seed about 3 mm. long and 4 mm. broad.

The English name is “poison ivy” or “poison oak,” and in the United States the plant is generally and unfavorably known, of wide distribution, common in many regions, and dreaded for its poisonous properties. The resinous sap, upon contact with the skin, produces serious inflammation, swelling, and pain, and the infection often is difficult to relieve or cure. Many people are highly susceptible to its effects, while others are not affected at all. The poisonous properties are located in a non-volatile oil, toxicodendrol. The sap is white at first, turning black upon exposure to the air. Poison ivy reaches its southern limit in the Department of Guatemala, but in the country of Guatemala it seems to be, fortunately, of very local occurrence, on the slopes near the river below the ruins of Zacaleu, near Huehuetenango and in a few other places in that department, where it is plentiful, growing either as a low erect shrub or as a vine running over trees, with the mature leaves turning bright red, as they do in the North in autumn. An Indian of the vicinity said that many persons, especially children, were severely poisoned by it.

***Rhus Schiedeana*** Schlecht. *Linnaea* 16: 480. 1842. *Jocotillo* (fide Aguilar).

Dry rocky hillsides, usually in pine-oak forest, 1,300–1,900 meters; Alta Verapaz; Baja Verapaz (Santa Rosa); Zacapa; Jalapa; Quiché. Veracruz and Chiapas.

A shrub 1.5–4.5 meters tall, the branchlets minutely grayish-puberulent; leaflets mostly 9, coriaceous, elliptic-lanceolate to ovate-oblong, mostly 4–8 cm. long, short-petiolulate, acute or obtuse, unequally rounded at the base, coriaceous, entire, almost glabrous, much paler beneath; panicles shorter than the leaves, the stout branches finely puberulent, the flowers whitish; sepals rounded, 2.4 mm. long, puberulent outside; petals 3.5 mm. long, glabrous; fruit red or orange-red, about 8 mm. in greatest diameter, densely hirtellous.

An abundant shrub on rocky hills about Santa Rosa, Alta Verapaz, associated with pine and oak.

*Rhus striata* Ruiz & Pavón, Fl. Peruv. 29. 1802. *R. juglandifolia* Willd. ex Roem. & Schult. Syst. Veg. 6: 649. 1820. *Toxicodendron striatum* Kuntze, Rev. Gen. 153. 1891. *Amché* (Quecchí); *Palo de compadre* (Huehuetenango); *Amté* (Huehuetenango).

Abundant in wet, mixed or pine forest, often in second growth, frequent in fencerows or pastures, chiefly at 600–1,900 meters; Alta Verapaz; El Quiché (Nebaj); Huehuetenango. Southern Mexico (Oaxaca, Veracruz, Chiapas); Costa Rica; Panama; Venezuela and Colombia to Peru.

A tree, commonly 5–12 meters high but often larger, with a rather slender trunk, the young branchlets puberulent; leaflets 11–17, ovate-oblong to oblong or lance-oblong, 5–13 cm. long, abruptly acute to rather long-acuminate, very unequal at the base, entire, membranaceous, glabrous or nearly so, on slender petiolules; panicles lateral, shorter than the leaves, puberulent; sepals semicircular, 1 mm. wide, glabrous; petals white, oval, 2.5 mm. long, glabrous; fruit whitish, glabrous; seed 5 mm. long and 7 mm. broad.

Called “palo de sarna” in Honduras and “hinchador” in Costa Rica. The Quecchí name signifies “spider-tree.” This plant is very much feared by everyone because of its severe poisonous properties, and in clearing land the Indians usually refuse to cut it saying that the tree “burns” (*quema*). It is one of the most abundant shrubs and trees of the Cobán region, occurring almost everywhere, so that one must always be on guard against it. The chances are very good that if one grasps a shrub or tree for support while climbing the hillsides, it will be “amché.” It begins to bloom about Cobán around the end of March. The young leaves are usually reddish; therefore, the tree is easily recognized by its color even at a distance. *Rhus striata* is closely related to *R. Vernix* L., the well-known poison sumac of eastern United States, and it is quite as dangerous, much more so, apparently, than *R. radicans*. Many people in Alta Verapaz

are poisoned by "amché," which sometimes causes great swelling of the body, so that the eyes are closed, blistering, intensely irritated and itching. The infection may last for weeks, and is difficult to remedy, at least with the treatments known to local physicians and *curanderos*. The most usual treatment in the Cobán region is said to be the application of the very thick, fleshy leaves of certain species of *Peperomia*.

***Rhus terebinthifolia*** Schlecht. & Cham. *Linnaea* 5: 600. 1839.  
*R. costaricensis* Riley, *Kew Bull.* 184. 1922 (type from Costa Rica).  
*R. terebinthifolia* var. *Loeseneri* Barkley, *Ann. Mo. Bot. Gard.* 24: 354. 1937 (type from Tactic, Alta Verapaz, *Seler* 3287). *R. terebinthifolia* var. *pilosissima* Loes. *Bull. Herb. Boiss.* II. 6: 836. 1906.  
*Sal de venado*; *Kenquichuc* (Cobán, Quecchí).

Moist or dry situations, most often in pine or oak forest, often on dry brushy slopes, 600–2,200 meters; Alta Verapaz; Baja Verapaz; Zacapa; Chiquimula; Jalapa; Guatemala; Sacatepéquez; Chimaltenango; Sololá; Quiché; Huehuetenango; Quezaltenango. Mexico; Honduras and Salvador to Costa Rica.

Usually a shrub of 1–3 meters, often arching, the branchlets densely short-pilose or glabrate; leaflets 3–11, membranaceous or papyraceous, elliptic to lanceolate, sessile or subsessile, 2–4.5 cm. long, acute or subacute, obtuse or rounded at the base and often unequal, sparsely or densely pilose on both surfaces, sometimes glabrate; flowers white or whitish, forming small or large, terminal, often leafy panicles; sepals deltoid-ovate, 1 mm. long, glabrous, ciliate; petals 1.5 mm. long, glabrous, ciliate; fruit red or orange-red, 6 mm. long, hirtellous and glandular.

Called "agrillo" in Honduras, doubtless in reference to the acid flavor of the fruit. One of the most common and characteristic shrubs of pine-oak forests, abundant in many parts of the Guatemalan mountains. Barkley maintains *R. costaricensis* as a distinct species, but it differs from typical *R. terebinthifolia* only in amount of pubescence, evidently a variable character of slight systematic importance, and both forms or "species" often may be found in the same locality. We have seen no material of var. *Loeseneri*, which is said to have glabrous leaves and branches. *Rhus Arsenei* Barkley (*Ann. Mo. Bot. Gard.* 24: 346. 1937) is reported from Guatemala on the basis of a specimen collected by A. Tonduz, without locality. The species is known also from Oaxaca and Puebla, and probably is only a form of *R. terebinthifolia*, at least so far as the Guatemalan collection is concerned. The leaflets are smaller than in typical *R. terebinthifolia*, but leaflet size can scarcely be considered a very convincing character in this genus.

**Rhus vestita** Loes. Bull. Herb. Boiss. II. 6: 835. 1906. *R. Schiedeana* f. *vestita* Radlk. ex Donn. Smith, Enum. Pl. Guat. 3: 22. 1893, nomen. *Schmaltzia vestita* Barkley, Amer. Midl. Nat. 24: 652. 1940. *Sal de venado*; *Sal de caballo*.

Dry brushy rocky slopes, often in quebradas or oak-pine forest, sometimes on limestone, 1,700–2,400 meters; Quiché (type from Sansiguán, *Heyde & Lux* 3032); Huehuetenango. Chiapas and perhaps elsewhere in Mexico.

A shrub or small tree, 6 meters high or less, the branches ferruginous, the young branchlets hirtellous; leaflets 7–9, broadly elliptic or ovate to oblong, mostly 3–6 cm. long, obtuse, truncate or rounded at the base, entire, thick-coriaceous, short-pilose on both surfaces, often sparsely so, deep green and lustrous above, much paler beneath; panicles lateral, shorter than the leaves, densely hirtellous, the flowers white; sepals suborbicular, 2 mm. long, almost glabrous, ciliate; petals 3 mm. long, glabrous, not ciliate.

The shrub is abundant on the very rocky and arid hills above Chiantla (Huehuetenango) and Aguacatán (El Quiché). Probably this is a mere variety or a form of *R. Schiedeana*, which it resembles in every respect except quantity of pubescence. The seeds or fruits of this shrub are said to be used in Huehuetenango as a purgative for domestic animals.

## SCHINUS L.

Trees or shrubs; leaves alternate, odd-pinnate, the leaflets opposite or alternate, sessile; flowers dioecious, bracteate, in axillary or terminal panicles; calyx small, 5-parted, the segments rounded, imbricate; petals 5, imbricate; disk annular; stamens 10, inserted on the disk, the filaments subulate; ovary sessile, 1-celled, the styles 3, with capitellate stigmas; ovule pendulous from near the apex of the cell; fruit drupaceous, globose, small, the putamen coriaceous or osseous, usually oily; seed compressed, pendulous from a parietal funicle, the testa membranaceous; endosperm scant, carnose; cotyledons plane, the radicle ascending, elongate.

About 18 species, all South American, one often cultivated in other regions.

**Schinus Molle** L. Sp. Pl. 388. 1753. *Pirú*; *Perú*; *Pimienta del Perú*.

Planted commonly in the central region, especially in parks and along streets, also about houses, chiefly above 1,200 meters, and far upward to 2,700 meters or more; to be found, at least a few trees, in almost all mountainous parts of Guatemala. Native of Peru, but cultivated for ornament or as a shade tree in many other regions, as in California.

A tree, often 15 meters high, with short thick trunk, the branches graceful and drooping; rachis of the leaf narrowly marginate; leaflets 15-27, linear or linear-lanceolate, entire or nearly so, sometimes serrate, mostly 3-6 cm. long, acute or subobtuse, glabrous; flowers small, yellowish white, in large panicles; petals oblong; fruit globose, 5 mm. in diameter, rose-red.

The English name is "pepper tree"; called "pimiento" and "pimientillo" in Salvador. The usual name in Guatemala is "pirú." The tree is said to have been introduced from Peru into Mexico by the first viceroy, Antonio de Mendoza, and probably it reached Antigua soon afterward. It is particularly abundant in this region, perhaps the finest trees of Guatemala being those at Ciudad Vieja, where the first Guatemalan trees were probably planted. The ones now there are so large and old that one could easily believe they were set in the time of Doña Beatriz de Alvarado of unhappy memory. The very large trees of the Parque Central of Antigua also are exceptionally beautiful. In early March they are loaded with flowers, among which there is an incessant humming of bees. Some of the trees bear the handsome red fruits at the same season. Pilgrims going upon the annual pilgrimage to the shrine of San Felipe, near Antigua, carry branches of this tree.

The specific name *Molle* is derived from *mulli*, the Quechua term for the tree. When fragments of the leaves are placed in water, they execute sudden jerking movements, due to release of the oil they contain. The fruit contains a volatile oil with a flavor resembling a mixture of fennel and black pepper. The drupes are not edible as such, but it is reported that in Mexico they are pulverized and mixed with certain beverages like *atol*, or are used as a flavoring ingredient of intoxicating beverages. In Mexico the tree and its products, especially a bitter acrid gum exuding from the trunk, are much used in medicine. The wood is similar to that of elm (*Ulmus*), moderately hard and heavy, tough, coarse-textured, of grayish or brown color. The tree is highly valued in Central America as a shade tree, although not plentiful south of the Guatemalan mountains. In California it is found objectionable because it harbors black scale, a serious pest of citrus fruits.

### SPONDIAS L.

Large or small trees; leaves alternate, odd-pinnate, the leaflets opposite, usually membranaceous; flowers polygamous, small, short-pedicellate, in terminal or lateral panicles; calyx 4-5-cleft, small, deciduous, the lobes subimbricate; petals 4-5, spreading, valvate in bud; disk cupular, crenate; stamens 9-10, inserted below the disk; ovary sessile, free, 4-5-celled; styles 4-5, connivent above; ovules solitary

in the cell, pendulous; fruit drupaceous, fleshy, the stone osseous, large, 1-5-celled; seeds pendulous, with membranaceous testa; embryo straight, the cotyledons elongate, plano-convex, the radicle short, superior.

About 8 species, widely distributed in tropical regions, at least in cultivation. One additional species is found in Costa Rica and Panama.

Leaflets acuminate or caudate-acuminate, mostly 6-10 cm. long; panicles usually terminal and 15-30 cm. long.....*S. Mombin*.

Leaflets rounded to acute or sometimes short-acuminate at the apex, mostly 2-5 cm. long; panicles chiefly 2-5 cm. long and lateral.....*S. purpurea*.

**Spondias Mombin** L. Sp. Pl. 371. 1753. *S. lutea* L. Sp. Pl. ed. 2. 613. 1762. ?*S. Radlkoferi* Donn. Smith, Bot. Gaz. 16: 194. 1891 (type from Escuintla, *J. D. Smith* 2087). *Jobo*; *Jocote jobo*; *Poc* (Quechí); *Jobo jocote*; *Kinim* (Petén, Maya).

Moist or wet forest, often along streams, common in second growth, mostly at 600 meters or less, rarely at somewhat greater elevations; Petén; Alta Verapaz; Izabal; Zacapa; Chiquimula; Huehuetenango; Quezaltenango; Suchitupéquez; Retalhuleu; San Marcos. Southern Mexico; British Honduras to Salvador and Panama; West Indies; tropical South America; Old World tropics, probably introduced.

A tree, sometimes 20 meters high or larger, the trunk often 60 cm. or more in diameter, straight, tall, the bark pale grayish brown, moderately smooth or with vertical fissures, the crown narrow or broad and spreading; leaflets 5-9 pairs, petiolulate, oblong or ovate-oblong, very oblique at the base, glabrous or sparsely short-pilose, especially on the nerves; flowers fragrant, white, in large showy panicles; petals 3 mm. long; fruit ovoid, yellow, commonly 3-4 cm. long.

The English name is "hog plum." Called "ciruela de monte" in Honduras and "ciruela amarilla" in Yucatan; "abal," "canabal" (Yucatan, Maya). The name "jobo" is believed to be of Antillean origin. In Guatemala it appears in such place names as Jovales and El Jobal, *caseríos* of Escuintla and San Marcos, and Los Jobos, an *aldea* of Baja Verapaz. The fruit, although larger than that of *S. purpurea*, is of inferior quality and little esteemed. The tree is plentiful about Puerto Barrios and also at many places on the Pacific plains. In Chiquimula it is said to be planted occasionally as coffee shade. On the Atlantic coast it is sometimes utilized for living fence posts. The tree is showy in flower because of the very numerous and large panicles of small white flowers. Oviedo writes that sap from the roots was drunk in lieu of water when the latter was not available. The wood is soft, rather light in weight, grayish



yellow, and perishable. It has been used in Venezuela for match sticks, and is believed to be suitable for making boxes.

**Spondias purpurea** L. Sp. Pl. ed. 2. 613. 1762. *Jocote*; *Run*, *Rum* (Quechí); *Unum*, *Canum* (Cacchiquel); *Anum* (Quiché); *Xúgut* (Pipil of Salamá).

Abundant in all the lower regions of Guatemala, in thickets or open forest, often in second growth, common in fencerows, pastures, and many other situations, ascending from sea level to about 1,700 meters; Petén; Alta Verapaz; Baja Verapaz; El Progreso; Izabal; Zacapa; Chiquimula; Jalapa; Jutiapa; Santa Rosa; Escuintla; Guatemala; Sacatepéquez; Quiché; Huehuetenango; Suchitupéquez; Retalhuleu; San Marcos. Mexico; British Honduras to Salvador and Panama; West Indies; South America.

A large shrub or a tall tree, sometimes 12–15 meters high, with thick branches, the bark smooth, grayish or whitish; leaflets 5–12 pairs, mostly sessile, very variable in shape, mostly oblong to trapezoid or obovate, usually somewhat pubescent when young but soon glabrate, or glabrous from the first; panicles small and narrow, often produced when the tree is leafless, mostly on the large branches at defoliate nodes, bright red or red-purple; petals 3 mm. long; fruit generally red or purple, sometimes yellow, resembling a plum, 3–3.5 cm. long or larger.

The English name is "hog plum." Maya names in Yucatan are "abal" and "chiabal." While always known in Guatemala by the name "jocote," the usual name in many parts of Mexico is "ciruela" ("plum"), given by the early Spaniards because of the close resemblance of the jocote fruit to an ordinary red plum. The same name is used also in Honduras. "Jocote" is derived from the Nahuatl "xocotl," a generic term for sour fruits, in contradistinction to "zapotl," sweet fruit. In Guatemala the term appears in such place names as Jocotenango ("place of jocotes," in Sacatepéquez, still a very appropriate name for the place), Los Jocotes, Jocotán, and El Jocote. While it can not be said that the jocote is the favorite fruit of Guatemala, there is little doubt that larger numbers of jocotes are eaten than of any other fruit, especially by children. They are produced in vast quantities, and often may be had at no cost, something true of very few Central American fruits except purely wild ones. The large stones of characteristic form that often litter the streets and highways germinate wherever they fall. The tree varies greatly in size. In the mountains in such places as the Antigua region many trees are very large, with thick tall trunks that can scarcely be climbed. In the lowlands most trees are low, with short trunks; often they branch from the ground. They often are planted for living

fence posts, being one of the best of all trees for the purpose in the tierra caliente. The trees bloom mostly toward the end of the dry season, generally when the leaves have fallen, and the bright red panicles, although small, sometimes make the trees conspicuous. Fruits can be obtained in Guatemala at almost any season of the year, produced locally or imported. They often are carried from the lowlands up into the highlands to such places as Totonicapán, where they do not grow ordinarily. The fruits are usually eaten ripe and raw, but boys and even grown people eat the sour, green fruits. The fruits are often stewed with *panela* or crude sugar, when they turn brown. Large jars full of the unappetizing mess are offered in most of the markets, and these cloyingly sweet fruits seem to be popular. The ripe fruit is much used for preparing mildly alcoholic "vino" and "chicha." Stewed or even raw fruit is sometimes served upon hotel tables, but it is not a dessert much favored, and would be considered rather "low." Small trees when covered with bright red, ripe fruit are quite handsome. To the northern palate the jocote is strongly suggestive of a plum in its acid flavor and abundant juice, although there is often a suspicion of turpentine in the taste, and there is a good deal of fiber on the seed coat. The jocotes show great variation in size, shape, color, and flavor. Dr. F. Webster McBryde, who has made detailed studies of this and many other Guatemalan food plants, states that about Atitlán some eight or ten distinct varieties can be found, some of them limited in range. Among the best-known varieties of Guatemala are the "jocote tronador" and the "jocote de corona," the latter often considered best of all, and marked by having a sort of "crown" or shoulder near the somewhat flattened apex. Others are known by such names as "jocote de iguana," "zamarute," "jocote amarillo," "San Jacinto," "jocote agrio," "pitarillo," and "jocotillo." The young shoots and leaves often are conspicuously colored with red and purple. They have a rather agreeable acid flavor, and often are eaten raw by children or adults. In some regions the ashes are used in soap-making. Limbs cut and set in the ground take root quickly, and often are set thickly to form hedges. At Cobán, Doña Rosita Diesseldorf has a large collection of orchids planted upon such reset limbs or trunks, finding them very good for the purpose "because they never die." Lac insects were formerly cultivated in Mexico upon this plant, and perhaps still are. The soft wood is said to have been used in Brazil for paper pulp. A good indication of the vast numbers of fruits produced in Central America is given by the countless thousands of seeds that may be found on many

of the sea beaches, to which they have been brought from the uplands by streams running into the sea.

### TAPIRIRA Aublet

Shrubs or trees, glabrous or pubescent; leaves alternate, odd-pinnate, the leaflets often numerous, entire or serrate; flowers polygamous, small, green or yellowish, often fragrant, in axillary or terminal panicles; calyx 5-parted, persistent, the lobes imbricate; petals 5, small, oval, spreading, imbricate in bud; disk 5-lobate; stamens 10, inserted at the base of the disk, the anthers globose; ovary ovoid, free, subimmersed in the disk, 1-celled, the style short, conic, the stigma simple; ovule pendulous from the apex of the cell; fruit drupaceous, oblique-oblong, fleshy, the stone rugulose, crustaceous or osseous; seed oblong, with thin testa; cotyledons large, plano-compressed, the radicle superior.

About 15 species, in tropical America, Asia, and Africa. Three others have been recorded from Costa Rica and Panama.

**Tapirira macrophylla** Lundell, *Phytologia* 1: 216. 1937.  
*Tanto* (Zacapa).

Moist mixed forest, sometimes along streams, 1,200 meters or less; Zacapa (Volcán de Monos, Sierra de las Minas, *Steyermark* 42290). Type from mountain pine ridge, San Agustín, British Honduras, *C. L. Lundell* 6841.

A tree of 12–25 meters, the trunk as much as 30 cm. in diameter, the bark thin, black; young branchlets pilose with small appressed brownish hairs; leaves glabrous, long-petiolate, the leaflets usually 7, petiolulate, coriaceous, entire, oblong-lanceolate, 8–20 cm. long, 3.5–7 cm. wide, acute or subacute, attenuate to the base, lustrous, brownish beneath when dried, the venation prominulous and laxly reticulate; panicles axillary, long-pedunculate, narrow and with few branches, 5–12 cm. long, glabrate; fruit oval or ellipsoid, about 2.5 cm. long, somewhat oblique, subtruncate at the apex, ferruginous when dried.

The author compares this with the only Mexican species (of Veracruz), *T. mexicana* Marchand, from which, indeed, it may not be distinct. The fruit is said to be eaten in Guatemala.

### CYRILLACEAE

Trees or shrubs; leaves simple, coriaceous, entire, persistent, without stipules; flowers small, regular, perfect, usually in spike-like axillary racemes; calyx 5-parted, persistent, the segments imbricate; petals as many as the calyx segments, free, subconvolute; stamens 5 (in *Cyrilla*), hypogynous; disk saucer-shaped, confluent with the base of the ovary; ovary 2–3-celled (in *Cyrilla*), the ovules solitary or 2–4 (usually 3), attached to a short placenta, pendulous from the apex of the cell; fruit usually small, 2-celled, with spongy pericarp, 1-seeded; endosperm carnosous, the embryo central, elongate, the radicle superior.

Three additional genera are known, ranging from the southern United States to Brazil.

### CYRILLA L.

Glabrous shrubs or small trees, with the characters of the family, the leaves narrow, petiolate; racemes elongate and many-flowered, fasciculate at the ends of branchlets of the previous season; petals white, sometimes tinged with red; disk green; ovary 2-celled, ovoid, the style short, thick, usually bilobate; ovules 2-3 in each cell.

Six or seven species are recognized by some authors, mostly in the West Indies. Only one is known in Central America.

*Cyrilla racemiflora* L. Mant. Pl. 1: 50. 1767. *C. antillana* Michx. Fl. Bor. Amer. 1: 158. 1803.

British Honduras (Temash River; Río Pinol; Río Privación), mostly on stream banks near sea level, probably extending into Petén; southern United States; Oaxaca; West Indies; northern South America.

Usually a shrub of 2-4 meters, but reported to attain in British Honduras a height of 15 meters with a trunk diameter of 20 cm., the bark thin, pale brown, breaking up into large scales; leaves obovate to oblanceolate, 3-11 cm. long, obtuse or acute, acute at the base, somewhat lustrous above, venation conspicuous and reticulate, paler beneath; racemes mostly longer than the leaves, the pedicels 2-3 mm. long; calyx 1 mm. long, the sepals acuminate; petals 2 mm. long; capsule 2.5-3 mm. long.

Wood heavy and hard but weak, reddish brown, close-grained, its specific gravity about 0.68.

### AQUIFOLIACEAE. Holly Family

*References:* Th. Loesener, Monographia Aquifoliacearum, Nov. Act. Acad. Leop. Carol. 78. 1901; 89: 1-314. 1908.

Trees or shrubs, usually glabrous or nearly so, without glands, the sap watery; leaves alternate, without stipules, usually persistent, petiolate, simple, entire or dentate; inflorescence axillary and terminal, cymose or racemose, or the flowers axillary and solitary or fasciculate, small, whitish, regular, polygamo-dioecious or unisexual; calyx 3-6-parted, usually persistent, the segments imbricate; petals 4-5, free or somewhat connate at the base, hypogynous, deciduous, imbricate; stamens hypogynous, as many as the petals, free or slightly adherent to the petals, the filaments subulate; anthers oblong-cordate, introrsely dehiscent; disk usually none; ovary free, ovoid or globose, 3-6-celled; style none or terminal, subulate or columnar, the stigma discoid or capitellate; ovules 1-2 in each cell, pendulous from the apex of the cell, collateral; fruit small, drupaceous, sparsely

carnose, containing 3-18 nutlets, these crustaceous and 1-seeded; seed pendulous, with membranaceous testa, the endosperm copious, carnosous; embryo minute, straight, the radicle superior.

Three genera, the following, one with a single species in the United States, and one in New Caledonia.

**ILEX L.**

Trees or shrubs; leaves mostly coriaceous and entire or dentate, sometimes spinose-dentate; flowers mostly perfect, solitary or fasciculate in the leaf axils or umbellate, racemose, or cymose, small and inconspicuous, whitish or yellowish; calyx small, persistent, 4-5-lobate; corolla rotate, 4-parted or less often 5-6-parted, the petals obtuse; stamens as many as the petals, the anthers oblong; ovary sessile, subglobose, usually 4-6-celled; style none or short and thick; stigmas as many as the ovary cells, distinct or confluent; ovules 1-2 in each cell; fruit globose, containing 4-8 osseous or crustaceous nutlets.

About 300 species, mostly in South America, but in smaller numbers in most temperate or tropical regions of the earth. About 10 species are known from other parts of Central America. The best-known species of the genus are *I. Aquifolium* L. of Europe and *I. opaca* Ait. of eastern United States, whose spine-toothed handsome green leaves are emblematic of Christmas, and are used in vast quantities for holiday decorations. The name used in Spain for the holly is "acebo." Because several of the Guatemalan species are known only from incomplete material, it has been difficult to prepare a key to them, but it is believed all those listed below are distinct, and that better characters will be found for distinguishing them.

Leaves densely pilose beneath with short spreading hairs.

Flowers 5- to 7-parted; leaves appressed-serrulate to entire, usually 5-13 cm. long.....*I. Brandegeana*.

Flowers 4-parted; leaves crenate or crenulate, usually 2.5-4.5 cm. long. *I. discolor*.

Leaves glabrous beneath or rarely minutely puberulent.

Leaves conspicuously crenate or serrate.

Pistillate flowers racemose, the fruiting racemes 3 cm. long, 20-30-flowered; leaves 16-18 cm. long.....*I. ampla*.

Pistillate flowers fasciculate in the leaf axils; leaves 2.5-11 cm. long.

Leaves glabrous beneath, mostly 7-11 cm. long.....*I. toluhana*.

Leaves puberulent beneath, mostly 2.5-4.5 cm. long.....*I. discolor*.

Leaves entire or essentially so.

Leaf blades small, mostly 3-4.5 cm. long, acuminate. Pistillate pedicels bracteolate and articulate.....*I. gracilipes*.

Leaf blades large, mostly 6-12 cm. long.

Young branchlets puberulent; pistillate pedicels, at least in *I. quercetorum*, not bracteolate and not articulate.

Leaves lanceolate; fruiting pedicels solitary, 8–13 mm. long.

*I. quercetorum*.

Leaves obovate to oblanceolate or elliptic; fruiting pedicels fasciculate, 6 mm. long or shorter. . . . . *I. Gentlei*.

Young branchlets glabrous; pistillate pedicels, so far as known, bracteolate and articulate.

Lateral nerves of the leaves usually 11–12 pairs, conspicuously elevated beneath. Leaf blades acuminate, pale beneath when dried.

*I. anodonta*.

Lateral nerves of the leaves usually about 8 pairs, little elevated and not conspicuous.

Fruit 6–7 mm. long; leaves mostly widest at or near the middle, acuminate. . . . . *I. belizensis*.

Fruit 4–5 mm. long; leaves mostly widest above the middle, usually obtuse but sometimes acute. . . . . *I. guianensis*.

***Ilex ampla*** I. M. Johnston, Journ. Arnold Arb. 19: 123. 1938.

Known only from the type, collected near Colomba, Quezaltenango, 900 meters, *A. F. Skutch* 1320.

A glabrous tree 22 meters high with broad crown; petioles 12–15 mm. long; leaf blades oblong or ovate-oblong, 16–18 cm. long, 6–9.5 cm. wide, coriaceous, obtuse or subacuminate, rounded to subcordate at the base, the margin remotely and inconspicuously crenate, somewhat lustrous above, the lateral nerves 12–15 pairs; pistillate inflorescences axillary, solitary, racemiform, cylindrical, in fruit 3 cm. long, 20–30-flowered, the fruiting pedicels 2–3 mm. long; calyx 4-lobate; fruit 4–5 mm. long, dark red, with 4 nutlets.

***Ilex anodonta*** Standl. & Steyerl. Field Mus. Bot. 22: 245. 1940. *Cerezo*.

Moist or wet, mixed forest, 1,300–3,000 meters; Zacapa (Sierra de las Minas); San Marcos (type collected along Río Tonaná, between Canjulá and La Unión Juárez, southeastern slope of Volcán de Tacaná, *Steyermark* 36381).

A large shrub or a tree, sometimes 12 meters high, the branchlets glabrous; leaves on petioles 7–13 mm. long, oblong or elliptic-oblong, 6.5–10 cm. long, 2.5–3.8 cm. wide, short-acuminate, with acute tip, acute or obtuse at the base, entire, glabrous; staminate flowers 4-parted, fasciculate, the pedicels 2.5 mm. long or less, glabrous; sepals ovate-orbicular, 1 mm. long; corolla glabrous, 1.5 mm. long; fruit unknown.

***Ilex belizensis*** Lundell, Phytologia 1: 217. 1937.

Known only from the El Cayo District of British Honduras, in advanced forest on limestone, the type collected near Valentín, *Lundell* 6247; to be expected in Petén.

A glabrous tree 20–40 meters high, the trunk 30–45 cm. in diameter, the bark rough but not fissured; petioles slender, 6–9 mm. long; leaf blades subcoriaceous, blackening when dried, elliptic to oblong-elliptic or rarely obovate-oblong, 5–12 cm. long, 2.5–4.5 cm. wide, abruptly acuminate with obtuse tip, rounded or obtuse at the base, somewhat paler beneath, entire, the lateral nerves about 8 pairs; fruiting pedicels fasciculate in the leaf axils, 2–4 mm. long, minutely puberulent, bracteolate and articulate; calyx 4 mm. wide, minutely puberulent; fruits ovoid or ellipsoid, 6–7 mm. long, containing 4–5 nutlets.

**Ilex Brandegeana** Loes. Nov. Act. Acad. Leop. Carol. 78: 148. 1901. *I. triflora* Brandeg. Gard. & For. 7: 347. 1894, not Blume, 1826.

Oak forest, 1,300–1,700 meters; Zacapa; Jalapa. Widely distributed in Mexico, the type from Baja California.

A large shrub or small tree, sometimes 10 meters high, the branchlets densely hirsutulous; leaves short-petiolate, elliptic to elliptic-oblong or oblanceolate-oblong, 4–13 cm. long, acute to obtuse or cuspidate-acuminate, coriaceous, acute to almost rounded at the base, appressed-serrulate, hirsutulous to glabrous above, the costa impressed, paler beneath and densely or sparsely hirsutulous with soft spreading hairs; flowers 5–6-parted, fragrant; fruit 7–9 mm. long.

**Ilex discolor** Hemsl. Diag. Pl. Mex. 5. 1878. *Ishum-té*.

Mixed forest, 1,400–1,600 meters; Huehuetenango (between Las Palmas and Chaculá, Sierra de los Cuchumatanes, *Steyermark* 51738). Southern and central Mexico.

Shrub or small tree, 6 meters or more high, the branchlets more or less densely puberulent; petioles 1.5–4 mm. long, densely puberulent to glabrate; leaf blades subcoriaceous, obovate to elliptic-oblong, 2.5–4.5 cm. long, 1–2 cm. wide, acute to rounded at apex, somewhat paler below, crenulate to serrulate, puberulent to glabrate above, densely minutely puberulent to glabrate below, the lateral nerves 4–7 pairs; flowers greenish-yellow; pedicels pubescent to glabrate; calyx puberulent to glabrate, 4-parted; fruiting pedicels pubescent to glabrate, 2–3 mm. long; fruit red, shining, subglobose to ovoid, 5 mm. long, with 3–4 nutlets.

**Ilex Gentlei** Lundell, Field & Lab. 13: 5. 1945.

Known only from the type locality, British Honduras, Toledo District, Punta Gorda-San Antonio road, in broken ridge, *P. H. Gentle* 4807.

A small tree, the trunk 12 cm. in diameter, the branchlets rather stout and puberulent; leaves on stout petioles 2–6 mm. long, coriaceous, obovate to oblanceolate or elliptic, 4–12 cm. long, 2–6.5 cm. wide, acute, obtuse, or abruptly short-acuminate, decurrent at the base, entire, glabrous, the nerves and costa impressed on the upper surface, the lateral nerves 5–8 on each side; fruiting pedicels fasciculate in the leaf axils, puberulent, 6 mm. long or shorter; fruits subglobose, as much as 7 mm. in diameter at maturity, glabrous.

***Ilex gracilipes*** I. M. Johnston, Journ. Arnold Arb. 19: 124. 1938.

Wet forest or open pastures, sometimes in *Abies* forest, 1,700–3,000 meters; endemic; Chiquimula (Montaña Norte, southeast of Concepción de las Minas); Chimaltenango; Quiché (between Nebaj and Chajul); Huehuetenango (type from Soloma, *Skutch* 1060).

A shrub of 2.5–3.5 meters, sometimes a tree of 6 meters, the young branchlets sparsely and finely puberulent; petioles 3–10 mm. long, puberulent or glabrate; leaf blades lance-ovate to broadly ovate or elliptic, 3–5 cm. long, 1.5–2.5 mm. wide, acute or acuminate, obtuse or acute at the base, subcoriaceous, entire or essentially so, glabrous, green and lustrous above, paler beneath, the lateral nerves about 8 pairs, very slender and inconspicuous; pistillate peduncles axillary, solitary and 1–2-flowered, or sometimes short-racemose and several-flowered, puberulent or almost glabrous, 10 mm. long or less, bracteate and articulate; calyx 4-lobate; corolla white, 5 mm. broad, the petals broadly ovate; fruit subglobose, 6-celled, 4–6 mm. long.

***Ilex guianensis*** (Aubl.) Kuntze, Rev. Gen. 1: 113. 1891. *Macoucoua guianensis* Aubl. Pl. Guian. 88. pl. 34. 1775. *I. panamensis* Standl. Field Mus. Bot. 4: 221. 1929.

Wet forest or thickets, sometimes along seashores, at or little above sea level; Alta Verapaz; Izabal. Tabasco; reported from Oaxaca; British Honduras; Honduras; Nicaragua; Panama; West Indies; Venezuela and Guianas.

A shrub or tree, sometimes 12 meters high with a trunk 30 cm. in diameter, but usually lower, the young branchlets puberulent or almost glabrous; petioles mostly 4–10 mm. long; leaf blades often or usually blackish when dried, subcoriaceous, obovate to obovate-oblong, sometimes oblong or oval-oblong, 6–13 cm. long and 2–5 cm. wide, commonly rounded or obtuse, sometimes acute, acute or cuneate-acute at the base, glabrous, the lateral nerves 8–12 pairs, not very conspicuous; peduncles fasciculate in the leaf axils, bracteate and geniculate, glabrous or puberulent; flowers mostly 4-parted, white, fragrant; petals oval or elliptic, 1.5–2 mm. long; fruit ellipsoid or subglobose, turning red and finally black, 4–5 mm. long.

Known in British Honduras by the names “cassada,” “bird-berry,” and “dogwood”; called “garlic wood” in Panama. The wood is said to be creamy white when freshly cut, turning greenish gray upon exposure.

***Ilex quercetorum*** I. M. Johnston, Journ. Arnold Arb. 19: 122. 1938.

Moist, mixed or oak forest, 1,500–2,000 meters; endemic; Zacapa (Sierra de las Minas); Quiché (type collected near Nebaj, *A. F. Skutch* 1663); Huehuetenango (Sierra de los Cuchumatanes).



A tree of 15 meters or less, the young branchlets puberulent; leaves on petioles 3-5 mm. long, lanceolate, 5-8 cm. long, 2 cm. wide, widest at or slightly below the middle, attenuate to each end, acuminate at the apex, acute at the base, entire or the juvenile leaves serrate, coriaceous, puberulent on the costa, elsewhere glabrous or sometimes glabrous throughout, the lateral nerves inconspicuous; fruiting pedicels axillary, solitary, 8-13 mm. long, puberulent, not bracteolate, not articulate; fruiting calyx 4 mm. broad, the 4 lobes apiculate; fruit red, globose, 8-10 mm. in diameter, containing 4 nutlets.

The trunk is said to be as much as 25 cm. in diameter; a number of trunks may arise together to form a clump of trees.

*Ilex tolucana* Hemsl. Diag. Pl. Mex. 5. 1878. *Colorado* (Chimaltenango); *Manzanito* (fide Aguilar).

Wet or moist forest or thickets, 1,500-3,000 meters; Guatemala; Chimaltenango; Suchitupéquez; Huehuetenango; Quezaltenango; San Marcos. Southern Mexico; El Salvador.

A small tree, usually 6-9 meters tall, glabrous throughout or nearly so; leaves commonly thick-coriaceous, on stout petioles 3-6 mm. long, oblong to elliptic-oblong or oblong-oval, mostly 5-9 cm. long and 3-4 cm. wide, obtuse to rounded at the apex, acute or obtuse at the base, serrulate or crenate-serrulate, slightly paler beneath; inflorescences fasciculate in the leaf axils, the staminate dichotomous, few-flowered, the pistillate peduncles usually 1-flowered, 2-4-fasciculate, about 4 mm. long, bracteolate, the flowers 4-parted; calyx 2 mm. broad, the lobes obtuse or subacute; petals white, oval, 3 mm. long; fruit subglobose, turning red or orange, 4-6 mm. long, containing 4 nutlets.

This is a common small tree on the upper slopes of Volcán de Pacaya, also in the forest of Volcán de Acatenango. It is closely related to *I. paraguariensis* St. Hil. of southern South America, whose leaves furnish the "mate" of commerce. This is used widely as a beverage in Brazil, Paraguay, Uruguay, and Argentina, where it largely replaces coffee and tea. Attempts to introduce its use into the United States and elsewhere have not been very successful, but it is sometimes used in making soft drinks.

#### CELASTRACEAE. Bittersweet Family

Shrubs or trees, erect or sometimes scandent; leaves opposite or alternate, often coriaceous, simple, entire or dentate, never lobate; stipules none, or present but small and soon deciduous; flowers small, greenish or white, perfect or by reduction often unisexual, monoecious or dioecious, usually in cymes; calyx small, with 4-5 lobes or segments, these imbricate, persistent; petals 4-5, short, spreading, sessile below the margin of the disk, imbricate; stamens 4-5, inserted on or near the margin of the disk, the filaments subulate; ovary 3-5-celled, the style short, thick, entire or 3-5-lobate, the stigma simple or lobate; ovules 2-1 in each cell, anatropous, erect or rarely pendulous; fruit capsular or drupaceous; seeds

usually erect, with or without an aril; endosperm carnose or sometimes none; embryo generally rather large, the cotyledons flat, foliaceous.

About 40 genera, in tropical and temperate regions of both hemispheres. All the Central American genera are represented in Guatemala except *Schaefferia*, which may well occur in Petén or along the Pacific coast.

Fruit samaroid, with terminal or lateral wings.

Fruit with 3 longitudinal wings; leaves alternate..... *Wimmeria*.

Fruit with a single terminal wing; leaves opposite..... *Zinowiewia*.

Fruit not winged, capsular, drupaceous, or baccate.

Fruit a dehiscent capsule.

Leaves opposite.

Capsule 1-celled; leaves entire..... *Microtropis*.

Capsule 3-5-celled; leaves usually serrulate..... *Euonymus*.

Leaves alternate.

Ovary free from the disk; ovules 2 in each cell; mostly woody vines or scandent to erect shrubs..... *Celastrus*.

Ovary confluent with the disk; ovule 1 in each cell; erect shrubs or trees. *Maytenus*.

Fruit baccate, drupaceous, or an indehiscent capsule.

Flowers paniculate; fruit depressed-globose, about 3.5 mm. in diameter.

*Perrottetia*.

Flowers cymose; fruit longer than broad, or at least not depressed, much more than 5 mm. in greatest diameter.

Leaves all opposite; fruit usually obovoid, drupaceous..... *Rhacoma*.

Leaves partly alternate; fruit globose or broadly ovoid, an indehiscent capsule..... *Elaeodendron*.

## CELASTRUS L.

Erect or mostly scandent shrubs or vines, glabrous or nearly so; leaves alternate, membranaceous, petiolate, entire or serrate; stipules composed of inconspicuous cilia; flowers sometimes unisexual, in terminal or axillary racemes or panicles, the pedicels bracteate; calyx urceolate at the base, 5-fid; petals 5, inserted below the disk, spreading at the apex; stamens 5, inserted in the sinuses of the disk, the filaments subulate, the anthers oblong; disk cupular or concave, 5-lobate; ovary seated on the disk but not immersed in it, 2-4-lobate, 2-4-celled, style short and thick or somewhat elongate, the stigma 3-4-lobate; ovules 2 and collateral in each cell, erect; capsule terete, globose or oblong, coriaceous, 2-4-celled, loculicidally dehiscent, the cells 1-2-seeded, the valves 3-4; seeds erect, surrounded by a conspicuous, usually red or orange aril; testa membranaceous, the endosperm copious, carnose; cotyledons foliaceous.

About 30 species, mostly in Asia, a few in Australia and tropical and temperate America. One other Central American species has been described from Panama. *C. scandens* L., of the eastern half of the United States, is a well-known woody vine, notable for its

handsome yellow and red fruits, which after dehiscence in autumn are much used as house decorations. The Guatemalan species, when in fruit, are very similar in appearance.

Leaves acute or cuneate at the base, elliptic-oblong, 2-3.5 cm. wide, mostly entire or nearly so.....*C. vulcanicolus*.

Leaves mostly rounded or very obtuse at the base, chiefly elliptic or oblong-elliptic, mostly 4-7 cm. wide, entire or crenate-serrate.....*C. chiapensis*.

**Celastrus chiapensis** Lundell, *Lilloa* 4: 380. 1939 (type from Mount Ovando, near Escuintla, Chiapas). *C. Mainsianus* Lundell, *Lloydia* 2: 99. 1939 (type collected along Valentino-Retiro road, El Cayo District, British Honduras, *C. L. Lundell* 6307). *Manzana de montaña* (Quezaltenango; probably a name composed for the occasion).

Moist or wet thickets and forest, 2,800 meters or less; Alta Vera-paz; Chiquimula; Quezaltenango. Chiapas; British Honduras.

A large woody vine, glabrous throughout, sometimes 50 meters long with a stem 5 cm. in diameter; leaves chartaceous or subcoriaceous, on petioles 6-7 mm. long, usually elliptic, 5-12 cm. long, generally 4-7 cm. wide, acute or short-acuminate with an obtuse tip, mostly rounded or broadly obtuse at the base, subentire or crenate-serrate, the lateral nerves 6-9 pairs, very slender, prominulous beneath, the veins laxly reticulate; inflorescences racemose, the racemes mostly fasciculate, as much as 3.5 cm. long, the staminate pedicels slender, the pistillate ones stout, usually articulate at or near the middle, 7 mm. long or less; calyx 5-lobate, the lobes ovate-deltoid, 1-1.2 mm. long, minutely erose-denticulate; petals 5, oblong-elliptic, 2-2.5 mm. long, rounded at the apex, punctate; staminate inflorescence usually paniculate, 2.5-3 cm. long; capsule oval or ovoid, about 1.5 cm. long, the aril bright orange-red.

The vine is a showy one when in fruit. There are no obvious characters by which *C. chiapensis* and *C. Mainsianus* may be separated. One was described from flowering specimens, the other from fruiting material. The leaves are more conspicuously crenate in the latter, but this can scarcely be considered a valid specific character. There is much doubt as to whether either is really distinct from *C. vulcanicolus*.

**Celastrus vulcanicolus** Donn. Smith, *Bot. Gaz.* 61: 373. 1916. *Cerezo* (Quezaltenango).

Moist or wet, mixed forest, 1,300-1,900 meters; so far as known, endemic; Sacatepéquez; Quezaltenango, but to be expected in Chiapas.

A large or rather small, woody vine, often climbing over tall trees, glabrous throughout, the branchlets conspicuously lenticellate; leaves on petioles 3-8 mm.

long, coriaceous or chartaceous, pale green or grayish green when dried, elliptic-oblong, 6-9 cm. long, 2-3 cm. wide, acuminate with an obtuse tip, cuneate or acute at the base, subentire, the lateral nerves about 6 pairs; flowers racemose, the racemes solitary or fasciculate, 8-12-flowered, at anthesis 2 cm. long or shorter, longer in fruit but shorter than the leaves, the pedicels 4 mm. long or less, articulate about the middle; calyx segments ovate, obtuse, 2 mm. long; petals oblong, obtuse, 1.5 mm. long; stamens shorter than the petals; stigma sessile or nearly so; capsule oval, 1.5-2 cm. long, yellow, thin-coriaceous, 1-celled; aril bright red.

### ELAEODENDRON Jacquin

Shrubs or trees, usually glabrous, the branches terete or angulate; leaves opposite and alternate, petiolate, entire or crenate, coriaceous, the stipules minute, caducous; flowers sometimes polygamous, whitish, the inflorescences cymose, axillary, short or elongate, sometimes fasciculate; calyx 4-5-parted; petals 4-5, spreading; stamens 4-5, inserted below the margin of the disk, the filaments short, subulate, the anthers subglobose; disk thick, explanate, sinuately 4-5-angulate or lobate; ovary pyramidal, confluent with the disk, usually 3-angulate and 3-celled, rarely 2-5-celled; style very short, the stigma 2-5-lobate; ovules 2 in each cell, erect from the base of the cell; fruit drupaceous, dry or with scant pulp, the stone 1-3-celled, the cells usually 1-seeded; seed erect, not arillate, the testa membranaceous or spongy, the endosperm carnose, copious or scant; cotyledons flat.

Species 25-30, in the tropics of both hemispheres. Only one is known from Central America.

*Elaeodendron trichotomum* (Turcz.) Lundell, *Lloydia* 2: 101. 1939. *Maytenus trichotomus* Turcz. Bull. Soc. Nat. Moscou 31, pt. 1: 451. 1858.

Moist or wet, mixed forest, 500-2,500 meters; Chiquimula; San Marcos. Western and southern Mexico.

A glabrous shrub or tree, sometimes 12 meters high, the young branches terete or subangulate; leaves partly opposite and partly alternate, coriaceous, pale, rather grayish green when dried, elliptic or oblong-elliptic, 8-13 cm. long, 3-6 cm. wide, obtuse or subacute, broadly cuneate at the base, rather coarsely and remotely crenate, on stout petioles 1.5 cm. long or shorter; cymes axillary, 4.5 cm. long or less, on short or elongate peduncles, rather few-flowered, often subracemose, the pedicels short and thick; calyx 3.5 mm. wide, the lobes broadly ovate, obtuse; petals longer than the calyx; ovary subglobose, the style short and thick; fruit subglobose, 1-2.5 cm. long.

The single fertile Guatemalan collection has fruit 2.5 cm. long, considerably larger than that originally described. The San Marcos collection is sterile, but in foliage agrees perfectly with Mexican material of the species. The wood in this genus is pinkish brown, hard, heavy, tough, strong, fine-textured, and fairly durable. It has little or no economic importance.

## EUONYMUS L.

Trees or shrubs, erect (in Guatemalan species) or rarely scandent, usually glabrous, the branchlets tetragonous; leaves opposite, petiolate, coriaceous to membranaceous, entire or serrate, the stipules caducous; flowers small, green or purplish, cymose, the cymes pedunculate, axillary, generally few-flowered; calyx 4-5-lobed, the segments spreading or recurved; petals 4-5, inserted below the disk, spreading, entire, dentate, or fimbriate; stamens 4-5, inserted above or on the margin of the disk, the filaments subulate, usually very short, the anthers broad, didymous; disk carnos, large, explanate, 4-5-lobate; ovary immersed in the disk and confluent with it; style short, the stigma 3-5-lobate; ovules mostly 2 in each cell, ascending or resupinate from the inner angle; capsule 3-5-celled, sometimes angulate or winged, coriaceous, often tuberculate or echinate, the cells 1-2-seeded, loculicidally 3-5-valvate; seeds inclosed in an aril, the testa chartaceous; endosperm carnos; embryo orthotropous, the cotyledons broad, foliaceous, the radicle inferior.

About 70 species, mostly in temperate regions, in the tropics found in the mountains, most of the species Asiatic, a few in Europe and North America. One other is recorded from Costa Rica.

Fruit obtusely tuberculate.....*E. acuminata*.  
 Fruit smooth, not at all tuberculate.....*E. enantiophylla*.

***Euonymus acuminata* Benth. Pl. Hartweg. 59. 1840.**

Moist or wet, mixed forest, 1,500-2,600 meters; El Progreso; Guatemala; Sacatepéquez; Quiché; San Marcos. Southern Mexico.

A glabrous shrub or tree, often 6-9 meters high, the young branches slender, green, terete or angulate; leaves firm-membranaceous, on rather stout petioles 4 mm. long or shorter, ovate-lanceolate to oblong-elliptic, 5-10 cm. long, 2-4 cm. wide, long-acuminate, with an acute or obtuse tip, broadly cuneate to rounded at the base, inconspicuously and finely crenate, scarcely paler beneath; peduncles short, mostly 3-5-flowered, solitary or fasciculate in the leaf axils, the pedicels slender and elongate; capsule globose or depressed-globose, about 1 cm. in diameter, green, densely and coarsely tuberculate, as broad as long or broader, rounded at the apex.

***Euonymus enantiophylla* (Donn. Smith) Lundell, Lloydia 2: 100. 1939. *Maytenus enantiophyllus* Donn. Smith, Bot. Gaz. 55: 432. 1913.**

Moist mixed forest, 1,899-3,000 meters; endemic; Baja Verapaz; El Progreso; Chimaltenango; Sololá; Suchitepéquez; Quiché (type from Chiúl, *Heyde & Lux* 3087).

A glabrous shrub or tree, sometimes 7 meters high, the younger branches very slender, green, angulate; leaves thick-membranaceous, on petioles 3-7 mm. long, ovate-lanceolate or oblong-elliptic, 8-11 cm. long, 2.5-3.5 cm. wide, acuminate or long-acuminate, rounded or obtuse at the base, crenate-serrulate,

punctate beneath; cymes long-pedunculate, once or twice trichotomous, the branches very slender, the peduncles 2-3.5 cm. long; sepals semiorbicular, 1 mm. long; petals rounded-obovate, 4 mm. long; style very short; capsule subglobose, greenish, 1 cm. in diameter, smooth, 2-3-celled; aril red.

The wood in this genus is yellowish white, fine-textured, and easily worked. That of the European species is used for making spindles, manicure sticks, and other small articles of turnery.

### MAYTENUS Feuillée

Shrubs or small trees, mostly glabrous or nearly so; leaves persistent, coriaceous, often distichous, alternate, petiolate, serrate or entire, the stipules minute, deciduous; flowers small, polygamous, cymose, solitary, or fasciculate, axillary, white or yellowish; calyx 5-fid, the petals spreading; stamens 5, inserted below the disk, the filaments subulate, the anthers ovate-cordate; disk orbicular, the margin undulate; ovary immersed in the disk and confluent with it, 2-4-celled; style none or short and thick, the stigma 2-4-lobate; ovules solitary or geminate in the cell, erect; fruit capsular, coriaceous, 1-3-celled, loculicidally 2-3-valvate; seed erect, arillate, the testa crustaceous; endosperm carnose or none; cotyledons foliaceous.

About 70 species are reported, all in tropical America and mostly in South America, but many of them are much alike in appearance, and the true number probably is considerably lower. One or two other species are known in extreme southern Central America.

Leaves very obtuse.....*M. belizensis*.

Leaves acute or acuminate, the tip often obtuse.

Pedicels short, mostly less than 4 mm. long, conspicuously thickened above.

*M. Matudai*.

Pedicels elongate, not thickened above, mostly 6-10 mm. long.

Petioles 3-5 mm. long; leaves 1.5-3 cm. wide.....*M. guatemalensis*.

Petioles 6-9 mm. long; leaves 2.5-5.5 cm. wide.....*M. Schippii*.

**Maytenus belizensis** Standl. Carnegie Inst. Wash. Publ. 461: 69. 1935.

Known only from the type, in forest, Jacinto Hills, British Honduras, 270 meters, *W. A. Schipp* S617.

A glabrous tree of 10 meters, the trunk 20 cm. in diameter; leaves on petioles 4-6 mm. long, coriaceous, entire, oblong or elliptic-oblong, 4.5-7 cm. long, 1.5-2.5 cm. wide, somewhat narrowed toward the obtuse or rounded apex, usually acute at the base, slightly paler beneath, the nerves and veins obscure or obsolete; flowers axillary, solitary or fasciculate, the pedicels stout, 3-4 mm. long; calyx persistent at the base of the fruit, 2 mm. broad, shallowly and obtusely dentate; capsule 1-seeded, ellipsoid or obovoid, apiculate, 6-9 mm. long, orange-red, smooth.

**Maytenus guatemalensis** Lundell, *Phytologia* 1: 305. 1939.

Known with certainty only from the type, *W. A. Schipp* S635, collected in Petén, at Camp 35, on the British Honduras boundary; sterile material from Cerro Chinajá, Alta Verapaz, may belong here.

A glabrous shrub a meter high; petioles 3–5 mm. long; leaf blades coriaceous, oblong-elliptic or narrowly elliptic, 4–7 cm. long, 1.5–3 cm. wide, abruptly rather long-acuminate, with an obtuse tip, broadly cuneate at the base, obscurely and minutely crenulate-serrate, the lateral nerves 7–9 pairs, prominulous beneath; flowers axillary, creamy white, fasciculate, the pedicels about 5 mm. long; calyx minute, 5-dentate, the teeth broadly deltoid; capsule obovoid, 11 mm. long, broadly rounded at the apex and tipped by the short persistent style, 1-seeded, brown.

The wood of certain South American species of this genus is of some economic importance. It is hard and heavy, but not durable in contact with the ground. All the species of *Maytenus* of the Guatemalan region are much alike, and it remains to be seen whether they can be maintained when more extensive material is available for study. Both this species and *M. Schippii* have been reported from the area as *M. longipes* Briq., a species of northern South America to which they all are very closely related.

**Maytenus Matudai** Lundell, *Lilloa* 4: 383. 1939.

Known only from the type, *E. Matuda* 2983, collected on the northern slope of Volcán de Tacaná, Chiapas; doubtless extending into San Marcos.

Glabrous throughout; stipules ovate, acuminate, minutely erose-denticulate, deciduous; petioles 3.5–8 mm. long; leaf blades subcoriaceous, oblong-elliptic, 5–12 cm. long, 2–4.5 cm. wide, acute or acuminate, with an obtuse tip, broadly cuneate at the base, irregularly and obscurely crenate-serrate or almost entire, the lateral nerves 7–9 pairs, inconspicuous; flowers fasciculate, the pedicels less than 5 mm. long, conspicuously thickened above; calyx cupuliform, 2.5 mm. broad, shallowly 5-lobate, the lobes rounded; petals broadly ovate, 2 mm. long, minutely erose; ovary 2-celled, the cells 2-ovulate; style thick and short.

**Maytenus Schippii** Lundell, *Phytologia* 1: 305. 1938.

Moist or wet forests, often or usually on limestone, 300 meters or less; Petén (Carmelita, *F. E. Egler* 42–250). Chiapas; Tabasco; British Honduras (type from Punta Gorda, *W. A. Schipp* 1014).

A glabrous tree or shrub, 10 meters high or less, the trunk sometimes 20 cm. in diameter, the wood cream-colored, the branches slender, subangulate; petioles 6–9 mm. long; leaf blades coriaceous, often lustrous when dry, paler beneath, elliptic or sometimes obovate-elliptic or ovate, 5–11 cm. long, 2.5–5 cm. wide, acute, acuminate, or abruptly acute, with a usually obtuse tip, broadly cuneate

or rounded at the base, rather remotely crenate-serrate, the lateral nerves 7-11 pairs, inconspicuous but prominulous beneath; flowers fasciculate in the leaf axils, on pedicels 4-6 mm. long; calyx persistent, 5-dentate, scarcely 2 mm. broad; capsule orange, obovoid, 9-12 mm. long, 2-celled, 1-3-seeded, the aril red.

This has been reported from British Honduras as *M. longipes* Briq. The type collection was distributed as *M. Schippii* Standl., a name never published.

### MICROTROPIS Wallich

*Reference:* T. A. Sprague, The American species of *Microtropis*, Kew Bull. 1909: 362-364. 1909.

Glabrous trees or shrubs, the branches opposite, terete; leaves opposite, persistent, petiolate, coriaceous, entire, without stipules; flowers sometimes unisexual, small, white, in pedunculate axillary cymes or in sessile fascicles; sepals 5, imbricate, persistent, 2 of them exterior; petals 5, rarely none, imbricate, connate at the base into a persistent annulus, this free or confluent with the disk, the petals fleshy, rounded; stamens 5, the filaments very short, subulate, the anthers broadly ovoid; disk none or annular, free or connate with the petals; ovary free, ovoid, perfectly or imperfectly 2-3-celled; style stout, the stigma minute, 2-4-lobate; ovules 2 in each cell, geminately attached to the central angle; capsule oblong, coriaceous, 1-celled, 2-valvate, 1-seeded, tardily dehiscent; seed erect, oblong, the testa often red and succulent; endosperm carnose, the cotyledons foliaceous.

Species about 14, in tropical America and southern Asia. Two others have been described from southern Central America.

Leaves mostly oblong-ob lanceolate, generally 1.5-2 cm. wide . . . *M. guatemalensis*.  
Leaves mostly elliptic or oblong-elliptic, mostly 2.5-4 cm. wide.

Leaves coriaceous, very pale beneath . . . . . *M. ilicina*.

Leaves chartaceous or membranaceous, little if at all paler beneath.

*M. occidentalis*.

**Microtropis guatemalensis** Sprague, Kew Bull. 1909: 364. 1909. *Café de monte*.

Wet, mixed mountain forest, sometimes in wet pine-oak forest, 2,400-3,350 meters; endemic; Quiché (type from Chiúl, *Heyde & Lux* 3088); Huehuetenango (Sierra de los Cuchumatanes).

A glabrous shrub or tree of 6-9 meters, densely branched, the branches tetragonous; leaves subcoriaceous, on petioles 4-5 mm. long, somewhat yellowish green when dried, oblanceolate or oblong-ob lanceolate, mostly 4-6.5 cm. long and 1.5-2 cm. wide, broadest above the middle, obtuse or narrowed to an obtuse apex, attenuate at the base, slightly paler beneath, the lateral nerves about 7 pairs, the veins conspicuously elevated and reticulate; cymes 1-1.5 cm. long, once or twice branched, few-flowered, the stout peduncles 4-8 mm. long,



the thick pedicels 1 mm. long, articulate below the middle; flowers 4-5-parted; outer sepals 1.5 mm. long, 2 mm. wide, the inner ones twice as large; petals suborbicular, 2 mm. broad; fruit narrowly obovoid, about 8 mm. long, apiculate.

In this genus the wood is white throughout, of medium luster, odorless and tasteless, rather light in weight but firm, somewhat harder and heavier than that of *Tilia*; of fine and uniform texture, straight-grained, easy to work, finishing smoothly; not resistant to decay.

**Microtropis ilicina** Standl. & Steyer. Field Mus. Bot. 23: 170. 1944.

Moist or wet, mixed mountain forest, 1,600-2,800 meters; endemic; El Progreso; Zacapa (type from southern slopes of Volcán Gemelos, Sierra de las Minas, *Steyermark* 43284); Huehuetenango (Cerro Pixpix, above San Ildefonso Ixtahuacán).

A glabrous tree of 9-12 meters, the branchlets purplish fuscous; leaves petiolate, coriaceous, entire, the stout petiole 7-10 mm. long; leaf blades elliptic or oblong-elliptic, broadest near the middle, 6.5-9.5 cm. long, 2.5-4.5 cm. wide, acute or subacuminate, with an obtuse tip, acute at the base, lustrous on both surfaces, rather yellowish green above when dry, the costa and nerves prominent, very pale beneath, silvery when fresh, the costa elevated, the lateral nerves about 8 on each side, scarcely prominent, the veins inconspicuous, laxly reticulate; peduncles 1-1.5 cm. long, stout, the cymes 1-2-branched, dense, few-flowered, 1-2 cm. broad, the pedicels thick, short, the bracts broad, blackish-marginate; outer sepals pale, 1.5 mm. long, 2 mm. wide, fuscous-marginate, the inner ones larger, erose-denticulate; petals white; capsule narrowly obovoid, acute or obtuse, narrowed near the base, 12-15 mm. long.

**Microtropis occidentalis** Loes. in Donn. Smith, Bot. Gaz. 24: 393. 1897.

Moist or wet, mixed forest, 1,000-1,300 meters; Quezaltenango(?); San Marcos. Southern Mexico; Costa Rica.

A glabrous shrub or small tree, sometimes 6 meters high or more, reported as sometimes subscandent or epiphytic; leaves chartaceous, on petioles 8-10 mm. long, elliptic or oblong-elliptic, chartaceous, mostly 7-12 cm. long and 2-5 cm. wide, acuminate with an obtuse tip, acute at the base, paler beneath, the lateral nerves about 6 pairs, very slender and inconspicuous; inflorescences usually solitary in the leaf axils, on peduncles 6-12 mm. long, mostly 4-7-flowered, the pedicels very short and thick; sepals 4 or usually 5, rounded, unequal, the inner ones larger, fimbriate; petals 4-5, orbicular, whitish; capsule oblong or obovoid, apiculate, 1-celled, 12-13 mm. long, 1-seeded, dark green.

The bark is gray to grayish green and almost smooth. The leaves are dark green and very lustrous on the upper surface. In Costa Rica the tree sometimes reaches a height of 15 meters.

## PERROTTETIA HBK.

Trees or large shrubs; leaves alternate, petiolate, membranaceous, finely serrate, sometimes glandular; stipules small, deciduous; flowers very small, polygamo-dioecious, in axillary thyrsoid panicles with very slender branches; calyx tube broadly obconic, the 5 lobes erect, remote, triangular, open or imbricate in bud; petals 5, triangular, short, valvate or subimbricate; stamens inserted on the margin of the disk, several times as long as the petals, or the filaments very short in the pistillate flower, filiform, the anthers small, didymous; disk of the staminate flower plane, of the pistillate flower annular; ovary ovoid, not confluent with the disk, 2-celled; style short or elongate, 2-fid at the apex, the lobes recurved, stigmatose on the inner side; ovules 2 in each cell, erect; fruit small, baccate, globose, 2-celled, 2-4-seeded; seeds subglobose, with a broad hilum, the testa crustaceous within, carnose outside, multicostate, the endosperm carnose; embryo minute.

Species about 6, in the mountains of tropical America and in the Hawaiian Islands. One other is known in Central America.

*Perrottetia longistylis* Rose, Contr. U. S. Nat. Herb. 5: 110. 1897. *Alis* (San Marcos); *Capulaltapa* (fide Aguilar).

Moist or wet forest or thickets, often on banks along streams, 550-2,900 meters, mostly at 1,200 meters or higher; Alta Verapaz; Baja Verapaz; El Progreso; Escuintla; Quiché; Huehuetenango; Quezaltenango; San Marcos. Southern Mexico.

A large shrub or a tree, commonly 6-12 meters high with a trunk 15 cm. or more in diameter, the branches slender, glabrous or nearly so; leaves short-petiolate, ovate-oblong or elliptic-oblong, 7-20 cm. long, 3-8 cm. wide, acuminate, often abruptly so, rounded to broadly cuneate at the base, finely and closely serrate with acute teeth, glabrous above, scarcely paler beneath, finely puberulent or in age usually glabrous or essentially so, laxly reticulate-veined; panicles many-flowered, minutely puberulent, usually much shorter than the leaves, the flowers on very short pedicels; flowers minute, greenish, scarcely more than 1.5 mm. broad, the minute petals scarcely exceeding the short calyx teeth; fruit red, juicy, depressed-globose, 3.5 mm. or less in diameter.

This is a common tree in the mountains of the Occidente, in general appearance reminding one somewhat of the chokecherry of the United States (*Prunus virginiana*). It has been reported from Guatemala as *P. lanceolata* Karst., a Colombian species. The leaves often bear on the lower surface along the costa, especially near the base of the blade, large and conspicuous shelters for parasites.

## RHACOMA L.

Shrubs or small trees, glabrous or pubescent; leaves mostly opposite or verticillate, sometimes alternate, entire or crenate, membranaceous to coriaceous, the stipules small and inconspicuous; flowers small, cymose or subsolitary

at the ends of short or elongate peduncles, generally 4-parted; calyx small, the tube short, urceolate, the 4-5 lobes rounded; petals 4-5, reflexed; stamens 5, inserted between the lobes of the disk, the filaments subulate, the anthers subglobose; disk almost plane, 4-5-lobate; ovary sessile, confluent with the disk, 3-4-celled, the style very short, the stigma 3-4-lobate; ovules solitary in the cells, erect; fruit small, dry or fleshy, usually obovoid, coriaceous or drupaceous, the stone crustaceous or osseous, commonly 1-celled; seeds erect, with or without an aril, the testa membranaceous; endosperm carnose; cotyledons broad, flat.

About 20 species, in tropical America. Only the following are known from Central America. The wood is brown to dark brown, hard, heavy, fine-grained. It has little or no use except possibly for fuel.

Flowers glabrous.

Flowers sessile or nearly so; leaves coriaceous.....*R. Tonduzii*.

Flowers slender-pedicellate, the pedicel usually as long as the flower; leaves membranaceous or chartaceous.

Leaves entire or nearly so, acute or short-acuminate, chartaceous.

*R. riparia*.

Leaves conspicuously crenate-serrate, usually long-attenuate, membranaceous.

*R. Standleyi*.

Flowers minutely puberulent or short-pilose.

Leaves coriaceous, narrowly long-attenuate to the base, the veins very conspicuous and closely reticulate on both surfaces.....*R. Gaumeri*.

Leaves membranaceous, broadly cuneate to very obtuse at the base, the veins inconspicuous, laxly reticulate.

Leaf blades mostly elliptic or ovate-elliptic and 2.5-5 cm. wide.*R. eucymosa*.

Leaf blades lanceolate to oblong-lanceolate or oblanceolate, 2 cm. wide or narrower.

Leaves narrowly oblanceolate, 1.3 cm. wide or narrower; sepals 0.6-0.8 mm. long.....*R. Gentlei*.

Leaves lanceolate or oblong-lanceolate, 1-2 cm. wide; sepals 1 mm. long.  
*R. puberula*.

**Rhacoma eucymosa** (Loes. & Pitt.) Standl. Carnegie Inst. Wash. Publ. 461: 69. 1935. *Myginda eucymosa* Loes. & Pitt. Contr. U. S. Nat. Herb. 12: 175. *pl.* 18. 1909. *Tzolucuc* (Petén).

Moist or wet, usually dense, mixed forest, 300 meters or less; Petén; Alta Verapaz (type collected along Río Cahabón, between Chimaxte and Cajal, *H. Pittier* 239); Izabal. British Honduras along the Atlantic lowlands to Panama.

A slender shrub or small tree, often 6-9 meters high but usually lower, the branchlets green, puberulent or almost glabrous; leaves membranaceous or firm-membranaceous, on petioles 5 mm. long or shorter, glabrous, mostly elliptic or ovate-elliptic, 4.5-10 cm. long, 2.5-5 cm. wide, acuminate, broadly cuneate at the base, somewhat paler beneath, obscurely serrulate; inflorescences cymose,

long-pedunculate, few-many-flowered, usually much shorter than the leaves, the pedicels filiform, puberulent, generally 1-2 mm. long but in fruit much longer; flowers yellowish green or cream-colored, sometimes reddish or purplish; sepals orbicular, 1 mm. long, puberulent or minutely spreading-pilose; petals obovate, 2-2.5 mm. long; style very short; fruit broadly obovoid, 1-1.5 cm. long, rounded at the base, narrowed at the apex, becoming red and finally black.

Called "limoncillo" in British Honduras. In many parts of the Atlantic lowlands of Central America this is a common and often abundant shrub in the dense high rain forest.

**Rhacoma Gaumeri** (Loes.) Standl. Field Mus. Bot. 12: 229. 1936. *Myginda Gaumeri* Loes. Field Mus. Bot. 1: 401. 1898.

Moist or wet thickets or thin forest, mostly on limestone, 200 meters or less; Petén. Campeche; Yucatan; British Honduras.

A shrub, commonly about a meter high, glabrous except in the inflorescence, the young branches green, tetragonous, sometimes sparsely hirtellous; leaves on rather stout petioles 12 mm. long or shorter, ovate to elliptic or obovate-elliptic, 5-11 cm. long, 2-5.5 cm. wide, obtuse to acuminate, usually bright green when dried, coriaceous, lustrous, narrowly long-attenuate to the base, appressed-serrate, often conspicuously so, the nerves and veins elevated and very conspicuous on both surfaces, the veins closely reticulate; inflorescences mostly 4 cm. long or shorter, few-many-flowered, the branches stout, the pedicels filiform, much longer than the flowers, puberulent; flowers densely puberulent or minutely pilose; calyx 1.5 mm. broad, the lobes short, rounded; petals maroon-red, orbicular, more than 1 mm. long; stamens very short; style almost none; fruit obovoid, somewhat asymmetric, almost or fully 1 cm. long, somewhat narrowed to the base.

The Maya name in Yucatan is recorded as "camba-och-lob."

**Rhacoma Gentlei** Lundell, Carnegie Inst. Wash. Publ. 478: 212. 1937. *Myginda Gentlei* Lundell, Bull. Torrey Club 64: 553. 1937.

Known only from the type, collected in forest on limestone hill, Gracie Rock, Sibun River, Belize District, British Honduras, *P. H. Gentle* 1527.

A shrub or small tree, 2-5 meters high, the branchlets tetragonous, glabrous; leaves glabrous, on petioles 2.5-3.5 mm. long, membranaceous, narrowly oblanceolate, 2.5-4.5 cm. long, 6-13 mm. wide, obtuse and mucronate or acute, cuneate at the base, serrulate; inflorescences solitary, 2.5-5 cm. long, the branches sparsely puberulent, the flowers 14 or fewer, the peduncle 1.5-3.5 cm. long, the pedicels 6-10 mm. long, glabrous; sepals depressed-orbicular, 0.6-0.8 mm. long or shorter, the outer ones puberulent; petals suborbicular, 2 mm. wide, minutely erose, wine-colored; ovary 2-celled, the style short; fruit obovoid, asymmetric, 8-10 mm. long, verrucose when dried.

**Rhacoma lanceifolia** Lundell, Field & Lab. 13: 6. 1945.

Known only from the type, British Honduras, Toledo District, between Rancho Chico and Cockscomb, Monkey River, on hillside in wild-coffee ridge, *P. H. Gentle* 4320.

A small tree, the trunk 10 cm. in diameter, the branchlets acutely angulate, sparsely puberulent, compressed at the nodes; leaves on sparsely puberulent petioles 2–4 mm. long, subchartaceous, slightly paler beneath, lanceolate or narrowly lanceolate, 6–13 cm. long, 1.5–4.5 cm. wide, attenuate-acuminate, subobtusate at the base, subentire, sparsely puberulent at first; cymes axillary, 6.5 cm. long or shorter, many-flowered, puberulent, the pedicels slender, puberulent, 1.5 mm. long or less at anthesis, elongate in age; sepals 4, broadly ovate, 0.7 mm. long, erose, puberulent; petals suberect, obovate-elliptic, 2.2–2.5 mm. long, short-unguiculate, glabrous; disk annular, thin, lobate; ovary 2-celled, with 1 erect ovule in each cell; stigma bifid.

We have seen no material of this species, and it is not included in the key. Its author states that it resembles closely *R. macrocarpa* (Brandeg.) Standl. of Chiapas.

**Rhacoma puberula** (Lundell) Standl. & Steyermark. Field Mus. Bot. 23: 60. 1944. *R. riparia* var. *puberula* Lundell, Carnegie Inst. Wash. Publ. 478: 213. 1937. *Myginda puberula* Lundell, Bull. Torrey Club 64: 553. 1937.

Along limestone bluffs, about 75 meters; Petén (Río Cancuén, *Steyermark* 45927). Moist or wet forest, at or little above sea level; British Honduras (type collected on bank of Northern River near Prospecto, Belize District, *P. H. Gentle* 871).

A slender shrub, 1.5–2.5 meters high, the branchlets tetragonous, glabrous, green; leaves on petioles 1–3 mm. long, membranaceous, narrowly lanceolate or oblong-lanceolate, 2.5–7 cm. long, 1–2 cm. wide, usually rather long-acuminate, cuneate to obtuse at the base, inconspicuously serrulate, grayish green when dried; inflorescence cymose, solitary in the leaf axils, 1.5–2.5 cm. long, few-flowered, the branches almost glabrous, the peduncles 7–14 mm. long, the pedicels about 7 mm. long; sepals orbicular-ovate, 1 mm. long or less, minutely erose, minutely puberulent; petals suborbicular, 2 mm. wide, minutely erose, wine-colored; stigma subsessile, minutely 2-fid; fruit obovoid, asymmetric, 9 mm. long, wine-colored (probably black at maturity), verrucose when dried.

The local representatives of this genus are closely related, and it is questionable whether all those recognized here are truly distinct. All except *R. Gaumeri* are much alike in general appearance.

**Rhacoma riparia** Lundell, Carnegie Inst. Wash. Publ. 478: 213. 1937. *Myginda riparia* Lundell, Bull. Torrey Club 64: 553. 1937.

Wet thickets or forest, 500 meters or less; Petén (type collected at edge of Río San Pedro Mártir, below El Paso, *C. L. Lundell* 1476); Alta Verapaz (Río Semococh).

A slender shrub or small tree, 5 meters high or less, glabrous throughout, the branchlets tetragonous; leaves on petioles 2–3 mm. long, membranaceous, oblanceolate, oblong-oblanceolate, or elliptic-oblong, 4.5–9 cm. long, 1.5–2.5 cm. wide, acute, cuneate at the base, obscurely crenulate-serrulate; inflorescences cymose, axillary, solitary, 2–3 cm. long, with 14 or fewer flowers, the peduncles 1.5–2.5 cm. long, the filiform pedicels 3–6 mm. long; sepals rounded-ovate, 0.7 mm. long, minutely erose; petals suborbicular, 2 mm. wide, minutely erose, wine-colored; ovary 2-celled, the stigma subsessile, minutely 2-fid; fruit obovoid, asymmetric, 9 mm. long, verrucose when dried.

**Rhacoma Standleyi** (Lundell) Standl. & Steyerl. Field Mus. Bot. 23: 60. 1944. *Myginda Standleyi* Lundell, Bull. Torrey Club 67: 618. 1940.

Moist or wet, usually dense, mixed forest, 900–1,700 meters; so far as known, endemic, but to be expected in Chiapas; Suchitepéquez; Quezaltenango; San Marcos (type from Finca Vergel, near Rodeo, *Standley* 68938).

A shrub or small tree, 2–6 meters high, the branchlets very slender, tetragonous, glabrous; leaves on petioles 2–4 mm. long, membranaceous, pale beneath, lanceolate or narrowly lanceolate, 4–11 cm. long, 1–3 cm. wide, long-attenuate, acute at the base, serrulate, the lateral nerves 5–7 pairs, rather conspicuous beneath, directed upward; inflorescences solitary in the leaf axils, slender-pedunculate or almost sessile, the branches glabrous, the flowers 15 or fewer, the filiform pedicels mostly 3 mm. long or less, glabrous or sparsely puberulent; sepals ovate, 0.6 mm. long, minutely erose; petals broadly ovate or suborbicular, 1.5 mm. long; style short; fruit obovoid, asymmetric, orange (at maturity probably almost black), very obtuse, almost 1 cm. long.

**Rhacoma Tonduzii** (Loes.) Standl. & Steyerl. Field Mus. Bot. 23: 60. 1944. *Gyminda Tonduzii* Loes. Bot. Jahrb. 29: 98. 1900. *G. costaricensis* Standl. Field Mus. Bot. 18: 632. 1937. *Retoña*; *Palo de peine*.

Dense, moist or wet, mixed mountain forest, 1,800–2,300 meters; Jalapa; Guatemala; Sacatepéquez; Chimaltenango; Quezaltenango; Huehuetenango. Chiapas; Costa Rica.

A small or sometimes large tree, glabrous throughout, the branches rather stout, subterete or tetragonous; leaves coriaceous, grayish green when dried, on stout petioles 2–6 mm. long, oblong or narrowly elliptic-oblong, 3.5–6.5 cm. long, 1.5–3 cm. wide, obtuse or acute, cuneate or obtuse at the base, serrulate or crenulate-serrulate, the lateral nerves 6–9 pairs, very slender and inconspicuous; inflorescences solitary in the leaf axils, several-many-flowered, the peduncles 5–10 mm. long, the branches short and stout, the flowers greenish

white, sessile or nearly so; sepals rounded; petals elliptic, 3-4 times as long as the sepals, almost 3 mm. long; style very short; ovary 2-celled; fruit ellipsoid or obovoid, blackish, 1-seeded.

The fine-grained wood is said to be utilized in Guatemala for making fine-toothed combs, one of the common manufactures of this and other Central American countries.

### WIMMERIA Schlechtendal

Shrubs or small trees, glabrous or pubescent; leaves alternate, short-petiolate, serrate or almost entire, often coriaceous, without stipules; flowers small, greenish white, in axillary cymes; calyx small, 5-lobate; petals 5, spreading, inserted at the base of the disk; stamens 5, inserted with the petals and about equaling them, the filaments filiform, the anthers broadly oblong; disk explanate, thick, carnose, obtusely pentagonal; ovary trigonous-pyramidal, 3-winged, confluent at the base with the disk, 3-celled, attenuate into a short thick style, the stigma 3-lobate; ovules 6-8 in each cell, affixed 2-seriately to the axis; fruit broadly oblong-quadrate, cordate at the base, 3-winged, indehiscent, 1-celled, 1-2-seeded, the wings broad, membranaceous, often colored; seeds narrowly linear, terete, the testa granulate, the endosperm carnose; cotyledons flat, lanceolate.

Species about 10, in Mexico and Central America. Only the following have been found in Central America.

Leaves glabrous; fruit 2.5-5 cm. long.....*W. Bartlettii*.

Leaves densely pubescent, at least beneath; fruit 1-2 cm. long.

Leaves obovate or spatulate, 8-30 mm. long; fruit 6-10 mm. long.

*W. pubescens*.

Leaves ovate or lance-ovate, mostly 2.5-6 cm. long; fruit usually 12-25 mm. long.....*W. cyclocarpa*.

**Wimmeria Bartlettii** Lundell, Bull. Torrey Club 65: 467. 1938. *Quiebra-hacha blanca*, *Chintoc*, *Ixolte ixnuc* (Petén, the last two names Mayan). Wet to rather dry, mixed forest, 400 meters or less; Petén; Alta Verapaz; Izabal. Tabasco; British Honduras.

A small or large tree, often about 6 meters high but sometimes 20-27 meters high, with a trunk as much as 60 cm. in diameter, the bark almost smooth, gray, glabrous throughout, the branchlets green; leaves subcoriaceous, on slender petioles 7-12 mm. long, lanceolate, elliptic-lanceolate, or ovate-lanceolate, 6-13 cm. long, 2-5.5 cm. wide, acuminate at each end, slightly paler beneath; cymes short-pedunculate, 1.5-3.5 cm. long, densely many-flowered, the flowers green or greenish white, on pedicels 3-13 mm. long; calyx lobes ovate-triangular, obtuse; petals 3 mm. long, fimbriate; fruit crimson, turning purple-red when dried, broadly ovate to broadly oblong, 2.5-5 cm. long, 3-4 cm. wide, deeply cordate at the base, shallowly or deeply emarginate at the apex, much longer than broad; seeds as much as 18 mm. long.

This has been reported from Petén and British Honduras as *W. concolor* Schlecht. & Cham. The wood in this genus is hard and heavy, fine-textured, reddish or purplish brown. That of the present species is reported to be utilized in Petén for making marimba keys. Trees probably of this species, observed near Tucurú, Alta Verapaz, were showy because of their great abundance of bright red fruits.

***Wimmeria cyclocarpa*** Radlk. in Donn. Smith, Bot. Gaz. 18: 199. 1893. *Colipava* (Chiquimula); *Palo de danta* (Amatitlán); *Flor de nácar* (fide Aguilar); *Mariposa rosada*; *Canilla de venado*; *Naranjillo* (Sacatepéquez).

Moist or dry, often rocky thickets or thin forest, sometimes in oak forest, often in wooded ravines, 1,000–2,100 meters; Baja Verapaz; Zacapa; Chiquimula; Jalapa; Santa Rosa (type from Volcán de Jumaytepeque, *Heyde & Lux* 3708); Escuintla; Guatemala; Sacatepéquez; Chimaltenango; Huehuetenango. El Salvador.

A shrub or small tree, often 6–10 meters high but sometimes flowering when only a shrub of 1.5–2.5 meters, rather densely and softly pubescent on the branchlets, leaves, and inflorescence; leaves on rather short, slender petioles, membranaceous or chartaceous, mostly elliptic-lanceolate or oblong-lanceolate, generally 2.5–7 cm. long, acute or sometimes obtuse, acute or attenuate at the base, minutely and inconspicuously glandular-serrulate; cymes mostly much shorter than the leaves and 7–15-flowered, the flowers slender-pedicellate; calyx 2 mm. broad or smaller; fruit suborbicular, usually 12–25 mm. long, sometimes broader than long, usually red or rose-colored, rather densely puberulent, shallowly or deeply emarginate at each end.

Called “Lupita” in Salvador. This also is a showy plant, conspicuous at a distance because of the abundant, brightly colored fruit.

***Wimmeria pubescens*** Radlk. Sitzungsab. Math. Phys. Akad. Wiss. München 8: 378. 1878. *W. guatemalensis* Rose, Contr. U. S. Nat. Herb. 12: 283. 1909 (type from near Nentón, *E. W. Nelson* 3522).

Thickets and limestone hillsides, 500–800 meters; Huehuetenango (near Nentón, *E. W. Nelson* 3522). Vera Cruz.

Large shrub or small tree, 4–5 meters high, pubescent on the young branches; leaves firmly membranaceous, on rather short petioles, obovate to spatulate, up to 30 mm. long and 15 mm. wide, obtuse or retuse, narrowed at the base, entire to remotely crenulate above the middle, sparsely puberulent on the lower surface,



more prominently puberulous on the lower midrib, above glabrate except for the puberulous midrib; cymes shorter than the leaves, the peduncles many-flowered, 5-6 mm. long, densely puberulous; pedicels 3-5 mm. long, minutely puberulent; calyx lobes broadly deltoid-triangular, obtuse, 0.5 mm. long, 1.5 mm. wide, minutely puberulent without; petals broadly ovate to oval, rounded at apex, entire, 2 mm. long, 1.5 mm. wide, glabrous; filaments glabrous, 2.2 mm. long; ovary 3-angled, about 1 mm. high, glabrous; fruit suborbicular, 6-12 mm. long, 12-15 mm. wide, glabrous, shallowly or deeply emarginate at each end.

### ZINOWIEWIA Turczaninow

Glabrous shrubs or small trees; leaves opposite, petiolate, subcoriaceous, entire, often lustrous, without stipules; flowers very small, green, in axillary cymes, these often fasciculate, dichotomously branched; calyx 5-lobate, the lobes rounded; petals 5, much longer than the calyx, spreading; stamens 5, inserted at the margin of the disk, shorter than the petals, the filaments filiform-subulate, the anthers broadly cordate; disk thick, annular, 5-lobate; ovary immersed in the disk and confluent with it, 2-celled; style short, conic, the stigma obscurely 2-lobate; ovules 2 in each cell, erect; fruit samaroid, compressed, narrowly oblong, the body 1-celled and 1-seeded, gradually dilated above into a lateral and terminal wing, this membranaceous, much longer than the body; seed erect.

Long considered to be a monotypic genus, eight new species have been described in this group during recent years. All are closely related and there is much uncertainty as to how many of them are distinct. One species is described from Venezuela, two from Costa Rica and Panama, while the others are Mexican.

Leaves obtuse or subobtuse, not at all acuminate..... *Z. pallida*.

Leaves acuminate or long-acuminate, the tip sometimes obtuse.

Petals 1-1.3 mm. long; leaf blades rounded at the base, abruptly and shortly contracted into the petiole; flowers green..... *Z. tacanensis*.

Petals 2-2.2 mm. long; leaf blades acute at the base; flowers maroon-colored.  
*Z. rubra*.

*Zinowiewia pallida* Lundell, Bull. Torrey Club 65: 473. *f.* 3. 1938.

In pine ridges, at or little above sea level; British Honduras (type from Río On, El Cayo District, *C. L. Lundell* 6794).

A glabrous tree as much as 10 meters high, the trunk 10-20 cm. in diameter; leaves pale green, chartaceous, on stout petioles 3-5 mm. long, oblanceolate to oblong-elliptic, 4-9.5 cm. long, 1.5-3 cm. wide, obtuse or rarely rounded at the apex, apiculate, acute or acuminate at the base, paler beneath; cymes 2-3 cm. long, pedunculate, 4-5 times dichotomous, the flowers small, pale green, the

pedicels 1–2 mm. long, articulate at the middle; calyx lobes 0.4 mm. long, rounded; petals broadly ovate, 1.2 mm. long; ovary submerged in the disk; fruits spatulate-oblong, 15 mm. long, 4 mm. wide, obtuse or rounded and short-mucronate at the apex, attenuate to the base, costate and reticulate-veined.

The wood in this and probably the other species is white throughout when fresh, becoming brownish gray when dried; luster rather low; odorless and tasteless; hard, moderately heavy, tough and strong, fine-textured, the grain irregular.

**Zinowiewia rubra** Lundell, Bull. Torrey Club 65: 475. 1938.  
*Trueno* (Huehuetenango).

Moist or wet, mixed forest, 1,800–3,500 meters; endemic; Guatemala (Volcán de Pacaya); Chimaltenango (type from mountains above Tecpám, *A. F. Skutch* 639); Quiché; Huehuetenango; San Marcos.

A large tree, sometimes 27 meters high with a trunk almost a meter in diameter, the branchlets often dark red; leaves chartaceous, on petioles 4–11 mm. long, lanceolate or lance-elliptic, 4–11 cm. long, 1.5–3.5 cm. wide, acuminate, with an acute or subobtuse tip, acute or acuminate and decurrent at the base; cymes 2 cm. long or less, 2–4 times dichotomous, the flowers crowded, maroon or tinged with maroon, the pedicels articulate at or above the middle; calyx lobes broadly triangular-ovate, 0.5 mm. long, obtuse; ovary submerged in the disk; fruits obovate-oblong, 12–15 mm. long, obtuse or rounded at the apex, rose-red or dull red.

**Zinowiewia tacanensis** Lundell, *Lloydia* 2: 101. 1939.

Two sterile collections probably belong here, from moist forest, 1,600–3,500 meters; Sacatepéquez (Finca Carmona, southeast of Antigua); San Marcos (southern slopes of Volcán de Tajumulco). Chiapas, the type from Volcán de Tacaná, 1,000–2,000 meters, *E. Matuda* 2455.

A glabrous tree 7–9 meters high, the trunk 15 cm. in diameter; leaves chartaceous or almost membranaceous, on petioles 4–6 mm. long or longer, lanceolate to ovate-elliptic, 4.5–9 cm. long, 1.5–4.5 cm. wide, acuminate to an obtuse tip, rounded at the base and abruptly short-decurrent; cymes 1–2.5 cm. long, subsessile or short-pedunculate, 4–6 times dichotomous, the flowers crowded, the terminal ones pedicellate, the lateral ones sessile; calyx abruptly short-stipitate, the lobes ovate-triangular, subobtuse, 0.5 mm. long; petals ovate, 1.1–1.3 mm. long, rounded-obtuse, 1-nerved; ovary submerged in the disk or nearly so.

## HIPPOCRATEACEAE

*Reference:* A. C. Smith, The American species of Hippocrateaceae, *Brittonia* 3: 341–555. 1940.

Usually woody vines, sometimes shrubs or trees, glabrous or pubescent; leaves simple, petiolate, usually opposite, rarely subopposite or alternate; stipules interpetiolar, small, inconspicuous, caducous, sometimes absent; inflorescences axillary or arising below the leaves, or pseudo-terminal, corymbose-paniculate, thyrsoïd, cymose, or fasciculate; flowers usually small and greenish or white, perfect, actinomorphic, bracteolate, usually pedicellate; sepals generally 5, imbricate, persistent; petals mostly 5, alternate with the sepals, imbricate, suberect to spreading, inserted beneath or without the edge of the disk, often persistent; disk various, often conspicuous, usually annular and continuous; stamens usually 3, inserted within the disk, the filaments commonly ligulate, often recurved; anthers basifixed, often extrorsely nutant, 2-celled, the cells dehiscent by confluent, apical or extrorse slits; ovary superior, often concealed within the disk and sometimes adnate to it, normally 3-celled; ovules 2-14 in each cell; style usually short, sometimes none, the stigmas obscure or obvious, usually 3, entire or 2-fid; fruit capsular or drupaceous, dehiscent or indehiscent, when capsular with 3 divergent, separate or laterally connate capsules; seeds few-many, without endosperm; cotyledons large, the radicle small; seeds in capsular fruits attached by a basal wing, in the drupaceous fruits not winged.

Two genera, widely distributed in tropical regions. Smith, in his careful and excellent monograph, has divided the American Hippocrateaceae into 12 genera, 5 of which (each with a single local species) are represented in Guatemala. But in view of the comparatively small number of species represented in Guatemala, the earlier conventional treatment is given here.

Fruit more or less globose, baccate, indehiscent; seeds imbedded in pulp, not winged; plants glabrous throughout (in Guatemalan species).....*Salacia*.  
Fruit vertically depressed and deeply 3-lobate, dry, dehiscent, the lobes more or less obovate or spatulate and wing-like; seeds winged; plants pubescent or glabrous, the leaves various; style obvious.....*Hippocratea*.

## HIPPOCRATEA L.

Woody vines, the branches terete; leaves opposite, entire or serrate; stipules small, caducous; flowers very small, in axillary panicles or cymes, the branchlets and pedicels 2-bracteolate at the base; petals spreading, larger than the sepals, valvate or imbricate; disk conic, cupular, or explanate; style short but obvious; ovules 2-6 in each cell, 2-seriate, affixed to the axis of the cell; mature carpels connate at the base, coriaceous, 2-valvate; seeds compressed, winged below.

Species 80 or more, in the tropics of both hemispheres. Several additional ones are found in other parts of Central America.

Branches of the inflorescence wholly glabrous.....*H. celastroides*.

Branches of the inflorescence variously and usually densely pubescent, or at least minutely puberulent.

Leaves sparsely or densely pubescent beneath; inflorescence hirtellous or pilose with conspicuous spreading hairs. Leaves rounded or very obtuse at the apex.....*H. excelsa*.

Leaves glabrous; inflorescence minutely pulverulent or tomentulose, the pubescence not spreading, the hairs scarcely perceptible.

Flowers 4-8 mm. broad, few in each cyme; disk large and conspicuous.

*H. volubilis.*

Flowers 2-2.7 mm. broad, very numerous in each cyme; disk small and inconspicuous. . . . . *H. floribunda.*

**Hippocratea celastroides** HBK. Nov. Gen. & Sp. 5: 136. 1822. *H. acapulcensis* HBK. op. cit. 137. *H. tabascensis* Lundell, Contr. Univ. Mich. Herb. 4: 16. 1940. *Pristimera celastroides* A. C. Smith, Brittonia 3: 371. 1940. *Matapiojo*; *Sombrerillo*.

Dry or moist thickets or forest, 1,200 meters or less; Petén; Alta Verapaz; Guatemala. Mexico; Salvador.

A woody vine, glabrous throughout, the stems as much as 10 cm. in diameter; leaves on petioles 4-15 mm. long, papyraceous or chartaceous, elliptic to elliptic-oblong, mostly 6-13 cm. long and 1.5-6 cm. wide, rounded or obtuse at the apex, obtuse or acute at the base, serrate or subentire; inflorescences 3-10 cm. long, long-pedunculate, many-flowered, the branches very slender; flowers 2.2-4.5 mm. broad, on slender pedicels 1.5 mm. long or shorter; sepals ovate or deltoid, 0.6-1.1 mm. long; petals elliptic or elliptic-oblong, 1.3-2.2 mm. long, entire; disk 1-1.5 mm. broad; lobes of the capsule obovate-elliptic or narrowly elliptic-oblong, 3.5-7.5 cm. long, 1.5-4 cm. wide, rounded or obscurely emarginate at the apex; seeds 4-6, the body 1-1.5 cm. long, the wing 2.5-3.5 cm. long and 1.2-1.5 cm. wide.

The Maya names in Yucatan are recorded as "tulubalam" and "tatsi." The local name "matapiojo" is given because a paste made from the pulverized seeds or the whole fruit is applied to kill lice (*piojos*) on human beings and domestic animals, a practice that seems widely spread in Central America and Mexico (see Luis Landa, *Hippocratea celastroides* [matapiojo, sombreroillo], Revista Agric. Guat. 14: 227-228. ill. 1936). In Yucatan the plant is used in domestic medicine as a calmant for nervous excitation, and this in conjunction with its use as an insecticide would indicate that the seeds perhaps contain some alkaloid.

**Hippocratea excelsa** HBK. Nov. Gen. & Sp. 5: 139. 1822. *H. uniflora* DC. Prodr. 1: 567. 1824. *H. subintegra* Blake, Contr. Gray Herb. 52: 73. 1917 (type from Manatee Lagoon, British Honduras, *M. E. Peck* 456). *H. chiapensis* Standl. Contr. U. S. Nat. Herb. 23: 687. 1923. *H. yucatanensis* Standl. Field Mus. Bot. 8: 19. 1930. *Hemiangium excelsum* A. C. Smith, Brittonia 3: 414. 1940. *Prionostemma setulifera* Miers, Trans. Linn. Soc. 28: 359. 1872 (type collected by Friedrichsthal, and said to be from Guatemala). *Palo de reguilete* (fide Aguilar); *Zipche* (Petén, Maya); *Zaccuche* (Maya); *Matapiojo*.

Moist or dry, often rocky plains or hillsides, 1,500 meters or less; Petén; Baja Verapaz; El Progreso; Zacapa; Chiquimula; Jutiapa; Santa Rosa. Mexico; British Honduras to Salvador and Costa Rica; southward to Paraguay.

A small or large, woody vine, or often a more or less erect shrub or small tree, the trunk as much as 10 cm. in diameter, the younger branchlets, petioles, leaves, and inflorescences hirtellous or puberulent with obvious pale hairs; leaves on petioles 5–12 mm. long, thin-coriaceous, oblong-elliptic to narrowly or broadly obovate, mostly 6–12 cm. long, usually rounded or very obtuse at the apex, obtuse or narrowly rounded at the base, obscurely crenulate or crenate-serrate; inflorescences 1.5–6 cm. long, 2–4 times branched, on a peduncle 1–2.5 cm. long, few-flowered; flowers 6–10 mm. broad; sepals often puberulent, ovate-deltoid to semi-orbicular, 1–1.5 mm. long, subacute to rounded at the apex; petals glabrous, oblong or elliptic-oblong, 3–5 mm. long, rounded or obtuse at the apex, entire; disk large and conspicuous; capsule lobes elliptic or broadly obovate, 4.5–6 cm. long, emarginate at the apex; body of the seed ovoid, 7–10 mm. long, the wing obovate-elliptic, about 3.5 cm. long and 1.5 cm. wide.

Called “matapiojo” and “cucaracho” in Salvador; “tietie” (British Honduras); “salbeets,” “chum-loop” (Yucatan, Maya).

**Hippocratea floribunda** Benth. Bot. Voy. Sulph. 78. 1844. *H. lancifolia* Lundell, Phytologia 1: 338. 1939 (type from Sittee River, Stann Creek District, British Honduras, *W. A. Schipp* 715). *Elachyptera floribunda* A. C. Smith, Brittonia 3: 387. 1940. *Rocsic* (Alta Verapaz).

Wet forest, usually along stream banks, 300 meters or lower; Alta Verapaz; Izabal. British Honduras; Panama; northern South America.

A large woody vine as much as 12 meters long, climbing over trees, the stems about 5 cm. in diameter; leaves on petioles 3–9 mm. long, chartaceous, elliptic to lance-oblong, mostly 5–12 cm. long and 2–5 cm. wide, narrowed to an obtuse tip, acute to rounded at the base, entire or undulate-crenate, glabrous; inflorescences solitary or 2–4-fasciculate, 2–11 cm. long, 4–8 times branched, on peduncles 3 cm. long or shorter, the branches minutely pulverulent; flowers 2–2.7 mm. broad, minutely puberulent, the slender pedicels 1–2 mm. long; sepals deltoid to semiorbicular, 0.3–0.5 mm. long; petals oblong or elliptic, whitish, 1–1.7 mm. long, entire or nearly so; ovules 2 in each cell; lobes of the fruit elliptic or somewhat obovate, 3–4.5 cm. long, obtuse or rounded at the apex; body of the seed ellipsoid, 15–22 mm. long, the wing oblong, 4–5 mm. long, 2–3 mm. wide.

**Hippocratea volubilis** L. Sp. Pl. 1191. 1753. *H. ovata* Lam. Tabl. Encycl. 1: 100. 1791.

Moist or wet thickets or forest, at or little above sea level, often on limestone; Petén; Izabal. Southern Florida; Mexico; British Honduras to Panama; West Indies; South America.

A large woody vine, as much as 25 meters long and climbing over tall trees, the branchlets, petioles, and inflorescences minutely and closely brownish-tomentulose or puberulent; leaves on petioles 4–10 mm. long, chartaceous or thin-coriaceous, ovate to elliptic or oblong-elliptic, mostly 6–14 cm. long and 3–7 cm. wide, rounded to acute at the apex, rounded or acute at the base, crenate or serrate or merely undulate, glabrous; inflorescences 3–12 cm. long, 2–6 times branched, usually long-pedunculate; flowers whitish, 4–8 mm. broad, the pedicels 1–3 mm. long; sepals broadly ovate or deltoid, 0.5–1.2 mm. long, rounded or obtuse at the apex; petals oblong or elliptic-oblong, 2.5–4 mm. long, subacute, often densely puberulent, minutely ciliate; lobes of the capsule obovate-elliptic or narrowly oblong-elliptic, 4–8 cm. long, 1.5–4 cm. wide, rounded or emarginate at the apex; body of the seed ellipsoid, 13–25 mm. long, 4–7 mm. broad, the wing obovate-oblong, 2–4 cm. long, 1–1.5 cm. wide.

Called "barracuta tietie" in British Honduras. The tough stems of this and other species are often used as a substitute for rope, especially in tying the framework of the pole and bamboo huts of the lowlands.

### SALACIA L.

Large woody vines, glabrous; leaves mostly opposite, petiolate, coriaceous, often lustrous on the upper surface, entire or crenate-serrate, the stipules caducous or none; flowers very small, fasciculate or cymose, sometimes paniculate, the cymes on long or short peduncles; calyx small, 5-parted; petals 5, spreading; stamens usually 3, free or connate with the ovary; anther cells longitudinally or transversely dehiscent; disk thick, explanate or conic, sinuate; ovary immersed in the disk, conic, 3-celled; stigma simple or 3-lobate; ovules 2, 4, or more in each cell; fruit baccate, often large, 1–3-celled, the cortex coriaceous or ligneous, the pulp mucilaginous, the cells 1–4-seeded; seeds large, angulate, the testa coriaceous or fibrous.

A large genus, of 80 species or more, in the tropics of both hemispheres. One or two other species occur in southern Central America.

*Salacia belizensis* Standl. Field Mus. Bot. 8: 19. 1930. *Cheiloclinium belizense* A. C. Smith, Brittonia 3: 540. 1940.

Moist or wet forest, 350 meters; Alta Verapaz (Cubilgüitz). British Honduras (type from Mullins River Road, Stann Creek District, *W. A. Schipp* 128).

A large woody glabrous vine; leaves on petioles 3–10 mm. long, coriaceous or thin-coriaceous, oblong-elliptic or lance-oblong, 10–19 cm. long, 3–7.5 cm. wide, acute or short-acuminate, acute or obtuse at the base, subtire or obscurely crenate; inflorescences rather large, axillary or arising below the leaves, 4–11 cm. long, 5–7 times dichotomously branched, the peduncles 1–5 cm. long, the pedicels 2.5 mm. long or shorter; flowers 2.5–4 mm. broad, the sepals ovate-deltoid, 0.6–0.9 mm. long, obtuse; petals oblong or ovate-elliptic, 1.5–2 mm. long, rounded at the apex, subtire; ovules 2 in each cell; fruit ligneous, globose or ellipsoid, 4.5 cm. long and 3.5 cm. broad or smaller, round at the base and apex.

## STAPHYLEACEAE. Bladdernut Family

Trees or shrubs, glabrous or nearly so; leaves opposite, odd-pinnate or 1-3-foliolate, usually with stipules and stipels; flowers small, regular, perfect, in terminal or axillary clusters or panicles; calyx 5-lobate, the lobes imbricate; petals 5, imbricate in bud; stamens 5, inserted outside the disk, this crenate or lobate; ovary usually 3-lobate and 3-celled, the 3 styles free or united; ovules few or numerous in each cell, attached to a central axis; fruit capsular or sometimes indehiscent, fleshy or leathery, 3-celled, each cell containing few-many seeds; seeds with a hard testa, the endosperm carnos, the cotyledons plano-convex.

Five genera are recognized, with about 25 species, mostly in the north temperate zone, a few species extending into the tropics of America as far south as Peru. Only one genus is represented in Central America, but *Staphylea* extends into Mexico.

## TURPINIA Ventenat

Trees or shrubs; leaves opposite, odd-pinnate or rarely simple, the lateral leaflets opposite; flowers small, white, in terminal panicles; calyx persistent; petals suborbicular, sessile; disk lobate or crenate; filaments complanate; ovary 3-lobate, sessile, the 3 styles distinct or connate, the stigmas capitate; ovules few, anatropous; fruit subglobose, 3-celled, indehiscent, somewhat fleshy; seeds compressed.

About 10 species, in the tropics of both hemispheres. Only the following species are known from Central America.

- Leaves 1-foliolate.....*T. insignis*.  
 Leaves with 3 or usually more numerous leaflets.  
 Leaflets coriaceous or subcoriaceous; fruit 2.5-3 cm. long, with 3 conspicuous large horn-like appendages near the apex. Flowers about 8 mm. long.  
*T. tricornuta*.  
 Leaflets membranaceous or thick-membranaceous; fruit usually 1.5 cm. long or shorter, the appendages very inconspicuous or in age obsolete.  
 Flowers 3-4 mm. long.....*T. paniculata*.  
 Flowers about 5-6 mm. long.....*T. occidentalis*.

**Turpinia insignis** (HBK.) Tulasne, Ann. Sci. Nat. III. 7: 296. 1847. *Lacepedea insignis* HBK. Nov. Gen. & Sp. 5: 143. pl. 444. 1821.

Moist or wet, mixed forest, 1,500-2,500 meters; Zacapa (Sierra de las Minas); Huehuetenango (Sierra de los Cuchumatanes). Southern Mexico.

A shrub or tree of 2-7 meters, glabrous throughout or nearly so; leaves 1-foliolate, the petiole about 1 cm. long; leaflet sessile or nearly so, elliptic or oblong-elliptic, 7-15 cm. long, abruptly acuminate or short-acuminate, acute at the base, entire or obscurely crenate-serrate, slightly paler beneath; panicles equaling or

sometimes much longer than the leaves, many-flowered, pedunculate, often much-branched, the flowers white, pedicellate, 5 mm. long, fragrant; sepals elliptic, obtuse or rounded at the apex, somewhat gibbous at the base; petals obovate-oblong, short-unguiculate, deciduous; stamens equaling the corolla; fruit ellipsoid or subglobose, 1.5 cm. long, orange, 3-cuspidate at the apex or almost smooth, 2 of the cells usually abortive.

**Turpinia occidentalis** (Swartz) G. Don, Hist. Dichl. Pl. 2: 3. 1832. *Staphylea occidentalis* Swartz, Prodr. Veg. Ind. Occ. 55. 1788. *Lacepedea paniculata* Schlecht. Linnaea 10: 240. 1835. *T. pinnata* Hemsl. Biol. Centr. Amer. Bot. 1: 216. 1880.

Moist or wet, usually mixed forest, 1,600–3,000 meters; Quiché; Huehuetenango; San Marcos. Southern Mexico; Costa Rica; Panama; Jamaica.

A tree, sometimes 12 meters high, glabrous or nearly so except in the inflorescence; leaflets usually 5–9, all or most of them on short petiolules, or the lower petiolules often more elongate, elliptic-lanceolate to ovate-oval, commonly 3–10 cm. long, acute or short-acuminate, obtuse or almost rounded at the base, crenate-serrate; panicles pedunculate, many-flowered, equaling or often longer than the leaves, the branches glabrous or puberulent, the flowers white, 5–6 mm. long; sepals very unequal, obtuse or rounded at the apex; petals crenate or erose; fruit subglobose, 1–1.5 cm. in diameter, black or dark purple, somewhat juicy, the corniculate appendages near the apex often conspicuous in the young fruit but in age obscure or obsolete.

When in flower, the plants of this genus have much the appearance of *Sambucus* (Caprifoliaceae), and the leaves are similar in form. The disposition of the Guatemalan material here referred to *T. occidentalis* and *T. paniculata* is far from satisfactory, principally for lack of abundant flowering specimens. In the West Indies, from which these species were described, they have different ranges, but in Central America this is not the case. It seems probable that when ample flowering specimens have been assembled from all the Central American countries and from southern Mexico, it may be possible to make a different and more satisfactory alignment of the species. There is great variability in pubescence in the material and also in the size of the flowers. It is quite possible that *T. pinnata*, based on Mexican material, may be distinct from the West Indian *T. occidentalis*.

**Turpinia paniculata** Vent. Choix Pl. 31. 1803. *Cajeta* (Suchitpequez); *Tinta*.

Moist or wet, usually mixed forest, 100–2,400 meters; Alta Verapaz; Baja Verapaz; Chiquimula; Jalapa; Santa Rosa; Escuintla;



Sacatepéquez; Suchitepéquez; Retalhuleu; Quezaltenango; San Marcos. British Honduras to Costa Rica; Greater Antilles.

A shrub or tree, sometimes 25 meters high, usually lower, with a trunk as much as a meter in diameter, the young branchlets generally puberulent but soon glabrate; leaves large, the leaflets 5-11, on short or long petiolules, membranaceous or thick-membranaceous, ovate to oblong-lanceolate, mostly 5-8 cm. long, acute or acuminate, acute to almost rounded at the base, crenate-serrate or subentire, glabrous or often pubescent beneath; panicles usually equaling or longer than the leaves, much-branched, many-flowered, the branches glabrous or pubescent, the flowers white, slender-pedicellate, 3-4 mm. long; sepals and petals oval, rounded or obtuse at the apex; stamens about as long as the petals; fruit globose or depressed-globose, 1-1.5 cm. in diameter, black or purple-black, juicy, the subapical horns obscure or obsolete in the mature fruit.

The true distribution of this species within Guatemala is uncertain. We have listed here all the material of this alliance not definitely referable to *T. occidentalis* by flower characters.

**Turpinia tricornuta** Lundell, Bull. Torrey Club 66: 598. 1939.

In forest, 2,500-2,800 meters; Huehuetenango (near Quetzal, Sierra de los Cuchumatanes, *Steyermark* 49119); doubtless also in San Marcos. Type from Volcán de Tacaná, Chiapas, *E. Matuda* 2941.

A tree of 7-11 meters, glabrous throughout; leaves large, the leaflets 5-7, on petiolules 18 mm. long or less, oblong-elliptic to oblong-ovate, 5-13 cm. long, acuminate or abruptly acuminate, rounded at the base, somewhat lustrous, coriaceous or subcoriaceous and stiff when dry, crenate-serrate; panicles small and few-flowered, often not exceeding the petioles, the white flowers 6-7 mm. long, pedicellate, the branches glabrous or puberulent; sepals ciliate; petals pilose inside along the costa, the margins erose; ovary pubescent; fruit 2.5-3 cm. long, obovoid, purplish, bearing below the apex 3 large, thick, very conspicuous, fleshy, horn-like appendages.

The fruit is said to be sometimes eaten. In their large size and curious form, the fruits are decidedly unlike those of other local species. In all of them the ovary and young fruit are more or less 3-corniculate, but in other species the appendages are obsolete or very inconspicuous when the fruit is mature.

## ICACINACEAE

*References:* Richard A. Howard, Studies of the Icacinaceae, I, Journ. Arnold Arb. 21: 461-489. pls. 1-4. 1940; Studies of the Icacinaceae, II, op. cit. 23: 55-78. pls. 1-4. 1942.

Trees or shrubs, glabrous or pubescent; leaves alternate, entire, without stipules; flowers usually small and whitish or greenish, in corymbs, panicles, or

spikes, unisexual or perfect; calyx lobate or dentate, the segments imbricate or valvate; petals 4-5, valvate, usually with a longitudinal costa on the inner surface, sometimes none; stamens as many as the petals and alternate with them; disk surrounding the ovary and adherent to it, or outside the stamens; ovary superior, usually 1-celled, the style short or sometimes none; ovules 1-2, pendulous from the apex of the cell; fruit drupaceous, the stone crustaceous or osseous; seed 1, with copious endosperm, this rarely ruminant, the radicle superior.

About 15 genera, in the tropics of both hemispheres. One other genus is known from southern Central America.

Flowers spicate, dioecious; fruits large, usually about 5 cm. long. . . . . *Calatola*.  
Flowers not spicate, perfect; fruits small, mostly less than 2 cm. long.

Petals villous within; anthers shorter than the filaments. . . . . *Mappia*.  
Petals glabrous within; anthers longer than the filaments. . . . . *Oecopetalum*.

### CALATOLA Standley

*References:* Paul C. Standley, The genus *Calatola*, Journ. Wash. Acad. Sci. 16: 413-418. f. 1. 1926; Sleumer, Notizblatt. 15: 247-248. 1940.

Trees, glabrous or pubescent; leaves alternate, petiolate, membranaceous or thin-coriaceous, entire; flowers very small, dioecious, the staminate bracteate, arranged in long slender solitary axillary spikes; pistillate flowers axillary, solitary and pedunculate or in few-flowered, spike-like inflorescences; staminate calyx small, 4-lobate, the corolla 4-parted, the lobes concave, valvate, 1-costate on the inner surface and sparsely villous along the costa; stamens 4, alternate with the corolla lobes, the anthers erect, basifixed, the filaments very short, adnate to the corolla; anthers oblong, 2-celled, dehiscent by lateral slits; pistillate calyx 4-lobate; fruit large, globose, oval, or obovoid, with rather thick flesh, the stone osseous, 2-cristate and with numerous irregular reticulate dentate crests over the whole surface; seeds large, the surface irregularly convolute, the endosperm copious, carnose.

Six species, the following, one in Mexico, one in Costa Rica, and three in western South America. The elongate and very slender staminate spikes suggest catkins.

*Calatola laevigata* Standl. Contr. U. S. Nat. Herb. 23: 689. 1923.

Moist or wet forest, 825 meters or less; Petén (Camp 32, Guatemala-British Honduras boundary, W. A. Schipp S708). Oaxaca; British Honduras.

A tree of 12-15 meters with a trunk 25 cm. or more in diameter, the branchlets appressed-pilose or glabrate; leaves on petioles 1.5-2 cm. long, oblong or elliptic-oblong, 11-23 cm. long, 4-8 cm. wide, acute, at the base obtuse or acute, glabrous at least in age, usually drying blackish, the lateral nerves about 10 pairs;

staminate spikes sessile, 4-6 cm. long or larger, flexuous, dense or somewhat interrupted, the bracts ovate-acuminate, equaling the flower buds; calyx minutely sericeous, the lobes obtuse; corolla cream-colored, the lobes obtuse, glabrous outside; pistillate flowers in short dense spikes; young fruit sparsely sericeous or almost glabrous; fruit broadly ellipsoid, about 5 cm. long, rounded or very obtuse at each end, covered with low obtuse ridges.

Little is known about this species, but presumably its characteristics are similar to those of the Mexican *C. mollis* Standl. and the Costa Rican *C. costaricensis* Standl. The curious stones of the fruit sometimes are found on Atlantic beaches of Central America, indicating that trees of the genus are not rare along the Atlantic slope, although few specimens have been collected. Stones forwarded by Don Mariano Pacheco, presumably from Guatemala, although the locality was not indicated, probably represent a distinct species. They are somewhat different in shape from those of *C. laevigata*, and scarcely 4 cm. long.

The wood in this genus is cream-colored throughout when freshly cut, soon changing to gray and finally to purplish blue (the fresh foliage often has a somewhat bluish cast); luster medium; not very hard or heavy; specific gravity 0.74; weight 46 pounds per cubic foot; texture medium, uniform, the grain somewhat irregular; very easily worked; durability poor. The Costa Rican species is called "duraznillo," "erepe," "palo de papa," "papa de palo," and "palo azul." Its wood is sometimes used for construction. The kernels of the seeds are white and firm, with a pleasant flavor that suggests coconut. They sometimes are roasted and eaten, and also are ground and made into tortillas, which are said to have the agreeable flavor of those prepared with grated cheese. The raw seeds are believed to be dangerous to eat, at least if consumed in some quantity.

The Mexican *C. mollis* is called "calate," "calatola," "calato-lazno," "zapote de mono," "aguacate de mono," and "onmanchinté" (Chiapas); the flower spikes are given the name of "colas de rata." The seeds are said to be used for dyeing, and to have vomitive-purgative properties when eaten raw.

### MAPPIA Jacquin

Trees or shrubs, almost glabrous; leaves alternate, petiolate, often with pores beneath in the axils of the nerves; inflorescence axillary, cymose or corymbose, the flowers articulate with the short pedicels, perfect, 5-parted; calyx patelliform, minutely dentate; petals valvate, strigose or glabrous outside, villous within; stamens free, the anther cells introrse, longitudinally dehiscent; ovary hirsute or glabrous, the disk carnosose, hirsute or glabrous on the margin and inside, glabrous

outside; ovary 1-celled, the ovules 2, anatropous, pendent from the apex of the cell; stone of the fruit not very hard or thick.

Four species are known, two in Mexico, one in Cuba, and the following.

**Mappia racemosa** Jacq. Hort. Schoenbr. 1: 22. 1797.

Wet forest, 300–500 meters; Alta Verapaz (between Chajmayic and Sebol, *Steyermark* 45736). Greater Antilles; Panama; probably also in Chiapas.

A tree about 11 meters high, the trunk as much as 30 cm. in diameter, the branches glabrous; leaves on petioles 1–2.5 cm. long, lanceolate, oblanceolate, or oblong, 10–19 cm. long, acuminate to rounded at the apex, acute at the base, glabrous, with conspicuous pores beneath in the axils of the nerves; inflorescence cymose or corymbose, the peduncles 1–several times as long as the petiole, densely pilose to glabrate, few-many-flowered; calyx sparsely strigose; petals lanceolate or oblong, reflexed, 3–4.5 mm. long, densely strigose to glabrate outside; ovary densely hirsute or glabrate; fruit ellipsoid or obovoid, 1.5 cm. long, yellow-green tinged with dull brick-red.

The single Guatemalan collection is in fruit, and it may be referable rather to *M. mexicana* Rob. & Greenm., although in foliage characters it agrees better with *M. racemosa* or *M. longipes* Lundell. The wood in this genus is pale yellow throughout, with rather high luster; moderately heavy, hard, and strong, medium-textured; grain straight; probably not durable on exposure.

**OECOPETALUM** Greenman & Thompson

Shrubs or trees, glabrous or nearly so outside the inflorescence; leaves alternate, short-petiolate, subcoriaceous; flowers small, perfect, in axillary pedunculate cymes; calyx 5-lobate; petals 5, valvate, costate and glabrous within, the margins and apex inflexed; stamens 5, coherent at the base with the petals; anthers erect, sagittate; disk obsolete; ovary 1-celled, the style elongate, conic at the base; ovules 2, pendulous; fruit 1-seeded, glabrous, the stone rugose, globose; seed globose; cotyledons foliaceous, ovate, about equaling the radicle.

Two or three species in southern Mexico and Guatemala.

Petals 5–5.5 mm. long; leaves concolorous or nearly so. . . . . *O. Greenmanianum*.

Petals 8 mm. long; leaves much paler on the lower surface. . . . . *O. guatemalense*.

**Oecopetalum Greenmanianum** Standl. & Steyer. Field Mus. Bot. 22: 154. 1940. *Tepecanoj* (fide Aguilar).

Moist or wet forest, at or little above sea level; Petén; Izabal (type collected along Río Dulce, 2–4 miles west of Livingston, on south side, *Steyermark* 39516); Escuintla; endemic.

A tree, sometimes 9 meters high, the branches glabrous; leaves on petioles 8–15 mm. long, subcoriaceous, oblong, elliptic-oblong, or lance-oblong, 10–20 cm. long, 3–8 cm. wide, acute or subacuminate, obtuse at the base and abruptly contracted, glabrous, at least in age, the lateral nerves 8–10 pairs; inflorescence dense and many-flowered, the peduncles short or elongate, the inflorescence as much as 5 cm. long and 6 cm. broad, the branches sparsely or densely sericeous, the flowers sessile; calyx 1.5–2 mm. long, the lobes ovate, acute, minutely sericeous, 0.7–1 mm. long, accrescent in fruit and 5.5–6.5 mm. long; petals liguliform, rounded at the apex, minutely sericeous outside; anthers 4 mm. long; fruit 1-seeded, depressed-ovoid-globose and somewhat oblique, about 1.5 cm. in diameter, glabrous.

**Oecopetalum guatemalense** Howard, Journ. Arnold Arb. 21: 483. pl. 3. 1940. *Molinillo*; *Naranjillo*.

Wet mixed forest, 1,100–2,100 meters; Suchitepéquez (type from Finca Mocá, A. F. Skutch 2080); Sololá; Quezaltenango; San Marcos. Chiapas.

A tree of 9–18 meters, the trunk 30 cm. in diameter, the bark smooth, brown; young branchlets sparsely sericeous or glabrous; leaves on petioles 7–10 mm. long, subcoriaceous, elliptic or elliptic-oblong, 10–14 cm. long, 3.5–6 cm. wide, acute, narrowly rounded or acute at the base, green and glabrous above, beneath sparsely sericeous with malpighiaceus hairs or almost wholly glabrous, the lateral nerves usually 4–7 pairs; cymes few-many-flowered, on peduncles 2.5 cm. long or shorter, appressed-pubescent; calyx short-campanulate, 2 mm. long, the lobes ovate, obtuse, densely sericeous; petals oblong-lanceolate, 8 mm. long, sericeous outside; anthers 5 mm. long; fruit globose, rugose, glabrous, yellowish brown, 18–20 mm. in diameter.

One collection from Volcán de Tacaná has been determined by Howard as *O. mexicanum* Greenm. & Thompson, and he reports *O. guatemalense* from the same state. It is strongly suspected that these two names represent a single species. They are at best very closely related, and one would certainly not expect two species so closely related to have overlapping ranges. It is not improbable that when ample material of the genus has been assembled, it will be found to represent a single somewhat variable species. The wood of *O. guatemalense* is described by Record as having the heartwood yellowish brown, the sapwood somewhat lighter; luster medium; moderately hard and heavy; texture rather fine, the grain straight; working properties good; durability probably low.

#### ACERACEAE. Maple Family

*Reference:* F. Pax, *Aceraceae*, Pflanzenreich IV. 163. 1902.

Trees or shrubs; leaves opposite, petiolate, without stipules, simple or palmately or pinnately compound; inflorescence terminal and subtended by a few leaves,

or arising from leafless, terminal or lateral buds, appearing with or before the leaves, racemose, corymbose, or fasciculate; flowers mostly small and greenish, symmetric, polygamo-dioecious or dioecious, 4-5-parted, with sepals and petals; disk annular or lobate, or reduced to teeth, outside or within the stamens; stamens 4-10, usually 8, hypogynous or perigynous, or inserted in the middle of a disk, the filaments free; ovary 2-celled, laterally compressed; styles 2, free or connate at the base; ovules 2 in each cell, orthotropous or anatropous, sessile by a broad base; fruit of 2 samaras, these prolonged into large thin wings, indehiscent, finally separating from one another, the seed basal; seeds without endosperm, by abortion usually solitary in the cell, the testa membranaceous; radicle elongate, the cotyledons foliaceous or thick, entire, flat or irregularly plicate.

Two genera, the second, of a single species, in central China.

### ACER L. Maple

Mostly trees; leaves opposite, undivided, palmate-lobate, or pinnately 3-5-foliolate; inflorescence arising from terminal or lateral buds, the flowers polygamous or dioecious, rarely without petals; disk annular, very rarely none; stamens mostly 8, usually inserted within the disk, hypogynous or perigynous; ovary 2-lobate, the cells each 2-ovulate; styles or stigmas 2.

About 100 species, almost all in temperate regions of Europe, Asia, and North America. Only the following extend to Central America. One species of *Acer* of the United States (*A. saccharum* Marsh.) is an important source of sugar and sirup. This is obtained by tapping the trunks of the trees in earliest spring or late winter, when the sap is beginning to "run." The sweet liquid is collected and reduced by boiling to sirup or finally to a hard brown sugar, of distinctive flavor. Both the sirup and sugar are used in vast amounts in the United States. At least one "Japanese" maple, probably *A. palmatum* Thunb., with small, deeply palmate-lobate leaves, is in cultivation in Finca La Aurora, Guatemala.

Leaves simple, shallowly palmate-lobate.....*A. Skutchii*.

Leaves pinnate, with usually 3 leaflets.

Branchlets glabrous.....*A. Negundo* var. *orizabense*.

Branchlets densely pubescent, at least when young.*A. Negundo* var. *mexicanum*.

### *Acer Negundo* L. Sp. Pl. 1056. 1753.

Widely distributed in the United States, and represented by several varieties. Known there by the name "box-elder," and often planted as a shade tree, although not very satisfactory for that purpose. It is planted principally because the tree grows rapidly and supplies shade in a short time. The heartwood is yellowish brown, merging rather gradually into the greenish yellow sapwood;

specific gravity about 0.45; weight about 28 pounds per cubic foot. In the United States it is sometimes used for cheap furniture, woodenware, cooperage, and fuel. The species is represented in Mexico and Central America by the following varieties:

**Acer Negundo** var. **mexicanum** (DC.) Standl. & Steyerm. Field Mus. Bot. 23: 60. 1944. *Negundo mexicanum* DC. Prodr. 1: 545. 1824. *A. serratum* Pax, Bot. Jahrb. 6: 296. 1885. *A. mexicanum* Pax, Bot. Jahrb. 7: 212. 1886, not *A. mexicanum* Gray, 1862. *Palo de vinagre*; *Granado* (Baja Verapaz); *Palomar* (fide Aguilar); *Raxoch* (Quechí); *Palo de azúcar*; *Palo de caballo*.

Usually growing along streams, but often seen in fields or fence-rows, or even in well-drained oak forest, 1,200–3,000 meters; Alta Verapaz; Baja Verapaz; Chimaltenango; Quiché; Quezaltenango; San Marcos. Central and southern Mexico.

Usually a small tree but sometimes 23 meters high, with a trunk 30–45 cm. in diameter, the young branches often purplish glaucous, densely pubescent at first, often glabrate in age; leaves long-petiolate; leaflets 3, petiolulate, ovate or lance-ovate, mostly 7–14 cm. long, acuminate or long-acuminate, obtuse or rounded at the base, regularly or irregularly serrate, sometimes shallowly 3-lobate, glabrate above except on the veins, usually very densely pilose beneath with pale hairs, often more or less coarsely tomentose, in age rarely glabrate beneath; flowers dioecious, without petals, usually purplish red; staminate inflorescences short and compact, the pistillate long and slender, pendent, often 30 cm. long or more; samaras about 3 cm. long, pilose or almost glabrous, the terminal wing almost 1 cm. wide, very conspicuously veined; pedicels often greatly elongate and filiform.

Called "acezintle" in central Mexico, a Nahuatl name. This is often abundant in the parts of Guatemala where it grows, especially about Cobán and in Quezaltenango and San Marcos. Around Cobán it borders most of the swift streams, and is in leaf almost throughout the year. Here as elsewhere it is noteworthy for its drooping leaves, whose leaflets are very concave or almost pouch-like and hang limply from the branches. In April the trees are very green and covered with the long pendent racemes of fruits. In the Cobán area the trees are often planted for hedges, and usually are cut back closely, perhaps for firewood. Large trees are scattered through the pastures. In the Occidente the tree behaves somewhat differently. There it is very conspicuous from January to March, for it is a real "spring" tree, losing its leaves at the beginning of the cold season and putting forth new ones as the flowers appear. The trees often are very conspicuous from a distance because of their great abundance of dark red or purplish flowers, the same colors being exhibited by the young foliage. In the white sand areas of

San Marcos the tree is much planted, usually in widely separated rows, to keep the sand from drifting. The bark and young shoots are said to contain much sugar, and they are used commonly in the Occidente for making vinegar, hence one of the vernacular names. Most of the trees seen in the Occidente have their limbs cut off close to the trunk, probably because of this use of the tree. This has been reported from Guatemala as *Negundo aceroides* var. *texanum* Pax.

**Acer Negundo** var. **orizabense** (Rydb.) Standl. & Steyerl. Field Mus. Bot. 23: 60. 1944. *Negundo orizabense* Rydb. Bull. Torrey Club 40: 55. 1913. *A. orizabense* Standl. Contr. U. S. Nat. Herb. 23: 690. 1923.

At the edges of streams or often in roadside thickets, 1,500–2,700 meters; El Progreso; Chimaltenango; Huehuetenango; Quezaltenango; San Marcos. Mexico.

Like the preceding, except in its glabrous branches and less pubescent leaves; a tree of 6–15 meters.

Rydberg recognized eight species of *Negundo*, but most earlier and later writers have considered all to represent a single species. Var. *orizabense* apparently is a form of little importance, and is not separated geographically from var. *mexicanum*. Its leaflets usually are only very sparsely pubescent beneath.

**Acer Skutchii** Rehder, Journ. Arnold Arb. 17: 350. 1936.

Along streams, often in wet mixed forest in ravines, 1,600–2,600 meters; endemic; Zacapa (Sierra de las Minas); Quiché (type from Nebaj, A. F. Skutch 1667).

A tree of 15–30 meters, the trunk often 75 cm. or more in diameter, the bark light gray, breaking up into thin plates, the branches glabrous; leaves long-petiolate, about as wide as long, generally 12–16 cm. long and 14–20 cm. wide, palmately 3–5-lobate almost to the middle, shallowly or deeply cordate at the base, the sinus closed or open, the lobes triangular-ovate or broadly ovate, acuminate, sinuate-angulate, glabrous above, paler beneath and often glaucous, villous-tomentose on the nerves, sparsely villous or glabrous elsewhere; fruiting inflorescence corymbose, glabrous, the pedicels as much as 3 cm. long; body of the samara 1 cm. long, not compressed, almost smooth, the wing 3.5–4.5 cm. long, 12–16 mm. wide, strongly veined, glabrous.

This species is closely related to the common sugar maple (*Acer saccharum*) of the United States. It occurs abundantly in quebradas or level ground of the Sierra de las Minas. It is deciduous, the leaves turning bright red or rose about the beginning of the *verano*, and



reappearing in March or April, or even earlier. The young leaves are bronze-red. The hard wood is used locally for bedposts, coffins, and other objects. In the original collection of this isolated species, the leaves are very glaucous on the lower surface, but there is much variation in this respect in specimens from Zacapa, in some of which there is no hint of glaucousness to be found.

### HIPPOCASTANACEAE. Horse-chestnut Family

Trees or shrubs; leaves opposite, digitately 3-9-foliolate or pinnate, without stipules; flowers polygamous, irregular, in terminal panicles, often large and showy; sepals 4-5, distinct or connate, imbricate; petals 4-5, unequal, unguiculate; stamens 5-9, distinct; disk extrastaminal; ovary superior, 3-celled, with 2 ovules in each cell; style and stigma each 1; fruit usually 1-celled, dehiscent, 3-valvate, commonly 1-seeded; seeds very large, with a large hilum, without endosperm.

Three genera and about 30 species, mostly in temperate regions of the northern hemisphere, one genus extending in the tropical highlands into Central and South America. The genus *Aesculus* is represented in North America by numerous species, one of which is found in northwestern Mexico.

### BILLIA Peyritsch

Small or rather large trees; leaves persistent, long-petiolate, digitately 3-foliolate, the leaflets subcoriaceous, short-petiolulate, entire or nearly so; flowers polygamous, large and showy, red, paniculate, the panicles mostly shorter than the leaves; sepals 5, almost free, connivent, unequal, the inner ones longest; petals 4-5, hypogynous, erect, the 2 posterior ones slightly longer and narrower; disk annular, obsoletely crenate; stamens 6-8, the filaments filiform, elongate; ovary 3-celled; stigma acute; fruit large, similar to that of *Aesculus*, usually containing a single large seed.

Two species, ranging from southern Mexico to Colombia and Ecuador. The other one, *B. colombiana* Planch. & Lind., is found in Costa Rica and northwestern South America.

**Billia Hippocastanum** Peyr. Bot. Zeit. 16: 153. 1858. *Aesculus mexicana* Benth. & Hook. ex Hemsl. Biol. Centr. Amer. Bot. 1: 212. 1880.

Moist or wet, usually mixed mountain forest, 1,500-2,900 meters; Alta Verapaz; Suchitepéquez; Quezaltenango; San Marcos. Southern Mexico; Costa Rica.

A small or large tree, often 15 meters high or more, glabrous throughout or finely pubescent in the inflorescence; leaflets on short stout petiolules, lance-oblong to elliptic, mostly 12-20 cm. long and 4.5-9 cm. wide, acute or abruptly

acuminate, usually acute at the base or abruptly contracted, very lustrous; panicles short-pedunculate, dense and many-flowered, the pedicels short or elongate; sepals 8-10 mm. long, the inner ones somewhat tomentose; petals flame-red, the larger ones about 2 cm. long; filaments long-exserted from the calyx; fruit about 4.5 cm. long, dark brown, covered with large pale lenticels; seed subglobose, 3 cm. in diameter, dark brown.

The bark is smooth and cream-colored to very pale gray; the wood is said to be hard. In Guatemala the tree is particularly abundant about Fuentes Georginas in Quezaltenango, where it forms a substantial part of the mountain forest. It is conspicuous also about Tactic in Alta Verapaz. When in flower this is one of the handsomest of all Central American trees, because of its many large bunches of vivid flame-colored blossoms. The young leaves often are tinged with red. Several writers have confused this species with *B. colombiana*, a more southern species, although both are found in Costa Rica. The latter has pale, white or pink flowers, and is not nearly so showy a tree as *B. Hippocastanum*.

#### SAPINDACEAE. Soapberry Family

*Reference:* L. Radlkofer, Sapindaceae, Pflanzenreich IV. 165. 1933-34.

Large or small trees, often woody or herbaceous vines with tendrils, the sap watery; leaves alternate, generally persistent, usually without stipules and compound, most often pinnate or bipinnate but often otherwise, the leaflets entire or dentate or lobate, usually not punctate; flowers mostly polygamo-dioecious, regular or irregular, variously arranged, generally small and white; sepals 4-5, very rarely none or more numerous, free or somewhat connate, often unequal, mostly imbricate; petals 3-5 or none, equal or unequal, often squamate or barbate within, imbricate; disk various, complete or incomplete, frequently unilateral; stamens 8, rarely 5-10, commonly hypogynous and inserted within the disk; filaments usually elongate, filiform or subulate, often villous; anthers oblong, didymous, or linear, basifixed or versatile; ovary central or excentric, entire, lobate, or parted almost to the base, most often 3-celled; style terminal or basal between the lobes, simple or divided, straight or declinate, the stigma usually simple; ovules anatropous, campylotropous, or amphitropous, 1-2 or rarely more in each cell, affixed to the axis, ascending; fruit capsular or indehiscent, drupaceous, baccate, or coriaceous, entire or lobate, often consisting of 2-3 samaras, indehiscent or variously dehiscent, the carpels often separating at maturity from a central axis; seeds globose or compressed, arillate or naked; endosperm none, the embryo usually thick, often plicate or spirally convolute; cotyledons usually plano-convex, unequal; radicle short, inflexed, inferior.

Genera about 140, widely dispersed, almost wholly in tropical regions. The genus *Dipterodendron* is represented in southern Central America. The treatment of the Sapindaceae in the *Pflan-*

*zenreich* is a particularly satisfactory one, well presented and based upon many years of study of the family. Dr. Radlkofer, its author, who was in some respects one of the most interesting as well as most capable botanists of recent times, died only a few years ago at the age of 99, having worked in his laboratory until only a few days before his death.

Plants scandent, usually with tendrils.

Fruit of usually 3 samaras, these with terminal or basal wings.

Seed inserted at the apex of the samara; leaflets 3 to many.....*Serjania*.

Seed inserted at the base of the samara; leaflets 3.....*Thinouia*.

Fruit not of samaras, the wings, if any, dorsal.

Fruit a thick-walled capsule; seeds subtended by an aril; leaflets 3 to many.  
*Paullinia*.

Fruit membranaceous; seeds not arillate.

Fruit inflated and bladder-like, not winged; leaflets more than 3.

*Cardiospermum*.

Fruit scarcely inflated, winged; leaflets 3.....*Urvillea*.

Plants erect, never with tendrils.

Leaves simple; fruit a winged capsule.....*Dodonaea*.

Leaves compound.

Leaves 3-foliolate, with a terminal leaflet.

Fruit not winged, somewhat fleshy.....*Allophylus*.

Fruit conspicuously winged, dry.....*Thouinia*.

Leaves with 2, 4, or more numerous leaflets, with no terminal leaflet.

Fruit dehiscent, capsular.

Stamens long-exserted; fruit usually 5 cm. long or larger; cultivated trees.....*Blighia*.

Stamens little if at all exceeding the petals; fruit usually 2 cm. long or less; native trees.

Sepals distinct.....*Cupania*.

Sepals united.....*Matayba*.

Fruit indehiscent, dry or fleshy.

Fruit of winged samaras.....*Thouinidium*.

Fruit fleshy, not winged.

Fruit usually 2-lobate, one of the lobes very small and representing an abortive cell.....*Sapindus*.

Fruit not lobate.

Seeds 2 in each cell; fruit glabrous.....*Exothea*.

Seeds 1 in each cell; fruit tomentulose.....*Talisia*.

### ALLOPHYLUS L.

Shrubs or trees; leaves petiolate, commonly 1-3-foliolate, the leaflets entire or serrate, often punctate or lineolate; flowers polygamo-dioecious, irregular, small, white or whitish, pedicellate, often closed in anthesis, racemose, the racemes usually paniculate; sepals 4, opposite by pairs, cucullate, membranaceous, im-

bricate, the 2 outer ones smaller; petals 4, small, glabrous or barbate within; disk unilateral, lobate or of 4 glands; stamens mostly excentric, included or short-exserted; ovary excentric, compressed or didymous, commonly 2-celled, the style stout, 2-3-lobate, or the styles 2-3 and stigmatose at the apex; ovules solitary, ascending from the base of the cell; fruit of 1 or rarely 2 cocci, ovoid or globose, dry or fleshy; seeds arillate.

About 175 species, in tropical regions, mostly in America, Africa, and Asia. One other species is known from southern Central America.

Leaflets glabrous beneath or nearly so.

Leaflets membranaceous; racemes usually branched, the branches densely short-pilose.....*A. psilospermus*.

Leaflets coriaceous or subcoriaceous; racemes simple, the rachis usually glabrous.  
*A. campstostachys*.

Leaflets densely and softly pilose beneath.

Racemes all or mostly simple, usually shorter than the leaves...*A. occidentalis*.

Racemes branched, mostly longer than the leaves.....*A. Cominia*.

***Allophylus campstostachys*** Radlk. Sitzungsber. Bayer. Akad. 38: 213. 1908. *A. longeracemosus* Standl. Trop. Woods 16: 39. 1928 (type from Columbia-Toledo, British Honduras, *Donald & Balderamos* 10). *Chenghues* (Alta Verapaz); *Achiotillo*.

Moist or wet forest, 800 meters or less; Petén; Alta Verapaz; Izabal. British Honduras; Veracruz; Tabasco.

A tree, sometimes 12 meters high with a trunk 25 cm. in diameter, the bark light or dark brown, the inner bark pinkish, the slender branches sparsely puberulent or almost glabrous, densely pale-lenticellate; leaves on short or long petioles, the leaflets 3, coriaceous or subcoriaceous, often lustrous, obovate-lanceolate to lanceolate, short-petiolulate, 7-15 cm. long, acute to long-acuminate, usually long-attenuate at the base, sinuate-dentate or repand-denticulate, glabrous or nearly so; racemes all simple, usually longer than the leaves, often curved, the rachis slender, essentially glabrous, the flowers rather remote, creamy white, almost glabrous, 1.5 mm. broad, the pedicels 1 mm. long; disk sparsely puberulent; ovary densely puberulent; fruit obovoid, 7 mm. long, broadly rounded at the apex.

Called "bastard axemaster" in British Honduras; "cascarilla," "cascarilla blanca," "rabo de lagarto" (Veracruz). The crown is dense and spreading. The wood is pale yellowish white throughout.

***Allophylus Cominia*** (L.) Swartz, Prodr. Veg. Ind. Occ. 62. 1788. *Rhus Cominia* L. Syst. Nat. ed. 10. 964. 1759. *A. Kinlochii* Standl. Trop. Woods 32: 16. 1932 (type from Temash River, 14 miles from the bar, British Honduras, *J. B. Kinloch* 43). *Chile de chachalaca*; *Icbach* (Petén, Maya).

Moist or wet thickets or forest; Petén. Tabasco; Yucatan; British Honduras; Honduras; West Indies.

A shrub or tree, rarely as much as 9 meters high with a trunk 20 cm. in diameter, the young branches densely pilose-tomentose; leaves long-petiolate, the 3 leaflets membranaceous or rather thick, lance-elliptic to elliptic or broadly elliptic, mostly 8-15 cm. long, acute or short-acuminate or sometimes obtuse, obtuse to acute at the base, usually short-petiolulate, serrulate or subentire, green above, and glabrate except on the veins, paler beneath, usually densely velutinous-pilose; racemes paniculate, the panicles with few branches, usually longer than the leaves, the branches densely tomentose, the flowers creamy white, slightly fragrant, 1 mm. broad; sepals almost glabrous but ciliate; ovary densely setulose; fruit red or orange, somewhat fleshy, globose, 5-6 mm. in diameter, sparsely short-pilose or glabrate.

Called "cherry" and "huesillo" in British Honduras; the Maya names are recorded as "bicbach" and "ixbahach"; "palo de caja" (Yucatan). The fruit is reported edible, but it has very scant flesh. *A. Kinlochii* is a form with rather narrow leaflets and chiefly appressed pubescence on the young branches. When described, it was thought sufficiently distinct, but later collections indicate that it is a mere form of *A. Cominia*.

***Allophylus occidentalis*** (Swartz) Radlk. Sitzungsber. Bayer. Akad. 20: 230. 1890. *Schmidelia occidentalis* Swartz, Fl. Ind. Occ. 2: 665. 1800.

Thickets along stream beds, or in open pine forest, 1,300 meters or less; Petén; Alta Verapaz; Izabal; Chiquimula; Jutiapa; Santa Rosa; Guatemala; Retalhuleu. Nicaragua; Costa Rica; Panama; West Indies; northern South America.

A shrub or small tree, seldom more than 6 meters high, the slender young branchlets densely and minutely tomentulose, glabrate in age; leaves long-petiolate, the 3 leaflets membranaceous, the lateral ones sessile, the terminal one petiolulate, obovate to elliptic or rhombic-lanceolate, mostly 6-16 cm. long, acute or acuminate with obtuse tip, cuneate to obtuse at the base, serrulate or repand-dentate, green and glabrate above, at least in age, paler beneath, densely pilose with usually soft, spreading hairs; racemes simple, commonly about as long as the petioles, short-pedunculate, lax, the flowers villosulous, creamy white, 3 mm. in diameter; petals ciliate, squamate within; fruit obovoid-globose, red, 6 mm. long, sparsely pilose; seeds canescent-hispid.

This species has been reported from Chiapas (Standl. Contr. U. S. Nat. Herb. 23: 704. 1923) but probably in error, the material so reported being referable rather to *A. psilospermus*.

***Allophylus psilospermus*** Radlk. Sitzungsber. Bayer. Akad. 20: 230. 1890.

Dense moist forest, 250–850 meters; Retalhuleu; Quezaltenango. Chiapas; Nicaragua to Panama; Martinique.

A shrub or small tree, rarely more than 12 meters high, with broad crown, the bark grayish brown, slightly roughened, the young branchlets puberulent, soon glabrate; leaves long-petiolate, the 3 leaflets membranaceous, lance-oblong to oblong-elliptic or oblanceolate, often 14–20 cm. long and 5–7 cm. wide but mostly smaller, acuminate, acute or attenuate at the base, irregularly and often coarsely serrate, bright green on the upper surface and soon glabrate, beneath short-pilose at first but soon glabrate except on the nerves; racemes mostly paniculate, sometimes simple, shorter than the leaves, short-pilose, the flowers glabrate, yellowish green, 2 mm. in diameter, the sepals ciliate; fruits mostly 8–12 mm. long, obovoid, rounded at the apex; seeds glabrous.

*Allophylus punctatus* Radlk. was reported by Captain Smith from Cubilgüitz, Alta Verapaz, on the basis of *Tuerckheim* 8286. The species is a South American one, and Radlkofer in his final monograph questions the determination. This Tuerckheim collection may represent an undescribed species.

### BLIGHIA Koenig. Akee

Trees; leaves large, even-pinnate, the leaflets entire; flowers polygamous, small, pedicellate, the inflorescences axillary, racemiform, the bracts small, the buds subconic; calyx 5-parted, the segments ovate-lanceolate, narrowly imbricate; petals 5, linear-lanceolate, squamate at the base and saccate; disk tumid, somewhat 8-lobate; stamens 8, inserted within the disk; fruit 3-celled, large, trigonous-pyriform; seeds surrounded by a large fleshy aril.

Six species, all African.

*Blighia sapida* Koenig in Koenig & Sims, Ann. Bot. 2: 571. pls. 16, 17. 1806. *Huevo vegetal*; *Arbol de huevo*; *Seso vegetal*; *Palo de huevo*; *Huevo de gallina* (Zacapa).

Planted frequently in Izabal, and said to be common in Chiquimula; reported from Jalapa. Native in West Africa, but cultivated in many tropical regions.

Usually a small or medium-sized tree but reported to attain in some regions a height of 50 meters, the young branchlets yellowish-tomentose; leaflets 3–5 pairs, usually 4 pairs, cuneate-obovate to elliptic or oblong, 10–20 cm. long, obtuse or short-acuminate, obtuse or acute at the base, on short thick petiolules, chartaceous or subcoriaceous, almost glabrous above, puberulent or short-pilose beneath; inflorescences sometimes equaling the leaves, tomentose, the flowers greenish white, fragrant, pedicellate; calyx 2.5–3 mm. long, the segments acute, tomentose; petals linear-lanceolate, 4 mm. long, acute, with a basal scale wider than the petal itself; disk annular, tomentose; fruit as much as 10 cm. long, red, glabrate outside, densely tomentose within; aril white, very large; seeds large, black.

The akee was introduced into Central America at least a century ago, probably brought from the Antilles by Negro immigrants. It is cultivated mostly along the Atlantic coast of Central America and by the West Indians. Probably it was brought to the West Indies from West Africa by the early slaves, who introduced the name "akee," by which it is best known in the West Indies. The fruit has never attained much favor among the Spanish and Indian inhabitants, which perhaps is just as well, since in the raw state the fruit is a dangerous poison. The aril is the edible portion, and for the table usually it is fried. If not thoroughly cooked, it may still be poisonous. The tree is said to be grown commonly in some parts of the Oriente, especially in Chiquimula, but although the Spanish names are well known to the people, we have observed very few trees anywhere except on the North Coast. Trees planted in Guatemala City grow well enough but are said not to fruit.

### CARDIOSPERMUM L. Balloon vine

Herbs or shrubs, usually bearing tendrils and scandent, the slender branches sulcate; leaves biternate or decompound, the leaflets coarsely crenate or serrate, often with pellucid dots or lines; flowers small, white, irregular, polygamo-dioecious, in axillary racemes or corymbs, the peduncle usually bearing 2 tendrils, the peduncles articulate; sepals 4-5, concave, broadly imbricate, the outer ones smaller; petals 4, the 2 larger ones bearing a large scale, the 2 smaller ones with a small cristate scale; disk unilateral, undulate, bearing 2 glands opposite the lower petals; stamens 8, excentric, the filaments unequal, free or connate at the base; ovary sessile or stipitate, 3-celled; style short, 3-fid; ovules solitary, ascending from the middle of the axis; capsule large and inflated, membranaceous, veined, loculicidally dehiscent, trigonous; seeds globose, often arillate at the base, with crustaceous testa; cotyledons large, transversely conduplicate.

A dozen species, widely dispersed in tropical regions of both hemispheres, but chiefly in America. No other species are found in Central America.

Glands of the disk short, suborbicular; fruit mostly 2-4 cm. long, usually pubescent, about as broad as long; flowers mostly 4-5 mm. long. . . . . *C. Halicacabum*.  
 Glands of the disk in part elongate and horn-like; fruit generally 5-6 cm. long, glabrous, longer than broad; flowers mostly 8-10 mm. long. . *C. grandiflorum*.

**Cardiospermum grandiflorum** Swartz, Prodr. Veg. Ind. Occ. 64. 1788. *Globillos*; *Farolitos*.

Moist or dry thickets, 1,500 meters or less; Petén; Guatemala. Southern Mexico; British Honduras to Panama; West Indies; South America; West Africa.

A small or large vine, usually herbaceous, the stems puberulent to long-hirsute, 5-6-costate; leaves biternate, the leaflets very unequal and irregular, thin, mostly ovate, petiolulate, coarsely serrate-dentate or incised-dentate, puberulent or almost glabrous above, sparsely or densely pubescent or even tomentose beneath; inflorescences long-pedunculate, the flowers subumbellate at the apex, white, long-pedicellate, 8-10 mm. long; capsule generally 5-6 cm. long, elliptic, acutely trigonous, usually glabrous or nearly so, acutish at each end; seeds globose, black, 7 mm. in diameter, the hilum conspicuous but much narrower than the body of the seed.

A rather showy plant because of its large flowers, and curious because of the bladder-like capsules. In central Guatemala it is cultivated for ornament, just as *C. Halicacabum* is sometimes grown in the United States. The name "tronadora" is applied to the vine in Veracruz. The seeds often are destroyed by insects.

**Cardiospermum Halicacabum** L. Sp. Pl. 366. 1753. *C. Corindum* L. Sp. Pl. ed. 2. 526. 1762. *C. molle* HBK. Nov. Gen. & Sp. 5: 103. 1821. *C. microcarpum* HBK. op. cit. 104. *Colochoero*; *Bejuco globo*; *Farolito*.

Moist or dry thickets, 1,600 meters or less; Zacapa; Chiquimula; El Progreso; Jalapa; Guatemala; Sacatepéquez. Mexico; Honduras; West Indies; South America; Old World tropics.

A small or large vine, usually herbaceous throughout, the stems glabrous or puberulent, 5-6-costate; leaves biternate, the leaflets thin, ovate or lanceolate, mostly acute or acuminate, sometimes obtuse, sessile or petiolulate, variously dentate or lobate, pubescent or glabrate; inflorescences umbel-like, long-pedunculate; flowers white, mostly 4-5 mm. long; capsule subglobose or somewhat turbinate-globose, pubescent, 2-4 cm. long; seeds black, 4-5 mm. in diameter, glabrous, the hilum almost as broad as the whole seed, somewhat reniform.

Names reported from Yucatan are "huayunac" (Maya) and "munditos." The species is a variable one, and Radlkofer treats *C. Corindum* as distinct, describing many varieties of both his species. He separates *C. Halicacabum* and *C. Corindum* on the basis of the shape of the hilum of the seed, but this character seems to be no more trustworthy than pubescence and other characters on which he bases his varieties. It is believed that his two species represent only a single highly variable specific unit.

## CUPANIA L.

Trees or shrubs, glabrous or pubescent; leaves even-pinnate or odd-pinnate, the leaflets opposite and alternate, entire or dentate; flowers small, regular, polygamo-dioecious, paniculate or racemose, white or greenish; sepals generally 4-5, orbicular, concave, imbricate more or less in 2 series; petals 4-5 or none,



naked or villous or bearing 1-2 scales; disk annular or tumid, crenate, glabrous or tomentose; stamens usually 8, inserted within the disk, the filaments mostly short, glabrous or villous; anthers commonly included, oblong; ovary 2-3-celled, the style short or elongate, sometimes 2-3-fid, the stigma simple or lobate; ovules solitary, affixed to the axis near the base; capsule obovoid, obcordate, or ovoid, rarely globose, usually coriaceous, 2-4-lobate, 2-4-celled, 2-4-valvate, often hispid or tomentose within; seeds subglobose or oblong, arillate, with crustaceous or coriaceous testa; embryo thick, curved, the cotyledons plano-convex, the radicle inflexed.

About 45 species, all in tropical America. A few others are found in southern Central America.

Leaflets densely pilose beneath.

Capsule glabrous or nearly so; branchlets and petioles minutely tomentulose with close fine subappressed hairs.

Seeds about 6 mm. long; opened capsule 1.5 cm. broad.....*C. belizensis*.

Seeds about 11 mm. long; opened capsule 2.5 cm. broad.....*C. mollis*.

Capsule densely pilose except when very old; branches and petioles coarsely tomentose or pilose with coarse spreading hairs.

Leaflets coriaceous, rounded or very obtuse at the base, broadest at or near the base, the veins very prominent beneath and densely reticulate.

Capsule with rounded or very obtuse lobes; bracts minute and inconspicuous.....*C. Schippii*.

Capsule with very acute lobes; bracts conspicuous, exceeding the flower buds.....*C. rufescens*.

Leaflets thin, acute at the base, the veins neither prominent nor closely reticulate beneath, usually broadest above the middle....*C. guatemalensis*.

Leaflets glabrous beneath or nearly so.

Leaflets acuminate or long-acuminate, entire or nearly so; sepals scarcely 1.5 mm. long.....*C. prisca*.

Leaflets obtuse or rounded at the apex, or sometimes abruptly short-acuminate; sepals usually 2 mm. long or larger.

Capsule densely pilose or tomentose.....*C. auriculata*.

Capsule glabrous.

Capsule deeply trilobate; leaflets usually 2-6.....*C. macrophylla*.

Capsule subterete, scarcely at all lobate; leaflets usually 6-12.

Leaflets with small pits beneath in the axils of the nerves....*C. dentata*.

Leaflets not pitted beneath.....*C. glabra*.

### **Cupania auriculata** Standl. Field Mus. Bot. 8: 20. 1930.

In forest at or little above sea level, British Honduras; type from broken pine ridge jungle, Stann Creek Railway, 6 miles, *Schipp* 267.

A tree of 5-9 meters, the trunk sometimes 10 cm. in diameter, the young branches densely puberulent-tomentulose; leaves large, the leaflets about 10, alternate, petiolulate, oblong or oblong-oval, 10-18 cm. long, 4.5-10 cm. wide, usually rounded at the apex and abruptly short-acuminate, obtuse or truncate at the base, sometimes auriculate on one side at the base, undulate or sinuate-dentate,

sometimes entire, coriaceous, glabrous or nearly so or sparsely sericeous beneath on the nerves, the lateral nerves about 11 pairs, prominent; panicles mostly longer than the leaves, much-branched, rather dense and many-flowered, the branches densely and minutely cinereous-sericeous, the flowers sessile or nearly so; bracts subulate, 3-5 mm. long; sepals 2-2.5 mm. long, densely puberulent; petals ochroleucous, glabrous; capsule pyriform, 13 mm. long, borne on a thick stipe, densely brownish-tomentose, the lobes rounded, densely hirsute within; seeds oval, 6 mm. long.

Called "Grande Betty." One collection now referred here was reported from British Honduras as *C. triquetra* A. Rich.

**Cupania belizensis** Standl. Trop. Woods 16: 40. 1928. *Copal Colorado* (Petén).

Moist forest or thickets, Petén; Escuintla(?). Campeche; British Honduras, the type from cohune ridge, Vaca, western Cayo District, *D. Stevenson* 15.

A shrub or tree sometimes 12 meters high or more, the trunk to 30 cm. in diameter, the young branchlets densely and minutely tomentulose or finally glabrate; leaves large, the leaflets mostly 8-10, usually long-petiolate, oblong, mostly 8-18 cm. long and 3-6 cm. wide, broadly rounded to subacute at the apex, acute to rounded at the base, coarsely appressed-serrate or sinuate-serrate, subcoriaceous, glabrate above but puberulent along the nerves, pilosulous beneath with short spreading hairs, sometimes velutinous-pilosulous; panicles large, often equaling the leaves, much-branched, sordid-tomentulose; bracts inconspicuous, 2 mm. long; sepals densely pilosulous, 2 mm. long; ovary minutely pilose; capsule glabrous outside or nearly so, glabrous within, long-stipitate, obovoid-globose, 1 cm. long, shallowly 3-lobate, the lobes rounded dorsally.

Called "Grandy Betty" and "bastard Grandy Betty" in British Honduras. The flowers are white or cream-colored.

**Cupania dentata** DC. Prodr. 1: 614. 1824.

Moist or wet thickets or forest, 1,400 meters or less; Alta Verapaz; Izabal; Suchitupéquez; Retalhuleu; Quezaltenango. San Luis Potosí; Veracruz; Honduras; Nicaragua.

A shrub or tree, usually 9 meters high or less, the young branchlets minutely tomentulose or cinereous-sericeous, soon glabrate; leaflets 6-14, lance-oblong to obovate-oblong, mostly 8-20 cm. long and 3-7 cm. wide, rounded and often retuse at the apex, sometimes obtuse or acute, usually acute to broadly cuneate at the base, crenate or serrate-dentate, glabrous above or nearly so, almost glabrous beneath, conspicuously domatiate in the nerve axils; panicles large, often equaling the leaves, densely and minutely cinereous-puberulent, the bracts small and inconspicuous, the pedicels 1 mm. long or less; sepals 2 mm. long, puberulent; capsule turbinate-globose, glabrous outside or nearly so, 1.5 cm. long, scarcely lobate, rather long-stipitate.

A good specimen of the original collection, *Sessé & Mociño* 4921, presumably from Mexico, is in the Herbarium of Chicago Museum.

**Cupania glabra** Swartz, Prodr. Veg. Ind. Occ. 61. 1788. *Cola de paujil* (fide Aguilar); *Cola de pavo*.

Moist or wet forest or thickets, 1,700 meters or less; Petén; Alta Verapaz; Izabal; Sololá; Quiché; Quezaltenango. Southern Mexico; Honduras; Costa Rica; West Indies.

A large shrub or a tree, often 12–15 (rarely 35) meters high, the trunk usually 25 cm. or less in diameter, the crown narrow or spreading, the bark light gray, smooth; young branchlets puberulent, soon glabrate; leaves large, the leaflets usually 7–14, mostly alternate, short-petiolulate, obovate-oblong to narrowly oblong, 6–20 cm. long, 2–7 cm. wide, generally rounded and often retuse at the apex, sometimes obtuse or subacute, repand-dentate or subentire, subcoriaceous, usually glabrous or nearly so in age, sometimes sparsely and inconspicuously pubescent beneath; panicles puberulent, axillary and subterminal, equaling or shorter than the leaves, much-branched and many-flowered, the pedicels 2–3 mm. long; flowers white, the bracts minute, the sepals 2 mm. long, minutely pubescent with appressed cinereous hairs; capsule turbinate-globose, scarcely lobate, 1.5–2 cm. long, glabrous outside and within.

Called “pava” in Honduras and “tres-lomos” in Veracruz. The latter name alludes to the fact that the trunk in cross section is somewhat 3-lobate, suggesting a clover leaf. The wood is pale brown.

**Cupania guatemalensis** (Turcz.) Radlk. Sitzungsber. Bayer. Akad. 9: 517. 1879. *Paullinia guatemalensis* Turcz. Bull. Soc. Nat. Moscou 32: 268. 1859 (type from Guatemala, without definite locality, *Kegel* 12771). *Cola de pava*; *Carboncillo*.

Wet forest, 350 meters or less; Alta Verapaz; Izabal; Huehuetenango. Chiapas; Oaxaca; Salvador; Nicaragua; Costa Rica; Panama.

A large shrub or a tree, often 9–12 meters high, the trunk 25 cm. or less in diameter, often fluted or 3-lobate, the bark medium brown or grayish to greenish, smooth, the inner bark brown; young branchlets densely soft-pilose or tomentose; leaflets 6–10, mostly alternate, oblong-lanceolate or oblanceolate-oblong, 5–15 cm. long, 2–5 cm. wide, obtuse or acute, broadly acute to attenuate at the base, more or less dentate or subentire, membranaceous-chartaceous, pilose above at first but in age glabrate, beneath usually very densely velutinous-pilose; panicles axillary, usually small and 10 cm. long or less, sparsely branched, densely tomentose, the bracts subulate, 2–3 mm. long, the pedicels 1 mm. long; sepals almost 3 mm. long, tomentulose; petals white, 3 mm. long, unguiculate, villous on the margin; capsule broadly triquetrous-turbinate, 1.5 cm. long, attenuate or abruptly contracted to the stipe, chartaceous, densely soft-pilose outside, glandular within; seeds almost 1 cm. long.

Known in Salvador by the names "cedrillo," "huesito," and "miacagüite"; "tres-lomos" (Oaxaca). The sapwood is white or cream-colored, the heartwood pinkish brown. The wood is used in some regions for fuel and for rafters in house construction.

**Cupania macrophylla** A. Rich. Fl. Cub. 1: 291. 1845. *Carbón colorado*.

Wet or moist thickets or forest, 1,500 meters or less; Alta Verapaz; Izabal; Sacatepéquez; Retalhuleu. Southern Mexico; British Honduras; West Indies.

A tree, usually 12 meters high or less with a trunk 25 cm. in diameter, the young branchlets puberulent or almost glabrous; leaflets 2-6, obovate to obovate-oblong or oblong, 5-20 cm. long, 2.5-8 cm. wide, rounded or obtuse at the apex, acute or subacute at the base, entire or nearly so, petiolulate, glabrous or nearly so, usually foveolate beneath in the nerve axils; panicles axillary, mostly shorter than the leaves, puberulent, the flowers white or cream-colored, the bracts minute, the pedicels 1-2 mm. long; sepals 1.5 mm. long, densely puberulent; petals scarcely more than 1 mm. long, bearing 2 villosulous scales; capsule deeply 3-lobate, 1-1.5 cm. long, short-stipitate, glabrous outside and within, the lobes dorsally acute, the valves obcordate.

**Cupania mollis** Standl. Journ. Wash. Acad. Sci. 13: 352. 1923. *Ojos de cangrejo*.

Dept. Guatemala, at 1,500 meters or perhaps lower; Quiché. Salvador, the type from Comasagua.

Branchlets glabrate in age; leaflets about 14, oblong or elliptic-oblong, 8-15 cm. long, 3.5-5 cm. wide, obtuse or rounded at the apex, rounded to acute at the base, on rather long petiolules, serrate, subcoriaceous, glabrate above, densely velutinous-pilose beneath with short spreading hairs; panicles axillary or sub-terminal, long-pedunculate, large, many-flowered, the branches closely tomentulose, the flowers sessile or nearly so; capsule glabrous outside and within, pyriform-trigonus, obtusely angulate, 12-15 mm. broad or larger, rounded and apiculate at the apex, on a rather long, thick stipe; seeds oval, black, lustrous, 11-13 mm. long.

Called "cola de pavo" in Salvador.

**Cupania prisca** Standl. Carnegie Inst. Wash. Publ. 461: 69. 1935. *Tzol*.

Known only from the type, *H. H. Bartlett* 12341, collected at Uaxactún, Petén.

A tree, the trunk 25 cm. in diameter, the bark rough, the young branchlets minutely fulvous-puberulent; leaflets 6, short-petiolulate, chartaceous or thinner, lance-oblong, 8-13 cm. long, 3-4.5 cm. wide, obtusely acuminate, acute to rounded

at the base, entire, lustrous, glabrous in age or essentially so; panicles axillary, lax, much shorter than the leaves, sparsely branched, 5-6 cm. long, the branches slender, densely puberulent, the pedicels 1 mm. long, the bracts small, subulate; sepals ovate, obtuse, scarcely 1.5 mm. long, yellowish-tomentulose.

Unfortunately the fruit is unknown, and the generic position of this tree is still somewhat uncertain. The foliage is unlike that of any other local species of *Cupania*, although not strikingly so.

**Cupania rufescens** Triana & Planch. Ann. Sci. Nat. IV. 18: 374. 1862. *C. asperula* Standl. Field Mus. Bot. 8: 223. 1929 (type from Bragmann's Bluff, Atlantic coast of Nicaragua).

British Honduras (Stann Creek District, in cohune ridge); Honduras; Nicaragua; Colombia.

A small or medium-sized tree, the trunk sometimes 25-50 cm. in diameter, the bark reddish brown, the young branchlets densely rufous-hirsute; leaflets 3-10, short-petiolulate or sessile, coriaceous, oblong or obovate-oblong, 5-14 cm. long, 2-6 cm. wide, obtuse or rounded at the apex, acute or obtuse at the base, entire or nearly so, sometimes repand-denticulate, the margins somewhat revolute, glabrate above except on the veins, somewhat bullate, rufous-hirsute or hirtellous beneath; panicles axillary, much shorter than the leaves, sparsely branched, rufous-hirsute, the bracts conspicuous, 5 mm. long, spreading, the pedicels 1-2 mm. long; sepals oblong, acute, 3 mm. long, densely hirtellous; petals equaling the sepals; capsule broadly triquetrous-turbinate, 1.5-2 cm. long and fully as broad, acutely trilobate, the angles thin and wing-like, densely brown-tomentose or hirsute; seeds about 1 cm. long.

Called "white Grande Betty" in British Honduras and in Nicaragua "cola de pavo" and "bilabila" (Mosquito dialect). The range is an unusually wide one for a species of *Cupania*, and there is some possibility that the Central American tree is distinct from *C. rufescens*, described from Colombia, but the scant available material seems to be probably all conspecific.

**Cupania Schippii** Standl. Field Mus. Bot. 12: 411. 1936.

Chiefly in wet open pine forest, 600 meters or less; Izabal. British Honduras, the type from Temash River, *Schipp* 1348; Veracruz.

A tree of 7-15 meters, the trunk often 25 cm. in diameter, the stout branches densely brown-tomentose, costate; leaflets about 10, on short or rather long, stout petiolules, coriaceous, oblong or lance-oblong, mostly 8-15 cm. long and 4-6.5 cm. wide, broadly rounded to acute at the apex, rounded or obtuse at the base, glabrate above except along the veins, the nerves often more or less impressed, brownish beneath, densely velutinous-pilose, the nerves strongly elevated and conspicuous, about 18 pairs; panicles axillary, large, much-branched, often equaling the leaves, densely brown-tomentose, the flowers cream-colored, almost sessile,

the bracts short and inconspicuous; sepals 2.5-3 mm. long, densely brown-pilous; petals scarcely longer than the sepals; capsule globose-pyriform, shallowly lobate, 1.5 cm. long, hirsute or tomentose outside, glabrous within, short-stipitate, the lobes rounded dorsally; seeds subglobose, black, lustrous, 8 mm. long.

This is related to *C. spectabilis* Radlk., whose type was collected in southern Mexico by Liebmann (at Cabrestos), but, so far as present material indicates, the two are probably distinct species. Leaflets of young shrubs often are coarsely and sharply dentate.

### DODONAEA L.

*Reference:* E. Sherff, *Am. Journ. Bot.* 32: 214. 1945.

Shrubs or trees, usually very viscid; leaves alternate, simple or abruptly pinnate, without stipules; flowers unisexual or polygamo-dioecious, small, whitish or yellowish, axillary and terminal, solitary, racemose, corymbose, or paniculate; sepals 2-5, imbricate or valvate; petals none; disk obsolete in the staminate flower, small in the pistillate; stamens 5-8, central, the filaments very short; anthers linear-oblong, obtusely tetragonous; ovary sessile, 3-6-angulate, 3-6-celled; style 3-6-fid; ovules 2 in each cell, collateral and superposed; capsule membranaceous or coriaceous, 2-6-angulate, the cells 1-2-seeded, the angles obtuse, acute, or broadly winged; seeds lenticular or subglobose, not arillate, with crustaceous or coriaceous testa, the embryo spirally convolute.

Radlkofer recognizes 54 species, of which 52 are Australian. Only the following is known in America. Although the fruit is really a capsule, at first glance it seems to be a samara, and seems to have been so interpreted by Linnaeus.

*Dodonaea viscosa* (L.) Jacq. *Enum. Pl. Carib.* 19. 1760. *Ptelea viscosa* L. *Sp. Pl.* 118. 1753. *Chilim* (Huehuetenango).

At 2,400 meters or less, growing in various habitats; at low elevations of the North Coast in strand thickets or on moist open pine-clad hillsides; elsewhere usually on dry, open, rocky, often brushy hillsides; Izabal; El Progreso; Chiquimula; Sololá; Huehuetenango. Arizona, southward through much of Mexico; British Honduras; Honduras; Costa Rica; Panama; West Indies; South America; widely distributed in the Old World tropics.

Usually a shrub of 1-3 meters with very viscid foliage, the branches slender, dark ferruginous; leaves mostly linear-oblong or oblong-oblong, sessile or short-petiolate, 5-12 cm. long, acute to rounded at the apex, attenuate to the base, pubescent or glabrous beneath; flowers pale yellowish, dioecious, in small lateral corymbs; sepals 3 mm. long; capsule usually 3-celled and 3-winged, 1.5-2.5 cm. wide, glabrous, deeply emarginate at the apex, the wings broad and thin, conspicuously veined.

This is not a common shrub in Central America, although it is locally abundant in widely separated localities. In Guatemala it is most plentiful on the arid serpentine outcrops along the southern slopes of the high mountains of Huehuetenango, where it forms low thickets of wide extent. It is not confined to serpentine, but is one of the characteristic plants of that formation. It is conspicuous during the dry months because its leaves, well protected by their gummy or resinous covering, remain bright green when most other plants have withered or lost their leaves. The distribution of this shrub in Central America is curious, occurring as it does in strand thickets along the sea, or in dry mountain regions of much elevation, but plants from the two habitats seem to be exactly alike. A plant with such a wide distribution as *Dodonaea viscosa* is naturally variable, and Sherff (loc. cit.) has recently divided this species into several varieties and forms, the predominant ones in Guatemala being *D. viscosa* var. *vulgaris* f. *Burmanniana* (DC.) Radlk., var. *vulgaris* f. *Schiedeana* (Schl.) Radlk., and var. *vulgaris* f. *repanda* (S. & T.) Radlk. The wood is brown, close-grained, and hard. It is said that in Australia the capsules, known as "native hops," formerly were much used as a substitute for true hops (*Humulus*) in making yeast and beer.

### EXOTHEA Macfadyen

Trees; leaves alternate, without stipules, petiolate, even-pinnate, the leaflets subopposite, petiolulate, entire, glabrous; flowers regular, dioecious, small, paniculate, axillary and subterminal; calyx 5-cleft to the base, the segments imbricate in 2 series, reflexed after anthesis and persistent in fruit; petals 5, oval, almost sessile, not appendaged; disk complete, sublobulate, pubescent; stamens 7-10, generally 8, inserted within the disk, longer than the petals, the anthers erect, ovate; ovary sessile, globose, 2-celled, the style short, filiform, thickened and subbilobate at the apex; ovules 2 in each cell, collateral, pendulous; fruit baccate, globose, fleshy, with thin pericarp, by abortion 1-celled, usually 1-seeded; seed globose, not arillate, with thin testa; embryo curved, the cotyledons carnosae, the radicle short, incumbent.

One other species is known in southern Mexico.

Leaflets 2.....	<i>E. diphylla</i> .
Leaflets usually 4-6.....	<i>E. paniculata</i> .

*Exothea diphylla* (Standl.) Lundell, *Phytologia* 1: 242. 1937.  
*Talisia diphylla* Standl. *Field Mus. Bot.* 8: 21. 1930.

Moist or wet forest, British Honduras, little above sea level; Campeche; Yucatan, the type from Kancabtsonot, *G. F. Gaumer* 23573.

A tree 12 meters high or larger, the branchlets glabrous, conspicuously lenticellate; leaves mostly 2-foliolate, on petioles less than 1 cm. long, some of the leaves 1-foliolate and appearing simple; leaflets oblong or oblanceolate-oblong, 5-8 cm. long, 1.5-3 cm. wide, obtuse or rounded at the apex and sometimes shallowly emarginate, sessile, acute at the base, subcoriaceous, entire, lustrous, slightly paler beneath; panicles often clustered at the ends of the branches, sparsely branched, equaling or somewhat longer than the leaves, minutely tomentulose, the pedicels 8-12 mm. long; sepals oval, 3 mm. long, persistent and reflexed in fruit, tomentulose; fruit globose, glabrous, about 1 cm. in diameter.

Called "uayamcox" in British Honduras, a Maya name. The Maya names in Yucatan are "culinche" and "esculinche."

*Exothea paniculata* (Juss.) Radlk. in Durand, Ind. Gen. 81. 1887. *Melicocca paniculata* Juss. Mém. Mus. Hist. Nat. Paris 3: 187. pl. 5. 1817. *Pimientillo* (Petén).

Moist forest or thickets, 1,400 meters or lower; Petén; Alta Verapaz; Izabal; Santa Rosa. Southern Florida; British Honduras; Costa Rica; West Indies.

A shrub or tree, sometimes 15-18 meters high, the trunk often 20-60 cm. in diameter, the young branchlets glabrous, the bark reddish brown, scaly, the wood hard, reddish brown; leaflets mostly 4-6, oblong to elliptic-oblong or lance-oblong, usually 8-11 cm. long, obtuse or short-acuminate, acuminate to obtuse at the base and somewhat unequal, glabrous or essentially so; panicles about equaling the leaves, densely puberulent-tomentulose, much-branched, many-flowered, the flowers whitish, 6-7 mm. broad, on pedicels 2-3 mm. long; fruit dark red or blackish purple, subglobose, 1.5 cm. in diameter.

Called "dantisca" in Guanacaste, Costa Rica, and reported erroneously from that region under the name *Talisia oliviformis*. The Guatemalan material is somewhat variable and it may be that some of it is referable to *E. Copalillo* (Schlecht.) Radlk., a species of Mexico. It is not obvious how that species is to be separated from *E. paniculata*, and it is evident that Radlkofer had no clear idea concerning the two, as may be seen by inspection of his key to species.

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*Litchi chinensis* Sonn., native of southeastern Asia, the "litchi" or "leechee," is in cultivation at Finca Mocá, Sololá, and probably elsewhere. It is a tree with pinnate leaves having entire leaflets. The rather large, subglobose fruits are deep rose-color when fresh, turning to brown in drying. They are one of the favorite fruits of Asia, the juicy aril having an excellent flavor, whether fresh or dried.



## MATA-YBA Aublet

Trees; leaves alternate or subopposite, even-pinnate, without stipules, the leaflets thick, mostly entire; flowers regular, small, polygamo-dioecious, racemose-paniculate; calyx cupular, shallowly 4-5-lobate, the lobes slightly imbricate or subvalvate and open in bud; petals 4-5 or none, with a scale-like appendage within at the base, villous; disk complete, annular or tumid; stamens 7-10, central, inserted within the disk, the filaments filiform, usually villous, the anthers short-oblong, long-exserted; ovary substipitate, 2-3-angulate, 1-3-celled; style terminal, the stigma 2-3-dentate; ovules 1 in each cell, inserted at the middle of the axis; capsule coriaceous, 1-3-lobate, sessile or stipitate, the lobes globose, 2-valvate; seeds arillate, with crustaceous testa.

About 45 species in tropical America. Three or four additional species are known from southern Central America.

Leaflets large, mostly 16-25 cm. long.....*M. clavelligera*.  
 Leaflets small, mostly 5-8 cm. long.....*M. oppositifolia*.

*Matayba clavelligera* Radlk. in Donn. Smith, Bot. Gaz. 33: 250. 1902. *Acalté* (Alta Verapaz).

Moist or wet forest, 300-650 meters or less; endemic; Petén; Alta Verapaz (Cubilgüitz); Quiché; Suchitepéquez (type from Mazatenango, *Bernoulli & Cario* 3344).

A tree of 7-12 meters, the trunk about 25 cm. in diameter, the young branchlets minutely pulverulent-tomentulose with yellowish hairs; leaflets 4-6, alternate, long-petiolulate, obovate to lance-oblong, mostly 16-25 cm. long and 6-8 cm. wide, obtuse, acute or obtuse at the base, coriaceous, entire, in age glabrous, lustrous; panicles large and much-branched, the flowers in long, rather dense racemes, white, the branches pulverulent-tomentulose, the pedicels 2 mm. long or shorter, articulate below the middle; calyx 1.5 mm. long, tomentulose outside; petals oblong, almost 2 mm. long; capsule turbinate-trilobate, 1 cm. long or larger, long-stipitate, glabrate.

*Matayba oppositifolia* (A. Rich.) Britton, Sci. Surv. Porto Rico 5: 528. 1924. *Cupania oppositifolia* A. Rich. in Sagra, Cuba 10: 292. 1845. *Zacuayum* (Petén, Maya).

Moist or wet forest or thickets, 2,300 meters or less; Petén; Alta Verapaz; Izabal; El Progreso; Zacapa; Huehuetenango. British Honduras; Honduras (Ruatán Island); Cuba; Puerto Rico.

A large shrub or a tree of 9-12 meters, the trunk 25 cm. or less in diameter, the young branchlets puberulent or almost glabrous; leaves subopposite, the leaflets 4-10, elliptic-lanceolate to oblong-obovate, mostly 5-8 cm. long, subacute or short-acuminate with very obtuse tip, acute or attenuate at the base, entire, subcoriaceous, subsessile, glabrous or nearly so, the costa elevated on both surfaces, the lateral nerves scarcely elevated, inconspicuous; panicles axillary, sparsely branched, often longer than the leaves, puberulent or glabrate, the bracts minute,

the pedicels 2-3 mm. long; calyx lobes deltoid, scarcely 1 mm. long; petals rudimentary; disk glabrous; capsule 2-3-coccos, short-stipitate, the cocci broadly rounded dorsally, 1 cm. long; seeds subglobose, 5-6 mm. long.

Names reported from British Honduras are "mabehu" and "Boy Job" (perhaps a corruption of a Maya name).

### PAULLINIA L.

Woody vines, usually with tendrils; leaves stipulate, the petiole often winged, compound, 1-3 times ternate or pinnate or decompound, the leaflets mostly dentate or lobate; flowers irregular, polygamo-dioecious, small, white or whitish, in axillary racemes, the racemes often bearing 2 tendrils; sepals 5, imbricate, the 2 upper ones connate; petals 4, squamate within; disk annular, produced into 4 glands; stamens 8, excentric, the filaments free or connate at the base; ovary excentric, stipitate or sessile, 3-celled, the style 3-fid or 3-parted; ovules generally solitary, affixed to the middle of the axis; capsule pyriform, trigonous, or 3-winged above, coriaceous, 1-3-celled, 1-3-seeded, septicidally 3-valvate; seeds short-arillate, with crustaceous testa, the embryo usually curved.

About 150 species, all American, one of them extending to Africa. Several additional ones occur in southern Central America. Most important member of the genus is *P. Cupana* Kunth, whose crushed seeds are official in the U. S. Pharmacopoeia under the name "guarana." They contain about 5 per cent of an alkaloid, guaranine, which has properties similar to caffeine, and may be identical with it. It is used as a remedy for chronic diarrhea. A beverage prepared from the fresh or roasted, ground seeds is much used in Brazil and Venezuela, more or less as a substitute for coffee. The crushed stems and leaves of various species of *Paullinia* and *Serjania* are much used in Central and South America as a *barbasco* or fish poison. When some quantity of the macerated foliage is thrown into the water, the fish soon are stupefied and float on the surface, where they may be secured easily. Those that are not removed from the water usually recover after a short time and swim away. Fish so captured are perfectly good for food. At the present time in Central America the country people prefer the more effective dynamite for this purpose, although use of both substances is prohibited by law in most regions.

Leaves biternate, with generally 9 leaflets.

Fruit subterete, not winged or angulate.....*P. costaricensis*.

Fruit 3-winged.....*P. fuscescens*.

Leaves pinnate or 3-foliolate.

Leaves 3-foliolate.

Capsule glabrous; petiole often winged.....*P. Cururu*.

Capsule pubescent; petiole not winged.....*P. turbacensis*.

Leaves pinnate.

Leaflets densely pilose beneath, membranaceous, dentate or crenate, sometimes shallowly lobate.

Sepals 4-5 mm. long; bracts oblong, conspicuous, about 5 mm. long.

*P. hymenobractea*.

Sepals 2.5 mm. long; bracts small, narrow, inconspicuous. . . . *P. tomentosa*.

Leaflets glabrous or nearly so except for tufts of hairs beneath in the nerve axils, thick and often more or less coriaceous.

Petiole not winged; leaflets entire, mostly elliptic.

Capsule glabrous, obscurely 3-costate. . . . . *P. scarlatina*.

Capsule tomentulose, 6-costate. . . . . *P. costata*.

Petiole conspicuously winged; leaflets usually coarsely dentate or serrate, mostly oblong.

Woody portion of the stem compound, consisting of a central body and 1-3 smaller outer ones; stipules mostly less than 1 cm. long.

*P. pinnata*.

Woody portion of the stem simple, without separate smaller ones; stipules mostly 1-1.5 cm. long. . . . . *P. clavigera*.

### **Paullinia clavigera** Schlecht. *Linnaea* 10: 239. 1836.

Moist or dry thickets, sometimes in rather open forest, 200-1,500 meters; Jutiapa; Santa Rosa; Escuintla; Sacatepéquez; Suchitpéquez; Retalhuleu; San Marcos. Southern Mexico; Salvador; Honduras; Nicaragua; reported by Radlkofer from the Amazon Valley, Brazil.

A large coarse vine, glabrous almost throughout, the branches 4-6-costate; leaves 5-foliolate, the rachis and petiole broadly winged; leaflets elliptic-lanceolate, elliptic-oblong, or obovate-oblong, mostly 6-14 cm. long, acute or acuminate, obtuse at the base, coriaceous, remotely and coarsely serrate-dentate, barbate beneath in the nerve axils but elsewhere glabrous or nearly so; stipules mostly large and conspicuous, greenish, oblong, 1-1.5 cm. long, striate; racemes solitary, 6-20 cm. long, tomentulose or appressed-pilosulous, usually dense and many-flowered, the pedicels 3 mm. long or less, articulate at or above the middle; petals 3 mm. long; capsule red, pyriform-obovoid, glabrous, 1.5-2 cm. long, 1.5 cm. broad, acute at the base, the stipe 1.5-2 cm. long; seed short-ellipsoid, 6 mm. long.

This has been reported from Guatemala as *P. pinnata* L., a species which it closely resembles in almost all characters.

### **Paullinia costaricensis** Radlk. *Ergänz. Monogr. Serjan.* 157. 1886.

Dry or moist thickets, 1,200 meters or less; Izabal; Alta Verapaz; Sacatepéquez; Sololá; Retalhuleu. Southern Mexico; British Honduras; Honduras; Nicaragua; Costa Rica; Panama.

A small or large vine, the branches densely pubescent or glabrate, the central woody body simple; stipules minute; leaves biternate, the petiole naked, the rachis winged; leaflets elliptic-lanceolate or rhombic, mostly 4-8 cm. long, usually obtuse,

acute or attenuate at the base, sessile, lobate-dentate, glabrous above or nearly so, sparsely or densely pilose beneath or almost glabrous, usually barbate in the nerve axils; racemes mostly solitary, puberulent, the bracts minute, the flowers usually dense, whitish, the pedicels 1-2.5 mm. long; inner sepals 2 mm. long; capsule usually dark red, subglobose, about 1 cm. long, on a stipe 4-5 mm. long, puberulent or glabrate outside, tomentose within; seeds black, lustrous.

Called "pate" in Honduras, from the Nahuatl "patl," medicine or remedy. Unless fruits are available, it is difficult to separate specimens of this from *P. fuscescens* HBK.

**Paullinia costata** Schlecht. & Cham. *Linnaea* 5: 216. 1830.

Moist thickets, 500-700 meters; Escuintla (material sterile, but probably referable here). Southern Mexico; Costa Rica.

Stems subterete, tomentulose or glabrate, the larger ones sometimes setose, the central woody portion simple; leaves 5-foliolate, the petiole naked, the rachis naked or narrowly marginate; leaflets oval or elliptic to broadly oblong, mostly 6-15 cm. long, acuminate or long-acuminate, acute to very obtuse at the base, petiolulate or sessile, entire, thick, often lustrous, sometimes barbate beneath in the nerve axils, otherwise glabrous; stipules minute, triangular; racemes solitary or paniculate-congested, shorter or longer than the leaves, the bracts minute, the pedicels 3 mm. long or less, articulate at the middle; sepals appressed-puberulent, 4 mm. long; capsule subdepressed-globose, 1-1.5 cm. long, long-stipitate, apiculate, longitudinally 6-costate, tomentulose outside, pilose within, the stipe 6-10 mm. long; seeds 1 cm. long, black, lustrous.

**Paullinia Cururu** L. *Sp. Pl.* 365. 1753.

Dry or moist thickets, sometimes in pine forest, 1,200 meters or less; Petén; Zacapa; Jutiapa; Santa Rosa; Retalhuleu; Huehuetenango. Southern Mexico; British Honduras; Honduras; Costa Rica; West Indies; South America.

A small or large vine, glabrous throughout or nearly so, the younger stems 6-costate or subtrigonus, the woody portion of a central body and 1-3 small adjacent ones; leaves long-petiolate, 3-foliolate, the petiole marginate or naked; leaflets elliptic or elliptic-lanceolate, sometimes lance-oblong or ovate, coriaceous, usually drying green, mostly 7-10 cm. long, subsessile, obtuse or acuminate, obtuse or acute at the base, remotely serrate-dentate, barbate beneath in the nerve axils, otherwise glabrous; racemes mostly solitary, often lax, shorter than the leaves; flowers white, the pedicels 3-4 mm. long, the bracts linear-subulate; sepals glabrate; petals 3 mm. long or less; fruit red, pyriform or clavate, 1.5-2.5 cm. long, 8-12 mm. broad, glabrous, the valves somewhat spongy-thickened; seeds 7-9 mm. long, black, lustrous.

The Maya name in Yucatan is "pahuch-ac" or "pajuj-ac."

**Paullinia fuscescens** HBK. *Nov. Gen. & Sp.* 5: 93. 1821. *P. velutina* DC. *Prodr.* 1: 605. 1824. *Bejuco colorado*; *Bejuco barbasco*; *Barbasco*; *Chilmecate*; *Sebo de pollo*; *Bejuquillo de gusano*.

Dry or moist thickets, 1,400 meters or lower; Petén; Jalapa; Jutiapa; Santa Rosa; Escuintla; Guatemala; Retalhuleu; San Marcos. Mexico; British Honduras to Salvador and Panama; Cuba; northern South America.

Often a large vine, the branchlets densely or sparsely puberulent or tomentulose, becoming glabrate, the woody portion simple; leaves biternate, on long or short petioles, the petiole naked, the rachis winged; leaflets oval to oblong-lanceolate, mostly 3-7 cm. long, usually obtuse, acute to long-acuminate at the base, crenate or dentate or often lobate, puberulent above on the veins, elsewhere glabrate, beneath densely velutinous-tomentose to glabrate, densely barbate in the nerve axils; stipules small, subulate; racemes solitary, lax or dense, usually densely pubescent, 5-15 cm. long, the flowers white, puberulent, the bracts small, subulate; inner sepals 2-3 mm. long; capsule 3-winged, 1-1.5 cm. long, short-stipitate, reddish at maturity, densely pubescent or glabrate; seed conspicuously arillate, black and shining, 6 mm. long.

Called "pate" and "campalca" in Honduras; in Salvador "nistamal," "nistamalillo," "bejuco cuadrado," and "barbasco"; Maya names in Yucatan "kexac" and "bix-chemac." In Guatemala this species is said to be used as a fish poison. The fleshy aril is edible, but the seeds are reported poisonous.

**Paullinia hymenobractea** Radlk. in Donn. Smith, Bot. Gaz. 20: 282. 1895.

Type from Malpais, Santa Rosa, 1,200 meters, *Heyde & Lux* 6093; collected also at Finca Transvaal, Alta Verapaz, 600 meters. Nicaragua.

Branches trigonous or subterete, pilose with spreading hairs, the woody portion compound, of a central body and 3 smaller ones; leaves large, pinnate, the rachis and petiole naked; leaflets 5, membranaceous, very unequal, irregularly and broadly rhombic or broadly ovate, 5-12 cm. long, 3-10 cm. wide, obtuse or broadly rounded at the apex, subtruncate to acuminate at the base, coarsely and irregularly crenate, often lobate, setose-pilose above, densely yellowish-hirsute beneath; thyrses axillary, raceme-like, longer or shorter than the leaves, short-hirsute, the pedicels 3 mm. long; bracts scarios-membranaceous, about 5 mm. long, oblong, conspicuous; inner sepals 4-5 mm. long.

The specific name, published originally as *hymenobracteata*, was later corrected by Radlkofer to *hymenobractea*.

**Paullinia pinnata** L. Sp. Pl. 366. 1753. *Barbasco; Salatxiu* (Petén, Maya).

Moist or dry thickets, 900 meters or less; Petén; Izabal; Suchitpequez; Retalhuleu; Sololá; San Marcos; Huehuetenango. Southern Mexico; British Honduras to Salvador and Panama; West Indies; South America; West Africa.

A large or small, woody vine, almost glabrous, the stems trigonous or 5-6-costate, the woody portion compound; leaves small or large, pinnate, the rachis and petiole winged; leaflets 5, ovate to oblong or lanceolate, mostly 7-12 cm. long, subcoriaceous, short-acuminate to very obtuse at the apex, obtuse or acute at the base, remotely and often coarsely serrate-dentate, often lustrous, almost or quite glabrous except for tufts of hairs in the nerve axils; stipules small, linear-subulate; racemes lax or dense, solitary, raceme-like or spike-like, longer or shorter than the leaves, often long-pedunculate, the bracts small, subulate, inconspicuous, the pedicels 2-4 mm. long; flowers white, 3-5 mm. long; sepals appressed-pilous; capsule cuneate-clavate or pyriform, sometimes with 3 short wart-like projections at the apex, usually deep red, subterete or obtusely trigonous, glabrous, 2-3 cm. long, 10-14 mm. broad; seeds black, lustrous, 12-15 mm. long, the aril white.

Called "tietie" and "fish poison" in British Honduras; "barbasco" (Tabasco); "macalte-ic" (British Honduras, Maya); "pate," "nistamal" (Honduras); "nistamalillo," "pozolillo," "chimplmecate" (Salvador). The stems of this and other species are much used as a substitute for cordage, especially in the construction of lowland dwellings. The seeds are reported to have been used in the Antilles for criminal poisoning.

**Paullinia scarlatina** Radlk. in Donn. Smith, Bot. Gaz. 16: 193. 1891. *Barbasco*.

Wet forest or thickets, 350 meters or less; Alta Verapaz; Izabal (type from Boca del Río Cajabón, 350 meters, *J. D. Smith* 1662). British Honduras; Honduras.

A large, almost glabrous vine, sometimes climbing to a height of 15 meters, the young branchlets pentagonous, puberulent, soon glabrate, the older branches terete; woody portion of the stem simple; leaves pinnate, the rachis and petiole naked; stipules small, triangular; leaflets 5, short-petiolulate, mostly elliptic and 6-12 cm. long, cuspidate-acuminate or sometimes long-caudate, broadly rounded to acute at the base, subcoriaceous, often lustrous, entire, barbate beneath in the nerve axils, elsewhere glabrous; racemes axillary, solitary, often equaling the leaves, the bracts small, subulate, the pedicels in fruit 6-7 mm. long; flowers white, the inner sepals 4 mm. long; capsule stipitate, red, ellipsoid or subglobose, 2-2.5 cm. long, 3-costate, glabrate, villous within; seeds 13-14 mm. long, black.

Called "pate" on the Atlantic coast of Honduras and used there as well as in Alta Verapaz as a *barbasco* or fish poison. This has been reported from British Honduras as *P. costata* Schlecht. & Cham., a Mexican species not definitely known from our area.

**Paullinia tomentosa** Jacq. Enum. Pl. Carib. 37. 1760.

Wet to rather dry thickets, 1,600 meters or less; Petén; El Progreso; Jalapa; Huehuetenango. Mexico; British Honduras; Honduras.

Stems tomentose, subterete, the woody portion simple; stipules small, filiform-subulate; leaves pinnate, the rachis winged, the petiole naked or nearly so; leaflets 5, ovate to rhombic or oval, mostly 4-7 cm. long, membranaceous, acute or obtuse, attenuate to obtuse at the base, coarsely crenate and often lobate, pubescent above, especially on the veins, and often between them, beneath densely tomentose or pilose, usually barbate in the nerve axils; racemes solitary or paniculate-congested, 5-20 cm. long, the bracts small, filiform-subulate, the pedicels 2-3 mm. long; flowers white or whitish, the sepals grayish-tomentulose, the inner ones 2.5 mm. long; capsule trigonous-globose, subsessile, 1-1.5 cm. long, somewhat trilobate, tomentulose, long-pilose inside; seeds subglobose, black, lustrous.

Called "barbasco" in Tabasco.

**Paullinia turbacensis** HBK. Nov. Gen. & Sp. 5: 89. 1821.

Moist dense forest, 300 meters; Retalhuleu (Río Vil, west of Retalhuleu, *Standley* 88315). Panama; Colombia.

A large woody vine, the branches terete, glabrous; leaves long-petiolate, the 3 leaflets membranaceous, oblong-lanceolate to broadly ovate, 10-20 cm. long, acuminate or long-acuminate, acute or obtuse at the base, remotely and coarsely serrate-dentate or repand-dentate, the terminal one long-petiolate, the lateral ones short-petiolulate, barbate beneath in the axils of the nerves, otherwise glabrous; stipules small, subulate; inflorescences arising from old wood, puberulent, short, the flowers pedicellate, white; sepals tomentulose outside; petals 5 mm. long; capsule cuneate-oblong or narrowly ellipsoid, about 2 cm. long and 1 cm. broad, sparsely or rather densely pubescent, attenuate at the base, 3-valvate, the valves carinate dorsally.

### SAPINDUS L. Soapberry

Trees; leaves alternate, without stipules, 1-foliolate or even-pinnate, the leaflets usually entire, the rachis often winged; flowers polygamous, regular, racemose-paniculate, terminal or axillary; sepals 4-5, biseriata, broadly imbricate; petals 4-5, naked or squamate within; disk complete, annular or elevated; stamens 8-10, central, the filaments usually pilose, the anthers versatile; ovary entire or 2-4-lobate, 2-4-celled, the style terminal, the stigma 2-4-lobate; ovules solitary, ascending from the base of the inner angle; fruit carnosous or coriaceous, 1-2-coccous, the cells oblong or globose, indehiscent; seeds usually globose, not arillate, the testa crustaceous or membranaceous; cotyledons thick, the radicle short.

About a dozen species, in the tropics and warmer regions of both hemispheres. Only the following species is found in Central America, but two others are recognized by Radlkofer as occurring in Mexico. They are, however, doubtfully distinct from *S. saponaria*.

**Sapindus saponaria** L. Sp. Pl. 367. 1753. *S. inaequalis* DC. Prodr. 1: 608. 1824. *Jaboncillo*; *Güiril*; *Huiril*; *Jaboncillal* (Huehuetenango).

Moist or dry thickets or open forest, often along roadsides or stream beds, frequently planted about country homes, 1,800 meters or less; Petén; Alta Verapaz; El Progreso; Zacapa; Jalapa; Escuintla; Guatemala; Sacatépequez; Suchitépéquez; Quiché; Huehuetenango; Retalhuleu; Quezaltenango; San Marcos. Mexico; British Honduras; Salvador; Nicaragua; Costa Rica; Panama; West Indies; South America; various parts of the Old World, probably introduced.

A tree, often 9–15 meters high or probably larger, the bark gray, fissured and flaking, the crown usually broad and dense, the trunk often 50 cm. or more in diameter; leaflets mostly 6–12, narrowly lanceolate to oblong, 5–18 cm. long, obtuse to long-acuminate, acute or obtuse at the base, asymmetric, glabrous, entire, the rachis often narrowly winged; flowers white or whitish, 4 mm. broad, in large, often long-pedunculate, much-branched panicles, the branches puberulent; petals 3 mm. long; fruit usually 1-cocccous, sometimes 2–3-cocccous, globose, glabrous, 1–2 cm. in diameter, very fleshy; seeds pale, globose, about 1 cm. in diameter.

Known in British Honduras as “soap tree,” “soap-seed tree,” and “jabón-che” (a combination of Spanish and Maya). Called “pacún” in Salvador and “pacón” in Honduras. The Maya name in Yucatan is reported as “zubul.” The fruits are said to contain as much as 37 per cent of saponin. When macerated in water they give copious suds, and in Guatemala and other parts of Central America they are used like soap for washing clothes. Large quantities of them often are on sale in the Guatemalan markets. The handsome seeds are utilized for making rosaries and necklaces, and children often use them like marbles for playing games. The fruit is employed in some parts of Mexico as a fish poison or *barbasco*. Although widely dispersed in Central America, the soapberry tree is nowhere very plentiful, and has the appearance of having been scattered by man. The trees are found mostly about fincas or in the neighborhood of settlements, and it would be difficult to indicate where, in Guatemala, for instance, it is really native.

### SERJANIA L.

Large or small, woody vines; leaves without stipules, or the stipules minute, 3-foliolate, biternate, or odd-pinnate, often pellucid-punctate; flowers small, whitish, irregular, polygamous, in axillary racemes or panicles, the inflorescences often tendril-bearing; sepals 5, or 4 with 2 of them connate, imbricate, the outer ones smaller; petals 4, squamate within; disk undulate, prolonged into 4 unequal glands; stamens 8, excentric, the filaments connate at the base; ovary sessile or short-stipitate, 3-celled, the style 3-fid; ovules solitary, affixed below the middle of the cell; fruit of 3 cocci, these samara-like, indehiscent, seed-bearing at the apex, finally separating from a central axis, extended below into a large broad wing; seeds sometimes short-arillate, with crustaceous testa; embryo incurved, the cotyledons plicate.



The largest genus of the family, with 200 species, all American. A number of other species grow in southern Central America. The plants are used in many parts of tropical America as *barbascos* or fish poisons, but these are little used in Guatemala, and in most parts of the country the people have no knowledge of this method of fishing. In most parts of the highlands there is too little water for fishing, or else the fish are too small to be of any value for food. In the lakes of Atitlán and Amatitlán, of course, there are plenty of fish, and in the latter many small fish are caught. "Pescado frito" or fried fish often is offered to travelers in the town of Amatitlán, especially when trains stop at the railroad station. About Cobán boys are seen with fishing poles along the streams, just as in the United States, a most unusual sight in Central America. While we have seen no evidence that they catch any fish worth taking, there must be some incentive else they would not continue fishing. In the larger streams of the lowlands there are plenty of fish, although as a rule the freshwater fish of Central America are very inferior as food, and where there are so many fine marine fish, little attention is given to the fresh-water ones. The following key is not altogether satisfactory because a few of the species still are known from incomplete material, without fruit. Two or three of the species listed are of rather doubtful standing.

Leaves 3-foliolate, pinnate, or pinnate-ternate with numerous (more than 9) leaflets.

Leaves 3-foliolate.

Stems densely setose-hirsute with long, spreading, brownish or yellowish hairs, at least on the angles.

Lateral leaflets sessile; stems hirsute on the sides as well as on the angles.  
*S. hispida*.

Lateral leaflets long-petiolulate; stems hirsute only on the angles.  
*S. phaseoloides*.

Stems glabrous or short-pilose with soft whitish hairs.

Fruit about 4 cm. long; leaves membranaceous.....*S. cardiospermoides*.

Fruit about 2 cm. long.

Leaflets coriaceous, entire or nearly so.....*S. yucatanensis*.

Leaflets membranaceous, coarsely serrate.....*S. Grosii*.

Leaves with 5 or numerous leaflets.

Leaves pinnate, with 5 leaflets.

Leaflets coarsely crenate, very densely pubescent beneath.....*S. lobulata*.

Leaflets subentire or appressed-serrate, or sometimes lobulate near the base, thinly pilose when mature or glabrous.

Leaves sessile or nearly so; leaflets entire or with a single tooth or small lobe on each side near the base.....*S. lateritia*.

Leaves long-petiolate; leaflets obscurely dentate or coarsely crenate.  
*S. depauperata*.

- Leaves ternate-pinnate, with very numerous leaflets.  
 Branches densely setose; leaflets long-acuminate.....*S. pterarthra*.  
 Branches not setose; leaflets mostly very obtuse.  
 Lower pinnae of the leaves with 5 leaflets.....*S. adiantoides*.  
 Lower pinnae of the leaves with usually 9 leaflets.....*S. rhachiptera*.
- Leaves biternate, with 9 leaflets.  
 Leaves entire or essentially so, usually subcoriaceous, mostly more than 6 cm. long.  
 Seed-bearing portion of the fruit glabrous, strongly compressed. *S. mexicana*.  
 Seed-bearing portion of the fruit puberulent or pilose, subglobose.  
 Seed-bearing portion of the fruit hard, reticulate-veined; pubescence of the flowers whitish or grayish.....*S. atrolineata*.  
 Seed-bearing portion of the fruit somewhat inflated, not reticulate-veined; pubescence of the flowers fulvous or rufous.  
 Leaflets lance-oblong, acuminate, glabrous or nearly so . . . *S. psilophylla*.  
 Leaflets elliptic, acute, often densely pubescent beneath.  
 Leaflets densely pubescent or tomentose beneath.....*S. sordida*.  
 Leaflets glabrous.....*S. rufisepala*.
- Leaflets conspicuously serrate or crenate, mostly membranaceous, sometimes coriaceous, if entire membranaceous and less than 6 cm. long.  
 Seed-bearing portion of the fruit densely hirsute or hirtellous.  
 Fruit 4-4.5 cm. broad; leaflets densely pilose beneath.....*S. macrocarpa*.  
 Fruit about 2 cm. broad.  
 Leaflets densely pubescent beneath.....*S. triquetra*.  
 Leaflets glabrous throughout or nearly so.....*S. gonicarpa*.
- Seed-bearing portion of the fruit glabrous or nearly so.  
 Fruit 3.5-4 cm. long; leaflets mostly oblong or elliptic-oblong, subcoriaceous.  
*S. caracasana*.  
 Fruit 2.5 cm. long or shorter; leaflets mostly ovate or lance-ovate, membranaceous.  
 Fruit 1.5-1.8 cm. long; leaflets entire or with few closely appressed, very acute serrations.....*S. punctata*.  
 Fruit 2-2.5 cm. long; leaflets usually coarsely serrate.....*S. racemosa*.

***Serjania adiantoides*** Radlk. in Millsp. Field Mus. Bot. 1: 403. 1898.

Logwood (*Haematoxylon*) swamps, 400 meters or less; Petén. Yucatán, the type from Buena Vista Xbac, *G. F. Gaumer* 1114; Campeche; British Honduras.

A small or large vine, the stems 5-sulcate, sparsely incurved-pilose or glabrate, the woody portion simple; leaves bipinnate, the pinnae usually 4, the lowest pinnae 5-foliolate, the upper ones 1-3-foliolate, the rachis narrowly winged, the petiole naked; leaflets oval or suborbicular to ovate or lance-ovate, mostly 1-2 cm. long, thick-membranaceous, subacute to rounded or emarginate at the apex, often mucronate, broadly rounded to cuneate-attenuate at the base, usually with 1 crenation on each side near the apex, often sublobate, puberulent above on the

costa, elsewhere glabrous or nearly so, microscopically glandular, paler beneath; racemes equaling or shorter than the leaves, often long-pedunculate, dense, the rachis densely puberulent, the pedicels 2.5 mm. long; flowers white, hirtellous-pilosulous, the inner sepals 2.5 mm. long; fruit glabrous, 1.5 cm. long, emarginate at the apex and base, not constricted below the cells, the cells with a broad septum.

The presumably Maya name of "bui" is recorded from Yucatan. Schipp reports the species as growing in British Honduras on bare limestone hilltops.

***Serjania atrolineata*** Sauv. & Wright, Fl. Cub. 24. 1868. *S. scatenans* Radlk. Serjan. Monogr. 213. 1875. *Ixlotoac* (Petén, fide Lundell).

Moist or wet thickets, 1,200 meters or less; Petén; Alta Verapaz; Izabal; Escuintla; Guatemala; Retalhuleu; Quezaltenango. Yucatan or Tabasco; British Honduras; Nicaragua; Costa Rica; Panama; Cuba; Venezuela.

Stems subterete, somewhat puberulent when young, soon glabrate; the woody portion compound, of a central body and 3 small separate ones; leaves biternate, the petiole naked, the rachis narrowly winged; leaflets oblong to lance-oblong or elliptic-oblong, mostly 5-9 cm. long, acuminate or long-acuminate, subacute to attenuate at the base, thick-membranaceous, entire or with a few serrations or crenations close to the apex, glabrous; racemes often much longer than the subtending leaves and thus forming terminal panicles, usually dense; flowers of medium size, the sepals densely tomentulose; fruit 2-2.5 cm. long and of about the same breadth, shallowly emarginate at the apex, cordate at the base, the cells subglobose, small, densely short-hirsute, the partition walls rather broad, the wings glabrate, but slightly constricted below the cells.

The Maya name is reported from Yucatan as "buiche."

***Serjania caracasana*** (Jacq.) Willd. Sp. Pl. 2: 465. 1799. *Paulinia caracasana* Jacq. Hort. Schoenbr. 1: 52. pl. 99. 1797. *P. glabra* Bertol. Fl. Guat. 413. pl. 40. 1840 (type from somewhere in Guatemala, probably Escuintla, Velásquez).

Moist or dry thickets, 1,300 meters or less; Alta Verapaz; Izabal; Chiquimula; Santa Rosa; Escuintla; Retalhuleu; Huehuetenango (Nentón). Southern Mexico; Salvador; Costa Rica; Cuba; South America.

Usually a large vine, glabrous or nearly so, the stems 6-8-striate, the woody portion compound, of a large central body and about 8 smaller ones; leaves all or mostly biternate, the petiole and rachis usually naked; leaflets subcoriaceous, usually lustrous, oblong to elliptic or lanceolate, mostly 6-12 cm. long, obtuse to short-acuminate, mostly coarsely crenate-serrate, glabrous or nearly so; flowers large, white, the thyrses rather broad, often equaling or exceeding the leaves, the pedicels 3-7 mm. long, puberulent and viscid, the branches of the inflorescence

usually blackish in the dry state; inner sepals 3–5 mm. long, the petals 4.5–7 mm. long; fruit glabrous, commonly 3.5–4 cm. long and about 3 cm. broad, cordate at the base, the cells strongly compressed, with a very narrow partition wall, the wings not contracted below the cells, lustrous.

Called "bejuco cuadrado" in Salvador.

***Serjania cardiospermoides*** Schlecht. & Cham. *Linnaea* 4: 418. 1831. *Zicac* (Petén, Maya, fide Lundell).

Moist or dry thickets, 1,000 meters or less; reported from Petén; Zacapa; Chiquimula; Huehuetenango. Southern Mexico; Honduras; Costa Rica.

Plants almost glabrous, the branches triangular, sulcate, the woody portion compound, of a large central body and 3 smaller ones; leaves 3-foliolate, long-petiolate, the petiole naked; leaflets ovate or broadly rhombic-ovate, membranaceous, mostly 5–9 cm. long, acute or obtuse, the lateral ones obtuse or rounded at the base, the terminal one abruptly contracted and long-decurrent, coarsely or rather finely and remotely serrate or crenate, paler beneath, glabrous on both sides or sometimes pubescent beneath; thyrses longer or shorter than the leaves, usually lax, puberulent, the pedicels often 8 mm. long, articulate at the middle; flowers white, the sepals rather sparsely puberulent; fruit usually 3.5–4.5 cm. long and 2.5–3.5 cm. wide, emarginate at the base, glabrous, the cells strongly compressed, with very narrow partition walls, the wings thin, green, not constricted below the cells.

Called "crespillo" in Honduras.

***Serjania depauperata*** Radlk. *Serjan. Suppl.* 92. 1886.

Known only from the type, *Bernoulli & Cario* 2929, from Santa Rosa (probably Dept. Santa Rosa).

Plants glabrate, the slender branches 5-angulate, the woody portion simple; leaves all or mostly pinnate, long-petiolate; leaflets 5, ovate-oblong to broadly ovate, 3–4.5 cm. long, 1.5–2.2 cm. wide, obtuse, mucronate, obscurely crenate-dentate, glabrous above, with a few hairs beneath on the nerves, pale beneath, subcoriaceous; thyrses solitary, lax, glabrous, few-flowered, the pedicels 5–6 mm. long; sepals sparsely puberulent; petals glabrous, 4 mm. long; fruit not known.

The species is known to us only by a photograph of the type.

***Serjania goniocarpa*** Radlk. *Monogr. Serjan.* 309. 1875.

Moist or wet thickets, sometimes in logwood (*Haematoxylon*) swamps, 900 meters or less; Petén; Alta Verapaz; El Progreso. Southern Mexico; British Honduras.

A large vine, sometimes 18 meters long, with a trunk 5 cm. in diameter, the branches puberulent at first, soon glabrate, the woody portion compound, with a

central portion and 3-5 smaller ones; leaves biternate, the petiole and rachis naked; leaflets ovate to rhombic-ovate or elliptic-oblong, mostly 3-6 cm. long, obtuse, coarsely and remotely crenate, subcoriaceous, often lustrous, paler beneath, minutely puberulent beneath on the nerves or almost wholly glabrous; thyrses generally numerous and often forming a large, terminal, almost naked panicle, the rachis puberulent, the pedicels 2 mm. long or less; flowers white, the sepals tomentulose, 2.5 mm. long; petals 3 mm. long; fruit about 2.5 cm. long and 1.5 cm. broad, cordate at the base, the cells densely tomentose or hirtellous, with broad partition walls, subglobose, hard, the wings glabrate, often reddish, scarcely constricted below the cells.

The Maya name "hab" is reported from British Honduras, where the vine is used as a *barbasco* or fish poison. Maya names reported from Yucatan are "buyac" and "kexac." Material of this species has been recorded from British Honduras and also from Petén as *S. scatens* Radlk.

**Serjania Grosii** Schlecht. *Linnaea* 18: 42. 1844.

Wet or dry thickets, 1,400 meters or lower; Zacapa; Jalapa; Santa Rosa; Escuintla; Suchitepéquez; Retalhuleu. Southern Mexico; Nicaragua.

A large or small vine, almost glabrous, the branches 5-6-sulcate, the woody portion simple; leaves 3-foliolate, long-petiolate; leaflets broadly ovate to rhombic, mostly 5-8 cm. long, acute or obtuse, coarsely and remotely crenate-dentate, membranaceous, green and glabrous above, paler beneath, barbate in the nerve axils, elsewhere glabrous; thyrses solitary or often forming large panicles, sparsely puberulent or almost wholly glabrous, the pedicels mostly 2 mm. long or less; flowers small, white, the sepals 2 mm. long, the petals of about the same length; fruit about 2 cm. long and 1.5 cm. wide, cordate at the base, glabrous, the cells somewhat inflated, venose, with broad partition walls, the wings not constricted below the cells, thin.

**Serjania hispida** Standl. & Steyerm. *Field Mus. Bot.* 23: 171. 1944.

Known only from the type, Alta Verapaz, damp forested slopes, along road between San Cristóbal and Chixoy, 1,200-1,300 meters, *Steyermark* 43926.

A woody vine, the stems slender, angulate, densely setose-hispid on all sides with long spreading brown hairs; stipules almost filiform, 1 cm. long or more, brown-hispid; leaves membranaceous, 3-foliolate, on petioles 2-3 cm. long, the petioles naked, densely hispid; lateral leaflets sessile, oblique-ovate, 6-7.5 cm. long, abruptly caudate-acuminate, obliquely rounded at the base; terminal leaflet rhombic-ovate or rhombic-elliptic, about 13 cm. long and 6.5 cm. wide, caudate-acuminate, abruptly cuneate-attenuate at the base and decurrent to the base of the petiolule; leaflets all coarsely and remotely crenate-dentate, green above, densely hispid, slightly paler beneath, densely and softly hirsute; inflorescences

on peduncles 7 cm. long, lax, many-flowered, about 5 cm. long and 3 cm. broad, very densely setose-hispid with long brown hairs, the flowers white, on long slender pedicels, the bracts almost filiform, hirsute, 5 mm. long; sepals almost 4 mm. long, broad, very densely brown-hispidulous; petals glabrous.

***Serjania lateritia* Radlk. Bull. Herb. Boiss. 1: 465. 1893.**

Dry brushy slopes, 1,200–1,600 meters; endemic; Baja Verapaz (type from Santa Rosa, *F. C. Lehmann* 1448); Zacapa (Sierra de las Minas).

Stems slender, 5-angulate, glabrous, the woody portion simple; leaves sessile or nearly so, pinnate, all or most of them 5-foliolate, the leaflets ovate-oblong or broadly ovate, 2–9.5 cm. long, very unequal in size, the lower ones smaller, obtuse or subacute, obsolete crenate-dentate or entire, the lateral ones mostly with 1–2 large teeth or small lobes near the base, sometimes shallowly 3-lobate, sparsely pilose beneath, especially on the nerves, or glabrate; inflorescences solitary, lax, glabrous, long-pedunculate, often longer than the leaves, the pedicels 5–6 mm. long; sepals red, almost glabrous; petals 4 mm. long, ciliolate; fruit glabrous, bright red, 3 cm. long, 2.5 cm. wide, the cells thin-walled and somewhat inflated, with narrow partition walls, the wings not constricted below the cells.

The species is noteworthy for the sessile leaves, whose leaflets usually are very unequal in size and not uniform in shape. The large, brilliantly colored fruits are more conspicuous than those of most other species.

***Serjania lobulata* Standl. & Steyerl. Field Mus. Bot. 23: 14. 1943. *Chilmecate*; *Mariposas* (fruits).**

Dry rocky hillsides, 250–850 meters; Zacapa; Chiquimula (type collected on the divide along the road between Zacapa and Chiquimula, *Standley* 73715); Jutiapa; endemic.

A large woody vine, the branches fuscous-ferruginous, subterete, at first minutely grayish-puberulent; leaves pinnately 5-foliolate, long-petiolate, the petiole and rachis naked; leaflets membranaceous, the lower ones long-petiolulate, the upper ones sessile, rhombic or rhombic-ovate, sometimes oblong-elliptic, 4–10 cm. long, 2–6 cm. wide, acute or obtuse, truncate to acute at the base or cuneate-attenuate, coarsely and remotely crenate or sublobate, green above and puberulent, paler beneath, densely short-pilosulous; thyrses 5–7 cm. long, shorter than the leaves, densely ochraceous-tomentulose, the pedicels short; sepals densely whitish-tomentulose, 3.5–4 mm. long; petals white, 5 mm. long, glabrous, glandular within; fruit broadly cordate, 2 cm. long, 2.5 cm. broad, the cells hard, subglobose, densely hirtellous, rugose-venose, with broad partition walls, the wings thin, densely puberulent, not constricted below the cells.

***Serjania macrocarpa* Standl. & Steyerl. Field Mus. Bot. 23: 15. 1943.**

Type from Los Amates, Izabal, *W. A. Kellerman* 7532. British Honduras (Vaca, El Cayo District).

Branches obtusely trigonous, densely brownish-pilose or subtomentose, the woody portion compound, of a large central portion and 3 small ones; leaves large, long-petiolate, biternate, the petiole naked, the rachis narrowly marginate; leaflets membranaceous, lance-oblong to obovate-elliptic or oblong-elliptic, 5–13 cm. long, 2.5–5.5 cm. wide, acuminate or abruptly acuminate, attenuate to acute at the base, sessile, coarsely and remotely crenate-serrate, puberulent above along the nerves, somewhat lustrous, paler beneath, densely velutinous-pilose; fruit broadly cordate, 4 cm. long, 4.5 cm. wide, softly pilosulous, the cells often tomentose, triangular in section, very acute and narrow dorsally and almost winged, the partition walls very broad, the wings thin, conspicuously veined.

*Serjania mexicana* (L.) Willd. Sp. Pl. 2: 465. 1799. *Paullinia mexicana* L. Sp. Pl. 366. 1753. *Barbasco*; *Bolomyoc*, *Chacac* (Petén, Maya); *Lambeador*.

Moist or dry thickets or open forest, mostly at 900 meters or less; Petén; Alta Verapaz; Izabal; Santa Rosa; Escuintla; Retalhuleu; San Marcos. Mexico; British Honduras, to Salvador and Panama; Jamaica; Colombia and Venezuela.

Often a large vine, the stems sometimes setose-aculeate, 5-sulcate, the woody portion simple; leaves biternate, the petioles naked, the rachis narrowly or broadly winged; leaflets elliptic to ovate or obovate, sometimes oblong, mostly 5–13 cm. long, subcoriaceous, acute or obtuse, glabrous above, glabrous or sparsely pubescent beneath, mostly entire but often with a few teeth near the apex; thyrses solitary or paniculate-congested and sometimes forming very large, almost naked panicles, the rachises sparsely puberulent or almost glabrous, the pedicels 2–5 mm. long; flowers white, the sepals about 2 mm. long, densely pale-tomentulose; petals 3 mm. long; fruit broadly cordate, 2–2.7 cm. long, about 2 cm. wide, glabrous, the cells strongly compressed, with very narrow partition walls, the wings often somewhat constricted below the cells.

Sometimes called "crespillo" in Honduras. The plant is said to be chewed in Guatemala as a remedy for toothache.

*Serjania phaseoloides* Standl. & Steyer. Field Mus. Bot. 23: 171. 1944.

Known only from the type, Huehuetenango, along Río Cuilco, between Cuilco and San Juan, 1,200–1,300 meters, *Steyermark* 50908.

A woody vine, the stems slender, deeply sulcate and angulate, setose-hirsute on the angles only with dense stiff yellowish hairs; leaves on petioles about 4 cm. long, membranaceous, 3-foliolate, the petiolules 1.5–2.5 cm. long, the petiole slender, sparsely hispidulous; lateral leaflets deltoid-ovate or ovate, 7–8 cm. long, acuminate or long-acuminate, usually subcordate at the base or truncate; terminal leaflets broadly rhombic-ovate, 7–10 cm. long, 5.5–7 cm. wide, acuminate, rounded at the base; leaflets all concolorous, remotely and coarsely undulate-dentate or

sometimes sublobate near the base, sparsely pilosulous on both surfaces or glabrate; inflorescences long-pedunculate, about 9 cm. long and 3 cm. broad, laxly many-flowered, hirtellous, the flowers white, on long slender pedicels; sepals about 3 mm. long, densely and minutely puberulent or tomentulose outside; immature fruit (only 7 mm. long) broadly obovate, emarginate at the apex, very sparsely and minutely puberulent, in age probably glabrous, ciliolate on the angles.

***Serjania psilophylla*** Radlk. in Donn. Smith, Bot. Gaz. 16: 192. 1891. *Bolonyac* (Quecchí).

Moist or wet forest, sometimes in pine forest, 1,100–1,400 meters; Alta Verapaz (type from vicinity of Cobán, *Tuerckheim* 1153); endemic.

A small or large vine, glabrous or nearly so, the stems 6-sulcate, the woody portion simple; leaves biternate, the petiole and rachis naked; leaflets oblong to lanceolate or oblong-ovate, 11 cm. long and 3 cm. wide or smaller, acute to long-acuminate, acute to rounded at the base, sessile or short-petiolate, entire, subcoriaceous, often brownish when dried, lustrous above, somewhat paler beneath; thyrses usually forming large naked panicles, the pedicels 2–2.5 mm. long, the branches of the inflorescence almost or quite glabrous; flowers white, the sepals puberulent, 3 mm. long or less; petals 3.5 mm. long; fruit unknown.

***Serjania pterarthra*** Standl. in Lundell, Carnegie Inst. Wash. 436: 315. 1934.

In thickets, 400 meters or less; Petén (El Paso). Campeche (type from Tuxpeña); Tabasco; British Honduras.

Stems 5-angulate, glabrous but densely setose on the angles, the woody portion compound, of a central body and 5 small outer ones; leaves decompose, the 2 lowest segments pinnate, the terminal one pinnate-ternate, the short petiole naked, the rachis broadly winged; leaflets lance-oblong or narrowly oblong, mostly 2.5–5 cm. long and 8–12 mm. wide, acuminate, at the base acute or obtuse, crenate near the apex, glabrous, green and lustrous above, paler beneath; thyrses solitary or sometimes paniced, often greatly elongate, the branches glabrous or nearly so, the pedicels 2 mm. long or less; sepals 2 mm. long, minutely puberulent; petals 2.5 mm. long; fruit cordate, about 2.3 cm. long and 1.5 cm. wide, glabrous, the cells somewhat compressed but not flattened, acute dorsally, rugose-venose, with narrow partition walls, the wings thin, not or scarcely constricted below the cells.

***Serjania punctata*** Radlk. in Donn. Smith, Bot. Gaz. 20: 281. 1895.

Moist or dry thickets, 500–1,700 meters; endemic; Chiquimula(?); Santa Rosa (type from Cuajiniquilapa, now Cuilapa, *Heyde & Lux* 6091); Escuintla; Sacatepéquez.

A small or large, slender vine, glabrous or nearly so, the stems 6-costate, the woody portion compound, of a central body and 2–3 small ones; leaves biternate, the petiole naked, the rachises narrowly winged; leaflets ovate or elliptic, mem-



branceous, mostly 3-4.5 cm. long, acute or acuminate and mucronate, usually acute or acuminate at the base, sessile, remotely and inconspicuously serrate or often entire, glabrous, green above, somewhat paler beneath; thyrses mostly solitary, often longer than the leaves, the pedicels 2 mm. long or less, the rachis sparsely puberulent or glabrous; flowers white, the sepals 1.5-3 mm. long; petals 3.5 mm. long; fruit rounded-cordate, 1.5-1.8 cm. long and broad, glabrous, the cells somewhat inflated, subglobose, rounded on the back, with broad partition walls, the wings thin, not constricted below the cells.

***Serjania racemosa*** Schumacher, Skrivt. Naturh. Selsk. Kjoebenhavn 3, pt. 2: 127. *pl. 12, f. 3.* 1794. *Salta-perico* (fide Aguilar).

Moist or dry thickets, 2,500 meters or less; Chiquimula; Jalapa; Escuintla; Guatemala; Sacatepéquez; Chimaltenango; Suchitepéquez; Retalhuleu; Quezaltenango; San Marcos; Huehuetenango. Mexico; Honduras; Costa Rica.

Stems 5-6-sulcate, glabrous or nearly so, the woody portion simple; leaves biternate, the petiole naked, the rachis usually with narrow wings; leaflets membranaceous, chiefly ovate or elliptic, commonly 3-7 cm. long, acute or acuminate, coarsely crenate-serrate or sometimes subentire, glabrous or nearly so, sometimes puberulent on the nerves, somewhat paler beneath; thyrses solitary or in terminal, sometimes large panicles, the rachis puberulent, short-pilose, or almost glabrous, the pedicels 1 mm. long; flowers white, the sepals 2-2.5 mm. long; petals 2.5-3 mm. long; fruit cordate-ovate, 2-2.5 cm. long, 1-1.7 cm. wide, glabrous, at least in age, the cells thin and somewhat inflated, subglobose, rounded dorsally, the partition walls narrow, the wings thin, scarcely constricted below the cells.

***Serjania rhachiptera*** Radlk. in Donn. Smith, Bot. Gaz. 16: 192. 1891. *Bejuco de solitaria; Tzibac* (Huehuetenango).

Moist or wet forest or thickets, 1,200-2,600 meters; Baja Verapaz; Zacapa; Guatemala (type from Guarda Viejo, *J. D. Smith* 1907); Sacatepéquez; Suchitepéquez; Sololá; Chimaltenango; Huehuetenango; Quezaltenango; San Marcos. Chiapas; Honduras; Salvador.

A small or large vine, usually almost glabrous, the stems glabrous or hirtellous, 6-costate, the woody portion simple; leaves bipinnate or decompose, the lower pinnae usually 9-foliolate, the petioles and rachises marginate; leaflets small, elliptic to suborbicular, mostly 1-2.5 cm. long, sessile, few-dentate, subchartaceous, glabrous or sometimes hirtellous beneath, green above, paler beneath; thyrses solitary or paniculate, the branches puberulent or glabrate, the pedicels 2.5 mm. long or less; flowers white, the sepals puberulent, the inner ones 3.5 mm. long; petals about equaling the sepals; fruit cordate-ovate, about 2 cm. long and broad, the cells pubescent, subglobose, reticulate-veined, rounded dorsally, the partition walls much narrower than the cells, the wings glabrous or nearly so, often red.

Called "barbasco" and "bejuco cuadrado" in Salvador. The specific name appeared originally as *rachiptera* but was altered by Radlkofer to *rhachiptera*. The foliage of this species is handsome

and somewhat fern-like in appearance because of the numerous small leaflets. The local name "bejuco de solitaria" signifies "tapeworm vine," in allusion to the appearance of the leaf segments. Radlkofer (Pflanzenreich IV. 165: 183. 1933) recognizes two forms, based upon Guatemalan material, f. *glabriuscula*, with almost glabrous foliage, and f. *hirtella*, in which the young branches, lower leaf surface, and fruits are hirtellous.

***Serjania rufisepala*** Radlk. in Donn. Smith, Bot. Gaz. 16: 191. 1891.

Type from Tres Cruces, near Cobán, Dept. Alta Verapaz, 1,420 meters, *J. D. Smith* 1766; Petén (?; material sterile). Costa Rica; Panama.

Plants glabrous or nearly so, the branches 6-sulcate, the woody portion simple; leaves biternate, the petiole and rachis naked; leaflets elliptic or lance-elliptic, mostly 8 cm. long and 5 cm. wide or smaller, cuspidate-acuminate, the terminal one attenuate at the base into a petiolule, the lateral ones sessile, entire, subcoriaceous, glabrous, lustrous above, somewhat paler beneath; thyrses subpaniculate, 7 cm. long, the rachis puberulent, the pedicels 3 mm. long or less; flowers yellowish white, the sepals rufous-tomentulose, 2.5 mm. long; petals about equaling the sepals; immature fruit bright red, short-ovate, 2 cm. long and 1.8 cm. wide or larger, the cells grayish-puberulent, the wings glabrous.

***Serjania sordida*** Radlk. Serjan. Monogr. 272. 1875.

Moist thickets or forest, 350–1,700 meters; Alta Verapaz; Jalapa. Southern Mexico; Costa Rica.

Stems 6-sulcate, rufous-pilose when young, the woody portion simple; leaves biternate, the petiole and usually the rachis naked; leaflets elliptic to oblong or ovate, mostly 10 cm. long and 5 cm. wide or smaller, subcoriaceous, acute or obtuse, sometimes short-cuspidate, entire, glabrous above, rufous-tomentose or pilose beneath; thyrses solitary or paniculate, dense, 5–15 cm. long, rufous-tomentulose, the pedicels 1.5 mm. long; sepals rufous-tomentulose, 2.5 mm. long or shorter; petals 2.5 mm. long; fruit ovate-cordate, about 2 cm. long and 1.8 cm. wide, slightly constricted below the cells, puberulent, densely so on the cells, these scarcely inflated, subglobose, the partition walls narrow.

***Serjania triquetra*** Radlk. Serjan. Monogr. 305. 1875. *Bejuco genio* (Zacapa); *Bejuco tres filios*; *Barbasco*.

Moist or dry thickets, sometimes in lowland forest, 1,850 meters or less; Baja Verapaz; Zacapa; Chiquimula (fide Radlkofer); Jutiapa; Santa Rosa; Escuintla; Guatemala; Suchitupéquez; Retalhuleu; Huehuetenango; Quiché. Southern Mexico; Honduras; Salvador; Nicaragua; Costa Rica.

A small or large vine, the stems trigonous or subterete, 6-sulcate, pubescent, the woody portion compound, of a large central body and 3-5 small surrounding ones; leaves biternate, the rachis and petiole naked, pubescent; leaflets membranaceous or thicker, mostly broadly ovate or rhombic and 4-8 cm. long, sometimes larger, obtuse to acuminate, coarsely crenate-serrate, densely and softly pilose beneath, sometimes only sparsely pilose, pubescent or glabrate above; thyrses solitary or paniculate, pubescent, mostly dense, the pedicels 2-3 mm. long; sepals whitish-tomentulose, 3 mm. long; petals 4 mm. long; fruit cordate-ovate, 2 cm. long or slightly larger and almost as broad, retuse at the apex, the cells hard, not inflated, hirtellous, reticulate-veined, obtuse or rounded and costate dorsally, with broad partition walls, the wings thin, sparsely pilose or glabrate.

Called "bejuco cuadrado" in Salvador.

**Serjania yucatanensis** Standl. Field Mus. Bot. 8: 21. 1930. In forest or thickets, 700 meters or less; Alta Verapaz (Cerro Chinajá, *Steyermark* 45661).

Yucatan, the type from Chichankanab; Campeche; British Honduras, and probably extending into Petén.

A large coarse vine, the branches 6-sulcate, glabrous, the woody portion compound, of a large central body and 3 small surrounding ones; leaves 3-foliolate, the petiole naked; leaflets sessile, coriaceous, ovate to elliptic-oblong or elliptic, 5-15 cm. long, 3-7 cm. wide, narrowed to the obtuse or subacute apex, acute and abruptly attenuate at the base, entire or with a few serrations near the apex, glabrous, paler beneath; thyrses mostly axillary and solitary, 5-9 cm. long, the rachis sparsely tomentulose or almost glabrous, the pedicels 2-3 mm. long; flowers white, the inner sepals 3-3.5 mm. long, tomentulose; fruit ovate-cordate, 18-20 mm. long and 15 mm. broad, glabrous, the partition walls very broad, the cells not inflated, acutish dorsally, the wings thin, often red.

**TALISIA** Aublet

Trees or large shrubs; leaves without stipules, alternate, even-pinnate, the leaflets alternate and opposite, usually coriaceous, entire; flowers regular, polygamodioecious, small, paniculate; sepals erect, 2-seriate, imbricate; petals 5, imbricate, unguiculate, villous on the margins, sometimes with a scale-like appendage; disk complete, tumid, pilose, lobate; stamens 8, central, the filaments short or elongate, often glabrous, the anthers basifixed, linear, apiculate; ovary sessile, villous, 3-lobate, 3-celled, attenuate to the style, the stigma 3-lobate; ovules solitary, ascending from the base of the axis; fruit dry, indehiscent, subterete, by abortion 1-celled and 1-seeded, crustaceous or coriaceous; seed erect.

Forty species, all American. Three others have been recorded for southern Central America.

Fruit 4-5 cm. long; leaflets 4-6, broadest at or near the base; flowers 6 mm. long. *T. Floresii*.

Fruit 2.5 cm. long or smaller; leaflets 4, most of them broadest at or above the middle; flowers 3-4 mm. long.....*T. olivaeformis*.

*Talisia Floresii* Standl. Trop. Woods 26: 14. 1931. *Poloc*, *Ixezul* (Petén, Maya).

Common in swamp or lakeside forest and in secondary upland forest, sometimes in *Haematoxylon* swamps; northern Petén. Campeche; Yucatan, the type from Progreso (cultivated).

A tree of 15-18 meters, the trunk sometimes 60 cm. in diameter, the bark gray, the young branchlets fulvous-tomentulose, the older ones densely elevated-lenticellate, the petioles and leaf rachis also densely and conspicuously lenticellate; leaflets 4-6, coriaceous, lustrous, on thick petiolules 3-6 mm. long, oblong to oblong-lanceolate or ovate-oblong, mostly 7-11 cm. long and 2-5 cm. wide, obtuse to narrowly rounded or long-acuminate at the apex, acute or obtuse at the base, glabrous, paler beneath, the venation conspicuous beneath and closely reticulate; panicles small or large, often much-branched and as much as 25 cm. long, densely fulvous-tomentulose, the flowers white, short-pedicellate or subsessile, 6 mm. long; sepals broadly ovate, obtuse, 3 mm. long, densely tomentulose; petals densely villous on the margins; fruit large and hard, subglobose, commonly 4-5 cm. long, broadly rounded at each end, somewhat oblique, densely tomentulose, containing a single large seed.

The Maya name in Yucatan is "coloc." In general appearance the large tobacco-colored fruit suggests the sapodilla or chicozapote (*Achras Zapota*). A fleshy cream-colored aril surrounding the huge seed is aromatic and edible, with a sweet agreeable flavor. In Yucatan the tree flowers in May and fruits in November and December. According to the original collector of this tree, Dr. Román S. Flores, in Yucatan the boys have from time immemorial made a small toy, a kind of whirligig, from the woody part of the fruit. After making a hole about 1 cm. in diameter in each end of the seed and another at the side, they gouge out all the kernel with a bit of wire. A round stick 20-25 cm. long is thrust through the end holes to half its length and fitted so that it will rotate freely. A cord 50-60 cm. long is attached at one end to the middle of the spindle, the other end extending out through the hole in the side of the shell. To the top of the spindle is fastened a disk 10-12 cm. in diameter, which is usually made from a gourd (*Lagenaria*). Then the shell is held in the fingers of one hand while the cord, previously wound up, is successively pulled and released, thus causing the disk to rotate back and forth rapidly and with a whirring noise.

*Talisia olivaeformis* (HBK.) Radlk. Sitzungsber. Bayer. Akad. 8: 342. 1878. *Melicocca olivaeformis* HBK. Nov. Gen. & Sp. 5: 100. 1821. *Jurgay*; *Urugualle*; *Talpajocote*; *Kenep*, *Guayo*, *Uayum* (Petén, Maya).

Wooded ravines or moist or dry thickets, often planted about dwellings, 500 meters or less; Petén; Zacapa; Chiquimula; Baja Verapaz; Jutiapa; Guatemala. Chiapas; Yucatan; British Honduras; Colombia and Venezuela.

A tree of 18 meters or less with dense spreading crown, the branchlets and petioles minutely puberulent or almost wholly glabrous; leaflets 4, opposite, elliptic to lance-oblong, mostly 5–12 cm. long, petiolulate, obtuse or short-acuminate with a very obtuse tip, acute to obtuse at the base, thinly coriaceous, the nerves and veins not conspicuous beneath; inflorescences axillary, often glomerate at the ends of the branches, usually small and shorter than the leaves, densely tomentulose, the pedicels 1–2 mm. long; flowers white, 3–4 mm. long, the sepals ovate, acute, tomentulose outside; petals ciliate; fruit subglobose, mammillate at the apex, densely and minutely pale-tomentulose.

Called "tinaljucó" in Honduras. In Salvador there is a belief that the tree fruits only once every ten years, a belief probably without basis. It is said to be much planted in Petén, and to be found about the old ruined cities, as if persisting from former cultivation. The fruit is of a handsome sage-green, or at full maturity yellowish. In the fresh state the rind is firm but flexible, enclosing a considerable amount of dull orange-red pulp that has a slightly acid and agreeable flavor. The fruit is not popular in Central America, because of the competition of so many better ones, but it is sometimes sold in the markets, as at Chiquimula, where it was observed in some quantity in April.

### THINOUIA Triana & Planchon

Woody vines with tendrils, these representing sterile peduncles; leaves petiole, 3-foliolate; flowers small, yellowish or white, regular or nearly so, polygamous; calyx short, cupular, 5-parted, the segments subimbricate; petals 5, spatulate, squamate within at the base; disk small, subcupular, 5-crenate; stamens 8, long-exserted, the filaments villous below, the anthers short-ellipsoid; ovary trigonous-pyramidal, 3-celled; fruit dry, obcordate or cuneate, stipitate, 3-coccous, broadly 3-winged above, excised at the apex, the cocci samara-like, the seed-bearing portion basal, the wing large and thin, venose.

Twelve species are known, all except the following in South America.

*Thinouia tomocarpa* Standl. Field Mus. Bot. 12: 411. 1936 (type from Temash River, British Honduras, in primary forest near sea level, *Schipp* 1336).

Wet forest, near sea level; Izabal (between Virginia and Lago de Izabal).

A woody vine 18 meters long, the branches terete, striate, rather densely lenticellate, the young branchlets minutely puberulent; leaflets on petiolules 1-3 cm. long, subcoriaceous, ovate or oblong-ovate, about 11 cm. long and 6 cm. wide, acute, rounded at the base and often oblique, entire or remotely and coarsely crenate, glabrate, barbate beneath along the costa; flowers subumbellate, numerous, the umbels long-pedunculate, the slender pedicels almost 2 cm. long, puberulent; fruit large, glabrous, lustrous, borne on a stipe 1 cm. long, the cocci 6-8 cm. long, near the apex 4 cm. wide, truncate at the apex or very broadly and shallowly excised, the seed-bearing portion strongly compressed, laxly reticulate-veined.

### THOUINIA Poiteau

Trees or shrubs; leaves without stipules, mostly 3-foliolate, sometimes 1-foliolate; flowers small or minute, racemose or paniculate, regular, polygamodioecious; calyx small, 4-parted, the lobes scarcely imbricate; petals 4, crenulate at the apex, squamate within at the base; disk complete, annular, lobate; stamens 8, central, the filaments elongate, pilose; ovary 3-lobate, 3-celled, the style elongate, 3-fid or entire; ovules solitary, affixed to the axis near its base; fruit of 3 samaras, these divergent, bearing a long terminal wing, separating from a central axis, 1-seeded at the base, the cells glabrous within; seeds oblong, not arillate, with membranaceous testa; radicle incurved.

About 27 species, in Mexico, Central America, and the Greater Antilles. One other Central American species is found in Costa Rica.

Inflorescences branched, paniculate.....*T. acuminata*.  
 Inflorescences simple, raceme-like.

Leaflets glabrous except for dense tufts of hairs beneath in the nerve axils.  
*T. paucidentata*.

Leaflets velutinous-pilosulous beneath, at least when young...*T. brachybotrya*.

**Thouinia acuminata** Watson, Proc. Amer. Acad. 25: 145. 1890.  
*T. acuminata* var. *pubicalyx* Radlk. in Donn. Smith, Bot. Gaz. 18: 200. 1893 (type from Laguna de Ayarza, Santa Rosa, Heyde & Lux 3955). *Sauquillo*.

Moist or dry thickets or open forest, 2,500 meters or less; Santa Rosa; Escuintla; Guatemala. Mexico.

A large shrub or a tree as much as 9 meters high, the young branchlets minutely puberulent or almost glabrous; leaves long-petiolate, the leaflets 3, ovate-lanceolate, membranaceous, mostly 5-12 cm. long, acuminate or long-acuminate, acute or obtuse at the base, appressed-serrate, nearly glabrous except for the barbate nerve axils beneath; panicles axillary, often long-pedunculate, equaling or longer than the leaves, pyramidal, puberulent; flowers white, 2 mm. long, the pedicels 1.5 mm. long; sepals ciliate, glabrous or in var. *pubicalyx* cinereous-puberulent; fruits by abortion usually 2-coccous, glabrous, the cocci with their wing 12-20 mm. long and 4-6 mm. wide, the wing rounded or obtuse at the apex.

**Thouinia brachybotrya** Donn. Smith, Bot. Gaz. 52: 45. 1911.

Moist or dry thickets, 200–600 meters; El Progreso(?); Zacapa (type from Río Grande, *C. C. Deam* 6343); Jutiapa; endemic.

A tree of 5 meters, the young branchlets cinereous-puberulent; leaves long-petiolate, the 3 leaflets elliptic, subsessile, 3.5 cm. long and 1.5 cm. wide, or probably when well developed considerably larger (only juvenile leaves known), subsessile, acute at each end, crenulate-dentate, grayish-velutinous above and bearing microscopic glands, densely grayish-velutinous beneath; racemes axillary at the ends of the branches, 1.5–2.5 cm. long, the pedicels 3 mm. long or less; flowers puberulent, the sepals 1.5 mm. long, ciliolate; carpels of the fruit by abortion often solitary, 2 cm. long, 1 cm. wide, the seed-bearing portion pilose, the wings glabrate.

**Thouinia paucidentata** Radlk. in Millsp. Field Mus. Bot. 1: 403. 1898 (type from Yucatan, *G. F. Gaumer* 865).

Moist or wet forest, 400 meters or less; Petén. Campeche; Yucatan; British Honduras.

An almost glabrous tree, sometimes 12 meters high with a trunk 25–30 cm. in diameter, the trunk conspicuously fluted; leaves slender-petiolate, the 3 leaflets elliptic or ovate to lanceolate, mostly 3–7 cm. long, acute to long-acuminate, acute or obtuse at the base, sessile or short-petiolulate, thick-membranaceous and rather stiff, remotely and obtusely dentate, glabrous except for dense tufts of whitish hairs beneath in the nerve axils, paler beneath, the nerves and veins conspicuous and elevated on the upper surface; racemes axillary, usually short but sometimes longer than the leaves, the rachis densely puberulent, the pedicels whitish-puberulent, 2–4 mm. long; flowers about 2 mm. long, cream-colored, the sepals appressed-puberulent, ciliolate; carpels of the fruit 1–2, about 13 mm. long, the wing 3–4 mm. wide, sparsely pilosulous with short whitish appressed hairs.

The Maya name in Yucatan is “canchunup.” The tree sheds its leaves and often blooms when leafless.

### THOUINIDIUM Radlkofer

Trees or shrubs, the branches terete; leaves petiolate, without stipules, even-pinnate, the leaflets opposite or the upper alternate; flowers small, white, polygamous, regular or nearly so, in usually large, terminal or lateral panicles; sepals 5, imbricate, the 2 outer ones smaller; petals 4–5, unguiculate, squamate within near the base; disk complete, cupular, glabrous; stamens 6–8, equaling or shorter than the sepals, the filaments filiform, pilose, the anthers short-oblong; ovary obcordate-triquetrous, cuneate at the base, 3-celled; style short, subulate; ovules solitary, erect; fruit 3-coccos, the carpels samara-like and bearing a large terminal wing, the seed-bearing portion laterally compressed, the pericarp pilose within; seeds subglobose or compressed, glabrous, the testa crustaceous or membranaceous.

Five species, in Mexico, Central America, and West Indies. Only the following reaches Central America.

**Thouinidium decandrum** (Humb. & Bonpl.) Radlk. Sitzungsber. Bayer. Akad. 8: 284. 1878. *Thouinia decandra* Humb. & Bonpl. Pl. Aequin. 1: 198. 1808. *Thouinia riparia* T. S. Brandeg. Univ. Calif. Publ. Bot. 6: 186. 1915. *Thouinidium riparium* Radlk. Repert. Sp. Nov. 17: 363. 1921. *Thouinidium Matudai* Lundell, Lloydia 4: 53. 1941 (type from Boca del Cerro, Tabasco, *E. Matuda* 3590). *Sufrillo*; *Zorro*; *Zorrillo*.

Mostly in dry thickets or forest, 900 meters or lower; Zacapa; Chiquimula; El Progreso; Baja Verapaz; Jutiapa; Escuintla; Guatemala; Retalhuleu; San Marcos; Huehuetenango. Mexico; Salvador; Nicaragua; Costa Rica.

A tree, usually 5–10 meters high, with broad crown, the branchlets appressed-pilosulous or almost glabrous; leaves large, the leaflets 4–8, sessile or short-petiolulate, thick-membranaceous, usually lustrous, narrowly lanceolate or lanceolate, mostly 5–10 cm. long, acute or acuminate at the base, appressed-serrate, rarely coarsely serrate, glabrous, the venation prominent and finely reticulate; panicles usually large and many-flowered, lax, sparsely pilosulous or glabrate, the pedicels 2 mm. long; flowers white, 5 mm. broad, glabrate; inner sepals 2 mm. long; petals usually 4; cocci of the fruit glabrous, at least in age, 2.5–3.5 cm. long, the wing about 1 cm. wide, at first acutish but in the mature fruit rounded or very obtuse at the apex, thin, conspicuously veined.

Called “cola de pava” and “plumón” in Salvador. The tree is abundant in dry thickets of the lower Motagua Valley, and almost equally plentiful in many parts of the Pacific plains. It seems to retain its foliage for all or most of the year.

## URVILLEA HBK.

Woody vines, the axils often bearing tendrils; leaves stipulate, ternate or rarely biternate, the leaflets entire or coarsely dentate, sometimes pellucid-punctate; flowers small, whitish, irregular, polygamo-dioecious, racemose, the racemes axillary, the peduncle often bearing 2 tendrils; sepals 5, imbricate, the 2 outer ones smaller; petals 4, squamate within above the base; disk unilateral, produced into 4 glands; stamens 8, excentric; ovary sessile, excentric, 3-celled, the style short, 3-fid; ovules solitary, ascending from the middle of the axis; fruit of 3 carpels, these samaroid, seed-bearing at the middle, indehiscent, membranaceous, broadly winged, separating finally from a central axis; seeds subglobose, arillate at the base, the testa crustaceous.

Thirteen species, all in tropical or subtropical America. Only one extends into Central America.

**Urvillea ulmacea** HBK. Nov. Gen. & Sp. 5: 82. 1821.

Moist or dry thickets, 1,100 meters or less; Petén; El Progreso; Zacapa; Santa Rosa; Escuintla; Guatemala; Retalhuleu. Texas,



southward through Mexico; British Honduras; Salvador; Nicaragua; Costa Rica; West Indies; South America.

A small or often large vine, the slender stems pubescent or glabrate; leaflets 3, membranaceous, petiolulate, mostly rhombic-ovate and 3-7 cm. long, acuminate to obtuse, coarsely crenate, glabrate above, densely pilose or often tomentose beneath, sometimes lobate; racemes mostly long-pedunculate and often exceeding the leaves, sometimes much reduced and sessile; flowers 4 mm. broad, white, the sepals pubescent or almost glabrous; fruit elliptic, 2-3 cm. long, stipitate and acute at the base, rounded or obtuse at the apex and often emarginate, the cells more or less inflated, the wings thin and soft; seeds blackish, 2-3 mm. long.

The Maya name in Yucatan is recorded as "puluxtacoc." This is a common vine in thickets of the Pacific plains and foothills, often or usually leafless during the dry season.

### SABIACEAE

*Reference:* Ignatius Urban, *Sabiaceae*, *Symb. Antill.* 1: 499-518. 1900.

Shrubs or trees, glabrous or pubescent; leaves alternate, without stipules, simple (in Guatemalan species) or rarely pinnate, dentate or subentire; flowers small, whitish, usually paniculate, perfect; sepals 5 or rarely 3, imbricate; petals 5, imbricate, equal or somewhat unequal; stamens 5, inserted on a torus but often adnate at the base to the petals, all fertile or 3 of them sterile and modified into scales; filaments short, linear, sometimes dilated above or dilated into an antheriferous cupule; anthers erect or inflexed or introrsely resupinate, the connective thickened, longitudinally dehiscent; disk annular, surrounding the base of the ovary, entire or 5-dentate; ovary sessile, generally 2-celled, the carpels connate or almost free, compressed or terete; styles connate or bifid at the apex, the stigmas punctiform, sometimes confluent; ovules 2 in each cell, superposed or subcollateral, affixed to the placenta above the middle; fruit usually 1-carpellate, the other carpel abortive, drupaceous or dry, indehiscent, bearing the style laterally above the base, the endocarp ligneous or osseous, perforated at the base, 1-seeded; testa of the seed coriaceous or membranaceous; endosperm scant or none; cotyledons rather thick, more or less plicate, the radicle inferior, several times serpentine-curved.

Three genera, one in tropical Asia, one in northern South America, and the following.

### MELIOSMA Blume

Shrubs or trees; leaves simple except in one Mexican species with pinnate leaves, usually dentate, often coarsely dentate; flowers very small, whitish; sepals 5, rarely 3; petals 5, the 3 outer ones orbicular or ovate, the 2 inner ones oblong or linear; 3 outer stamens without anthers, the 2 inner ones fertile, the filaments compressed, dilated into an antheriferous cupule; disk irregularly dentate or none; styles 2, wholly connate or 2-fid at the apex.

About 55 species, in tropical America and Asia. Seven or 8 additional species are known from southern Central America.

Leaf blades narrowly cordate or subcordate at the base.....*M. Seleriana*.

Leaf blades attenuate at the base.

Leaves densely or sparsely pilose beneath with short spreading hairs, usually velutinous, about 50 cm. long.....*M. maxima*.

Leaves glabrous or essentially so, mostly 25 cm. long or shorter.

Flowers sessile or on very short, stout pedicels scarcely longer than the calyx; dry fruit 6-8 mm. long.....*M. dives*.

Flowers on elongate pedicels 2-4 mm. long, the pedicels much longer than the calyx; dry fruit fully 10 mm. long.....*M. dentata*.

**Meliosma dentata** (Liebm.) Urban, Ber. Deutsch. Bot. Gesell. 13: 212. 1895. *Lorenzanea dentata* Liebm. Vid. Medd. Kjoebenhavn 70. 1850.

Moist or wet forest, 2,000-2,600 meters; Zacapa (Cerro de los Monos, Sierra de las Minas); Quiché (between Nebaj and Agua-catán). Central and southern Mexico.

A shrub of 3-5 meters, or sometimes a tree 8 meters high, the young branches pubescent but soon glabrate; leaves on petioles 7-15 mm. long, coriaceous or subcoriaceous, obovate-oblong or oblanceolate-oblong, mostly 10-18 cm. long and 2.5-6 cm. wide, acuminate or long-acuminate, attenuate to the base, coarsely or rather finely dentate or often almost entire, somewhat pubescent beneath when young but soon glabrate and in age glabrous, the nerves elevated beneath; inflorescences equaling or usually shorter than the leaves, open and many-flowered; the branches puberulent, the pedicels very stout, 2-4 mm. long in anthesis, more elongate in fruit; outer petals 3 mm. long; calyx 4 mm. broad; disk well developed; style equaling the ovary, entire at the apex; fruit obovoid-globose, when dry fully 1 cm. long; fresh young fruit whitish green, as much as 2 cm. long.

**Meliosma dives** Standl. & Steyerl. Field Mus. Bot. 23: 60. 1944. *Plumilla de gallina*.

Moist or wet, mixed forest, sometimes in *Pinus-Abies* forest, 1,000-3,000 meters; Jalapa (?; sterile); Suchitpéquez (type from eastern slopes of Volcán de Santa Clara, above Chicacao, *Steyermark* 46773); Sololá; Quezaltenango (?; sterile); so far as known, endemic.

A shrub or tree, sometimes 12-15 meters high, but flowering when only a shrub, the young branchlets minutely pubescent, soon glabrate; leaves on petioles 12-15 mm. long, chartaceous, narrowly oblanceolate or oblong-oblanceolate, mostly 12-18 cm. long and 3-6 cm. wide, long-acuminate, narrowly long-attenuate to the base, remotely and inconspicuously serrate-dentate, or the leaves of sterile branches or young plants coarsely and irregularly dentate, in age glabrous or merely barbate beneath in the axils of the nerves, the lateral nerves about 10 pairs; panicles terminal and axillary, lax, many-flowered, mostly 8-18 cm. long, rather

densely sordid-pubescent, the flowers sessile or on short thick pedicels; calyx 2 mm. broad, the sepals orbicular or ovate-orbicular, rounded at the apex, ciliate and pubescent; style much shorter than the ovary; drupe in the dry state 6-8 mm. long, glabrous, subglobose or obovoid-globose.

There is a considerable number of sterile specimens of the genus at hand, and these have been referred doubtfully to this species, but they can not be determined with certainty. A peculiarity of this group of plants is that the very base of the leaf blade, especially on sterile branches, often is conspicuously recurved toward the lower side of the blade.

**Meliosma maxima** Standl. & Steyerem. Field Mus. Bot. 23: 61. 1944.

Wet mixed forest, 300 meters or less; Izabal (type collected along a stream between Bananera and La Presa, Montaña del Mico, *Steyermark* 38170).

A tree of 9 meters, the branchlets thick, densely sordid-pubescent when young; leaves very large, on stout petioles 2-3 cm. long, membranaceous, narrowly cuneate-obovate or spatulate-obovate, 40-55 cm. long, 14-20 cm. wide, apparently obtuse or rounded at the apex, narrowly long-attenuate to the base, entire or nearly so, green and glabrous above, beneath densely or sparsely velutinous-pubescent; panicles axillary, as much as 23 cm. long, lax, many-flowered, sparsely branched, the branches slender, densely pubescent; flowers white, sessile or nearly so in anthesis, the pedicels elongating in fruit; ovary glabrous; dry fruit subglobose, 2 cm. in diameter.

**Meliosma Seleriana** Urban, Symb. Antill. 1: 507. 1900.

Known only from the type, in virgin forest (between Trinidad and Rosario, Huehuetenango, *Seler* 3066).

Young branchlets and inflorescence rufous-pilose with very short hairs; petioles slender, 5.5-9 cm. long; leaf blades narrowly lance-oblong, 24-36 cm. long, 8-12 cm. wide, short-acuminate, rather narrow at the base and shallowly cordate, chartaceous, inconspicuously and remotely denticulate, glabrous; panicles arising from the upper leaf axils, 7-12 cm. long, on peduncles 4-5 cm. long; fruit white, glabrate, in the dry state globose and 7.5-9 mm. in diameter.

We have seen a photograph of the type. The species is a very distinct one, especially noteworthy for the very long petioles and the cordate leaf bases.

## IMPATIENTACEAE. Touch-me-not Family

Succulent, annual or perennial herbs; leaves mostly alternate, simple, petiolate; flowers often showy, irregular, on axillary, 1-several-flowered peduncles; sepals 3, rarely 5, imbricate, the posterior one petaloid, saccate and calcarate; petals 5,

or only 3 and 2 of them then 2-cleft into dissimilar lobes; stamens 5, the filaments short, distinct, the anthers short and thick, united around the stigmas; ovary 5-celled, the style short or none, the stigma 5-dentate or 5-lobate; ovules 2-many in each cell; seeds pendulous, anatropous; endosperm none, the embryo almost straight, the cotyledons flat.

One other genus is known, with a single species in tropical Asia.

### IMPATIENS L.

Glabrous or pubescent herbs; leaves serrate or dentate, without stipules, often glandular at the base of the petiole; peduncles solitary or aggregate, the flowers purple, red, yellow, or white; sepals 3, colored; petals 3, the lateral ones 2-fid; ovules superposed, 1-seriate; capsule short or elongate, some of the cells often aborted, elastically and loculicidally dehiscent, 5-valvate; seeds glabrous or villous.

More than 200 species, mostly in tropical Asia. A very few are native in North America, and in Central America there is one native species, in the higher mountains of Costa Rica.

Flowers mostly pink or white; stems more or less villous above; capsule tomentose.

*I. Balsamina.*

Flowers usually scarlet or bright red, sometimes pink or white; stems glabrous; capsule glabrous.....*I. Sultani.*

**Impatiens Balsamina** L. Sp. Pl. 938. 1753. *China; Flora de China.*

Native of southern Asia, but cultivated for ornament in most parts of the earth; one of the commonest garden flowers of Guatemala, planted at all elevations; rarely escaping to waste ground or thickets, sometimes a weed in cafetales.

Plants annual, erect, the stems thick and succulent, simple or sparsely branched, 60 cm. high or less, short-villous, at least above; leaves petiolate, oblanceolate, 5-15 cm. long, acute or acuminate, gradually attenuate to the base; flowers solitary or geminate in the leaf axils, the pedicels 1-2 cm. long, puberulent; spur of the posterior sepal 1-1.5 cm. long; capsule ovoid, 1.5-2 cm. long.

The common garden balsam is one of the favorite cultivated flowers of Central America, as in the United States. It is very easy to cultivate and blooms quickly after planting. The flowers are variable in color, usually white or pink, and frequently double. When the almost ripe capsules are touched or squeezed, they open elastically in one's hand and twist about almost like a caterpillar, a fact well known to children wherever the plants are grown. In Central America, juice from the stems sometimes is used to reduce inflammation in the eyes.

**Impatiens Sultani** Hook. f. Bot. Mag. pl. 6643. 1882. *China; Quince de abril; Los quince; Amor de los quince; Amor de quince años; Chata, Chatilla.*

Native of eastern tropical Africa, cultivated in tropical and temperate regions for ornament; grown commonly in Guatemalan gardens at low and middle elevations; often more or less naturalized as a weed on roadside banks and in cafetales, especially in the Pacific bocacosta.

Plants somewhat succulent, glabrous, erect, simple or branched, 30-60 cm. high; leaves on long slender petioles, mostly ovate or elliptic, acute or acuminate, acute at the base, often contracted and decurrent, crenate-serrate; lower leaves alternate, the upper ones subverticillate; peduncles axillary, short or elongate, usually several-flowered, the pedicels almost filiform; flowers scarlet, or sometimes pink or white, the petals large, flat, spreading; spur of the posterior sepal very long and slender.

Usually called "sultana" in the United States, where often it is grown in greenhouses. The specific name was given by Hooker in honor of the Sultan of Zanzibar.

#### RHAMNACEAE. Buckthorn Family

Trees or shrubs, rarely herbs, sometimes scandent, frequently armed with spines, rarely provided with tendrils; leaves simple, usually stipulate, alternate, opposite, or subopposite, frequently 3-5-nerved, entire or serrate; stipules small, generally deciduous; flowers small, perfect or rarely polygamo-dioecious, mostly in axillary cymes, green or yellowish; calyx tube obconic, turbinate, urceolate, or cylindric, the limb 4-5-lobate, the lobes triangular, erect or recurved, valvate, often with an elevated longitudinal line within; petals 4-5 or none, inserted in the throat of the calyx, often smaller than the calyx lobes, cucullate or convolute, sessile or unguiculate; stamens 4-5, inserted with the petals and often concealed by them, the filaments subulate or filiform; anthers versatile, short, didymous or oblong, dehiscent by slits; disk perigynous, rarely none; ovary sessile, free or immersed in the disk, superior or more or less connate with the calyx tube, with usually 3, sometimes 2 or 4, cells; style erect, commonly short, the stigma capitate or 3-lobate, or the stigma lobes stigmatose at the apex; ovules usually 1 in each cell, erect from the base of the cell, anatropous; fruit with usually 3, sometimes 2 or 4, cells, coriaceous, capsular, or drupaceous, 3-coccos or the stone 1-3-celled; seeds solitary in the cells, erect, often arillate at the base, the testa coriaceous, crustaceous, or membranaceous; endosperm carnosous, often scant, rarely none; embryo large, orthotropous, the cotyledons plane or plano-convex, the radicle short, straight, inferior.

The family consists of about 50 genera and 600 species, widely dispersed in temperate and tropical regions. At least one other genus, *Rhamnidium*, is known in Central America, in Panama.

- Plants herbaceous.....*Crumenaria*.  
 Plants trees or shrubs.  
 Plants with tendrils; ovary inferior; fruit longitudinally winged.....*Gouania*.  
 Plants without tendrils; ovary superior; fruit not winged.  
 Fruit drupaceous, containing a single 1-4-celled stone.  
 Leaves 3-5-nerved; branches usually armed with spines.....*Zizyphus*.  
 Leaves penninerved; branches unarmed.  
 Plants scandent.....*Berchemia*.  
 Plants erect shrubs or trees.  
 Endosperm present; petals present.....*Karwinskia*.  
 Endosperm none; petals none.....*Krugiodendron*.  
 Fruit capsular, or drupaceous but containing 2-4 distinct or only slightly coherent stones.  
 Leaves opposite or subopposite; flowers sessile.....*Sageretia*.  
 Leaves alternate; flowers pedicellate.  
 Fruit fleshy and juicy, its cells indehiscent.....*Rhamnus*.  
 Fruit dry, its cells dehiscent.  
 Petals greenish or yellowish.....*Colubrina*.  
 Petals pale blue.....*Ceanothus*.

### BERCHEMIA Necker

Scandent or erect shrubs; leaves alternate, petiolate, ovate or oblong, penninerved; flowers small, greenish white, in axillary or terminal inflorescences, rarely solitary; calyx tube hemispheric, the limb 5-dentate; petals 5, sessile, concave or cucullate; stamens 5, the filaments filiform; disk filling the calyx tube, covering the ovary but not united with it; fruit a drupe, oval, obtuse, somewhat compressed, with thin flesh, its stone 2-celled; seeds linear-oblong, the cotyledons thin.

Species about 10, one in North America, the others in Asia and tropical Africa.

*Berchemia scandens* (Hill) Trelease, Trans. St. Louis Acad. Sci. 5: 364. 1889. *Rhamnus scandens* Hill, Hort. Kew 453. pl. 20. 1768. *R. volubilis* L. f. Suppl. Pl. 152. 1781. *B. volubilis* A. DC. Prodr. 2: 22. 1825.

Known in Guatemala only from Baja Verapaz, growing along the margin of the large swamp below Pantín, 1,575 meters. South-eastern United States.

A slender glabrous vine with tough terete branches; leaves slender-petiolate, ovate to oblong, mostly 3-5 cm. long, acute to rounded and cuspidate at the apex, rounded at the base, deep green and lustrous above, slightly paler beneath, the margin undulate, the lateral nerves 8-12 pairs, slender but conspicuous; flowers greenish cream, 3 mm. broad, mostly in small terminal panicles; petals acute; drupe black, 6-8 mm. long.

The occurrence of this plant in Guatemala is most extraordinary, since its nearest known station is in Texas. Only a few individuals were found in the single Central American locality known for it.

### CEANOTHUS L.

Small or large shrubs; leaves alternate, petiolate, coriaceous or membranaceous, entire or dentate; flowers small, white or blue, in terminal or axillary corymbs or panicles; calyx tube hemispheric or turbinate, the limb 5-lobate; petals 5, cucullate, unguiculate, longer than the calyx lobes, inserted below the disk; stamens 5, the filaments filiform, elongate; ovary immersed in the disk and adnate to it at the base, 3-lobate; disk adnate to the calyx; style short, 3-cleft; fruit dry, 3-lobate, separating longitudinally at maturity into 3 nutlets; seeds with a smooth testa, the endosperm carnose, the cotyledons oval or obovate.

About 60 species, all North American. The single species of Central America is the southernmost representative of the genus.

*Ceanothus coeruleus* Lagasca, Gen. & Sp. Nov. 11. 1816. *C. azureus* Desf. Cat. Pl. Paris. 232. 1815, nomen nudum. *Cakix* (Quezaltenango); *Caxkix* (Chimaltenango); *Hierba de hierro* (Guatemala); *Ixcaquichi* (fide Aguilar).

Mostly on open brushy hillsides or in pine, oak or *Cupressus* forest, in Huehuetenango in *Juniperus* forest, 1,500–4,000 meters; El Progreso; Guatemala; Sacatepéquez; Chimaltenango; Sololá; Quiché; Huehuetenango; Totonicapán; Quezaltenango; San Marcos. Mexico; Salvador; Panama.

Usually a shrub of 1–4 meters, densely branched; leaves short-petiolate, coriaceous, oblong-lanceolate to ovate, mostly 3–8 cm. long, acute or obtuse at each end, serrulate, green above and glabrate, or sometimes densely pubescent, covered beneath with a dense brownish tomentum; flowers pale blue, forming small dense terminal panicles, the individual flowers 2.5 mm. long; calyx laxly tomentose; petals on very long claws; stamens long-exserted; fruit subglobose, 4 mm. high.

This is one of the most abundant shrubs in many parts of the central and western highlands, occurring in many regions in monotonous abundance. Frequently it forms dense thickets of considerable extent. It is noteworthy in Guatemala for its very wide altitudinal range, matched in relatively few other woody plants. Although the individual sprays of flowers are rather handsome, the shrub is not an attractive one in flower, especially by roadsides where too often it is densely covered with dust. While most of the blossoms are produced during the rainy months, the shrub also flowers almost continuously during the dry season.

### COLUBRINA Richard

Trees or shrubs, sometimes armed with spines; leaves alternate, petiolate, entire or dentate; flowers small, perfect, yellow or greenish, in axillary clusters; calyx tube hemispheric, the 5 lobes spreading; disk angulate or lobate; petals 5, cucullate; stamens 5, the filaments short and slender; ovary 3-celled, immersed in the disk, with 1 ovule in each cell; styles 3, united below, the stigmas obtuse; fruit dry, capsule-like, slightly 3-lobate, the carpels separating and dehiscent along the inner edge; seeds smooth and shining, with scant endosperm.

About 15 species, one Asiatic, the others in tropical America. One or two other species are known from southern Central America.

Leaves finely or coarsely serrate or serrulate.

Leaves very finely and evenly serrulate; inflorescence glabrous or nearly so.

*C. celtidifolia.*

Leaves coarsely and remotely serrate; inflorescence densely pilose.

*C. guatemalensis.*

Leaves entire.

Trees usually armed with stout spines; flowers fasciculate in the leaf axils or at the nodes of the branches.....*C. heteroneura.*

Trees unarmed; flowers in cymes.

Leaf blades with 2 conspicuous glands at the base, mostly subacute or merely obtuse at the base; pubescence of the branches and inflorescence brown or grayish.....*C. reclinata.*

Leaf blades without basal glands, broadly rounded at the base; pubescence of the branches and inflorescence rufous.....*C. ferruginosa.*

**Colubrina celtidifolia** (Schlecht. & Cham.) Schlecht. Linnaea 15: 471. 1841. *Ceanothus celtidifolius* Schlecht. & Cham. Linnaea 5: 602. 1830.

Chiquimula, along stream, Volcán de Quezaltepeque, 2,000 meters; reported also from Santa Rosa (Volcán de Jumaytepeque). Southern Mexico, the type from Jalapa, Veracruz.

A tree 8 meters tall, the young branches pilose or almost glabrous, dark ferruginous; leaves short-petiolate, ovate to broadly elliptic-ovate, mostly 8-14 cm. long, acuminate or long-acuminate, broadly rounded at the base, finely and evenly crenate-serrate, green above and glabrous or nearly so, pale beneath and densely or sparsely pilose, 3-nerved from the base; flowers in small or rather large, pedunculate cymes, these usually glabrous, the flowers sessile.

Called "coral" in Mexico.

**Colubrina ferruginosa** Brongn. Ann. Sci. Nat. I. 10: 369. 1827. *Rhamnus colubrinus* Jacq. Enum. Pl. Carib. 16. 1760. *Colubrina colubrina* Millsp. Field Mus. Bot. 2: 69. 1900. *Coxté, Costex; Guayabillo.*



Common in damp thickets and forest of the Pacific plains, also in Alta Verapaz, 1,400 meters or less, usually at 350 meters or lower, often planted as a shade tree; Alta Verapaz; Santa Rosa; Guatemala; Retalhuleu; Quezaltenango. Yucatan Peninsula region of Mexico; southern Florida; Honduras; Salvador; West Indies.

A large shrub or a tree, sometimes 20 meters high with a trunk 50 cm. in diameter, the young branches ferruginous-tomentose; leaves short-petiolate, ovate to elliptic, mostly 6–18 cm. long and 4–10 cm. wide, acute or short-acuminate, rounded or even subcordate at the base, entire, glabrous above or nearly so at maturity, densely rufous-tomentose beneath at first, often glabrate in age, essentially penninerved; cymes rufous-tomentose, usually equaling or shorter than the petioles; calyx lobes ovate, obtuse; petals spatulate, greenish yellow, shorter than the calyx lobes; fruit obovoid-globose, 6–8 mm. in diameter, blackish.

Known in Salvador by the names “chaquirio,” “chaquira,” and “chaquiro.” The Maya name in Campeche is given as “churumay.” The wood is said to be hard, durable, and strong, and used at times in the West Indies for construction. The tree is much planted in the Pacific coast fincas for shade. Called “cascalata” in Chiapas.

**Colubrina guatemalensis** Standl. Field Mus. Bot. 8: 22. 1930. *C. mollis* Lundell, Contr. Univ. Mich. Herb. 8: 75. 1942 (type from Chiapas). *Duraznillo*; *Perla de sensontle*; *Guayabillo* (fide Aguilar).

Usually on dry brushy hillsides, sometimes in thickets along streams, 250–1,600 meters; Zacapa; Jutiapa; Escuintla; Guatemala; Chimaltenango (type from San Martín Jilotepeque, *Morales Ruano* 1230); Quiché; Huehuetenango. Chiapas.

A slender shrub or small tree, usually 5 meters tall or less, the branchlets dark ferruginous, when young densely pilose with pale hairs; leaves short-petiolate, membranaceous, on slender petioles 7–13 mm. long, oblong-ovate, mostly 7–13 cm. long and 4.5–7 cm. wide, long-acuminate, obtuse or rounded at the base, 3-nerved from the base, remotely and coarsely crenate-serrate, sparsely pilosulous above or almost glabrous, somewhat paler beneath, densely brownish-tomentose beneath; flowers fasciculate in the leaf axils or at defoliate nodes, the pedicels 5–7 mm. long, puberulent; sepals reflexed in fruit, broadly triangular, acute, 1.5 mm. long; petals yellowish green, scarcely exceeding the sepals; capsule globose, glabrous, 5–6 mm. long; seeds 4 mm. long, lustrous, obovoid.

**Colubrina heteroneura** (Griseb.) Standl. Journ. Wash. Acad. Sci. 15: 285. 1925. *Zizyphus heteroneurus* Griseb. Bonplandia 1858: 3. 1858. *Espino de clavo* (Petén).

In thickets at 1,200 meters or less; Petén; Santa Rosa; Huehuetenango. Mexico; Salvador; Costa Rica; Panama.

A stout shrub or a tree, 7 meters high or less, usually abundantly armed with long stout spines, the branches grayish or sometimes fuscous, the youngest branch-

lets ferruginous-strigose; leaves petiolate, elliptic to suborbicular, 4-6 cm. long, obtuse or rounded at the apex, acute or obtuse at the base, deep green above, glabrous, paler beneath, reddish-sericeous when young but soon glabrate, essentially penninerved, bearing 2 conspicuous glands beneath at the base; flowers densely clustered in the leaf axils, ferruginous-tomentose; fruiting pedicels about 1 cm. long, stiff; fruit subglobose, 7-8 mm. broad, glabrous, conspicuously 3-lobate.

Called "espino santo" in Salvador. This species has been referred by some authors to *Cormonema*, a genus better reduced to synonymy under *Colubrina*.

**Colubrina reclinata** (L'Hér.) Brongn. Ann. Sci. Nat. I. 10: 369. 1827. *Ceanothus reclinatus* L'Hér. Sert. Angl. 6. 1788.

Dry or moist thickets, 1,000 meters or less; Petén; Baja Verapaz. Veracruz; Yucatan; southern Florida; West Indies; Venezuela.

A shrub or small tree, commonly 4-6 meters high, said to be sometimes a tree of 20 meters with a trunk diameter of 1.5 meters, the bark orange-brown, fissured, exfoliating in thin layers, the young branches finely pubescent; leaves slender-petiolate, membranaceous, elliptic to ovate-lanceolate or lance-oblong, mostly 4-9 cm. long and 2-5 cm. wide, acute or subobtuse, usually acute or merely obtuse at the base; cymes densely pilose, equaling or shorter than the petioles; calyx lobes acute; petals cucullate, shorter than the calyx lobes; fruit globose, orange-red to brownish, 7-9 mm. broad; seeds oblong-ellipsoid or ovoid, 3.5-5 mm. long, brownish black.

The wood is yellowish brown, heavy, hard, strong, fine-textured, and durable. Little use, apparently, is made of it. In Yucatan the tree is called "sacna-ché" (Maya name). Its leaves and wood are said to impart a yellow color to water. The tree is used in Yucatan in domestic medicine as a remedy for itch (*sarna*).

### CRUMENARIA Martius

Annual or perennial herbs with slender stems; leaves alternate, petiolate, 3-nerved or often scale-like or wanting; stipules linear, ciliate; peduncles axillary and elongate, 1-2-flowered, or short and fasciculate; flowers very small, polygamous; calyx campanulate, connate at the base with the ovary, the limb 5-lobate; petals 5, cucullate; stamens 5, hidden within the petals, the anthers cordate; disk none; ovary inferior, 3-celled, the style short, 3-fid; fruit small, 3-lobate, the lobes compressed, winged, the wings produced below, 3-coccos, the cocci chartaceous, dorsally convex, obcordate, separating at maturity from the persistent axis; seeds obovate, the testa corneous, lustrous, the endosperm thin; cotyledons orbicular, plano-convex, carnose, the radicle very short.

Species about 5, all except the following in southeastern South America.

**Crumenaria Steyermarkii** Standl. Field Mus. Bot. 22: 156. 1940.

Frequent in the Oriente, moist or rather dry, brushy or rocky slopes or fields, sometimes a weed in cultivated fields, 300–1,400 meters; endemic; Zacapa; Chiquimula; Jalapa; Jutiapa (type collected between Agua Blanca and Amatillo, *Steyermark* 30448). Honduras.

A slender annual, erect to procumbent, often much-branched, the stems 50 cm. long or less, sparsely appressed-hispidulous; leaves short-petiolate, membranaceous, ovate or oblong-ovate, mostly 10–15 mm. long and 5–10 mm. wide, acuminate to obtuse, rounded or subcordate at the base, entire or appressed-crenate, glabrous above, appressed-hispidulous beneath, 5-nerved from the base; peduncles axillary, filiform, 1–2-flowered, longer than the leaves, the flowers white; calyx corolla-like, 2–2.5 mm. long, the lobes abruptly acuminate; petals minute, 0.6 mm. long; stamens equaling the petals; fruit obovoid, 5 mm. long and 4 mm. broad, shallowly emarginate at the apex, narrowed and shallowly emarginate at the base, short-pilose.

The plant is abundant during the wetter months in many localities of the Oriente. The occurrence of a single species of the genus in Guatemala, far remote from the previously known distributional area of the group, is somewhat remarkable.

### GOUANIA L.

Shrubs, usually scandent or arching, furnished with tendrils; leaves alternate, petiolate, dentate or entire, penninerved or 3-plinerved; stipules usually narrow and deciduous, sometimes broad and persistent; flowers small, whitish, polygamous, in terminal and axillary, often paniculate spikes or racemes, the rachis often terminated by a tendril; calyx tube short, obconic, adherent to the ovary, the limb 5-lobate; petals 5, cucullate, inserted below the margin of the disk; stamens 5, hidden within the petals, the anthers longitudinally dehiscent; disk glabrous or pilose, epigynous and filling the calyx tube, 5-angulate or produced into 5 horn-like appendages; ovary immersed in the disk, 3-celled, the style 3-parted or 3-fid, the stigmas minute; fruit coriaceous, crowned by the persistent calyx, generally 3-winged, with usually broad and rounded wings, 3-coccos, the cocci subligneous, indehiscent, separating from the persistent axis; seeds plano-convex, obovate, the testa corneous, lustrous, the endosperm scant; cotyledons rounded, the radicle very short.

About 30 species, mostly in tropical America, a few in tropical Asia and Africa, one in the Pacific islands. One other Central American species is known from Costa Rica.

Leaves glabrous beneath or nearly so, usually appressed-pilose along the nerves.  
*G. lupuloides.*

Leaves abundantly pubescent beneath, most often densely tomentose.  
Fruit densely pilose.....*G. eurycarpa.*  
Fruit glabrous or nearly so.

Axis of the fruit 3–4 mm. high.....*G. polygama.*  
Axis of the fruit 5–8 mm. high.....*G. Conzattii.*

**Gouania Conzattii** Greenm. Field Mus. Bot. 2: 257. 1907.  
*Bejuco costex* (Guatemala, fide Aguilar); *Espumilla*.

Dry thickets or forest, Dept. Guatemala, 1,100–1,500 meters; probably in other departments of the Pacific coast. Southern Mexico, the type from Cerro San Felipe, Oaxaca.

An arching or subscandent shrub, the branches tomentulose; leaves short-petiolate, rounded-ovate to ovate-elliptic, mostly 5–9 cm. long, acute or short-acuminate, rounded or subcordate at the base, irregularly and coarsely crenate, green above but often abundantly short-pilose or puberulent, thinly or densely tomentose beneath; fruit glabrous or nearly so, 10–14 mm. broad, emarginate at base and apex, the thick pale wings higher than broad.

**Gouania eurycarpa** Standl. Field Mus. Bot. 4: 315. 1929.

Sacatepéquez, near Pastores, 1,600 meters, dry thicket, *Standley* 59894. Type from Progreso, Dept. Yoro, Honduras, near sea level.

A shrub or a small vine, the branchlets densely pilose; leaves on petioles 8–12 mm. long, elliptic or ovate-elliptic, 5–9 cm. long, 2.5–5.5 cm. wide, acute or abruptly acute, obtuse or rounded at the base, remotely appressed-crenate, green above, densely pilose or glabrate, paler beneath, densely velutinous-pilose or tomentose; racemes longer than the leaves, 6–9 cm. long, dense at first, the flowers almost sessile; fruit 15 mm. broad and 10–12 mm. high, emarginate at base and apex, densely pilose, the wings very thick, higher than broad.

The fruits are much larger than those of *G. polygama*, to which this species is closely related.

**Gouania lupuloides** (L.) Urban, Symb. Antill. 4: 378. 1910.  
*Banisteria lupuloides* L. Sp. Pl. 427. 1753. *Rhamnus domingensis* Jacq. Enum. Pl. Carib. 17. 1760. *G. domingensis* L. Sp. Pl. ed. 2. 1663. 1763.

Dry, moist, or wet thickets or forest, most often in second-growth thickets, ascending from sea level to about 1,500 meters; Petén; Izabal; Zacapa; Santa Rosa; Escuintla; Guatemala; Suchitepéquez; Retalhuleu; Quezaltenango; San Marcos; Huehuetenango. Mexico to British Honduras and Panama; West Indies.

An arching shrub or sometimes a large vine as much as 10 meters long, the branches glabrous or nearly so; leaves usually membranaceous, short-petiolate, ovate to elliptic, mostly 4–10 cm. long and 2–6 cm. wide, acute or short-acuminate, rounded or subcordate at the base, crenate-serrate, usually glabrous above, beneath almost wholly glabrous or appressed-pilose on the nerves; flowers small, white, in slender racemes 5–20 cm. long, these often forming large terminal panicles, the pedicels 3 mm. long or less, pubescent; calyx pubescent, 1–1.5 mm. long; petals ovate, acute; fruit 8–12 mm. broad, glabrous or nearly so, the wings usually much broader than high.

Called "chew-stick" and "soap-stick" in the British West Indies. From Yucatan are reported the Maya names "xomac," "chevez-ac," and "xpajuyic." The flowers are much frequented by bees. The stems of this and other species probably contain saponin, and when they are chewed large quantities of lather are produced. They have been dried and exported in large amounts from tropical America to the United States and Europe for use in preparation of dentifrices. In Central America the stems often are chewed to clean the teeth and harden the gums. A decoction of the root is used in Yucatan as a gargle for sores in the mouth and throat. In Jamaica the bitter stems were used formerly as a substitute for hops in brewing beer. In Yucatan the plants are reputed poisonous, which is to be assumed if they contain saponin. Material generally referred to this species is somewhat variable in the form of the fruit and details of the leaves, although typical West Indian material seems to show about as much variation as the Central American. It is suspected that when a larger series of specimens is available from Central America, one or two species may be found separable from typical *G. lupuloides*.

***Gouania polygama*** (Jacq.) Urban, Symb. Antill. 4: 378. 1910. *Rhamnus polygamus* Jacq. Enum. Pl. Carib. 17. 1760. *G. tomentosa* Jacq. Sel. Stirp. Amer. 263. 1763. *Jaboncillo*; *Canillo*; *Pie de pava* (Huehuetenango); *Bejuco coxté*, *Coxté* (fide Aguilar); *Onac*, *Onhac* (Petén, Maya).

Common in many regions, especially of the lowlands, moist or wet thickets or at the edge of forest, sometimes in dry rocky thickets or coastal thickets, ascending from sea level to about 1,500 meters; Petén; Alta Verapaz; Baja Verapaz; Zacapa; Jalapa; Santa Rosa; Escuintla; Guatemala; Sacatepéquez; Quiché; Suchitepéquez; Retalhuleu; San Marcos; Huehuetenango. Central Mexico to British Honduras and Panama; West Indies; northern South America.

An arching shrub or a woody vine, sometimes climbing over small trees, the branches tomentose; leaves short-petiolate, membranaceous, oblong-ovate to broadly oval, mostly 6–15 cm. long and 3–8 cm. wide, acuminate to obtuse, rounded or subcordate at the base, green above but usually more or less pilose or puberulent, sparsely or often densely tomentose beneath; flowers small, white, racemose, often forming large terminal panicles; calyx tomentose, 1.5 mm. long; fruit 8–13 mm. broad, glabrous or nearly so, the wings thick and hard, frequently lustrous, often much broader than high.

Called "jaboncillo" in Salvador and "limpia-dientes" in Honduras. This is by far the most common species of the genus in Guatemala as well as in Central America generally. It is a charac-

teristic plant of lowland thickets, especially in second growth. Sometimes when in full flower, the vine covers the trees with a sheet of white blossoms. Guatemalan and other Central American material is somewhat variable, and it may be possible ultimately to segregate some of the forms as species.

### KARWINSKIA Zuccarini

Trees or shrubs, unarmed; leaves opposite, petiolate, entire, penninerved, pellucid-punctulate; stipules small, membranaceous, deciduous; flowers small, greenish, axillary, solitary or in small cymes or umbels; calyx 5-fid, the tube hemispheric or turbinate, the lobes triangular, acute; petals 5, short-unguiculate, cucullate; stamens longer than the petals, the filaments subulate; disk filling the calyx tube; ovary subglobose, immersed in the disk, 2-3-celled, attenuate to the style, this 2-3-lobate at the apex, the stigmas obtuse, papillose; ovules 2 in each cell, collateral; fruit a drupe, subglobose or ovoid, apiculate, subtended at the base by the calyx, the stone 1-2-celled, the cells 1-seeded; seeds erect, obovoid, with membranaceous testa, the endosperm thin, carnose; cotyledons oval, carnose, the radicle very short.

Probably 6 species, in western Texas, Mexico, and Central America, southward to Nicaragua, and about 5 more in the West Indies.

**Karwinskia Calderoni** Standl. Journ. Wash. Acad. Sci. 13: 352. 1923. *Huilihuiste*; *Güiligüiste*; *Anonillo* (Amatitlán, fide Morales Ruano). *Fruto de cabro*; *Tacualtucu* (Santa Rosa); *Ilamasac* (fide Aguilar).

Usually in dry thickets or forest, occasionally in oak-pine forest, sometimes in moist places, in the Oriente and along the Pacific slope, ascending from sea level to about 1,400 meters; Zacapa; El Progreso; Chiquimula; Jalapa; Jutiapa; Santa Rosa; Escuintla; Guatemala; Retalhuleu. Chiapas; Salvador; Nicaragua; originally described from Aculhuaca, Salvador.

A large shrub or a tree, sometimes 12 meters high or more, glabrous throughout or often finely pubescent on the branchlets, inflorescences, and lower leaf surfaces; petioles 7-12 mm. long; leaf blades lance-oblong or rarely oblong-ovate, mostly 5-10 cm. long and 1.5-3.5 cm. wide, acute to long-acuminate, rounded at the base, deep green above, pale beneath, the lateral nerves 7-14 pairs, conspicuous and elevated beneath; peduncles 6 mm. long or less, usually bifurcate above the middle, each branch bearing a few-flowered umbel, the pedicels 1.5-4 mm. long; flowers 3-4 mm. broad; fruit subglobose, black, lustrous, 6-7 mm. long.

Guatemalan material has been reported under the name *K. Humboldtiana* (Roem. & Schult.) Zucc., which is not known from Central America, although common through much of Mexico, and known

in Yucatan by the name "cacachila." The wood is hard and strong. It is used in Salvador and probably also in eastern Guatemala for railroad ties, as well as for axles of *carretas*, balls, fuel, and other purposes. It is noteworthy that in most of the *Karwinskia* specimens from the lower Motagua Valley the leaves are densely and finely pubescent beneath, while in those from other regions they are quite glabrous. The most interesting feature of this genus is found in the poisonous properties of the fruit or seeds, something long and widely known in Mexico, although less well known, apparently, in Central America. The senior author was told at Jutiapa that pigs sometimes were killed by eating the fruit, but inquiries at other places revealed no knowledge of such properties. The fruit is sweet and edible, and is eaten by birds and various mammals, and sometimes by children who have not been warned against it. It is believed that the poisonous properties reside in the stones, which if swallowed cause paralysis, particularly of the lower limbs (in children), the paralysis spreading to other parts of the body and finally causing death. The same results are produced in pigs and chickens. No remedy is known for the poisonous effects, and the plant is, therefore, exceedingly dangerous.

### KRUGIODENDRON Urban

Unarmed trees or shrubs; leaves persistent, short-petiolate, entire; flowers small, perfect, axillary, subumbellate; calyx 5-parted, the lobes longer than the tube; petals none; stamens 5, the filaments subulate; disk annular, crenate; ovary short-conic, the style short, the stigmas 2, small; ovules 2; fruit drupaceous, small, ovoid, the stone thin-walled; testa of the seed adherent to the endocarp, the cotyledons carnose, semiglobose; endosperm none.

The genus consists of a single species.

***Krugiodendron ferreum*** (Vahl) Urban, Symb. Antill. 3: 314. 1902. *Rhamnus ferreus* Vahl in West, St. Croix 276. 1793. *Quiebra-hacha*.

Forests of northern Petén. Southern Florida; southern Mexico; Honduras; West Indies.

A tree, glabrous or nearly so, sometimes 10 meters tall with a trunk as much as 50 cm. in diameter, often only a shrub, the bark ridged, the branchlets often puberulent; leaves mostly opposite, petiolate, ovate to oval, rather thin, 2-7 cm. long, 1.5-4.5 cm. wide, obtuse or emarginate at the apex, rounded or obtuse at the base, deep green above, slightly paler and dull beneath; flowers yellowish green, 4 mm. broad, the inflorescences little longer than the petioles; calyx lobes triangular-ovate; stamens slightly shorter than the calyx; drupes globose or ovoid, black, 5-8 mm. long.

Called "axemaster" and "quebracho" in British Honduras; the Maya name in Yucatan is "chimtoc." The wood is hard and heavy, with a specific gravity of about 1.3. In the United States it is noted as being the heaviest wood produced by any tree of the country. It is orange-brown to dark brown, often more or less streaked; appears wavy; is hornlike, very fine-grained, finishes smoothly, and appears durable.

### RHAMNUS L. Buckthorn

*Reference:* Carl B. Wolf, The North American species of *Rhamnus*, Rancho Santa Ana Bot. Gard. Mon. no. 1, 136 pp. 1938.

Trees or shrubs, usually unarmed; leaves alternate, petiolate, deciduous or persistent, penninerved, entire or dentate, the stipules small, deciduous; flowers perfect or polygamo-dioecious, small, greenish, axillary, fasciculate, racemose, cymose, or umbellate; calyx 4-5-fid, the tube urceolate, the lobes triangular-ovate, erect or spreading, carinate within; petals 4-5 or none, inserted on the margin of the disk, cucullate or flat; stamens 4-5, with very short filaments; disk filling the calyx tube, its margin thin; ovary free, ovoid, 3-4-celled, attenuate to a short or elongate, 3-4-fid style, the stigmas obtuse, papillose; fruit a berry-like drupe, oblong or globose, containing 2-4 nutlets, these osseous or cartilaginous; seeds obovoid, the testa membranaceous or crustaceous, smooth or sulcate dorsally, the endosperm carnose; cotyledons plane or with recurved margins, thin, the radicle short.

About 75 species, in temperate and tropical regions of both hemispheres. At least one other species is known from southern Central America.

Flowers all or mostly in pedunculate cymes or umbels, 5-parted; leaves pale beneath and usually covered with a soft tomentum.....*R. discolor*.

Flowers all or chiefly in sessile umbels, 4-5-parted; leaves usually green beneath.

Leaves, at least most of them, broadly rounded at the apex, densely and softly pilose on both surfaces.....*R. Pringlei*.

Leaves acute or acuminate, often glabrate, sometimes pubescent.

Fruit 2-coccos; sepals normally 4; leaves mostly 1-1.5 cm. wide.. *R. serrata*.

Fruit 3-coccos; sepals 5; leaves mostly 2-6 cm. wide.

Leaves membranaceous or chartaceous, mostly 4.5-6.5 cm. wide; ovary pubescent.....*R. capreaefolia*.

Leaves coriaceous, mostly 2-3 cm. wide; ovary glabrous.....*R. Nelsoni*.

***Rhamnus capreaefolia*** Schlecht. *Linnaea* 15: 464. 1841. *Yema de huevo*; *Colama* (Quezaltenango); *Sup* (Cobán, Quezchí); *Ilamo negro* (fide Aguilar).

Moist forest or thickets, often in pine or oak forest, 1,200-3,000 meters; Alta Verapaz; Baja Verapaz; El Progreso; Guatemala;



Sacatepéquez; Chimaltenango; Sololá; Quezaltenango; San Marcos; Huehuetenango. Southern Mexico; Salvador; Costa Rica.

Usually a large shrub or a small tree, sometimes 15 meters high with a trunk 30 cm. in diameter, the young branches densely pubescent or glabrate; leaves slender-petiolate, mostly membranaceous, sometimes thicker, elliptic to lance-oblong, mostly 6–15 cm. long, shortly acuminate or long-acuminate, obscurely serrulate, subacute to rounded at the base, green and glabrate above, somewhat paler beneath, sparsely or usually densely pubescent beneath; flowers greenish, densely clustered in the leaf axils, densely pilose, slender-pedicellate; petals present; calyx about 2.5 mm. long; fruit black or dark purple, 5–7 mm. long, glabrous or pilose.

The local name of “yema de huevo” (“egg-yolk”) refers to the yellow color of the wood. The available material of this species is variable, and it may well be that it represents more than a single species. Good specimens, however, are not sufficiently numerous to permit a satisfactory alignment of the forms. The tree is sometimes planted for ornament and was noted in the park at Sololá.

**Rhamnus discolor** (Donn. Smith) Rose, Contr. U. S. Nat. Herb. 5: 51. 1903. *R. capreaefolia* var. *discolor* Donn. Smith, Bot. Gaz. 20: 200. 1893. *Palo liso* (San Marcos); *Capulín amarillo* (fide Aguilar).

Moist thickets or forest of the mountains, 500–2,700 meters; Alta Verapaz (type from Cobán, *Tuerckheim* 710, 3051); Zacapa; Jalapa; Guatemala; Chimaltenango; Quiché; Suchitepéquez; Quezaltenango; San Marcos; Huehuetenango. Southern Mexico.

A large shrub or a tree, rarely 15 meters high with a trunk 25 cm. in diameter, the young branches densely pubescent; leaves slender-petiolate, often somewhat coriaceous, elliptic to oblong-elliptic, mostly 6–15 cm. long, acuminate or long-acuminate, green and almost glabrous above, whitish or grayish beneath and usually covered with a dense but not very close tomentum; umbels densely many-flowered, densely pilose, most of them pedunculate but some of them at times sessile, 1.5 cm. long or less, the pedicels 7 mm. long or shorter; flowers greenish yellow, with petals; fruit black, commonly 3-coccos, subglobose, about 7 mm. in diameter.

**Rhamnus Nelsoni** Rose, Contr. U. S. Nat. Herb. 8: 50. 1903. *Manzanilla* (Huehuetenango).

Moist or dry to wet forest or thickets, sometimes in pine-oak or *Abies* forest, 1,900–3,000 meters; Guatemala; Sololá; Quezaltenango; Huehuetenango. Chiapas.

A shrub or tree, sometimes 9 meters high, the branches densely short-pilose or almost glabrous; leaves short-petiolate, coriaceous, oblong or lance-oblong to elliptic, mostly 6–8 cm. long and 2–3 cm. wide, acute or acuminate with an obtuse

tip, obtuse at the base, appressed-serrulate or subentire, deep green, lustrous, and almost glabrous on the upper surface, the ultimate veinlets often impressed and very closely reticulate, usually somewhat yellowish beneath when dried, softly pilosulous or glabrate; flowers solitary or fasciculate in the leaf axils, slender-pedicellate, the pedicels and calyx usually densely pubescent, sometimes glabrate in age; sepals 5; fruit black or purple-black, glabrous, 3-celled, 7-8 mm. in diameter.

The Guatemalan material referred here is of somewhat ambiguous relationship and somewhat variable. There are two obvious forms, the material from the higher Cuchumatanes being somewhat different from that of lower elevations, particularly in its broader leaves. However, there have not been found any good characters for separating the two forms, and leaf shape alone is scarcely sufficient. It is quite possible that the proper name for the species is really *R. mucronata* Schlecht., based on Mexican material, but the original description does not apply well to the specimens, and there is at least little doubt regarding the proper application of the name *R. Nelsoni*. Wolf, in the monograph cited, considers *R. Nelsoni* a synonym of *R. mucronata*.

**Rhamnus Pringlei** Rose, Contr. U. S. Nat. Herb. 8: 51. 1903.

Moist or dry thickets or forest, often in pine or oak forest, 1,650-2,100 meters; Chimaltenango; Sololá; Quiché; Huehuetenango. Southern Mexico (Oaxaca, Veracruz).

A stout shrub 1.5-2.5 meters high, the branches densely short-pilose; leaves small, membranaceous, on petioles 2-4 mm. long, oblong to oval or obovate, mostly 1.5-3 cm. long, rounded or very obtuse at the apex, rarely subacute, rounded or obtuse at the base, inconspicuously serrulate, pilose on the upper surface, densely soft-pilose beneath; flowers perfect, 5-parted, in axillary fascicles of 2-5, the pedicels 3-5 mm. long; petals 1 mm. long; ovary glabrous, 3-celled; fruits obovoid, usually solitary, about 8 mm. in diameter; seeds 5 mm. long and broad.

**Rhamnus serrata** Willd. ex Roem. & Schult. Syst. Veg. 5: 295. 1819. *R. serrulata* HBK. Nov. Gen. & Sp. 7: 51. pl. 607. 1825.

Huehuetenango, dense *Juniperus* forest on limestone, 3,300-3,500 meters, Sierra de los Cuchumatanes. Southern Mexico.

A shrub or small tree, usually a shrub of 2 meters or less in Guatemala; leaves short-petiolate, oblong or elliptic-oblong, commonly 2-5.5 cm. long, acute or obtuse at each end, coriaceous, acutely serrulate, green and almost glabrous above, beneath yellowish green and apparently somewhat resinous, at first minutely pilose but soon glabrate; flowers in sessile axillary umbels, commonly glabrous but sometimes pilose, the calyx 2.5 mm. long; fruit black, 6-7 mm. long.

The shrub is rare in the Cuchumatanes.

## SAGERETIA Brongniart

Trees or shrubs, the branches slender or stout and stiff, often spinescent, opposite or subopposite; leaves subopposite, short-petiolate, penninerved, often reticulate-veined, entire or serrate, the stipules minute, deciduous; flowers very small, in small or large panicles, perfect; calyx 5-fid, the tube hemispheric or urceolate, the lobes ovate, acute, carinate within; petals 5, unguiculate, cucullate; stamens 5, about equaling the petals; disk cupular, lining the tube of the calyx, the margin free, 5-lobate; ovary ovoid, immersed in the disk but free from it, 3-celled, the style short, the 3 stigmas capitate or obtuse; drupe globose, containing 3 coriaceous indehiscent nutlets; seeds oblong, with thin endosperm, the cotyledons plane.

About 10 species, native of Asia and America, only the following in Central America. Two species grow in Mexico.

*Sageretia elegans* (HBK.) Brongn. Ann. Sci. Nat. 10: 359. 1827. *Rhamnus elegans* HBK. Nov. Gen. & Sp. 7: 53. pl. 619. 1825. *S. salamensis* Loes. Verh. Bot. Ver. Brandenb. 51: 30. 1910 (type from Cuesta Choacuz, Baja Verapaz, *Seler* 2482). *Duraznillo*; *Espino de corona*; *Canac* (Petén, Maya); *Clavillo*; *Clavo verde*; *Jaboncillo* (Jalapa).

Moist or dry thickets, sometimes in oak-pine forest, often on limestone, ranging from near sea level to about 2,100 meters; Petén; Alta Verapaz; Baja Verapaz; Chiquimula; Jalapa; Jutiapa; Santa Rosa; Guatemala; Sacatepéquez; Chimaltenango; Quiché; Huehuetenango. Mexico to British Honduras; Honduras; Costa Rica; Colombia to Peru.

A shrub, usually about 2 meters high but often longer and subscaudent, the branches at least partly spinescent, slender, densely whitish-puberulent or glabrate; leaves on short slender petioles, subcoriaceous, lustrous, lanceolate to ovate-elliptic, mostly 4-9 cm. long, acute or acuminate, rounded or subcordate at the base, when young often densely whitish-tomentose but in age almost glabrous, acutely serrulate or crenate-serrulate; panicles large and broad or small, leafy, with white-tomentose branches, the flowers sessile, about 1.5 mm. long, greenish white, the calyx loosely tomentulose; fruit blackish, subglobose, 6-8 mm. in diameter.

Called "cherry" in British Honduras. *S. salamensis* is a form with copious pubescence on the leaves at early stages of development, but apparently of no importance systematically. The fruit of some species of *Sageretia* is said to be edible. The leaves of *S. theezans* (L.) Brongn. are said to be employed in China as a substitute for Chinese tea. In Honduras the shrub is called "cambrón," a name given in Spain to *Rhamnus catharticus* L.

**ZIZYPHUS** Miller

Trees or shrubs, often sarmentose, armed with spines in the Guatemalan species; leaves alternate, subdistichous, petiolate, coriaceous, entire or crenate, 3-5-nerved from the base; flowers small, in short few-flowered axillary cymes, greenish; calyx 5-fid, the tube broadly obconic, the lobes triangular-ovate, acute, spreading, carinate within; petals 5 or rarely none, cucullate, deflexed; disk plane, 5-angulate, the margin free; stamens 5, concealed within or longer than the petals, the filaments subulate; ovary immersed in the disk, confluent with it at the base, 2-4-celled, the styles 2-3, conic, free or connate, divergent, the stigmas small, papillose; drupe fleshy, globose or oblong, the stone ligneous or osseous, 1-3-celled, 1-3-seeded; seeds plano-convex, the testa thin, smooth; endosperm none or scant, the cotyledons thick, the radicle short.

Species about 40, in tropical and subtropical regions of both hemispheres. Only one species is known to be native in Central America.

Leaves glabrous or nearly so, green beneath.....*Z. guatemalensis*.

Leaves densely whitish-tomentose beneath.....*Z. mauritiana*.

**Zizyphus guatemalensis** Hemsl. Diagn. Pl. Mex. 6. 1878.  
*Mocoso*.

Type collected in Guatemala by Skinner, the locality not known but probably in the lower Motagua Valley; dry brushy hillsides, 250-480 meters; Zacapa; Chiquimula. Probably also in Guanacaste, Costa Rica.

A tree about 5 meters high with broad crown, armed with short sharp spines, the branches stout but somewhat flexuous; leaves short-petiolate, oblong-elliptic to rounded-obovate, mostly 4-5.5 cm. long, broadly rounded at the apex and sometimes retuse, rounded at the base, inconspicuously crenate-serrate, 3-nerved or somewhat 5-nerved, glabrous above, slightly paler beneath and sometimes sparsely pilose at the base; flowers small, subumbellate, the umbels axillary, about 10-flowered, puberulent; ovary 2-celled.

The wood is said to be used for fuel.

**Zizyphus mauritiana** Lam. Encycl. 3: 319. 1789. *Z. Jujuba*  
Lam. op. cit. 318. 1789.

Planted at Zacapa, also in British Honduras. Native of southern Asia and Africa.

A small tree with broad crown, said to attain sometimes a height of 15 meters, the branches armed with short stout spines, the young branches densely tomentose; leaves petiolate, suborbicular to oval or oblong, mostly 4-5 cm. long, broadly rounded and often emarginate at the apex, rounded at the base, green and glabrate above, covered beneath with a dense, whitish or rusty tomentum, finely crenate-serrate; flowers in short-stalked or sessile, many-flowered, axillary umbels or cymes; fruit subglobose to oblong, usually orange-red, 12-20 mm. in diameter.

The sweet fruit is edible, and is used in some regions in making confectionery and medicine.

VITACEAE. Grape Family

Scandent shrubs, usually with copious watery sap, the stems nodose or articulate; leaves alternate, petiolate, simple or digitately 3-5-foliolate or pedate, rarely bipinnate, the petiole articulate at the base with the stem and thickened, often dilated into a membranaceous stipule; flowers regular, perfect or unisexual, small, usually greenish, the inflorescence commonly cymose-paniculate or racemose, the peduncles often tendril-bearing; calyx small, entire or with 4-5 teeth or lobes; petals 4-5, free or coherent, valvate, in anthesis spreading-recurved or sometimes coherent and caducous; stamens 4-5, opposite the petals, inserted at the base of the disk or between its lobes, the filaments subulate; anthers free or connate, short, 2-celled, introrsely dehiscent; disk various in form, sometimes none; ovary usually immersed in the disk, 2-6-celled, the cells 1-2-ovulate; style short, conic, subulate, or none, the stigma capitate or discoid; ovules 1-2 in each cell, ascending, anatropous; fruit baccate, 1-6-celled; seeds erect, with osseous testa; endosperm cartilaginous, sometimes ruminant; embryo short, the cotyledons oval, the radicle very short, inferior.

About 11 genera, chiefly in tropical regions, except for the genus *Vitis*. Only the following groups are found in Central America.

- Leaves digitately 5-foliolate.....*Parthenocissus*.
- Leaves simple or 3-foliolate.
- Petals coherent and deciduous as a cap. Leaves simple.....*Vitis*.
- Petals free, spreading.
- Petals 4; disk 4-lobate; leaves simple or 3-foliolate.....*Cissus*.
- Petals 5; disk 5-lobate; leaves simple.....*Ampelocissus*.

AMPELOCISSUS Planchon

*Reference:* C. L. Lundell, Mexican and Central American species of *Ampelocissus*, Carnegie Inst. Wash. Publ. 478: 214-216. 1937.

Scandent shrubs with tendrils; leaves simple in the American species, resembling those of *Vitis*, the peduncles usually tendril-bearing; flowers small, cymose or corymbose, sometimes paniculate, monoecious-polygamous; calyx cupular, usually 5-lobate; petals generally 5, spreading in anthesis; stamens 5, inserted at the base of the disk, this annular, erect, vertically 5-10-sulcate; ovary immersed in the disk, 2-celled, the cells 2-ovulate; style short, conic, the stigma minute; berries 2-3-seeded.

About 45 species, only three of which are American. One other has been described from Costa Rica.

Ovary of the staminate flower more or less spinulose-papillose; pedicels mostly 2-3 mm. long or more and often much longer than the flowers; petals 2.5-3 mm. long.....*A. Erdwendbergii*.

Ovary of the staminate flower glabrous; pedicels about 1.5 mm. long, usually not exceeding the flower but sometimes elongate; petals 2 mm. long. *A. acapulcensis*.

**Ampelocissus acapulcensis** (HBK.) Planch. in DC. Monogr. Phan. 5: 403. 1887. *Vitis acapulcensis* HBK. Nov. Gen. & Sp. 7: 230. 1825.

Frequent in dry thickets, 1,400 meters or less; Zacapa (Sierra de las Minas); Escuintla; Retalhuleu. Southern Mexico; Salvador.

A small or large, woody vine, arising from a large fleshy root, the stems scandent over shrubs and trees or often prostrate upon the ground, when young usually laxly floccose-tomentose but soon becoming quite glabrous and polished; leaves on petioles 1-5 cm. long, broadly ovate-cordate, 6-16 cm. long, acute, dentate, sometimes shallowly 3-lobate, when young very densely floccose-tomentose, especially beneath; flowers small, dark red, in very dense or lax panicles, the pedicels glabrous or pilose, the branches of the cymes densely floccose-tomentose or glabrous; petals acute, glabrous; fruiting panicles often very large and heavy, as much as 25 cm. broad; fruit wine-colored, globose, 1.5-2.5 cm. in diameter or even larger.

Called "uva" and "uva silvestre" in Salvador. The large fruit is handsome and of appetizing appearance but it is quite inedible, being sour and unpleasantly flavored. In Salvador it is sometimes utilized for making vinegar. The plant is abundant in the hot dry thickets about Champerico.

**Ampelocissus Erdwendbergii** Planch. in DC. Monogr. Phan. 5: 404. 1887. *Uva*.

Petén (La Libertad). Southern Mexico.

A woody vine, the stems rather persistently floccose-tomentose; leaves on petioles 6.5 cm. long or less, broadly ovate-cordate, 6-15 cm. wide, sometimes shallowly lobate, acute or acuminate, irregularly dentate, green above, hispidulous and somewhat floccose-tomentose, at least when young, densely covered beneath with a brown floccose tomentum; inflorescences small or large, lax and open or rather dense, the pedicels usually glabrous, slender, 2-3 mm. long; berries subglobose, when dry only 5-10 mm. wide; seeds obcordate, 5 mm. long.

None of the characters used by Lundell in his key to species seem to be constant, and it is questionable whether the American species are three or really one. It is quite possible, although not at all certain, that *A. Erdwendbergii* is a distinct species, separable from *A. acapulcensis* primarily by its small fruits. The reputed characters of pubescence and petal size are particularly unstable.

## CISSUS L.

Plants mostly scandent, herbaceous or usually woody, often tendril-bearing; flowers commonly perfect, small, green or red, 4-parted, cymose-corymbose, usually

opposite the leaves, sometimes appearing axillary; petals finally spreading, rarely somewhat connate; disk 4-lobate, adnate to the base of the ovary; ovary 2-celled, the cells 2-ovulate; style subulate; berry 1-4-seeded, not edible; seeds ovoid or obtusely trigonous.

About 200 species, widely distributed in tropical regions. One or two other Central American species are known.

Leaves 3-foliolate.

Leaflets small, 1.5-3.5 cm. long, glabrous.....*C. Martiniana*.

Leaflets all or mostly 4-10 cm. long, often pubescent.

Leaflets sparsely or densely hirsute or tomentose beneath.

Leaflets obtuse, the venation conspicuously reticulate.....*C. salutaris*.

Leaflets acuminate, the venation not conspicuously reticulate.

*C. rhombifolia*.

Leaflets glabrous or essentially so.

Terminal leaflet sessile or essentially so; venation of the leaflets prominent and closely reticulate.....*C. erosa*.

Terminal leaflet long-petiolulate; venation neither prominent nor closely reticulate.....*C. microcarpa*.

Leaves simple, often lobate.

Larger or lower leaves conspicuously palmate-lobate, glabrous or essentially so.

*C. gossypifolia*.

Larger and lower leaves not at all lobate.

Berries about 12 mm. long; leaves glabrous or nearly so.....*C. biformifolia*.

Berries 6-8 mm. long; leaves usually pubescent, sometimes glabrous.

Leaves thick and succulent, the pubescence of rather stiff, spreading hairs; teeth spreading or at least not incurved, not or scarcely subulate-tipped; base of the leaf blade usually truncate or rounded.*C. sicyoides*.

Leaves thin, scarcely succulent, the pubescence none or of few long slender weak hairs; teeth subulate-tipped, appressed or incurved; base of the leaf blade usually conspicuously cordate.....*C. cacuminis*.

**Cissus biformifolia** Standl. Field Mus. Bot. 4: 225. 1929.

*C. cardiophylla* Standl. op. cit. 226. *Vitis lanceolata* Watson, Proc. Amer. Acad. 21: 462. 1886, not *Cissus lanceolata* Malme, 1901 (type from Río Dulce and Río Chocón, Izabal, *Sereno Watson* 46).

Wet forest or thickets, at 1,800 meters or less; Alta Verapaz; Izabal; Huehuetenango. British Honduras; Honduras; Costa Rica; Panama.

A large or small, woody vine, glabrous throughout or nearly so, the branches not winged, bearing numerous elevated lenticels; leaves long-petiolate, broadly ovate to lance-oblong, 23 cm. long and 13 cm. wide or smaller, acute or acuminate, cordate to rounded at the base, rather thick when dried, with conspicuous, elevated and reticulate venation, repand-denticulate; flowers bright dark red, in small or large, often dense cymes; berries about 12 mm. long in the dry state, much larger than those of other Central American species, dull purple.

**Cissus cacuminis** Standl. in Yuncker, Field Mus. Bot. 17: 375. 1938.

Wet thickets or forest, 1,200–1,900 meters; Chiquimula; Jalapa; Chimaltenango; Quezaltenango; Huehuetenango. Honduras, the type from the region of Siguatepeque, Dept. Comayagua.

A large woody vine, the branches slender, brownish, subterete, glabrous or sparsely pilose; leaves on petioles 1.5–4.5 cm. long, thin when dried and not very fleshy when fresh, ovate or broadly ovate, mostly 5–10 cm. long and 3–5 cm. wide, acute or acuminate, usually shallowly cordate at the base, closely serrate with slender-tipped, appressed or incurved teeth, sparsely villous above at first but soon glabrate, beneath sparsely pilose with long weak hairs or glabrate, 5-nerved at the base, the upper lateral nerves about 3 pairs; cymes slender-pedunculate, lax, many-flowered, about 3 cm. wide, the branches villous; flowers green or yellowish, slender-pedicellate; calyx 1 mm. broad, undulate, the petals slightly more than 1 mm. long; berries subglobose, 8 mm. in diameter (when dry).

This is a forest species and not a weedy vine like *C. sicyoides*, to which it is closely related. It seems quite distinct from that species, and ampler material probably will strengthen the apparent differences.

**Cissus erosa** L. Rich. Act. Soc. Hist. Nat. Paris 1: 106. 1792.

Wet thickets, at sea level; Izabal. Southern Mexico; West Indies; South America.

A small or large vine, the slender stems glabrous or sparsely pilose, not winged; leaves 3-foliolate, on long or short petioles; leaflets all sessile, lanceolate to oblong-ovate, mostly 5–10 cm. long, acute or short-acuminate, rounded to acute at the base, undulate to serrulate, subcoriaceous and lustrous when dried, the veins prominent and reticulate; cymes long-pedunculate, the flowers and pedicels bright red; berry globose or globose-ovoid, about 6 mm. long; seeds ovoid, 5 mm. long.

**Cissus gossypiifolia** Standl. Field Mus. Bot. 8: 23. 1930 (type from Honey Camp, Orange Walk, British Honduras, *C. L. Lundell* 25). *C. formosa* Standl. loc. cit. (type from Suitun, Yucatan, *Gaumer* 23389).

Moist or wet forest or thickets, 1,300 meters or lower; Huehuetenango (Paso del Boquerón, below La Libertad, *Steyermark* 51208). British Honduras; Campeche; Tabasco; Yucatan.

A small or large, woody vine, the young branches glabrous or nearly so; leaves long-petiolate, very variable in shape, the larger and lower ones 9–15 cm. long and often fully as wide, truncate or shallowly cordate at the base, shallowly 3–5-lobate, the lobes acute or abruptly acute, entire or serrate, the upper and smaller leaves ovate to broadly elliptic, not lobate, acute or short-acuminate, entire or serrulate, glabrous or nearly so; cymes pedunculate, dense or lax and many-flowered, the flowers bright red; calyx truncate; petals obtuse, 1.8 mm. long; berries obovoid, about 6 mm. long when dry, bright red.



**Cissus Martiniana** Woodson & Seibert, Ann. Mo. Bot. Gard. 24: 191. 1937.

Wet forest, 1,500–3,000 meters; El Progreso; Zacapa; San Marcos; Huehuetenango. Honduras; Salvador; Chiapas; Costa Rica; Panama.

A small vine, usually creeping closely on tree trunks, glabrous throughout or nearly so, the stems not winged, emitting roots at the nodes; leaves long-petiolate, small, the petioles often pink or reddish; leaflets mostly 1.5–3.5 cm. long, sessile, rhombic to broadly oval or elliptic, rounded to acute at the apex, acute or acuminate at the base, coarsely crenate, rather thin and pale green when dried, not or scarcely succulent; cymes small and few-flowered, sparsely pilose; berries subglobose, 5–6 mm. long, white at maturity.

This is a plant of deep wet cool forests.

**Cissus microcarpa** Vahl, Eclog. Amer. 1: 16. 1796.

Moist or dry forest or thickets, 900 meters or lower; Izabal (?); Santa Rosa; Suchitepéquez; Retalhuleu; Quezaltenango. Southern Mexico; British Honduras and probably extending into Petén; Honduras; Nicaragua; Panama; West Indies; South America.

A small or large, woody vine, glabrous throughout or nearly so; larger branches often narrowly 4-winged; leaves long-petiolate, 3-foliolate; leaflets drying rather thin, obliquely ovate or rhombic to broadly elliptic, mostly 4–10 cm. long and acute or acuminate, obliquely rounded to acuminate at the base, mucronate-serrate; cymes many-flowered, shorter than the opposing leaves, long-pedunculate, lax or dense, the flowers usually deep red; berries ovoid-globose, 6–8 mm. long, purple or dark red.

In Central America this species has been much confused with *C. rhombifolia*, and has been reported from Honduras and British Honduras under that name.

**Cissus rhombifolia** Vahl, Eclog. Amer. 1: 11. 1796. *Comemano*.

Dry to wet thickets, 1,200 meters or less; Petén; Alta Verapaz; Izabal; Jutiapa; Santa Rosa; Escuintla; Guatemala; Retalhuleu. Southern Mexico; Honduras and Salvador to Panama; West Indies; South America.

A small or large, woody vine, often climbing over tall trees, the stems thick and soft, usually narrowly 4-winged, the young branches villous, often densely so; leaves long-petiolate, 3-foliolate; leaflets fleshy when fresh, drying thick, obliquely ovate or rhombic to broadly elliptic, acute or acuminate, generally rounded or very obtuse at the base, serrate or serrulate, usually rather densely villous on both surfaces, rarely glabrate, 4–10 cm. long; inflorescences mostly large and dense, long-pedunculate, the flowers deep bright red, the pedicels villous; petals often hirtellous; fruit black at maturity.

Called "picamano" in Honduras; "uva cimarrona," "comemano" (Salvador); "xtabcanil" (Yucatan, Maya). The species is somewhat variable, especially as regards quantity of pubescence. In the wet forests of the Atlantic lowlands the vine is often conspicuous and showy, especially along the main railway line, where the brilliant red inflorescences are abundant, and easily noted from a moving train.

**Cissus salutaris** HBK. Nov. Gen. & Sp. 5: 225. 1821. *Coralillo*; *Bejuco de pollo* (fide Aguilar).

Moist thickets or open forest, 1,650 meters or less; Petén; Chiquimula; Jalapa; Jutiapa; Quiché. Southern Mexico; Honduras; Panama; northern South America.

A small or large, woody vine, the young stems not winged, slender, sparsely or densely hispidulous; leaves on long or short petioles, 3-foliolate; leaflets rather thick when dried and conspicuously reticulate-veined, the lateral ones sessile, the terminal narrowed to a slender petiolule, obovate to oblong, usually broadest above the middle, 4.5-9 cm. long, narrowly rounded to subacute at the apex, acuminate to very obtuse at the base, crenate-serrate, thinly or densely hispidulous or hirsute, especially beneath; cymes long-pedunculate, often longer than the opposing leaves, hispidulous or villous, the flowers deep bright red, the pedicels pilose.

**Cissus sicyoides** L. Syst. Nat. ed. 10. 2: 897. 1759. *Vitis sicyoides* Morales in Poey, Repert. 1: 206. 1866. *Comemano*; *Sanaltodo*; *Bejuco de gallina*.

Common or abundant in dry to wet thickets and forest, 1,200 meters or less; Petén; Alta Verapaz; Izabal; Zacapa; El Progreso; Chiquimula; Jalapa; Jutiapa; Santa Rosa; Escuintla; Guatemala; Suchitépéquez; Retalhuleu; San Marcos. Mexico; British Honduras to Salvador and Panama; West Indies; South America.

Often a very large, woody vine, frequently climbing over tall trees, the stems thick and tough, very flexible; leaves simple, on long or short petioles, oblong-ovate to rounded-ovate, often very asymmetric, 4-16 cm. long, obtuse to acuminate, rounded to cordate at the base, coarsely or finely serrate, usually densely pubescent but sometimes almost glabrous; cymes small or large, pedunculate, usually dense and shorter than the opposing leaves, sometimes lax and open, pubescent; flowers green or yellowish green; fruit globose-obovoid, black at maturity, 1-seeded, about 6 mm. long in the dry state.

Called "picamano" in Honduras and "bejuco loco" in Tabasco. This is one of the most common and widely distributed of tropical American plants. It exhibits a great deal of variation in pubescence and leaf form, as a result of which numerous varieties have been

named. Perhaps someone may find a basis for separating satisfactorily some of these forms, but with present material the lines of division are vague. The plant emits many long aerial roots that dangle loosely from the tree branches or sometimes strike root in the ground. If the main stem is cut, the upper part of the plant continues to grow. The stems and roots are tough, and often are used as cordage, and in Costa Rica baskets are made from them. When cut they yield a copious watery sap, which is generally believed to cause blisters upon the skin, although we have never seen this demonstrated. The leaves macerated in water give a suds like that of soap, which sometimes is utilized for washing clothes. In Guatemala the sap is applied as a remedy for gangrene. In Salvador a decoction of the crushed stems and wood ashes is applied to wounds of cattle. It is said to change the color of their hair, which later resumes its natural color. The inflorescences frequently are greatly deformed by a smut, *Mycosyrinx Cissi* (DC.) Beck, so much so that it resembles a strange parasitic plant. This diseased form was made the type of a new genus of flowering plants, *Spondylantha*, by Presl.

### PARTHENOCISSUS Planchon

Woody vines, the tendrils with adhesive tips by which the plants usually are attached closely to the supporting tree trunk or other object, the bark close, lenticellate, the pith white; leaves deciduous, digitately compound in the American species, long-petiolate, the leaflets coarsely dentate; flowers perfect or rarely polygamous, in pedunculate compound cymes opposite the leaves; often densely aggregate at the ends of the branchlets and forming panicles; calyx minute; petals normally 5, spreading; style short and thick; disk indistinct; ovary 2-celled, the cells 2-ovulate; fruit a 1-4-seeded, dark blue or bluish black berry.

About 10 species, in North America and eastern and southern Asia. Only the following is found in Central America.

**Parthenocissus quinquefolia** (L.) Planch. in DC. Monogr. Phan. 5: 448. 1887. *Hedera quinquefolia* L. Sp. Pl. 202. 1753. *Tripas de iguana*.

Thickets along streams, 1,300-1,500 meters; Huehuetenango (Río Azúl below Jacaltenango; between San Andrés and San Marcos). Southern Canada and eastern and southern United States; Mexico.

A large woody vine, glabrous throughout or nearly so or often rather copiously pubescent; tendrils usually numerous and with dilated disk-like tips that adhere tightly to any object that they touch, aerial roots often present; leaves long-petiolate, the normally 5 (3 on young tips) leaflets membranaceous, petiolulate,

oval to oblong-ob lanceolate, 5-15 cm. long, acute or acuminate, attenuate to the base, coarsely dentate, at least above the middle, deep green above, usually glabrous, somewhat paler beneath, glabrous or more or less pilose; panicles small or rather large, many-flowered; berries blue, about 6 mm. in diameter, containing 2-3 seeds; pedicels and branches of the panicle usually bright red in fruit.

Usually called "Virginia creeper" in the United States, where the vine is much planted to cover the sides of buildings. It is probably the most common ornamental vine of the United States, although much inferior to the true or English ivy (*Hedera*), which is not hardy in the colder parts of North America. The plant was found to be common along the Río Azúl in the Cuchumatanes, but it was noted in only one locality between San Andrés and San Marcos. It has not been reported previously from Central America and its occurrence in Guatemala is quite unexpected, since the nearest Mexican locality at which it has been collected is about 600 miles distant (in the State of Mexico). In the Guatemalan specimens the leaflets are very sparsely pilose beneath on the nerves and veins.

### VITIS L. Grape

Woody vines, often very large, scandent by tendrils borne opposite the leaves, or the tendrils sometimes arising from the peduncles; flowers small, polygamodioecious, the staminate flowers similar to the perfect ones but with longer stamens and an abortive ovary; calyx cupular, repand-dentate; petals 5, valvate, coherent by their tips to form a deciduous cap; stamens 5; hypogynous glands 5, adnate to the base of the ovary, more or less united; ovary 2-celled, the cells 2-ovulate; ovules erect from the base of the cell, anatropous; fruit baccate, usually edible, 2-celled, pulpy; seeds more or less pyriform, usually narrowed at the base into a beak, the face 2-foveolate.

About 60 species, chiefly in temperate regions of the Northern Hemisphere. Only two species are native in Central America.

Branches of the panicles floccose-tomentose, sparsely or usually not at all hispidulous; leaves, at least when young, pale beneath, densely floccose-tomentose, the tomentum usually persistent and often very dense in age. . . *V. tiliifolia*.

Branches of the inflorescence without floccose tomentum, viscid-hispidulous; leaves green beneath, the tomentum very sparse, consisting of only a few, long, slender, scarcely matted hairs. . . . . *V. Bourgaeana*.

*Vitis Bourgaeana* Planch. in DC. Monogr. Phan. 5: 368. 1887.  
 ?*V. vulpina* L. var. *yzabalana* Wats. Proc. Amer. Acad. Sci. 21: 463. 1886 (type from lake shore near Izabal, *Watson* 48; not seen but the description seems to suggest this, rather than *V. tiliifolia*).  
*Tusuj* (Quechí); *Tusub cam* (Quechí, fide Dieseldorff).

Moist or wet thickets, sometimes in pine forest, 1,450 meters or less; Petén(?); Alta Verapaz; Izabal(?); Huehuetenango. British Honduras; southern Mexico.

A small or large vine, the stems terete, somewhat floccose-tomentose when young but soon glabrate, often short-pilose or hispidulous; tendrils intermittent, at each second node, furcate; leaves on long, slender, often hispidulous petioles, the blades thin, rounded-ovate, mostly 5-10 cm. long, cuspidate-acuminate, sometimes shallowly 3-lobate, rarely deeply 3-5-lobate, repand-denticulate or serrulate, truncate or shallowly cordate at the base, green above and more or less puberulent or minutely hispidulous, beneath green and scarcely paler, bearing sparse, long, scarcely matted hairs or almost glabrous, often hispidulous on the nerves; flowers yellowish green, very fragrant, paniculate, the panicles rather lax, long and narrow, often exceeding the leaves, the branches not at all floccose-tomentose but hispidulous or villosulous and sometimes more or less viscid, the flowers slender-pedicellate; berries small, 4 mm. long when dry, very acid, purple-black at maturity.

In Central America this species seems to be quite limited in distribution. When growing it is easily differentiated from *V. tiliifolia* by its much smaller leaves, which lack the abundant tomentum of the lower leaf surface that usually is so conspicuous in *V. tiliifolia*. It was believed at first that the Guatemala plant represented an undescribed species, but it seems to agree well with forms of the Mexican *V. Bourgaeana*, described from the region of Orizaba, Veracruz, and the range is a natural one. The vine is common in the pine forests surrounding Cobán.

*Vitis tiliifolia* Humb. & Bonpl. ex Roem. & Schult. Syst. Veg. 5: 320. 1819. *V. caribaea* DC. Prodr. 1: 634. 1824. *Uva*; *Paac* (Cacchiquel); *Bejuco de agua*; *Uva de pájaro*.

Common in wet to dry forest or thickets, 1,700 meters or lower, often in pine-oak forest, most plentiful at lower elevations; Baja Verapaz; El Progreso; Zacapa; Chiquimula; Jalapa; Jutiapa; Santa Rosa; Escuintla; Guatemala; Sacatepéquez; Chimaltenango; Huehuetenango; Suchitepéquez; Retalhuleu; Quezaltenango; San Marcos. Mexico; British Honduras to Salvador and Panama; West Indies; Colombia.

A small or often a very large vine with thick stems, the young branches densely floccose-tomentose, becoming glabrate, subterete; leaves thin, rounded-ovate, mostly 8-18 cm. long, abruptly acuminate, often shallowly or deeply 3-5-lobate, finely or coarsely dentate, when young floccose-tomentose above but in age glabrate, beneath usually covered with a dense, close or very lax, grayish or brownish tomentum, this generally persistent in age; flowers greenish yellow, fragrant, the panicles pedunculate, narrow, lax or dense, the branches abundantly floccose-tomentose or in age glabrate, the flowers slender-pedicellate; fruit purple-black, 6-8 mm. in diameter, usually very sour.

Called "bejuco de agua" and "water-wise" (withe?) in British Honduras. Known in Salvador as "uva montés" and "uvilla." This has been reported from Guatemala as *V. aestivalis* Michx., a species of the United States. *Vitis tiliifolia* is a well-known water vine of Central America, that is, from sections of the stem there may be obtained considerable quantities of watery sap that may be drunk in place of water, a fact of which advantage often is taken in regions where surface water is lacking. The tough stems are used for temporary cordage in gathering firewood and for other purposes. The fruit, even when fully ripe, is too acid to be palatable, but it is utilized sometimes for making vinegar.

*Vitis vinifera* L. Sp. Pl. 202. 1753. *Uva; Parra; Vid; European grape.*

Probably native in the region of the Caucasus and the Caspian Sea, and in western India; now grown in many parts of the earth for its delicious fruit, from which many kinds of wine are prepared; planted extensively in western North America, especially in California; also in Mexico. In Guatemala at the present time, as in other parts of Central America, the grape is little grown, but scattered vines may be found in fincas of the mountains and foothills. In order to produce well, apparently they must be carefully tended. The climate of most regions seems unsuited for them, and they have many insect and other enemies, especially leaf-cutting ants. Good Malaga grapes are produced in very small quantities in the central region, and are seen sometimes in the markets. Substantial quantities of grapes are imported from California. Soon after the conquest the European grape was introduced into Spanish America and flourished in many regions, particularly Mexico, Chile, and Argentina. Important wine industries were developed, but these were discouraged or suppressed by the Spanish government, to protect the wines produced in Spain. One region of Guatemala was formerly famous for its grapes and wine, not only in Guatemala but far outside its boundaries. At San Gerónimo, Baja Verapaz, the Dominican friars planted many hundreds of acres of vines, which thrived under irrigation, and supplied grapes for great quantities of wine, but the industry vanished for political and religious reasons, and the lands are now occupied by sugar cane, from which rum is produced.

#### TILIACEAE. Linden Family

Trees or shrubs, rarely herbs, the pubescence often of branched hairs; leaves alternate, rarely opposite, simple; stipules geminate or none; flowers small or

large, generally perfect, cymose; sepals 5, valvate or subimbricate; petals free, sometimes none, occasionally sepaloid, contorted, imbricate, or valvate; stamens usually numerous, free or short-connate into 5-10 fascicles, the anthers 2-celled, opening by longitudinal slits or apical pores; ovary superior, sessile, 2-10-celled; style usually simple and divided at the apex, the stigmas rarely sessile; ovules on axial placentae; fruit 2-10-celled, rarely by abortion 1-celled, the cells sometimes with transverse dissepiments, baccate, drupaceous, or variously dehiscent; seeds 1-many in each cell, sometimes pilose, the endosperm thin or copious; embryo usually straight.

About 50 genera, widely dispersed, most numerous in tropical regions. *Muntingia* and *Sloanea* listed below are sometimes placed in a separate family, Elaeocarpaceae. The only other Central American genera are *Dicraspidia* and *Goethalsia*. The former occurs in the Department of Atlántida, Honduras, and might be expected in Izabal.

Fruit baccate. Petals white.....*Muntingia*.

Fruit dry.

Fruit unarmed, without spines or bristles.

Capsule linear or narrowly oblong; herbs or low shrubs.....*Corchorus*.

Capsule not linear; large shrubs or tall trees.

Sepals united to form a campanulate calyx; leaves entire.

Leaves glabrous or nearly so; seeds setose.....*Carpodiptera*.

Leaves densely stellate-pubescent; seeds glabrous.....*Christiana*.

Sepals distinct; leaves entire or dentate.

Leaves entire, glabrous or nearly so.....*Mortoni dendron*.

Leaves dentate, copiously pubescent.

Capsule compressed, 2-celled, thin-walled; petals violet.....*Belotia*.

Capsule terete or 5-angulate, ligneous; petals white.....*Lutheia*.

Fruit armed with spines or bristles.

Fruit opening by 4 valves, these thick and woody; petals none.....*Sloanea*.

Fruit indehiscent or bivalvate, not ligneous; petals usually present, sometimes none.

Anthers linear; fruit depressed, 8-10 cm. broad.....*Apeiba*.

Anthers short; fruit not depressed, much smaller.

Fruit compressed, with numerous slender radiating bristles on the margins.....*Heliocarpus*.

Fruit not compressed, covered on all sides with stiff spines...*Triumfetta*.

### APEIBA Aublet

Trees, usually with copious pubescence of stellate hairs; leaves 3-5-nerved; flowers yellowish or greenish, in 2-3 times branched cymes, terminal or opposite the leaves; sepals 5, free; petals as many as the sepals, naked at the base; stamens numerous, inserted on a flat torus, free, with short filaments; anthers erect, linear, the connective produced beyond the cells as a membrane; ovary 8-many-celled, the cells many-ovulate; style simple, the stigma concave, denticulate; fruit de-

pressed-globose, coriaceous, tuberculate or echinate, scarcely dehiscent, the cells with pulp; seeds very numerous, orbicular or obovate, compressed, the testa thin-coriaceous, the endosperm carnose; embryo straight, the cotyledons orbicular-cordate.

About 10 species, in tropical America. One other, *A. aspera* Aubl., in which the leaves are minutely whitish-tomentulose beneath, occurs in Central America from Honduras southward.

**Apeiba Tibourbou** Aubl. Pl. Guian. 538. pl. 213. 1775. *Peine de mico*.

Dry or moist forest or thickets of the Pacific plains and hills, 1,200 meters or less; Santa Rosa; Retalhuleu; Quiché(?); probably in all the Pacific coast departments. Southern Mexico; Salvador to Panama; northern South America.

A small or medium-sized tree, often 9 meters high, with spreading crown, the trunk low, 30-70 cm. in diameter, sometimes with small buttresses, the bark grayish or grayish black, moderately smooth or with small scales, the inner bark chocolate-brown, containing a mucilaginous translucent sap; branchlets hirsute; leaves short-petiolate, oblong-ovate to elliptic-oval, 10-30 cm. long, acute or acuminate, narrow and shallowly cordate at the base, 5-nerved, crenulate, stellate-pilose, especially beneath, sometimes glabrate above but rough to the touch, the veins impressed; flowers yellowish, in small cymes opposite the leaves, 2.5 cm. broad, the sepals hirsute, the petals 1-1.5 cm. long, nearly glabrous; filaments hirsute; fruit depressed-globose, 8-10 cm. broad, very densely covered with long, stout but flexible, greenish spines.

The wood is almost spongy, creamy white when freshly cut, turning to medium brown on exposure to air. The tough bark has been used in some regions for making coarse rope. The tree often grows on cut-over or formerly cultivated land. It is easily recognized by its fruits, which closely resemble sea-urchins.

#### BELOTIA A. Richard

*References:* T. A. Sprague, A revision of the genus *Belotia*, Kew Bull. 270-278. 1921; A. A. Bullock, Notes on the genus *Belotia*, Kew Bull. 517-521. 1939.

Trees; leaves short-petiolate, usually 3-5-nerved, serrulate or denticulate; flowers 5-parted, in cymes; sepals not appendaged at the apex; petals ligular or oblong-spatulate, bifid or dentate at the apex, bearing within at the base a ciliate nectariferous spot, blue or violet; androgynophore naked, bearing at the apex a broad ciliate disk; stamens numerous, free, the anthers suborbicular; ovary 2-celled, the cells many-ovulate, the ovules biseriata; capsule 2-celled, compressed contrary to the septum, loculicidal; seeds discoid, long-ciliate.



Sprague recognized 11 species, in Mexico, Central America, and West Indies. A few of these were reduced by Bullock, and there is no doubt that the number must be still further reduced. Most of Sprague's species were based upon characters extremely inconstant in the Malvales, and the accumulation of numerous new specimens, as well as field study, shows that the number of species may not be more than three. One other species besides those listed here may occur in southern Central America.

Fruit 1.5–2 cm. long; sepals 8–11 mm. long . . . . . *B. mexicana*.

Fruit about 1 cm. long; sepals 5–7 mm. long . . . . . *B. Campbellii*.

**Belotia Campbellii** Sprague, Kew Bull. 277. 1921 (type from Seven Hills Estate, British Honduras, *E. J. F. Campbell* 75). *B. tabascana* Sprague op. cit. 278 (type from Lomas de San Sebastián, Tabasco). *Mecate colorado* (Izabal); *Holol* (Petén, Maya); *Chai* (Alta Verapaz).

Moist or wet forest or thickets, often in pastures, at or little above sea level; Petén; Alta Verapaz; Izabal. Oaxaca to Tabasco; British Honduras to Costa Rica.

A tree 9–18 meters high or probably even larger, the crown broad or narrow, the trunk often 60 cm. in diameter, the bark fairly smooth, light gray, the inner bark pinkish brown; branchlets densely stellate-pubescent; leaves oblong-ovate or ovate-lanceolate, mostly 10–18 cm. long and 4–7 cm. wide, narrowly long-acuminate, obtuse or rounded at the base, green and glabrate above, grayish or whitish beneath or in young leaves green, stellate-pubescent or stellate-tomentose, the hairs conspicuously unequal in length; cymes mostly much shorter than the leaves, dense, with few or numerous flowers; sepals bright pink; petals 6–7 mm. long, violet, bifid at the apex; capsule 1 cm. long or less and slightly broader, hirsute, truncate at the apex and rostrate.

Known in British Honduras by the names "moho," "mountain moho," and "narrow-leaf moho." The tough bark can be pulled off in long strips and is often used as a substitute for cordage, especially in putting together house frames. The wood is soft, creamy white with a pinkish brown tint, turning reddish brown on exposure to air. It is said to be used sometimes for house construction, but can scarcely be very serviceable for that or any other purpose requiring durability. In Oaxaca the tree is called "majagua" and "capulín"; in Honduras sometimes "sirín de paloma." When in bloom it is very showy and handsome because of the contrasting pink and brilliant violet of the flowers, which are produced in lavish abundance. Here doubtless are to be referred Guatemalan specimens reported by Bullock as *B. caribaea* Sprague and *B. grewiifolia* A.

Rich. These species are separated by Sprague from *B. Campbellii* on characters that will scarcely bear critical study, if they exist at all. The two authors whose papers are cited above evidently were not acquainted with the variation in pubescence, particularly in density, found in these trees, especially upon seedling or young individuals, whose leaves do not exhibit the dense covering of pale tomentum that characterizes the foliage of flowering branches. It is believed that the proper name for the species here described is probably *B. grewiifolia* A. Rich., to which both *B. Campbellii* and *B. caribaea* should be reduced, with perhaps other species proposed as distinct.

**Belotia mexicana** (DC.) Schum. in Engl. & Prantl, Pflanzenfam. 3, pt. 6: 28. 1890. *Grewia mexicana* DC. Prodr. 1: 510. 1824. *B. Galeottii* Turcz. Bull. Soc. Nat. Moscou 19, pt. 2: 504. 1846. *Capulin*.

Moist or rather dry forest or thickets, often in second growth, chiefly at 600–1,500 meters; Alta Verapaz; Chiquimula; Santa Rosa; Guatemala; Escuintla; Suchitupéquez; Retalhuleu; Sololá; Quezaltenango; San Marcos. Southern Mexico.

A tree of 15 meters, or sometimes 33 meters high with a trunk 50 cm. in diameter, the young branchlets stellate-tomentose; leaves short-petiolate, lance-oblong or ovate-oblong, mostly 12–25 cm. long, narrowly long-acuminate, obtuse or rounded at the base, almost entire, green above and glabrous or nearly so, whitish or grayish beneath and covered with a fine minute close stellate tomentum, the hairs all alike or nearly so; cymes dense, axillary, 10 cm. long or shorter, densely stellate-tomentose; sepals 8–11 mm. long, pink, the petals violet, bidentate at the apex, about equalling the sepals; fruit 1.5–2 cm. long and about as wide, truncate and rostrate at the apex, densely stellate-hirsute.

A probable synonym of this is *B. grandifolia* Sprague, described from Veracruz.

### CARPODIPTERA Grisebach

Trees, the pubescence of minute stellate hairs; stipules linear or filiform, small, deciduous or persistent; leaves long-petiolate, 5-nerved, entire or nearly so; flowers dioecious, the inflorescences terminal and lateral, paniculate or corymbose, the flowers small, white or pink; calyx closed in bud, in anthesis cleft into 2 or rarely 3–4 lobes, persistent in fruit; petals free, imbricate or contorted, naked at the base; stamens 13–34 in the staminate flower, hypogynous, inserted on a flat torus, all fertile, the filaments connate near the base, pluriseriate, the anthers small; ovary free, sessile, 2-celled, the ovules solitary in each cell, pendulous from the apex of the cell; stigmas 2, subsessile; capsule subglobose, the 2 carpels loculicidally separating and bivalvate; seeds ovate, setose, the testa thick-coriaceous; endosperm carnosous, the cotyledons suborbicular, cordate at the base, flat, the radicle superior.

About 6 species, 2 in Africa, the others in the Antilles, Mexico, and Central America. Only the following is known from continental America.

**Carpodiptera Ameliae** Lundell, *Field & Lab.* 6: 13. 1937.

British Honduras (Gracie Rock, Sibun River, *Gentle* 1691); Tabasco; San Luis Potosí.

A tree of 10–25 meters, the branchlets densely and minutely stellate-pubescent; leaves long-petiolate, subcoriaceous, ovate or ovate-lanceolate, 10–20 cm. long, 5–9 cm. wide, obtuse-acuminate, truncate or subcordate at the base, when young sparsely and very minutely stellate-puberulent, in age glabrous but barbate beneath in the nerve axils, 3–5-nerved at the base and penninerved above; panicles 10–20 cm. long, much-branched and many-flowered, minutely stellate-tomentulose, the pedicels 5–11 mm. long; calyx 5 mm. long, 2–3-lobate, densely and minutely stellate-tomentulose; petals purple, glabrous, spatulate-obovate, 8–10 mm. long; stamens 25–30.

The American species of this genus are closely related and their differences vague and of slight apparent importance. It is probable that when ample material accumulates, part of them will have to be reduced.

**CHRISTIANA DC.**

Trees; leaves large, long-petiolate, palmate-nerved; flowers rather small, cymose-paniculate, the panicles large, terminal; calyx campanulate, irregularly 3–5-lobate; petals 5, naked at the base; stamens numerous, free or obscurely 5-fasciculate, all fertile, inserted on a flat torus; carpels of the fruit 5 or fewer, free at maturity, subglobose, 2-valvate; seeds solitary, ascending, with crustaceous testa; endosperm carnose, the cotyledons large, foliaceous.

The genus consists of a single species.

**Christiana africana** DC. *Prodr.* 1: 516. 1824. *Palo mulato*.

Orange Walk District, British Honduras; Guianas and Brazil; central Africa.

A small or medium-sized tree, the branches densely stellate-tomentose; stipules filiform; leaf blades ovate-cordate, 14–25 cm. long, 9–15 cm. wide, acute or short-acuminate, rather deeply cordate at the base, entire, about 9-nerved at the base, penninerved above, rough to the touch, densely stellate-pubescent on both surfaces, more densely so beneath; panicles many-flowered, 15–20 cm. long, very densely stellate-tomentose; calyx 3–4 mm. long; petals 5–6 mm. long, oblong, rounded at the apex, attenuate to the base; flowers by abortion unisexual; ovary stipitate, 5-lobate, densely pilose; follicles subglobose, 1 cm. long, densely stellate-tomentose.

The wood is hard, light brown, with handsome grain. The distribution of this tree is most unusual, occurring as it does in three

widely separated and isolated regions. It is to be expected at other places along the Atlantic coast of Central America, but so far it has been found only in British Honduras.

### CORCHORUS L.

Herbs or low shrubs, the pubescence of simple or stellate hairs; leaves small, serrate, membranaceous; peduncles very short, axillary or opposite the leaves, 1-few-flowered, bracteate, the flowers small, yellow; sepals 5; petals as many as the sepals, naked at the base; stamens commonly numerous, free, inserted on a flat torus; ovary 2-5-celled, the cells many-ovulate; style short, stigmatose at the apex; fruit capsular, usually elongate and silique-like, sometimes short or subglobose and muricate, loculicidally 2-5-valvate, many-seeded; seeds pendulous or horizontal, with endosperm; embryo usually incurved, the cotyledons foliaceous.

About 30 species, widely distributed in the tropics. Two species of the genus, natives of Asia, are of great commercial importance, *C. olitorius* L. and *C. capsularis* L., from which jute (*yute*) fiber is extracted by wetting the slender stems in water. The leaves and young shoots of both species are said to be used in the Orient as pot herbs. Only the following species are found in Central America.

- Capsule narrowly 3-winged, with 3 long beaks at the apex. Leaves mostly obtuse; plants herbaceous.....*C. aestuans*.  
 Capsule not winged, with very short or no beaks.  
 Capsule obtuse, not at all rostrate; plants shrubby.....*C. siliquosus*.  
 Capsule acuminate, rostrate; plants herbaceous.  
 Capsule hirsute with spreading hairs.....*C. hirtus*.  
 Capsule glabrate or puberulent, or with appressed hairs.....*C. orinocensis*.

**Corchorus aestuans** L. Syst. Nat. ed. 10. 1079. 1759. *C. acutangulus* Lam. Encycl. 2: 104. 1786.

Weedy field, Champerico; Retalhuleu, at sea level. Western Mexico; Florida; West Indies; South America; Old World tropics.

Plants annual, erect or spreading, the stems puberulent or short-pilose; stipules subulate; leaves ovate to rounded, 2-6 cm. long, obtuse or subacute, rounded or subcordate at the base, crenate, glabrate or pilose, slender-petiolate; flowers solitary or geminate in the leaf axils, almost sessile; sepals 4 mm. long, cucullate at the apex; petals obovate, equaling the sepals; capsule narrowly oblong, triangular in cross section, narrowly winged on the angles, 1.5-3 cm. long, with 3 long beaks at the apex, glabrous.

This species apparently is of infrequent occurrence in Mexico and Central America.

**Corchorus hirtus** L. Sp. Pl. ed. 2. 747. 1762. *C. pilolobus* Link, Enum. Hort. Berol. 2: 72. 1822.

Open banks, or often a weed in grain fields, 200–1,500 meters; Santa Rosa; Guatemala; Huehuetenango. Salvador; Honduras; Costa Rica; West Indies; South America.

An annual, erect or spreading, the stems sparsely or densely hirsute, mostly 50 cm. high or less, branched; stipules equaling or shorter than the petioles; leaves ovate to lance-oblong, 5 cm. long or less, obtuse to acuminate, rounded or subcordate at the base, crenate, sparsely or densely hirsute; flowers mostly solitary, short-pedunculate; sepals pilose, 6 mm. long; petals about equaling the sepals; capsule linear, hirsute, often curved near the base, acuminate, compressed, 3–5 cm. long.

**Corchorus orinocensis** HBK. Nov. Gen. & Sp. 5: 337. 1821.

*Escoba.*

Moist or wet thickets, often in waste ground, 900 meters or less; Petén; Zacapa; Chiquimula; Jutiapa; Santa Rosa. Texas; Mexico; Salvador; Panama; West Indies; South America.

Plants annual, usually erect, herbaceous, slender, commonly 60 cm. high or less, branched, the stems generally glabrate; stipules usually shorter than the petioles; leaves lanceolate or lance-ovate, 4–10 cm. long, acute to long-acuminate, rounded or obtuse at the base, crenate, glabrate; peduncles mostly solitary and shorter than the petioles; sepals 5 mm. long, green, sparsely pilose; petals slightly longer than the sepals; capsule linear, usually straight, 4–7 cm. long, acuminate and rostrate, sparsely pubescent or almost glabrous, compressed.

The Maya name in Yucatan is reported as “putschichibe.”

**Corchorus siliquosus** L. Sp. Pl. 529. 1753. *Escobillo; Pelo* (Huehuetenango).

Moist or dry thickets, often in waste ground, 1,000 meters or lower; Petén; Zacapa; Chiquimula; Escuintla; Huehuetenango. Florida; Mexico; British Honduras to Panama; West Indies; South America.

A shrub a meter high or less, often densely branched, the slender branches puberulent or glabrate, green; leaves ovate to oblong-lanceolate, mostly 1–4 cm. long, acute or obtuse, rounded or obtuse at the base, crenate, short-petiolate, thin, puberulent or glabrate; flowers solitary or 2 together, short-pedunculate; sepals linear, acute, 6 mm. long; petals obovate, about equaling the sepals; capsule linear, compressed, 5–8 cm. long, 3 mm. broad, obtuse, 2-celled, puberulent or glabrate.

The Maya name in Yucatan is “chichibe” or “putschichibe.” The plant is a common weed in some parts of Central America but has not been found in abundance in Guatemala. It is called “té” in Panama and “té de perla” in Salvador, the leaves, it is said, being used to prepare a beverage similar to tea. In the American

Virgin Islands the leaves are sometimes cooked and eaten, like spinach.

### HELIOCARPUS L.

*Reference:* E. E. Watson, The genus *Helioarpus*, Bull. Torrey Club 50: 109-128. 1923.

Trees or shrubs, the pubescence of stellate hairs; leaves petiolate, entire or lobate, often dentate, palmate-nerved; flowers polygamous or dioecious, small, paniculate, 4-5-parted; sepals valvate, acute, flat or cucullate, often with a small appendage near the apex behind the hood; petals alternate with the sepals, sometimes none, narrow, glandular, pubescent toward the base; receptacle with glands opposite the petals; stamens 14-40, inserted on the receptacle below the ovary, the anthers introrse, opening by longitudinal slits; ovary somewhat compressed, 2-celled, each cell with 2 ovules separated by a false septum; style erect, filiform, bifid, the lobes spreading, acute, sometimes again lobate; fruit indehiscent, compressed, bearing 2 series of long plumose hairs around the compressed margin.

About 22 species, in tropical America. Most of the species are natives of Mexico and Central America. One other occurs in southern Central America. The genus is easily recognized by its fruit, consisting of a small, hard, somewhat compressed, central body surrounded by a border of long plumose radiating hairs, the whole suggesting a conventionalized portrayal of the sun (whence the generic name, signifying "sun fruit").

Leaves with conspicuous foliaceous appendages at the base of the blade, covered beneath with a very dense, pale tomentum. . . . . *H. appendiculatus*.

Leaves not appendaged, not densely pale-tomentose beneath.

Inflorescences axillary, leafy; stamens about 25-30; buds with conspicuous appendages at the tips of the sepals. . . . . *H. mexicanus*.

Inflorescences terminal, not leafy; stamens 12-24; buds without appendages at the tips of the sepals. . . . . *H. Donnell-Smithii*.

***Helioarpus appendiculatus*** Turcz. Bull. Soc. Nat. Moscou 31: 226. 1858. *Majauha*; *Cajetón*.

Moist or wet forest or thickets, 250-1,600 meters or less; Alta Verapaz; Izabal; Huehuetenango. Southern Mexico; Honduras to Panama.

A tree, 15 meters tall or less, the trunk 30-40 cm. in diameter, the bark light gray or grayish yellow, the inner bark red or reddish brown, mucilaginous, the branchlets densely scurfy-tomentose; leaves long-petiolate, broadly ovate or rounded-ovate, mostly 12-23 cm. long, sometimes obscurely lobate, crenate-serrulate, acute or acuminate, rounded or subcordate at the base and abruptly dilated into 2 small green appendages, green above and almost glabrous but bearing scattered minute stellate hairs, covered beneath with a very dense, pale, close tomentum; panicles large and much-branched, the buds 6 mm. long; sepals

linear, densely and minutely stellate-tomentulose, pale; fruit long-stipitate, the body oval or orbicular, the faces densely hirsute, the margins densely ciliate with long plumose hairs.

Called "majagua" in Chiapas; "majao," "mecate de agua" and "damajao colorado" in Honduras; "jonote," "jonote blanco," and "jonote colorado" in Veracruz. The wood in this and related species is white or nearly so, very light, soft, and spongy, fairly straight-grained, rather coarse-textured, rather stringy, perishable. In South America *Heliocarpus* wood has been used for interior construction, boxes, and paper pulp. The tough bark often is used as a substitute for twine and rope.

***Heliocarpus Donnell-Smithii*** Rose in Donn. Smith, Bot. Gaz. 31: 110. *pl. 1.* 1901 (type from Arenal, Alta Verapaz, *J. D. Smith* 1722). *H. polyandrus* var. *nodiflorus* Donn. Smith, Bot. Gaz. 23: 240. 1897 (type from Río Pinula, Santa Rosa, *Heyde & Lux* 4329). *H. nodiflorus* Donn. Smith & Rose, Contr. U. S. Nat. Herb. 5: 126. 1897. *H. Caeciliae* Loes. Repert. Sp. Nov. 12: 227. 1913. *H. cuspidatus* Lundell, Phytologia 2: 2. 1941 (type from El Cayo District, British Honduras, *P. H. Gentle* 2297). *H. floribundus* Lundell, loc. cit. (type from Belize District, Gracie Rock, Sibun River, British Honduras, *Gentle* 1534). ?*H. Gentlei* Lundell, op. cit. 3. 1941 (type from Belize District, Gracie Rock, Sibun River, *Gentle* 1787). *Majao*; *Mecate blanco*; *Chai* (Alta Verapaz).

Moist or dry forest or thickets, often in second growth, ascending from near sea level to about 2,300 meters, most common at lower elevations on foothills; Alta Verapaz; El Progreso; Santa Rosa; Escuintla; Suchitupéquez; Retalhuleu; Quezaltenango; San Marcos; Quiché. Southern Mexico; British Honduras to Costa Rica; West Indies.

A tree, often 15-23 meters high, the trunk to 50 cm. in diameter, the bark smooth, grayish, the inner bark mucilaginous; leaves long-petiolate, broadly ovate or rounded-ovate, often very large, acute or short-acuminate, rounded or cordate at the base, crenate, glabrous on the upper surface or with minute scattered stellate hairs, beneath minutely pubescent with stellate appressed hairs, often appearing glabrous; panicles often very large, finely stellate-tomentulose; sepals 5 mm. long, not appendaged, densely and minutely stellate-tomentulose and grayish; fruit long-stipitate, oval-orbicular, the faces densely hirsute.

Known in British Honduras as "moho," "broadleaf moho," "white moho," and "high-ridge moho"; sometimes called "damajao" in Honduras; "jolocín" (Tabasco). This plant has been reported from Guatemala under the name *H. americanus* L., a species at

present unknown from the country. The tree often occurs in abundance in the Pacific foothills. When it flowers it is conspicuous because of the large panicles, which are pinkish or purplish and give a rather hazy or "smoky" appearance to the tree. *H. nodiflorus* was recognized as a distinct species by Watson in his treatment of the genus, and is maintained as distinct by Dr. KoKo Lay in his recent monograph of the genus (Ann. Mo. Bot. Gard. 36: 536. 1949).

***Heliocarpus mexicanus*** (Turcz.) Sprague, Kew Bull. 272. 1921. *Adenodiscus mexicanus* Turcz. Bull. Soc. Nat. Moscou 19: 504. 1846 (type from Oaxaca). *H. glanduliferus* Robinson ex Rose, Contr. U. S. Nat. Herb. 5: 127. 1897 (type from mountains near Santa María, Sutton Hayes). *H. glabrescens* Hochr. Ann. Conserv. Jard. Bot. Genève 18-19: 122. 1916. *H. belizensis* Lundell, Phytologia 2: 2. 1941. *Cajete*; *Cajeto*; *Cajetón*; *Mozote*; *Majagua*.

Moist or dry forest or thickets, often in second growth, at 2,100 meters or less, most common at lower elevations; Izabal; Chiquimula; Jutiapa; Santa Rosa; Guatemala; Sacatepéquez; Chimaltenango. Southern Mexico; Salvador to Costa Rica.

A small to large tree, often 15 meters high, with pale smooth bark, the young branchlets stellate-pubescent or glabrate, red-glandular; leaves on long slender petioles, ovate to rounded-ovate, often large, acuminate or long-acuminate, usually more or less cordate at the base, crenate, green above and appearing glabrous, paler beneath, varying from almost glabrous to rather densely and softly stellate-pubescent; panicles small or large, often very leafy; sepals cucullate, appendaged at the apex, glabrate; fruit sessile, ellipsoid or subglobose, the body 5 mm. long, sparsely or densely stellate-pilose on the faces, becoming glabrate and often coarsely rugose in age, reddish-glandular.

Called "majao blanco" in Honduras, and in Salvador known by the names "calagua," "calagüe," "mozote," and "mozotillo." The mucilage of the bark is sometimes utilized for clarifying sirup in making sugar. The tree is a common one in the central region, especially about Antigua, where dense stands of it sometimes are seen.

### LUEHEA Willdenow

Large trees or tall shrubs, the pubescence of stellate hairs; leaves short-petiolate, dentate, usually tomentose beneath; flowers often large and showy, white or pink, in axillary cymes or terminal panicles, subtended by numerous bractlets, these often longer than the calyx and simulating an outer calyx; sepals 5; petals 5, glandular-thickened within at the base; stamens numerous, very shortly or obscurely united into 5 or 10 fascicles, the numerous outer ones without anthers; anthers sagittate; ovary 5-celled, the cells many-ovulate; style simple, the stigma



capitate or obscurely 5-lobate; capsule ligneous, large, loculicidally 5-valvate for part of its length; seeds imbricate-ascending, the testa crustaceous, expanded above into a wing; endosperm carnose, the cotyledons plane, foliaceous.

About 15 species, in tropical America. Only the following are found in North America.

Calyx about 1 cm. long; bractlets caducous; fruit 2 cm. long. . . . . *L. Seemannii*.

Calyx 1.5-3 cm. long; bractlets usually persistent through anthesis; fruit 3.5-6 cm. long or larger.

Fruit acutely angulate. . . . . *L. candida*.

Fruit subterete, scarcely at all angulate. . . . . *L. speciosa*.

**Luehea candida** (DC.) Mart. Nov. Gen. & Sp. 1: 102. 1824.  
*Alegria candida* DC. Prodr. 1: 517. 1824. *L. endopogon* Turcz. Bull. Soc. Nat. Moscou 31, pt. 1: 225. 1858. *Trompo*; *Algodoncillo*; *Cajetilla* (fide Aguilar).

Chiefly on dry, brushy or wooded hillsides, ascending to about 1,800 meters, but usually at 900 meters or less; El Progreso; Chiquimula; Jutiapa; Santa Rosa; Guatemala; Baja Verapaz; Quiché; Huehuetenango. Mexico; Honduras and Salvador to Costa Rica; Colombia.

Usually a small or medium-sized tree, often only a shrub, seldom more than 12 meters high, the crown broad, the trunk often branched from the base, the branchlets stellate-hispidulous, the older ones ferruginous; leaves on very short petioles, deciduous, mostly membranaceous, broadly elliptic or ovate-elliptic, usually broadest at or above the middle, 10-20 cm. long, abruptly short-acuminate, rounded or cordate at the base, coarsely or finely serrate, green above; rough to the touch, sparsely stellate-scabrous, grayish or whitish beneath and softly stellate-pilose or tomentose; bractlets oblong-lanceolate, mostly 3-4 cm. long, persistent or deciduous, attenuate, stellate-tomentose outside, densely pilose within with long hairs; calyx about 3 cm. long or sometimes shorter, densely tomentose; petals white, 4.5-5.5 cm. long, 2-4 cm. wide; capsule very thick and woody, 5-6 cm. long, acutely 5-angulate, glabrate in age.

Known in Honduras as "caulote blanco," in Salvador as "bonete," "cabo de hacha," "contamal," and "caulote." The tree is an abundant one in some parts of the lower Motagua Valley, often forming dense stands on the rocky hillsides or along sandy and rocky stream beds. It often blooms when only a shrub of 2 meters. Large trees are showy when in flower because of the abundance of large, pure white blossoms. In Costa Rica this tree is called "molenillo," a name derived from the fact that the large woody capsules are fastened to the end of a stick and used for beating chocolate into a froth. The bark contains a tough fiber and is often used as temporary cordage.

**Luehea Seemannii** Triana & Planch. Ann. Sci. Nat. IV. 17: 348. 1862. *Yayo*; *Tapasquit*; *Cotonrón*.

Abundant in wet forest, 300 meters or less; Alta Verapaz; Izabal. British Honduras, along the Atlantic coast to Panama; Colombia.

A tall tree, often 30 meters high or even more, with a trunk a meter or more in diameter, the young branchlets stellate-tomentulose, the older ones ferruginous; leaves persistent, usually subcoriaceous, short-petiolate, oblong to oblong-ovate, acuminate, rounded and often subcordate at the base, acutely serrate above the middle, green and glabrate above, densely covered beneath with a fine close brownish tomentum; flowers smaller than in other species and much more numerous, forming large or small panicles; bractlets mostly 6-7 mm. long; calyx 1 cm. long, densely stellate-tomentose; petals white or cream-colored, little exceeding the calyx; capsule 2 cm. long, densely brown-tomentose, deeply 5-sulcate and acutely angulate.

Called "mapola" and "caulote" in British Honduras, and "guácimo" or "guácimo colorado" in Honduras. The trunk is often supported by large, high buttresses. This is one of the three or four giant trees of Central America, perhaps the largest one of the Atlantic coast, and is found in abundance from southern British Honduras to Panama, often forming a large part of the lowland rain forest. The wood is weak and has few uses.

**Luehea speciosa** Willd. Ges. Naturf. Freund. Berlin Neue Schrift. 3: 410. 1801. *Patashte de monte*; *Hupay* (Jalapa); *Cazcat* (Petén, Maya); *Cajeto* (fide Aguilar).

Dry or moist forest or thickets, sometimes in pine forest, 1,100 meters or lower; Petén; Baja Verapaz; Izabal (hills near Quiriguá); Jalapa; Jutiapa; Santa Rosa; Guatemala; Retalhuleu. Southern Mexico; British Honduras to Salvador and Panama; Cuba; South America.

A large shrub or more often a tree, sometimes 25 meters high with a trunk 45-60 cm. in diameter, often buttressed, the crown spreading; bark light to dark brown or almost black, slightly scaly, the inner bark light to dark brown; young branchlets densely stellate-tomentose, the older ones dark ferruginous; leaves short-petiolate, deciduous, often thick and firm, elliptic to oval or elliptic-ovate, 10-20 cm. long, abruptly acuminate, rounded or cordate at the base, green above and sparsely stellate-scabrous, beneath covered with a dense or lax, white to brownish, stellate tomentum, finely or coarsely serrate; bractlets commonly about 1.5 cm. long; calyx densely stellate-tomentose, generally 1.5 cm. long or somewhat larger; petals white, 2.5-4 cm. long; capsule 3-4 cm. long, densely brown-tomentose, not sulcate, obtusely 5-angulate or subterete, very hard and woody.

Known in British Honduras by the names "caulote," "mountain moho," and "broadleaf bay cedar"; "pataxtillo" (Tabasco); "pepe cacao" (Campeche); "bonete," "cabo de hacha," "contamal,"

"cotonrón," "tepecaulote" (Salvador). The wood is white when first cut but upon exposure turns pale pinkish brown or reddish.

### MORTONIODENDRON Standley & Steyermark

Trees or shrubs, the pubescence scant, of stellate hairs; leaves alternate, subcoriaceous, penninerved, entire; flowers small, perfect, cymose-paniculate, the panicles terminal; sepals 5, valvate, densely stellate-tomentose outside; petals valvate, slightly shorter than the sepals; stamens numerous, all fertile, fasciculate, unequal; anthers 2-celled, longitudinally dehiscent, mucronate at the apex, the filaments short, free; ovary 5-celled, stellate-tomentose, the ovules numerous; fruit capsular, globose, 5-celled, the valves thick; seeds 2-3 in each cell.

Three species are known, all Central American, ranging from Guatemala to Panama, one of them in Honduras and one in Panama.

*Mortoniodendron guatemalense* Standl. & Steyerm. Field Mus. Bot. 22: 157. 1940.

Wet mixed forest, at or near sea level; Izabal, the type from bank of Río Dulce, *W. R. Hatch & C. L. Wilson* 54; collected several times along the Atlantic coast; endemic.

A large shrub or small tree 6 meters high or more, the branches slender, at first sparsely stellate-pubescent; leaves distichous, on petioles 5-10 mm. long, oblong-elliptic or oblong-lanceolate, mostly 8-15 cm. long and 2-5 cm. wide, abruptly long-acuminate, subacute or obtuse and somewhat unequal at the base, entire, membranaceous, almost glabrous above, sparsely stellate-pubescent on the nerves or almost wholly glabrous, 3-nerved at the base, the lateral nerves 6-7 pairs; flowers few, the cymes 4.5-7 cm. long, the branches minutely stellate-pubescent, the pedicels 4-12 mm. long; sepals ovate, 8-10 mm. long, acute; petals ovate or ovate-lanceolate, acute or acuminate, glabrous; fruit 3-celled, obtusely angulate, dull green, 2 cm. long, 1.5-1.8 cm. broad; seeds 2 in each cell, loosely covered by a deep orange aril, 7-8 mm. long; endosperm copious.

### MUNTINGIA L.

Trees or shrubs, the pubescence of stellate hairs; leaves short-petiolate, distichous, dentate, several-nerved from the base, the stipules small, subulate; flowers perfect, the peduncles axillary, 1-flowered, mostly in clusters of 2-3, the flowers rather large, white; sepals 5, rarely 6-7; petals as many as the sepals, naked at the base, very thin; stamens numerous, free, inserted about an annular subperigynous disk; ovary surrounded by glandular hairs, 5-7-celled, the cells many-ovulate; stigma sessile, thick, sublobate; fruit baccate, globose, irregularly many-celled; seeds small, embedded in pulp, with endosperm; embryo straight, the cotyledons small, continuous with the thick radicle.

A single species.

**Muntingia Calabura** L. Sp. Pl. 509. 1753. *Capulin*; *Capulin blanco*.

Dry to wet thickets or secondary forest, often on brushy slopes or along sandy stream beds, 900 meters or less; Petén; Alta Verapaz; Izabal; Zacapa; Chiquimula; El Progreso; Baja Verapaz; Santa Rosa; Escuintla; Guatemala; Retalhuleu. Southern Mexico; British Honduras to Salvador and Panama; West Indies; northern South America.

A shrub or small tree, sometimes 12 meters high but usually lower, with slender branches; leaves on very short petioles, membranaceous, lance-oblong, 6-14 cm. long, long-acuminate, very oblique at the base, coarsely and unequally serrate, glabrate and green above, densely stellate-tomentose and white or grayish beneath; peduncles mostly 2-3 cm. long; petals 1 cm. long, very thin, pure white; fruit globose, 1 cm. in diameter or slightly larger, glabrous, yellow or red.

Said to be called "bersilana" in Chiapas. The bark contains a very tough fiber suitable for cordage. In Guatemala it is utilized for making baskets, especially those used for gathering coffee berries. The fruit is edible and intensely, almost nauseatingly, sweet. The shrub or tree is essentially a weedy one, and often springs up abundantly in abandoned land that has been under cultivation.

### SLOANEA L.

Small or large trees; leaves alternate or subopposite, entire or dentate, pinnately-nerved, usually long-petiolate; flowers perfect, racemose, paniculate, or fasciculate, axillary or terminal, sometimes solitary; sepals or calyx lobes 4-5, valvate or irregularly subimbricate, sometimes united to form a truncate calyx; petals generally none, rarely 1-4 and sepaloïd, imbricate, smaller than the sepals, entire or dentate; stamens numerous, distinct, densely inserted over the foveolate disk; anthers linear or rarely short, apiculate or naked, dehiscent by longitudinal slits; ovary usually 4-celled, the cells many-ovulate; style subulate, entire or 5-fid; capsule often large, thick-coriaceous or ligneous, densely echinate, setose, or velutinous, 4-celled or by abortion 1-celled, 1-4-seeded; seeds pendulous, the testa coriaceous; endosperm copious, the cotyledons broad.

Probably 60 species or more, all natives of tropical America. Several additional ones are known from southern Central America.

Leaves small, mostly 3-7 cm. wide, glabrous or nearly so, at least when mature; petioles relatively short (1-2.5 cm. long or often less than 1 cm.).

Leaves rounded or very obtuse at the apex.....*S. terniflora*.

Leaves acute or acuminate.

    Anthers 3 times as long as the filaments; inflorescence glabrous.....*S. pentagona*.

    Anthers much shorter than the filaments; inflorescence puberulent.

        Filaments glabrous.....*S. meianthera*.

        Filaments puberulent.....*S. Schippii*.

Leaves large, mostly 8–18 cm. wide, frequently pubescent beneath, at least when young, often densely so, in age sometimes glabrate; petioles 4 cm. long or more, often much more than 4 cm.

Leaves abundantly pubescent beneath.

Sepals 1 cm. long or larger; fruit, including the spines, 8–10 cm. in diameter; stipules somewhat persistent.....*S. ampla*.

Sepals 4–5 mm. long; fruit smaller, the valves about 2.5 cm. long; stipules caducous.....*S. Tuerckheimii*.

Leaves glabrous throughout or nearly so.....*S. petenensis*.

***Sloanea ampla*** I. M. Johnston, Journ. Arnold Arb. 19: 124. 1938. *Palo de peine; Peine de mico; Zulk'n* (Quiché).

Moist or wet, mixed forest, 1,000–1,700 meters; endemic; Escuintla; Suchitpéquez; Chimaltenango; Huehuetenango; Quezaltenango (type from Volcán de Zunil, *Skutch* 968); San Marcos.

A tall tree, sometimes 30 meters high, with a trunk almost 2 meters in diameter, the buttresses small, the bark irregularly and deeply ridged and furrowed; leaves on very long petioles, thick-membranaceous or subcoriaceous, oblong to obovate-oval, mostly 35–55 cm. long and 12–20 cm. wide, abruptly short-acuminate to rounded at the apex, somewhat narrowed to the rounded or very obtuse base, glabrous above, green or brownish beneath when dried and densely short-pilose on the costa and nerves, the stout lateral nerves about 17 pairs, the veins prominent and laxly reticulate; stipules herbaceous, 2.5–4 cm. long, triangular-lanceolate; inflorescence about 18 cm. long, few-flowered, densely ochraceous-tomentose, the bracts large and conspicuous, the stout pedicels mostly 2.5–3.5 cm. long; sepals 1 cm. long, obtuse or subacute, unequal; stamens very numerous, densely pubescent, buff; capsule very large, the body 4–6 cm. long, densely covered with slender pubescent spines 2–5 cm. long; seeds ellipsoid, 2.5 cm. long, 12–17 mm. thick, the aril orange-red.

Easily recognized by the very large capsules, which with the spines are 8–10 cm. broad and are brick-red or bright deep red within. The seeds remain for some time hanging from the capsule, when the aril is eaten by birds. The capsules are strongly suggestive of large chestnut (*Castanea*) burs.

***Sloanea meianthera*** Donn. Smith, Bot. Gaz. 37: 208. 1904.

Moist or wet, dense forest, 150–350 meters; endemic; Alta Verapaz (type from Cubilgüitz, Alta Verapaz, *Tuerckheim* 8191); Huehuetenango (Ixácán).

A tree as much as 30 meters high; leaves opposite or subopposite, on slender petioles 1–2 cm. long, lance-elliptic or lance-oblong, 8–18 cm. long, 2.5–5.5 cm. wide, narrowly long-acuminate, acute at the base, glabrous above, brownish beneath when dried, puberulent on the nerves, the lateral nerves about 7 pairs, the margin entire or nearly so; racemes puberulent, 1.5–3 cm. long, lax, 5–9-

flowered, the pedicels 7 mm. long or less; sepals 4, ovate or lance-ovate, pubescent, 2-2.5 mm. long; stamens glabrous; ovary densely pilose.

***Sloanea pentagona*** Donn. Smith, Bot. Gaz. 18: 1. 1893.

Known only from the type, collected at Pansamalá, Alta Verapaz, 1,200 meters, *Tuerckheim* 1411.

A large tree, glabrous except on the ovary; leaves on petioles 6 mm. long, coriaceous, lustrous, oblong, entire, 17-22 cm. long, 3-7.5 cm. wide, acuminate, subobtusate at the base, the lateral nerves 6-7 pairs; racemes subsessile, few-flowered, the pedicels thick, 12-16 mm. long; perianth 4-5-parted, the sepals thick, ovate-lanceolate; stamens biseriate, the anthers linear, 3 times as long as the filaments; ovary velutinous-pilose, pyramidal, 5-angular.

***Sloanea petenensis*** Standl. & Steyerl. Field Mus. Bot. 23: 172. 1944.

Known only from the type, Petén, forest between Finca Yal-pemech, along Río San Diego, and San Diego on Río Cancuén, 50-150 meters, *Steyerl* 45309.

Branchlets slender, glabrous or glabrate; leaves large, chartaceous, somewhat lustrous, on slender petioles 2-4 cm. long or probably even longer, narrowly elliptic-oblong, 18-27 cm. long, 7.5-9 cm. wide, narrowly long-acuminate, somewhat narrowed to the obtuse base, entire or undulate, glabrous, the slender costa prominent, the lateral nerves about 8 pairs, slender, prominent on both surfaces, the veins prominulous and closely reticulate on both surfaces; capsules (only imperfect ones seen) ovoid-globose, about 3 cm. long, densely puberulent and sparsely hispidulous, densely covered with stout hard spines about 8 mm. long, the valves woody, 4 mm. thick.

***Sloanea Schippii*** Standl. Carnegie Inst. Wash. Publ. 461: 70. 1935.

Wet mixed forest, 900 meters or less; Petén (Camp 36 on the British Honduras boundary); Izabal (Río Tameja). Type from Río Grande, British Honduras, *W. A. Schipp* 1163.

A tree of 10-12 meters, the trunk 15-20 cm. in diameter, the slender branchlets puberulent or glabrate; stipules subulate, 4-5 mm. long; leaves on slender petioles 2-3.5 cm. long, firm-membranaceous, lance-oblong, 9-13 cm. long, 3-4.5 cm. wide, narrowly acuminate with obtuse tip, cuneate-acute or subobtusate at the base, glabrous above, somewhat paler beneath, puberulent on the nerves or almost glabrous, the lateral nerves about 9 pairs; racemes few-flowered, lax, equaling or slightly longer than the petioles, the pedicels 13 mm. long or less, densely puberulent; sepals narrowly triangular, 3 mm. long, attenuate-acute, densely puberulent; stamens very numerous, densely puberulent, the anthers muticous, much shorter than the filaments; capsule globose or globose-ovoid, 10-13 mm. long, rounded at the apex or obtuse, tomentose, densely covered with rigid, antrorsely scabrous setae 2-3 mm. long.

The collector of the type describes the capsule as red.

*Sloanea terniflora* (Moc. & Sessé) Standl. Trop. Woods 79: 10. 1944. *Lecostemon terniflorum* Moc. & Sessé ex DC. Prodr. 2: 639. 1825. *S. quadrivalvis* Seem. Bot. Voy. Herald 85. pl. 15. 1853. *Terciopelo*.

Dry or moist forest or thickets, 500 meters or less; Alta Verapaz; Santa Rosa; Escuintla; Guatemala; Retalhuleu; San Marcos. Western and southern Mexico; Salvador; Nicaragua; Costa Rica; Panama.

A tree, sometimes 20 meters high, the branchlets hirtellous or almost glabrous; leaves on short petioles, coriaceous or subcoriaceous, mostly obovate-oblong, 7-12 cm. long, 3-5 cm. wide, rounded or obtuse at the apex, commonly narrowed to the obtuse or obtusely cuneate base, entire, glabrous, lustrous, the lateral nerves about 7 pairs, the veins prominent and laxly reticulate; stipules small, subulate, often persistent; peduncles axillary, 1-3-flowered, usually very slender, glabrous; sepals 4, ovate-acuminate, about 8 mm. long, glabrous outside, whitish-tomentulose within; stamens numerous, minutely puberulent, the connective produced into a long subulate appendage; capsule oval or globose-oval, 4-celled, about 1.5 cm. long, terete, rounded at the apex, very densely covered with short, reddish or purplish or black, crowded, pilose bristles.

Known in Salvador and Costa Rica by the name "terciopelo," in reference to the velvety appearance of the fruit. The hairs of the capsule, however, are suggestive of anything else but velvet, for they are easily detached, penetrate the skin, and cause intense irritation similar to that of *Mucuna*. The wood is said to be of good quality, and is utilized in some parts of the Pacific coast of Central America.

*Sloanea Tuerckheimii* Donn. Smith, Bot. Gaz. 57: 416. 1914. *S. eriostemon* Sprague & Riley, Kew Bull. 19. 1924 (type from British Honduras, without definite locality, *M. E. Peck* 400). *Pojshic* (Alta Verapaz).

Wet mixed forest, 350 meters or lower; Alta Verapaz (type from Cubilgüitz, *Tuerckheim* 4157); sterile specimens from Izabal perhaps represent the species, which is to be expected in Petén. Oaxaca; British Honduras.

A tree, said to attain sometimes a height of 25 meters, the bark grayish, thin, brittle, the inner bark red, the young branchlets thick, densely velutinous-pilose; leaves mostly large and on greatly elongate petioles, coriaceous to subcoriaceous, oval to elliptic, oblong-obovate, or broadly oblong, 14-32 cm. long and 8-14 cm. wide or even larger, broadly rounded to short-acuminate at the apex, acute or obtuse at the base, entire or undulate, glabrous above, velutinous-pilose with short hairs beneath or sometimes glabrate in age, the lateral nerves 11-13 pairs, the veins elevated and reticulate; racemes densely pubescent, 5-13 cm. long, the pedicels 1-3.5 cm. long; flowers whitish, fragrant, 1 cm. broad; sepals 5-8, oblong-





**Triumfetta Bartramia** L. Syst. Nat. ed. 10. 1044. 1759. *T. rhomboidea* Jacq. Enum. Pl. Carib. 22. 1760.

British Honduras, open places, at sea level (Stann Creek, *Schipp* 833); West Indies; South America; Old World tropics.

A shrub a meter high or less; leaves long-petiolate, broadly ovate or rhombic-ovate, mostly 4–8 cm. long, 3–5-nerved, often somewhat 3-lobate, irregularly dentate, rather sparsely stellate-pubescent; sepals rather densely pubescent, 6–8 mm. long, short-appendaged at the apex; petals somewhat shorter than the sepals; fruit small, about 3 mm. in diameter, 2–6-celled, the body stellate-tomentose, the prickles short, glabrous, uncinata at the apex (as in other species).

Apparently very rare on the mainland of North America except in Florida, where introduced.

**Triumfetta Calderonii** Standl. Journ. Wash. Acad. Sci. 14: 98. 1924. *Pelo de gato* (Jalapa); *Mozote*; *Montero* (Jutiapa).

Chiefly in dry rocky thickets, 400–1,200 meters; Baja Verapaz; El Progreso; Chiquimula; Jalapa; Jutiapa; Guatemala. Salvador (type from San Salvador); Honduras; Costa Rica.

A shrub or small tree 2.5–10 meters high, the bark smooth and pale, the crown spreading; branchlets densely covered with a double indument of fine stellate hairs and coarse stiff spreading ones; leaves on petioles 3–7 cm. long, ovate to ovate-orbicular, 9–15 cm. long, 5–11 cm. wide, abruptly acuminate or long-acuminate, rounded or subcordate at the base, irregularly crenate-dentate, sometimes obscurely 3-lobate or angulate, stellate-setulose or stellate-tomentulose above or finally glabrate, pale beneath and covered with a dense but rather lax, stellate tomentum; panicles terminal and axillary, often very large in fruit, the branches densely stellate-tomentose; sepals oblong-linear, 4–5 mm. long, not appendaged at the apex, minutely grayish-tomentulose outside; petals one-third as long as the sepals, oblong, glabrous; fruit 5–7 mm. long, the bristles very numerous and slender, densely pilose with spreading white hairs.

Called “mozote blanco” and “mozote de caballo blanco” in Salvador.

**Triumfetta dumetorum** Schlecht. Linnaea 11: 377. 1837. *Mozote*; *Mozote de caballo*; *Estrellitas*; *Ruc-max* (Cobán, Quecchí).

Moist, wet, or dry thickets, sometimes in pine-oak forest, 500–2,200 meters; Alta Verapaz; Chiquimula; Jalapa; Jutiapa; Guatemala; Sacatepéquez; Chimaltenango; Sololá; Quezaltenango. Southern Mexico.

A shrub, commonly 1–1.5 meters high, often much-branched; leaves long-petiolate, broadly ovate to oblong-lanceolate, acute to long-acuminate, rounded or obtuse at the base, sometimes shallowly lobate, duplicate-serrate, thinly pilose above with long, stiff, mostly simple hairs, green beneath and thinly stellate-

hirsute; sepals 6–8 mm. long, each with a short slender appendage at the apex, green; petals yellow, equaling the sepals; fruit 8–10 mm. in diameter, the body hirtellous, the spines slender, retrorse-barbate.

Names used in Yucatan are “cadillo” and “ochmul” (Maya). This species has been reported from Guatemala as *T. orizabae* Turcz. As in other species, the sap is more or less mucilaginous. The boiled extract of the plant is used about Cobán as a remedy for jaundice, and elsewhere in treating inflammation of the stomach and gonorrhoea. The “mozotes” or burs of these plants are a great nuisance, especially in the lowlands, where they most abound. They cling tenaciously to clothing and to the pelage of animals, being thus dispersed widely. The manes and tails of horses sometimes become so filled with the burs that the hair must be cut away. A probable synonym of *T. dumetorum* is *T. hispida* A. Rich., which has a wide range from the West Indies far into South America, and has been reported from Yucatan. The tough, flexible branches sometimes are used for making rough brooms or brushes.

**Triumfetta grandiflora** Vahl, *Eclog. Amer.* 2: 39. 1798. *T. longicuspis* Turcz. *Bull. Soc. Nat. Moscou* 31, pt. 1: 229. 1858. *Ampakipi* (Cobán, Quecchí).

Wet thickets or in forest clearings, sometimes in *Liquidambar* forest, 1,100–1,500 meters; Alta Verapaz; Baja Verapaz; Quiché (Cerro Putul); Huehuetenango. Southern Mexico; West Indies.

A shrub 2–4 meters high, the branches stellate-hirtellous or glabrate; leaves long-petiolate, ovate or broadly ovate, large, cuspidate-acuminate or caudate-acuminate, rounded or subcordate at the base, glandular-serrate, in age almost glabrous, when young sparsely furnished with small stiff stellate hairs; sepals glabrate, 15–18 mm. long; petals yellow, linear-oblongate, almost equaling the sepals; fruit 1–1.5 cm. in diameter, glabrous or nearly so, the spines very numerous and dense, slender, glabrous.

**Triumfetta Lappula** L. *Sp. Pl.* 444. 1753. *Mozote*; *Mozote colorado*; *Mozotillo*; *Ruccmax* (Cobán, Quecchí).

Wet to dry thickets, often in second growth or waste ground, frequent in hedges, 2,200 meters or lower, most common at lower elevations; Petén; Alta Verapaz; El Progreso; Izabal; Zacapa; Chiquimula; Jutiapa; Santa Rosa; Escuintla; Guatemala; Sacatepéquez; Suchitépéquez; Retalhuleu; Huehuetenango. British Honduras to Salvador and Panama; West Indies; South America; western Africa.

A shrub 1–2 meters high; leaves long-petiolate, ovate or rhombic, small or large, often 3-lobate, dentate, acute or acuminate, finely and densely or sparsely

stellate-pubescent on both surfaces, often stellate-tomentose beneath; sepals green, 3-4 mm. long, appendaged at the apex, densely tomentulose; fruit 6-8 mm. in diameter, stellate-pubescent, the spines slender, retrorse-barbate.

Called "bur" in British Honduras; in Salvador "mozote de caballo" and "mozotillo." The bark contains a tough and rather fine fiber suitable for making cordage. The sap is sometimes used for clarifying sirup in making sugar.

**Triumfetta polyandra** DC. Prodr. 1: 508. 1825. *T. obovata* Schlecht. & Cham. Linnaea 5: 228. 1830.

Quiché; Huehuetenango. Western and southern Mexico; mountains of Honduras.

A shrub a meter high or less, simple or branched, the stout branches densely stellate-tomentose; leaves short-petiolate, often almost sessile, oblong to oval or almost rounded, 7-15 cm. long, 3-5-nerved, rounded to acute at the apex, obtuse to subcordate at the base, thick, glandular-serrulate, very densely and softly stellate-tomentose on both surfaces with rather coarse hairs; inflorescences terminal, few-flowered; sepals densely stellate-tomentose, 2.5-3.5 cm. long, with a long slender appendage at the apex; petals yellow, about equaling the sepals; fruit 2-4 cm. in diameter, the spines very dense and numerous, densely hirsute with long spreading hairs.

Called "oreja de coyote" in Honduras, in reference to the soft gray leaves, which often are widest above the middle.

**Triumfetta semitriloba** Jacq. Enum. Pl. Carib. 22. 1760. *T. althaeoides* Lam. Encycl. 3: 420. 1789. *Mozote*; *Mozote colorado*; *Mozote de caballo*; *Escobilla amarilla*; *Mozotillo*.

Moist or dry thickets, sometimes in thin forest, especially oak forest, often a weedy plant of waste places, common in second growth, 1,800 meters or lower, most frequent at low elevations; Petén; Alta Verapaz; Jalapa; Santa Rosa; Escuintla; Guatemala; Sacatepéquez; Chimaltenango; Quiché; Huehuetenango; Quezaltenango. Mexico; British Honduras to Panama; West Indies; South America.

A shrub 1-2 meters high, often much-branched; leaves long-petiolate, ovate to rhombic, acute or acuminate, rounded or cordate at the base, often shallowly lobate, unequally dentate, stellate-pubescent above, beneath sparsely or densely stellate-pilose or often densely tomentose; sepals 5-7 mm. long, green, appendaged at the apex; petals yellow, about equaling the sepals; fruit 6-8 mm. in diameter, the body glabrate in age, the very numerous spines slender, retrorse-barbate.

Called "ochmul" (Maya) and "cadillo" in Yucatan. This is an abundant weedy plant in many parts of the Guatemalan lowlands.

**Triumfetta speciosa** Seem. Bot. Voy. Herald 86. 1853. *Molac* (Huehuetenango); *Maguaga* (Jalapa; Majagua?).

Moist or wet thickets, sometimes in wet open forest, often in oak forest, 1,000–1,700 meters, rarely at somewhat lower elevations; Alta Verapaz; Baja Verapaz; Zacapa; El Progreso; Jalapa; Santa Rosa; Guatemala; Quiché; Huehuetenango. Southern Mexico; British Honduras to Salvador and Panama.

A shrub or small tree, sometimes 6 meters high but usually lower, the branches densely pilose; leaves long-petiolate, rounded-ovate, often shallowly 3-lobate, long-acuminate, rounded or cordate at the base, unequally serrate, densely and softly stellate-tomentose beneath; sepals deep red or orange-red, 3–4 cm. long, hirsute, bearing long slender appendages at the apex; fruit 1–2 cm. in diameter, the spines slender, very numerous and dense, usually densely hirtellous.

Called “mozote” in Salvador. The shrub is plentiful on the divide between Baja and Alta Verapaz, on the road from Salamá to Cobán. It is much more showy than other species because of its large, bright red flowers, and is rather handsome when viewed from a short distance, but the burs are quite as objectionable as those of other species.

### MALVACEAE. Mallow Family

Herbs, shrubs, or trees; leaves alternate, mostly palmate-nerved, generally dentate or lobate; stipules free; peduncles axillary, solitary, and 1-flowered or arranged in fascicles, racemes, or panicles, the flowers sometimes sessile; bractlets often present at the base of the calyx, 3–many, forming an involucl, distinct or united; flowers regular, almost always perfect; sepals normally 5, more or less united, the lobes valvate in bud; petals 5, hypogynous, mostly adnate to the base of the stamen column, contorted and imbricate in bud; stamens numerous, sometimes 5 or 10, hypogynous, usually united to form a column, this divided above into 5 fascicles bearing stamens or more or less covered with stamens; anthers 1-celled; ovary with 2 to numerous cells, the carpels verticillate; style simple at the base, dividing into as many branches as there are cells; ovules 1 or more in each carpel, attached along the inner angle, anatropous; fruit usually dry, the mature carpels separating as cocci, 2-valvate or indehiscent, sometimes united to form a capsule, this loculicidally dehiscent; seeds with scant endosperm; embryo curved, the cotyledons foliaceous, folded or twisted and folded.

About 45 genera, widely distributed except in arctic regions, in America the plants most numerous in the warmer regions. The only other genera known from Central America are *Wercklea* and *Sidas-trum*, in Costa Rica and Panama.

Fruit a loculicidal capsule, the carpels not separating at maturity; calyx subtended by an involucl of bractlets.

Bractlets at the base of the calyx 3, cordate, dentate. . . . . *Gossypium*.

Bractlets usually more than 3, not dentate, sometimes bifurcate at the apex.

Cells of the fruit 1-seeded. Herbs with usually hastate leaves. . . . . *Kosteletzkya*.  
 Cells of the fruit with 2 or more seeds.

Styles distinct; herbs, shrubs, or trees, the leaves usually dentate or lobate, rarely entire, not lepidote. . . . . *Hibiscus*.

Styles united; shrubs or trees, the leaves entire, lepidote. . . . . *Thespesia*.

Fruit not capsular, composed of few or numerous carpels, these separating at maturity; or the fruit rarely capsular, but the calyx then without bractlets at its base.

Carpels of the fruit covered with numerous short barbed spines. . . . . *Urena*.

Carpels of the fruit unarmed, or rarely with 1-3 long spines.

Bractlets present at the base of the calyx, or the flowers subtended by large, usually cordate, leaf-like bracts.

Flowers subtended by large, mostly cordate-ovate, leaf-like bracts and almost concealed by them. Plants mostly hirsute with very harsh pubescence. . . . . *Malachra*.

Flowers not subtended by large bracts.

Fruit fleshy, berry-like; petals erect, convolute, usually bright red. Style branches twice as many as the carpels. . . . . *Malvaviscus*.

Fruit dry; petals usually spreading, not convolute, rarely red.

Style branches twice as many as the carpels of the fruit and ovary.

Fruit often armed with 1-3 barbed spines near the apex. *Pavonia*.

Style branches as many as the carpels of the fruit.

Ovules and seeds several in each carpel. Shrubs with large, red or white flowers. . . . . *Sphaeralcea*.

Ovules solitary in each carpel.

Style branches ending in capitellate or clavate stigmas; bractlets 3 or fewer, rarely none. . . . . *Malvastrum*.

Style branches stigmatose above along the inner side; bractlets 3 or more.

Bractlets 3, distinct; plants small herbs, usually prostrate, or sometimes erect. . . . . *Malva*.

Bractlets 3-9, connate at the base; tall coarse erect herbs or shrubs.

Central column of the fruit shorter than the carpels, the fruit thus depressed at the apex; plants herbaceous. . . . . *Althaea*.

Central column of the fruit longer than the carpels; plants usually shrubs. . . . . *Lavatera*.

Bractlets none at the base of the calyx, the flowers not subtended by large cordate leaf-like bracts.

Seeds 1 in each cell of the fruit.

Fruit a loculicidal 5-8-celled capsule. . . . . *Bastardia*.

Fruit of 5 or more carpels, these separating at maturity.

Carpels of the fruit membranaceous at maturity.

Dorsal wall of the carpel separating at maturity from the lateral walls; plants herbaceous, with small flowers. . . . . *Gaya*.

Dorsal wall of the carpel not separating from the lateral walls; trees or decidedly woody shrubs with large showy flowers.

*Robinsonella*.

Carpels of the fruit not membranaceous, usually hard or at least coriaceous.

- Fruit depressed, much broader than high; lateral walls of the carpels disappearing in age; petals purple or violaceous. . . . . *Anoda*.
- Fruit not depressed, usually about as high as broad; lateral walls of the carpels usually thick and hard. . . . . *Sida*.
- Seeds 2 or more in each cell of the fruit.
- Carpels of the fruit each with a divergent or reflexed, long spine at the base, the cells membranaceous. Plants herbaceous, with showy purple flowers. . . . . *Neobrittonia*.
- Carpels without basal spines.
- Carpels of the fruit imperfectly 2-celled.
- Carpels usually 5, imperfectly 2-celled by the lateral constriction of their walls; leaves often entire. . . . . *Wissadula*.
- Carpels 5-11, a free partition projecting from the dorsal wall; leaves dentate. . . . . *Pseudabutylon*.
- Carpels of the fruit 1-celled.
- Carpels membranaceous, rounded at the apex; petals white. *Gayoides*.
- Carpels coriaceous or chartaceous, often rostrate or apiculate; petals usually not white. . . . . *Abutilon*.

### ABUTILON Gaertner

Herbs, shrubs, or sometimes small trees, the pubescence chiefly or wholly of stellate hairs; leaves mostly cordate, often angulate or lobate; flowers axillary, paniculate, or cymose, small or large and showy, mostly white, yellow, or red; bractlets none at the base of the calyx; calyx 5-lobate; stamen column divided at the apex into numerous slender filaments; ovary 5-many-celled, the ovules 3-9 in each cell; style branches as many as the cells, filiform or clavate; mature carpels coalescent at the base or free, rounded at the apex or often rostrate or angulate, bivalvate, naked within; seeds subreniform, the upper ones usually ascending, the lower ones pendulous or horizontal.

Probably 100 species, in tropical and subtropical regions of both hemispheres. A few additional species are found in southern Central America. Perhaps 40 species are known in Mexico, but the Central American ones are but few.

- Carpels of the fruit usually 4-8-seeded; flowers large, mostly 3-5 cm. long.
- Peduncles, at least most of them, 3-flowered.
- Stamens about equaling the petals; petals deep wine-red. . . . *A. Pachecoanum*.
- Stamens much exceeding the petals; petals orange-yellow with reddish veins. *A. tridens*.
- Peduncles 1-flowered.
- Corolla open, the petals spreading or recurved, yellow.
- Leaves crenate. . . . . *A. Purpusii*.
- Leaves entire.
- Peduncles mostly longer than the subtending leaves, divaricate, the flowers nutant; petals reflexed; calyx covered with a dense tomentum of large and coarse, very unequal, branched hairs. . . . . *A. Nelsoni*.

- Peduncles much shorter than the subtending leaves, erect or ascending; calyx covered with a close stellate tomentum. . . . . *A. Chittendenii*.
- Corolla campanulate or tubular, the petals erect and coherent, yellow or yellowish striped with dark red or purple, or wholly dark red.
- Leaves deeply lobate. . . . . *A. striatum*.
- Leaves not lobate.
- Stipules conspicuous, foliaceous; calyx dark red; corolla almost tubular. . . . . *A. megapotamicum*.
- Stipules linear or subulate, inconspicuous; calyx greenish; corolla campanulate. . . . . *A. pictum*.
- Carpels of the fruit with usually 3 seeds; flowers smaller, almost always less than 2.5 cm. long.
- Peduncles axillary, 1-flowered, solitary.
- Branches hirsute with long spreading simple hairs. Carpels rounded at the apex, not rostrate. . . . . *A. hirtum*.
- Branches finely stellate-tomentose.
- Leaves rounded at the base; petals about 3 cm. long. . . . . *A. Pittieri*.
- Leaves deeply cordate at the base; petals about 1.5 cm. long. . . . . *A. permolle*.
- Peduncles axillary or terminal, if axillary always bearing several flowers, often paniculate.
- Petals blue-purple, 9 mm. long; carpels 18-24; leaves entire. . . . . *A. pleiopodum*.
- Petals yellow, usually larger; carpels 11 or fewer; leaves dentate.
- Carpels not or scarcely rostrate, the beaks, if any, spreading.
- Branches deeply 3-sulcate. . . . . *A. trisulcatum*.
- Branches terete.
- Branches closely stellate-tomentose; carpels 8-9 mm. long. . . . . *A. Calderonii*.
- Branches stellate-tomentose and also hirsute; carpels 13-15 mm. long. . . . . *A. giganteum*.
- Carpels long-rostrate, the beaks suberect.
- Upper leaves long-petiolate, broadly cordate, the blades conspicuously cordate at the base.
- Stems stellate-hirsute; calyx almost equaling the body of the carpels. . . . . *A. umbellatum*.
- Stems sparsely pilose with very long simple hairs and stellate-puberulent; calyx scarcely half as long as the body of the carpels. . . . . *A. orientale*.
- Upper leaves short-petiolate, lance-ovate or oblong-ovate, the blades rounded or subcordate at the base. . . . . *A. Hemsleyanum*.

**Abutilon Calderonii** Standl. Journ. Wash. Acad. Sci. 14: 99. 1924.

Dry brushy slopes, 300-1,200 meters; Jalapa; Guatemala (near Amatitlán). Salvador, the type from San Salvador.

A much-branched shrub 1-3 meters high, the branchlets terete, covered with a dense close grayish tomentum; leaves on slender petioles 5-11 cm. long, broadly ovate-cordate or orbicular-cordate, mostly 8-17 cm. long and 6-14 cm. wide,

abruptly acuminate or long-acuminate, deeply cordate at the base, shallowly and finely crenate, sometimes obscurely 3-lobate near the apex, green above, sparsely and very minutely stellate-pubescent, covered beneath with a very close and fine, grayish, stellate tomentum; flowers orange, in large open pyramidal terminal panicles, the slender pedicels 1.5-3.5 cm. long, articulate near the base; calyx 5-6 mm. long, the lobes ovate, acute, densely stellate-tomentulose, appressed or spreading in fruit; petals 12-15 mm. long, spreading; carpels of the fruit 10-11, with 2-3 seeds, 8-9 mm. long, obtuse or rounded at the apex, densely stellate-tomentose with rather lax and somewhat viscid hairs.

Called "malva" in Salvador. In that country there is found var. *longipilum* Standl. (loc. cit.), which is distinguished from the typical form of the species by having a few long simple hairs on the branches, especially those of the inflorescence. *A. Calderonii* differs constantly from *A. giganteum* in having substantially smaller fruiting carpels.

**Abutilon Chittendenii** Standl. Trop. Woods 10: 5. 1927.

Moist or dry, brushy slopes, 500-1,000 meters; Zacapa; Chiquimula; Santa Rosa; Guatemala (Estancia Grande). Honduras, the type from the region of Olanchito.

A shrub or small tree 1.5-3 meters high or somewhat larger, the young branches densely stellate-tomentose with rather coarse, fulvous hairs; leaves on short or often much elongate petioles, ovate-orbicular or almost reniform, mostly 7-15 cm. long and 6-14 cm. wide but sometimes much larger, acuminate or abruptly acuminate, shallowly or deeply cordate at the base, entire, sometimes obscurely 3-lobate, green above, sparsely and minutely stellate-hirtellous, rough to the touch, beneath slightly paler, rather sparsely or densely stellate-hirtellous, the blades 7-nerved at the base; peduncles mostly solitary, simple, sometimes very short but often longer than the petioles, articulate near the apex; calyx 2-2.5 cm. long, costate, densely rufous-tomentose, deeply lobate, the lobes ovate-triangular, subulate-acuminate; petals bright yellow or cream-colored, maroon or dark red at the base, 3.5-4 cm. long; filaments dark red; carpels about 14 and 2 cm. long, obtuse at the apex and not at all rostrate, densely covered outside with a rufous, close, very harsh, stellate tomentum.

The plant is a somewhat showy and rather handsome one when in flower. It is rather common near the divide between Zacapa and Chiquimula. The species was named for George P. Chittenden, Vice-President of the United Fruit Company.

**Abutilon giganteum** (Jacq.) Sweet, Hort. Brit. 1: 53. 1829. *Sida gigantea* Jacq. Hort. Schoenbr. 2: 8. pl. 141. 1797. *Sida elata* Macfad. Fl. Jam. 87. 1837. *A. elatum* Griseb. Fl. Brit. W. Ind. 79. 1859. ?*A. mexicanum* Presl, Rel. Haenk. 2: 115. 1836. *Oropéndola de monte*.

Dry or moist, brushy slopes, sometimes in wet thickets or in hedges, 1,000-2,300 meters; Jalapa; Guatemala; Sacatepéquez;



Chimaltenango; Quiché; Quezaltenango. Southern Mexico; Salvador; Costa Rica; West Indies; northern and western South America.

A branched herb or shrub 1-2 meters high, the branches usually closely stellate-tomentose and abundantly pilose with long soft spreading hairs; leaves long-petiolate, rounded-ovate, mostly 6-17 cm. long, acute or acuminate, deeply cordate at the base, irregularly obtuse-dentate, sometimes shallowly 3-lobate, green above, with rather sparse, stellate and simple hairs, grayish beneath and covered with a soft and rather lax, stellate tomentum, pilose with simple hairs on the nerves, about 9-nerved at the base; flowers orange-yellow with a dark red center, mostly in terminal, large, often much-branched panicles; calyx 1 cm. long, stellate-tomentulose and often pilose with simple hairs, deeply lobate, the lobes lance-triangular; petals 1.5 cm. long, at length spreading or reflexed; carpels of the fruit 8-14, 3-seeded, 13-15 mm. long, pilose with stellate or simple hairs.

The stems of this and other species contain a fine tough fiber used in some regions for making cordage.

**Abutilon Hemsleyanum** Rose, Contr. U. S. Nat. Herb. 10: 123. 1906. *A. sidoides* Hemsl. Diag. Pl. Mex. 24. 1879, not Dalz. & Gibs. 1861.

Moist or rather dry thickets, sometimes in pine-oak forest, 1,500-2,400 meters; Baja Verapaz; Sacatepéquez; Chimaltenango; Quiché; Huehuetenango; Sololá. Southern Mexico.

An herb or shrub, usually 1-3 meters high, sometimes weak and reclining, the branches stellate-hirsute; lower leaves long-petiolate, the upper short-petiolate, ovate-lanceolate or oblong-ovate to broadly ovate, acuminate or long-acuminate, rounded or shallowly cordate at the base, conspicuously serrate, green above, hirsute with chiefly simple hairs, somewhat paler green beneath, stellate-hirsute or hirsute with simple hairs on the nerves, 5-nerved at the base; peduncles partly axillary and few-flowered, most of them forming a small terminal leafy panicle, articulate above the middle; sepals broadly ovate, cuspidate-acuminate, 7 mm. long; petals pale yellow or orange-yellow, 8-10 mm. long; carpels about 8, stellate-hispid, with very long, erect beaks, 13-14 mm. long.

**Abutilon hirtum** (Lam.) Sweet, Hort. Brit. 1: 53. 1826. *Sida hirta* Lam. Encycl. 1: 7. 1783.

Thickets, 400 meters or less; Petén. Southern Mexico; British Honduras; Honduras; Salvador; Costa Rica; Panama; southern Florida; West Indies; South America; tropical Asia and Africa.

A coarse herb or shrub about a meter high, the branches bearing 3 kinds of hairs, small stellate ones, larger glandular ones, and long soft simple spreading ones; leaves long-petiolate, ovate-orbicular or rounded-ovate, mostly 5-10 cm. long, short-acuminate to broadly rounded and apiculate at the apex, shallowly or deeply cordate at the base, crenate-dentate, sometimes shallowly 3-lobate,

velutinous on both surfaces, green above, stellate-pubescent and pilose, paler beneath and densely stellate-pilose with unequal hairs; flowers solitary, long-pedunculate, the peduncles 2-5 cm. long, articulate above the middle; calyx 13-16 mm. long, densely stellate-tomentose, the lobes ovate, cuspidate; petals almost 2 cm. long, orange-yellow, with a dark red spot at the base; carpels of the fruit about 20, each 3-ovulate, 10-12 mm. long or slightly larger, very obtuse or rounded at the apex, stellate-pilose with rather long hairs; seeds dark brown, pitted, minutely stellate-pubescent.

Called "malva" and "malvita" in Salvador, and "wild cotton" in British Honduras.

**Abutilon megapotamicum** (Spreng.) St. Hil. & Naud. Ann. Sci. Nat. II. 18: 49. 1842. *Sida megapotamica* Spreng. Syst. Veg. ed. 16. Tent. Suppl. 19. 1828. *A. vexillarium* Morren, Belg. Hort. 289. f. 16. 1864.

Cultivated occasionally in gardens for ornament. Believed to be a native of South America, although perhaps unknown except in cultivation.

A slender shrub about a meter high, said to be sometimes scandent, the young branches minutely stellate-pubescent; leaves on rather short, slender petioles, narrowly elongate-triangular or ovate-oblong, 5-10 cm. long, 1-3.5 cm. wide, long-attenuate, shallowly cordate at the base, serrate, green but sparsely and very minutely pubescent above, minutely stellate-pubescent beneath; stipules green, 4-10 mm. long, 2-6 mm. wide, several-nerved, usually entire, semi-oblong or ovate, persistent; peduncles axillary, solitary, very slender, the flowers nutant; calyx dark red, tubular-campanulate, 2.5-3 cm. long, 5-winged, finely stellate-tomentulose; petals 3-3.5 cm. long, pale yellow; carpels 5, velutinous-pilose, 6-7-ovulate.

The plant is unusual in the form of its rather dull-colored flowers, which are not especially showy. It is rather infrequent in cultivation in Central America. The relatively large and foliaceous stipules are unusual in the genus *Abutilon*.

**Abutilon Nelsoni** Rose, Contr. U. S. Nat. Herb. 5: 134. pl. 12. 1897. *Amapola*.

Known certainly only from the type, *E. W. Nelson* 3562, collected somewhere in Guatemala, probably in Huehuetenango or Quezaltenango; a sterile collection from Democracia, Huehuetenango, is probably conspecific.

A shrub or small tree 6 meters high or less, the young branchlets, young leaves, and petioles densely covered with a coarse scurfy rufous stellate tomentum; stipules ovate, 10-12 mm. long, deciduous; leaves long-petiolate, the blades rounded-ovate to cordate-orbicular, 25 cm. long or less and of about the same width, acute or subacuminate, deeply cordate at the base, entire, finely and

densely stellate-pubescent on both surfaces; peduncles 1-flowered, solitary or geminate in the upper leaf axils, 15 cm. long or less; calyx almost 4 cm. long, the lobes rounded and apiculate at the apex, covered outside with long coarse stellate hairs; petals dark yellow, 5-6 cm. long, reflexed in age; styles about 24.

The Huehuetenango collection was taken from a tree 6 meters high.

**Abutilon orientale** Standl. & Steyerm. Field Mus. Bot. 23: 173. 1944.

Known only from the type, Zacapa, in shaded quebrada, along road between Agua Blanca and Cumbre de Chiquimula, 350-500 meters, *Standley* 74420.

An erect herb a meter high or less, probably perennial, slender, branched, the stems terete, sparsely and minutely stellate-puberulent and also abundantly pilose with long soft spreading simple hairs; leaves on slender petioles 1.2-4 cm. long, membranaceous, broadly cordate-ovate, 4.5-7.5 cm. long, 2-6 cm. wide, gradually or abruptly long-acuminate, deeply and openly cordate at the base, crenate, sparsely pilose above with long spreading simple hairs, scarcely paler beneath, sparsely stellate-pilose; stipules narrowly linear, 5-6 mm. long, green; flowers numerous, mostly in lax few-flowered cymes, axillary and terminal, on long slender pedicels, the pedicels stellate-puberulent and pilose with simple hairs; calyx broadly campanulate, 4 mm. long, densely stellate-pilose, the lobes much shorter than the tube, very broadly ovate, filiform-cuspidate; petals pale yellow, very broadly obovate, 5 mm. long, glabrous; calyx in fruit less than half as long as the carpels; carpels of the fruit 5, densely stellate-pubescent, abruptly rostrate, the body 5-6 mm. long, the short beaks obliquely divergent, scarcely 2 mm. long; seeds 2 in each carpel.

**Abutilon Pachecoanum** Standl. & Steyerm. Field Mus. Bot. 23: 61. 1944.

Moist or wet forest or thickets, 2,200-2,500 meters; Quezaltenango (type from region of Las Nubes, south of San Martín Chile Verde, *Standley* 83528); San Marcos (near Tajumulco). Chiapas.

A shrub or tree of 3-6 meters with few branches, the branches densely pale-tomentulose with stellate hairs and pilose with spreading soft simple hairs; leaves long-petiolate, rounded-ovate, 10-25 cm. long, acuminate, deeply cordate at the base, thin, entire, sometimes obscurely 3-lobate near the apex, green above and sparsely and minutely stellate-pubescent, whitish beneath and covered with a very dense and fine, stellate tomentum; peduncles axillary, 10-28 cm. long, 3-flowered, the pedicels 6-12 cm. long; calyx 28 mm. long, densely covered with a close stellate brownish tomentum and with long simple viscid hairs, the lobes ovate, 3-nerved; petals deep wine-red, 5.5 cm. long; carpels of the fruit about 10 and 3.5-4.5 cm. long, long-cuspidate at the apex, tipped with a stiff spine-like cusp 4-5 mm. long, densely viscid-pilose with mostly stellate but partly simple hairs; seeds 8 in each carpel.

The species is named for Don Mariano Pacheco Herrarte, formerly Director General de Agricultura of Guatemala. It is one of the handsomest plants in the genus, and by far the handsomest of any of the native species of Guatemala, but apparently it is rare in the mountains of the Occidente. In the Chile Verde region prolonged search failed to discover a second plant. The coloring of the deep wine-red flowers is unlike that of any other Central American species.

**Abutilon permolle** (Willd.) Sweet, Hort. Brit. 1: 53. 1826.  
*Sida permollis* Willd. Enum. Hort. Berol. 723. 1809.

Petén (El Paso, *Lundell* 1540). Southern Mexico, at least in Yucatan and Campeche and probably elsewhere; southern Florida; West Indies.

A coarse herb or shrub 1-1.5 meters high, the branches terete, softly stellate-pubescent; leaves long-petiolate, ovate to rounded-cordate, mostly 5-10 cm. long, usually narrowly long-acuminate, deeply cordate at the base, irregularly crenate, green above, softly stellate-pubescent with short hairs, whitish beneath and densely stellate-pilose with longer soft hairs; peduncles axillary, solitary, 1-flowered, articulate near the apex, equaling or shorter than the petioles; calyx 8-10 mm. long, not costate, densely stellate-tomentose, the lobes ovate-lanceolate, acute or acuminate; petals 1.5 cm. long, yellow; carpels 7-10, at maturity 1 cm. long, 3-seeded, short-rostrate.

Maya names in Yucatan are "zacxiu" and "sacmizbil." The strong fiber is reported to be used there for making twine. This species has been recorded from Petén and Yucatan as *A. lignosum* (Cav.) Don, synonymous with *A. americanum* (L.) Sweet, a species not known to occur in Central America.

**Abutilon pictum** (Gill.) Walp. Repert. Bot. 1: 324. 1842.  
*Sida picta* Gill. ex Hook. & Arn. in Hook. Bot. Misc. 3: 154. 1833.

Sometimes grown in gardens for ornament. Said to be native of South America, but very likely known only in cultivation.

A shrub of 1-2 meters, the branches at first sparsely and minutely stellate-puberulent but soon green and glabrous, the stipules inconspicuous, subulate, deciduous; leaves long-petiolate, narrowly or broadly ovate, mostly 4-8 cm. long, acuminate, shallowly cordate at the base, crenate, sometimes shallowly 3-lobate near the base, green above, sparsely stellate-puberulent or almost glabrous, somewhat paler beneath, very minutely stellate-puberulent and often appearing glabrous, 5-nerved at the base; peduncles axillary, solitary, articulate near the apex, usually equaling the leaves, the flowers nutant; calyx 2 cm. long, greenish, costate, finely stellate-tomentulose, the lobes triangular-obovate, acute; corolla campanulate, 3 cm. long, the petals yellow with dark red veins, turning red in age.

This much resembles *A. striatum* except in leaf form, and the two are sometimes united as a single species. The leaves are so dissimilar that it is believed that two distinct species are represented.

**Abutilon Pittieri** Donn. Smith, Bot. Gaz. 56: 51. 1913.

Known only from the type, *H. Pittier* 138, collected at El Puente near Las Canoas, Guatemala, 500 meters (1,500 meters?).

Branchlets stellate-pubescent; stipules filiform, 8 mm. long, caducous; leaves on petioles 1.5–3 cm. long, orbicular-ovate, 5–7 cm. long, 4–6 cm. wide, cuspidate, obtuse and 7-nerved at the base, entire, pilose above with simple hairs, stellate-pubescent beneath; peduncles axillary, solitary, 3–4 cm. long; calyx 5-angulate, 12 mm. long, the lobes deltoid-ovate, apiculate; petals yellowish when dried, purple-spotted at the base, 3 cm. long, bilobate; carpels 10, pilose when young, 3-ovulate, the mature carpels unknown.

The original description of the species is highly misleading in describing the leaves as "orbiculari-obovata." Captain Smith's descriptions usually are accurate, but in this instance there was a lapse, for evidently he intended to write "orbiculari-ovata." We have seen the type specimen from the U. S. National Herbarium, kindly lent for study through the courtesy of Mr. C. V. Morton.

**Abutilon Purpusii** Standl. Contr. U. S. Nat. Herb. 23: 750. 1923.

Wet forest, 900 meters; San Marcos (Finca Vergel, near Rodeo, *Standley* 68904). Chiapas; Veracruz.

A shrub of 3 meters, the branches densely covered with a close brownish stellate tomentum; lower leaves long-petiolate, the upper on rather short petioles; leaf blades ovate-cordate or rounded-cordate, 10–20 cm. long, acuminate or long-acuminate, deeply cordate at the base, crenate-dentate, green above, sparsely and almost minutely stellate-pubescent or in age glabrous, beneath finely and densely stellate-pubescent; peduncles axillary, simple, 5–12 cm. long, articulate near the apex, the flowers nutant; calyx 2 cm. long, costate, densely stellate-tomentose with brownish tomentum, the lobes oval-ovate, acute or obtuse, mucronate; petals 3–3.5 cm. long; carpels 8–10, rounded at the apex, 2–3 cm. long, stellate-tomentose.

**Abutilon striatum** Dickson in Lindl. Bot. Reg. 25: Misc. 39. 1839. *A. venosum* Lem. Fl. Serres 2, pt. 3: pl. 5. 1846. *Campanilla*; *Amapola*; *Mapola*; *Campanita*.

A common ornamental plant of gardens, at almost all elevations; escaped and naturalized about Cobán; abundant in wet brushy quebradas of the bocacosta of San Marcos and in Quezaltenango above Coloma, at 900–1,400 meters; growing wild in Huehuet-

nango (Cerro Cananá) at 2,500–2,800 meters. Cultivated for ornament in many parts of the earth, out of doors in warmer regions and in hothouses in the North; native habitat uncertain.

A slender shrub of 1.5–2.5 meters, the branches glabrous or nearly so; leaves long-petiolate, deeply 5–7-lobate, almost glabrous, the lobes acuminate, serrate; peduncles axillary, solitary, about as long as the leaves, articulate near the apex, the flowers nutant; calyx 2 cm. long, stellate-pilose, costate, the lobes acute or acuminate; petals 4 cm. long, orange or yellow veined with crimson or purple; carpels about 11 and 7–9-ovulate, 1.5 cm. long.

Called “pompón” and “pastor” in Salvador. This is one of the common cultivated shrubs of Guatemala and other countries of Central America, and is seen frequently in hothouses of the United States, where it attracts attention because of the unusual coloring of the pendent bell-shaped flowers. The native country is often given as Guatemala; upon what basis is uncertain. However, the shrub does grow abundantly in some of the wet forested quebradas of Quezaltenango and San Marcos, in association with native plants and in places that certainly never have been under cultivation. One might believe that it is indigenous there, but unfortunately in the same places are found other plants, such as *Datura*, which certainly are not native, and it is suspected that these apparently wild plants have really escaped from cultivation in nearby fincas.

**Abutilon tridens** Standl. & Steyerl. Field Mus. Bot. 23: 173. 1944.

Moist ravines or forest, 1,500–2,500 meters; endemic; El Progreso (type from hills between Finca Piamonte and the slopes southeast, along a small creek, *Steyermark* 43439); Zacapa (Sierra de las Minas, Río Sitio Nuevo and Río Repollal).

A shrub or small tree of 2.5–4.5 meters, the branches rather thick, densely and softly stellate-pilose or tomentose, the tomentum very unequal in length and often appearing tuberculate; stipules 12–15 mm. long, linear, slightly dilated at the base; leaves large, on petioles 4–17 cm. long, membranaceous, broadly cordate-ovate or rounded-cordate, 12–24 cm. long, 8.5–18 cm. wide, acuminate or abruptly long-acuminate, deeply and narrowly cordate at the base, green above, sparsely stellate-pilose or glabrate, very glaucous beneath, densely stellate-pilose and on the nerves and veins pilose with long simple hairs; peduncles axillary, about 16 cm. long, mostly 3-flowered, sometimes only 1-flowered, the pedicels stout, erect, mostly 4–6 cm. long, articulate some distance below the calyx; calyx 2.5–3 cm. long, very densely brown-tomentose, the hairs short, brownish, stellate, deeply lobate, the lobes broadly ovate, acute or acuminate, densely tomentose within; petals broad, 4–5 cm. long, orange-yellow with deep red veins or sometimes salmon-rose, broadly rounded or truncate at the apex, with conspicuous elevated veins; stamen column long-exserted, almost twice as long as the petals; carpels

of the fruit about 12, long-rostrate, 2.5-3 cm. long, densely stellate-hispid, the beaks about 5 mm. long; seeds about 8 in each carpel.

**Abutilon trisulcatum** (Jacq.) Urban, Repert. Sp. Nov. 16: 32. 1919. *Sida trisulcata* Jacq. Enum. Pl. Carib. 26. 1760. *S. triquetra* L. Sp. Pl. ed. 2. 963. 1763. *A. triquetrum* Sweet, Hort. Brit. 53. 1827.

Moist, rocky hillside forest, 300 meters; Huehuetenango (Ciénaga de Lagartero below Miramar, *Steyermark* 51487). Mexico; Honduras; Nicaragua; Cuba.

Plants 1-1.5 meters high, herbaceous or suffrutescent below, much-branched, the stems deeply sulcate and obtusely trigonous, minutely tomentulose; leaves on long slender petioles, broadly ovate-cordate or rounded-cordate, 4-15 cm. long, rather abruptly long-acuminate, deeply cordate at the base, crenate or subentire, soft and grayish on both surfaces, very densely and minutely stellate-tomentulose; flowers cymose-paniculate, forming large terminal panicles; calyx lobes ovate, caudate-acuminate, spreading in age at the base of the fruit; petals pale or dull yellow, 5 mm. long; carpels of the fruit 5, densely stellate-tomentulose, 6-8 mm. long, the beaks very short, scarcely more than 1 mm. long.

**Abutilon umbellatum** (L.) Sweet, Hort. Brit. 1: 53. 1826. *Sida umbellata* L. Syst. Nat. ed. 10. 1145. 1759.

Moist or dry thickets, 1,700 meters or less; El Progreso; Zacapa; Santa Rosa; Escuintla (San José); Chimaltenango. Southern Mexico; West Indies; northern and western South America.

An herb 1-1.5 meters high, sometimes suffrutescent, the branches slender, terete, stellate-pilose; leaves long-petiolate, suborbicular to rounded-ovate, mostly 5-12 cm. long, abruptly acute or short-acuminate, shallowly cordate or truncate at the base, crenate, sometimes obscurely 3-lobate, green, rather densely, softly, and closely stellate-pubescent beneath, minutely stellate-puberulent above; peduncles axillary and turbinate, often forming terminal panicles, usually 2-5-flowered, the flowers corymbose or umbellate, the pedicels usually viscid-pilose; calyx 5-6 mm. long, not costate, usually long-pilose, the lobes broad; petals buff, 8 mm. long; carpels 5-7, each with 3 seeds or ovules, at maturity 6-8 mm. long, hirsute-tomentose, with rather long and stiff, stout, suberect beaks.

The Maya name in Yucatan is "sacxiu."

### ALTHAEA L.

Herbs, often large and tall, usually stellate-tomentose, the leaves lobate or parted; flowers often very large, axillary, solitary or in terminal racemes or corymbs, the petals variously colored but not yellow; bractlets at the base of the calyx 6-9, connate; calyx 5-lobate; ovary many-celled, the cells 1-ovulate; style branches as many as the cells, filiform, longitudinally stigmatose on the inner side; mature carpels forming a depressed fruit, equaling or exceeding the short axis, separating from the axis, indehiscent; seed ascending.

About 15 species, all natives of temperate regions of the Old World.

*Althaea rosea* (L.) Cav. *Monad. Diss.* 91. 1785. *Alcea rosea* L. *Sp. Pl.* 966. 1753. *Vara de San José; Malva rosa; Malva de jardín; Malva real; Malva loca.*

Said to be native of Asia, but cultivated for ornament in most temperate regions. Grown frequently in the higher regions of Guatemala, as in Guatemala, Cobán, and Quezaltenango, and doubtless in other departments.

Plants biennial or often persisting and perennial; basal leaves numerous, long-petiolate, rounded-cordate, large, more or less lobate or undulate and crenate, rough, densely stellate-tomentose; stems 1-2 meters high, mostly simple, bearing a long spire-like raceme of almost sessile flowers, these white to pink or purple, and often double.

Called "malva real" in Salvador. The hollyhock is a rather frequent garden plant in the higher regions of Central America. It thrives especially well about Cobán.

#### ANODA Cavanilles

*Reference:* B. P. G. Hochreutiner, *Monographia generis Anodae*, *Ann. Conserv. Jard. Bot. Genève* 20: 29-68. 1916.

Herbs, usually annual, hispid or with stellate pubescence; leaves mostly long-petiolate, often hastate or variously lobate; peduncles axillary and solitary or in terminal racemes or panicles, the petals usually blue or purple, sometimes yellow or red; bractlets none at the base of the calyx; calyx 5-lobate; stamen column cleft into numerous filaments; ovary many-celled, the cells 1-ovulate, the style branches filiform, capitate or truncate at the apex; mature carpels stellately spreading, separating from the persistent axis, not rostrate, the internal cell walls usually more or less evanescent, the ripe carpels thus opening into one another; seed pendulous or attached horizontally.

About 14 species, all American, mostly Mexican. Only the following are known in Central America.

Carpels of the fruit not at all rostrate dorsally or apically, or with only a small short tubercle.....*A. acerifolia.*  
 Carpels of the fruit with a rather long, spreading horizontal beak at or near the apex.....*A. cristata.*

*Anoda acerifolia* (Zuccagni) DC. *Prodr.* 1: 459. 1825. *Sida acerifolia* Zuccagni in *Roem. Coll. Bot.* 148. 1809. *S. hastata* Sims, *Bot. Mag. pl.* 1541. 1813.



Weedy fields, vicinity of Champerico, Retalhuleu, at sea level, abundant. Mexico; West Indies; northern South America; naturalized in the East Indies.

Plants erect or procumbent and then with elongate branches, the young branches sparsely or densely hispid; leaves long-petiolate, deltoid to pentagonal, hastately or palmately lobate, the lobes acute or obtuse, truncate or shallowly cordate at the base, the margins entire or nearly so; flowers axillary, solitary, long-pedunculate, the peduncles usually longer than the leaves; calyx 7-9 mm. long, in fruit as much as 13 mm. long, deeply lobate, the lobes cuspidate-acuminate, setose outside; petals purple or pale purple, 1.5 cm. long; ovary setose only at the apex; carpels 9-15, sparsely short-setose, rounded at the apex, dorsally gibbous, the whole fruit 11-12 mm. broad; seeds brown, smooth.

This species has been noted in Guatemala only about the port of Champerico, where it is common and conspicuous. The plants are almost all prostrate, while those of *A. cristata* so common elsewhere, are usually erect or nearly so. Also, *A. acerifolia* blooms profusely throughout the dry months, when most plants of *A. cristata*, except in the wet Cobán region, are long since withered. It seems very dry about Retalhuleu during the *verano*, but perhaps there is more moisture in the ground than is apparent.

**Anoda cristata** (L.) Schlecht. *Linnaea* 11: 210. 1837. *Sida cristata* L. Sp. Pl. 685. 1753. *A. hastata* Cav. Diss. 1: 39. pl. 10. 1785. *A. triloba* Cav. loc. cit. *A. triangularis* DC. Prodr. 1: 459. 1825. ?*A. lavateroides* Medic. Malvengat. 19. 1787. *Violeta de monte*; *Malvavisco* (reported from North Coast region); *Malvilla*; *Malva abrisca*; *Malvavisca*; *Botón* (Jutiapa).

Common in many regions, a frequent weed in cornfields and other cultivated ground, moist or dry fields or thickets, often a weed in waste ground about dwellings and along roadsides, ascending from sea level to about 2,000 meters; Petén; Alta Verapaz; Baja Verapaz; Izabal; Chiquimula; Jalapa; Jutiapa; Santa Rosa; Guatemala; Sacatepéquez; Chimaltenango; Sohilá; Quiché; Huehuetenango. Southwestern United States, southward through Mexico; British Honduras to Salvador and Panama; South America.

Annual, erect or prostrate, the stems setose-hispid, at least on the younger parts; leaves very polymorphic, triangular to hastate or palmate-lobate, often serrate or dentate, the lobes acute to acuminate or sometimes obtuse, green, sparsely hirsute or hispidulous or glabrate; stipules subulate, persistent; flowers axillary, solitary or binate, long-pedunculate, the peduncles usually setose-hispid; calyx green, much accrescent in fruit, often 1.5 cm. long or even larger, the lobes acute, setose outside; petals rose-purple or lilac, about 2.5 cm. long but variable in size; carpels of the fruit 10-20, usually densely setose, especially near the apex,

forming a large depressed fruit 1.5 cm. in diameter, each carpel with a stout spine-like dorsal appendage, the carpels radiating like the points of a star; seeds gray, smooth.

Called "malva" in Salvador; in Yucatan "amapolita." The Maya name in Yucatan is recorded as "tzalyaltzai." The plant is rather showy and handsome because of its large, prettily colored flowers, but it is decidedly weedy, often filling the cornfields toward the end of the wet season. About Cobán, where there is abundant moisture, the plants probably bloom throughout the year, but in most parts of Guatemala they wither early in the *verano*.

### BASTARDIA HBK.

Herbs or low shrubs, similar to *Sida* in habit, with stellate pubescence and usually also viscid; leaves petiolate, cordate, entire or crenate; stipules filiform, deciduous; peduncles axillary, solitary or 2-3-nate, yellow; bractlets none at the base of the calyx; calyx 5-lobate; ovary usually 5-celled, the cells sometimes more numerous; ovules 1 in each cell, pendent, attached above at the inner angle; styles as many as the carpels; capsule loculicidally 5-valvate, or the valves sometimes as many as 8; seeds pendulous.

About 6 species, all in tropical America. A single species is known from Central America.

**Bastardia viscosa** (L.) HBK. Nov. Gen. & Sp. 5: 256. 1822.  
*Sida viscosa* L. Syst. Nat. ed. 10. 1145. 1759.

Moist or dry thickets or weedy fields, at or near sea level; Retalhuleu (Champerico). Southern Mexico; West Indies; South America.

A suberect herb about a meter high, or sometimes subscaudent, much-branched, the branches terete, densely glandular-pubescent and pilose with long spreading soft hairs; stipules 2-3 mm. long; leaves long-petiolate, cordate-ovate, 2-10 cm. long, acuminate or long-acuminate, 5-7-nerved at the base, finely undulate-dentate, velutinous, densely and finely stellate-tomentose on both surfaces, paler beneath; peduncles slender, 1-3 cm. long; calyx 3.5-4 mm. long, deeply lobate, viscid-pilose, the lobes acuminate; petals 5 mm. long, buff; capsule 5-8-celled, closely and rather densely stellate-pilosulous, the valves 3 mm. long, rounded at the apex, erostrate; seeds somewhat cordiform, black, puberulent.

The species seems to be not at all frequent in Mexico and Guatemala.

### GAYA HBK.

Herbs or low shrubs, similar in habit to *Sida*, the pubescence mostly of stellate hairs; leaves petiolate, cordate, not lobate; peduncles axillary or in terminal racemes, the flowers small, usually yellow; bractlets none at the base of the calyx; calyx 5-fid; ovary many-celled, the cells 1-ovulate; style branches as many as the

cells, filiform, capitate-stigmatose or truncate-stigmatose at the apex; mature carpels membranaceous, connivent at the apex, separating below from the axis, dorsally bivalvate; seed pendulous or attached horizontally.

About a dozen species, all in tropical America. A single one occurs in Central America.

**Gaya calyptrata** (Cav.) HBK. Nov. Gen. & Sp. 5: 208. 1821.  
*Sida calyptrata* Cav. Monad. Diss. 57. 1780. *S. disticha* Cav. Icon. Pl. 5: 12. pl. 57. 1790. *G. hermannioides* HBK. Nov. Gen. & Sp. 5: 209. pl. 475. 1821.

Moist or dry thickets, often in oak or pine forest, sometimes in arenales, 1,900 meters or less; Zacapa; Jalapa; Jutiapa; Santa Rosa; Guatemala; Huehuetenango. Southern Mexico; Honduras; South America.

A slender erect annual herb 1.5 meters high or less, the stems simple and virgate or sparsely branched, softly stellate-pilose with short whitish hairs, slightly viscid above; stipules subulate; leaves on short slender petioles, ovate to lance-oblong, mostly 2-5 cm. long, acute or acuminate, cordate at the base, finely or coarsely serrate, densely and finely stellate-pubescent on both surfaces; peduncles axillary, very slender, equaling or shorter than the leaves; calyx 5 mm. long, finely stellate-tomentulose, the lobes ovate, subulate-cuspidate; petals buff, 10-12 mm. long; carpels of the fruit 10-14 and 5-7 mm. long, broadest near the base, the whole fruit depressed-cordate in cross section, sparsely and inconspicuously puberulent or almost glabrous.

*Seler* 2900 in the Berlin herbarium, from Dept. Huehuetenango, has been marked by Ulbrich as a new species, but not published. So far as one may judge from a photograph of the specimen, it is conspecific with *G. calyptrata*. Guatemalan material of *G. calyptrata* has been reported under the name *G. minutiflora* Rose, which pertains to a Mexican species.

### GAYOIDES Small

Plants annual or essentially so, much-branched, the pubescence mostly of stellate hairs; stipules subulate; leaves slender-petiolate, ovate-cordate, crenate; peduncles filiform, axillary, 1-flowered, the flowers small, white; bractlets none at the base of calyx; calyx deeply 5-fid; petals 5, distinct, spreading; carpels of the fruit numerous, 1-celled, membranaceous and inflated in fruit, rounded at the apex, 2-6-seeded; seeds glabrous.

A single, somewhat polymorphous species.

**Gayoides crispum** (L.) Small, Fl. Southeast. U. S. 764. 1903.  
*Sida crispa* L. Sp. Pl. 685. 1753. *Abutilon crispum* Medic. Malvengat. 29. 1787. *Farolitos chinos*.

Moist or dry fields or thickets, often in arenales, 1,400 meters or less; Zacapa; Chiquimula; El Progreso; Santa Rosa; Guatemala; Quiché; Huehuetenango. Southern Florida; Texas through Mexico; British Honduras to Salvador and Costa Rica; West Indies; South America; tropical Asia.

Sometimes an erect herb a meter high but more often procumbent or even creeping, sometimes suffrutescent, the stems mostly stellate-pilose, sometimes pilose with soft simple spreading hairs; leaves slender-petiolate, the upper ones often very shortly petiolate, broadly ovate or rounded-ovate, mostly 2-7 cm. long, acute or acuminate, deeply cordate at the base, crenate; peduncles filiform, longer or shorter than the leaves, articulate near the apex, the flowers often nutant; calyx broadly campanulate, stellate-pilose and often long-pilose, 4-6 mm. long, the lobes ovate or ovate-lanceolate, acute or acuminate; petals white, thin, sometimes yellow at the base, twice as long as the calyx; fruit depressed-globose, 12-20 mm. broad, the carpels thin and papery, somewhat inflated, pale green or whitish, stellate-pilose and usually bearing also long simple hairs.

Many authors consider this plant a species of *Abutilon* but some who have devoted much attention to the family, such as Hochreutiner, consider it a distinct genus, and apparently it has as good claims to generic rank as many other generally recognized groups of the Malvaceae.

### GOSSYPIUM L. Cotton

*References:* George Watt, The wild and cultivated cotton plants of the world, 1907; Guy Roberty, Hypothèses sur l'origine et les migrations des cotonniers cultivés et notes sur les cotonniers sauvages, *Candollea* 7: 297-360. 1938; J. B. Hutchinson, R. A. Silow & S. G. Stephens, The evolution of *Gossypium*, i-xi, 1-160. ill. 1947.

Tall herbs or shrubs; leaves usually long-petiolate and 3-9-lobate; flowers large, yellow or red, the calyx subtended by 3 large cordate bractlets, these often black-punctate, incised-dentate or entire; calyx truncate or shortly 5-fid; ovary 5-celled, the cells many-ovulate; style clavate at the apex, 5-sulcate and bearing 5 stigmas; fruit a loculicidally dehiscent capsule; seeds subglobose or angulate, densely lanate with usually very long hairs, sometimes almost glabrous; endosperm scant or none; cotyledons strongly plicate, the radicle straight.

Watt recognizes 42 species (whereas Hutchinson et al. reduce the number to 20, with several varieties), natives of tropical and subtropical regions of both hemispheres. The species that are or have been under cultivation are difficult of determination because the plants hybridize freely, and at best the specific characters seem to be poorly marked and not well understood. Except for Watt's treatment, which taxonomically is very far from being satisfactory,

no serious recent attempt has been made to classify the cultivated cottons. No species except the following are known in Central America.

Calyx lobes with long subulate tips.....*G. irenaeum*.

Calyx lobes merely acute or obtuse.

Seeds with long, loose, easily detachable hairs, without a covering of "fuzz" or short hairs; staminal column long; anthers compactly arranged, on short filaments which are all about the same length.....*G. barbadense*.

Seeds with a double coat, consisting partly of long, firmly adherent hairs and also of a dense coat of "fuzz" or short hairs; staminal column short; anthers loosely arranged, the anther filaments longer above than below.

Leaves mostly large, with 3 ascending lobes, abundantly pilose, at least beneath.....*G. hirsutum*.

Leaves smaller, with 3-5 spreading lobes, often glabrate but frequently abundantly pilose.....*G. mexicanum*.

***Gossypium barbadense* L. Sp. Pl. 693. 1753. *Algodón. Sea Island or Long Staple Cotton.***

Cultivated on a small scale in Guatemala, and rarely found persisting after cultivation. Native of tropical South America. Cultivated in many warm regions of the earth.

A coarse herb or a shrub 1-4 meters high; leaves long-petiolate, 5-15 cm. long, 3-5-lobate or entire, the lobes ovate or ovate-lanceolate, ascending or spreading, acute or acuminate, glabrous or nearly so; bractlets shorter than the petals, broadly cordate, with few lacinations; petals about 5.5 cm. long, pale yellow, turning dull red or purple; capsule ovoid, acuminate, pitted; cotton white, long, easily separating from the seeds which bear no fuzz.

This is planted at various places in Guatemala, but less commonly, apparently, than *G. hirsutum*. It is grown in Escuintla, also in the lowlands of Alta Verapaz, and doubtless also in other parts of the country. The Maya names in Yucatan are "tsiin" and "taman."

Cotton is of very great economic importance in Guatemala (as in most other parts of the earth) because of the extensive manufacture of textiles in that country. Not enough cotton is produced within the country for the local manufactures, and much has to be imported from the United States in raw form; some also comes from the neighboring republic of Salvador, where at present larger amounts are produced. It is said that around 1865 more cotton was planted locally than at present. The use of cotton was well known to the original inhabitants of all parts of Guatemala, who early learned to weave from it cloth for their clothing. At the present time cotton cloth is woven in all parts of the country, especially by the more primitive Indians, who weave in their own

homes cloth that they wear or sell to their neighbors who do not weave. The Guatemalan textiles, of both cotton and wool, are infinitely varied in quality, color, and thread, and even a brief discussion of them would fill many pages. Probably in few regions of the earth, except the highly commercialized ones, has cotton weaving been so much of an art or so diversified. Almost every village of Guatemala produces its own peculiar cloth, which can be recognized at once by one familiar with the country. The village from which an Indian woman comes usually can be determined by a glance at her upper garments. Formerly the same was true of the men, but in recent years through most of Guatemala the men have discarded their distinctive costumes, unless on holiday occasions, for the prosaic white cotton trousers or the even less distinctive overalls. Almost every settlement of Guatemala merits mention for its cotton weaving, but especially is this true of the clothing worn by the women of Cobán and other parts of Alta Verapaz, where exquisite garments, usually worn spotlessly white, are fabricated. Very many indeed are the hand looms of the country, to be found in thousands of the lowlier homes, and some of the looms for weaving small articles are very primitive. There are also in Guatemala establishments with modern machinery for weaving cotton and wool. The principal one, and a very large one, is situated at Cantel in the Department of Quezaltenango. This textile industry is one of great benefit to the country, for it gives employment to many thousands of people and makes unnecessary the importation of large amounts of cloth, stockings, etc., all or most of which must be imported into such countries as Costa Rica and Panama.

According to statistics of the Department of Agriculture of Guatemala, there were produced in the country in 1938-39 about 1,625,000 pounds of cotton. The leading departments in production were Retalhuleu, Quezaltenango, Suchitupéquez, Santa Rosa, and Sacatepéquez. Less than 5 per cent of the cotton woven in Guatemala is produced inside the country. Retalhuleu produces more than any other department and the extensive fields there are very conspicuous. The plants grow only during the *invierno* or rainy months, and during the dry *verano* the fields appear quite as dead as the cotton fields of the southern United States in winter. Some of these plantations are tended by Indians from the highlands of San Martín Chile Verde. Much wild cotton may be seen in this same region, and it is amusing to note that the birds have learned to build their nests of it. The notes on production given above cover both *G. barbadense* and *G. hirsutum*. The figures relating to production

probably are incomplete, especially as regards the considerable quantities produced upon small *finquitas*. Alta Verapaz, for instance, is credited with only 600 pounds of cotton, and Petén with 900. Cotton seed is exploited on a very large scale in the United States for its oil, which is used in cookery and in many industries. Refuse left after the oil has been expressed is an important stock feed and is used also in fertilizers. The root bark is official in the U. S. Pharmacopoeia. It has emmenagogue properties and is useful in facilitating parturition, but it is now little if at all employed. In some regions it has been used to induce abortion. It may be noted here that the Maya name used for sheep in Yucatan, formed, of course, after these animals were introduced from Spain, is "htaman," the term for cotton plus the masculine sign.

On the basis of their study of the evolution of cultivated and wild cottons, Hutchinson et al. conclude that no wild-linted type can be regarded as ancestral to the cultivated races, and that both biological and ethnological data support the view that the cultivated cottons of the New World as well as the Old "owe their origin to the activities of civilized man." (loc. cit.)

**Gossypium hirsutum** L. Sp. Pl. ed. 2. 975. 1763. *Algodón*.  
*Short staple cotton*.

Cultivated in numerous regions, especially the Pacific lowlands; sometimes persisting after cultivation or more or less naturalized.

A coarse herb or a shrub, 1-4 meters high, villous or hirsute with long, spreading, simple and stellate hairs; leaves 5-15 cm. long, shallowly cordate, mostly 3-lobate, glabrate above, hirsute or villous beneath, the lobes mostly short, deltoid to ovate, acute or acuminate, ascending; bractlets 3-6 cm. long, shorter than the petals, broadly cordate-ovate, cut into 9-13 lacinations; petals pale yellow fading to pink; capsule ovate-elliptic, acuminate, rough; seeds covered with short fuzz, greenish or ferruginous, the long white cotton firmly adherent to the seed.

This is the species most commonly and abundantly grown in the United States, and it is produced extensively in many other parts of the earth.

**Gossypium irenaeum** Lewton, Smithson. Misc. Coll. 60, no. 4: 1. pls. 1, 2. 1912. *Algodón*.

Cultivated in the lowlands of Alta Verapaz; described from plants grown in Florida from seeds collected at Finca Trece Aguas, Rubezul; Santa Rosa (Chiquimulilla).

A shrub 2-3 meters high; leaves 3-5-lobate, pilose above on the nerves, the lobes ovate, acute; bractlets large, broadly ovate-cordate, deeply lacinate, with

12-17 laciniations; calyx deeply 3-lobate, the lobes often trifid, the lobes subulate-attenuate, the middle one almost twice as long as the calyx tube; petals pale yellowish white, without red on the claws; capsule 5 cm. long, conic, acuminate; seeds black, without fuzz except for a tuft of hairs at the pointed end, the cotton abundant, white.

**Gossypium mexicanum** Todaro, Rel. Cult. Cot. 193. *pl.* 6. 1877-78. *G. hirsutum* f. *mexicanum* Roberty, Candollea 7: 332. 1938. *Algodón*; *Mix* (Poconchí); *Nooc* (Mame); *Teno* (Jacalteca); *Piitz* (Chuje); *Mit* (Quiché); *Coc'* (Jacalteca); *Ixcaco*, *Cuyuscate* (the brown form).

Frequent in the Pacific lowlands in moist or dry thickets, and probably native there; also planted frequently in the lowlands, chiefly a few shrubs about dwellings. Mexico; Salvador, and doubtless farther south in Central America.

A shrub 1-2 meters high, the branches and petioles pilose, at least at first; leaves usually small and 8 cm. long or less, 3-5-lobate, the lobes ovate, acute, radiating, often deeply cordate at the base, usually glabrate but often abundantly pilose; bractlets broadly ovate-cordate, about equaling the petals, with 7-9 laciniations; calyx 5-dentate, the teeth ovate, deltoid, or rounded; petals scarcely exceeding the bractlets, pale yellow, fading pink; capsule ovoid-oblong, acuminate; seeds with dense ashy fuzz and abundant, white or brown cotton.

This is presumably the cotton originally used by the Indians of Guatemala, and it must have been in use for many centuries. It has a wide distribution also in Mexico, and some of the cultivated cottons of the United States and other regions are said to be derived from it. At the present time it is cultivated to some extent in Guatemala, that is, in the ordinary manner, and a few bushes can be found about almost every dwelling, where the fiber is gathered and used for various purposes in the home. It grows wild plentifully on the Pacific plains, especially near the sea, and this may well be the original home of the plant. Of special local interest is "Ixcaco," the brown cotton grown on a limited scale, mostly in Suchitepéquez and Retalhuleu. It is, of course, not limited to this region but occurs also in Mexico. In Guatemala this often is offered in the markets in quantity, especially in the market of Momostenango, and it is spun into thread that is used in its natural color in some of the local textiles. It is presumably this species that has been reported from San José (Escuintla) under the name *Gossypium Davidsoni* Kellogg, a Mexican species.

Hutchinson et al. include this species as synonymous with *G. hirsutum*.



## HIBISCUS L.

*Reference:* B. P. G. Hochreutiner, Révision du genre *Hibiscus*, Ann. Cons. Jard. Bot. Genève 4: 23-191. 1900.

Herbs, shrubs, or trees, hispid, tomentose, or almost glabrous; leaves variable, often lobate; flowers mostly large and showy; bractlets usually numerous, sometimes only 3-5, at the base of the calyx, free or more or less united; calyx 5-lobate or 5-dentate; ovary 5-celled, the cells 3-many-ovulate; style branches 5, the stigmas capitate or spatulate; capsule loculicidally 5-valvate, the endocarp sometimes membranaceous and separable; seeds reniform or subglobose, glabrous or pubescent.

Species about 200, chiefly in tropical regions. A few additional ones are known from southern Central America.

Bractlets bifurcate or orbicular-dilated at the apex.

Bractlets orbicular-dilated at the apex, not bifurcate.....*H. sororius*.

Bractlets bifurcate at the apex.

Stems and petioles conspicuously aculeolate, the leaves glabrate beneath.  
*H. bifurcatus*.

Stems and petioles not aculeolate or very obscurely so, the leaves often densely stellate-tomentose beneath.

Leaves stellate-hispidulous beneath, green, rough to the touch.*H. costatus*.

Leaves stellate-tomentose beneath, pale, soft to the touch...*H. furcellatus*.

Bractlets neither bifurcate nor orbicular-dilated at the apex.

Leaves entire; trees or large shrubs of coastal thickets or mangrove swamps.  
*H. tiliaceus*.

Leaves dentate and often lobate.

Calyx spathaceous, cleft on one side in anthesis. Leaves lobate; petals yellow.

Bractlets linear, numerous, or at least more than 6; lobes of the leaves long-acuminate.....*H. Abelmoschus*.

Bractlets ovate-lanceolate, 4-6; lobes of the leaves rounded or very obtuse.  
*H. esculentus*.

Calyx not spathaceous, not cleft.

Bractlets 3-6 mm. wide, broadly linear or oblong-obovate.

Leaves 3-5-lobate almost to the base; calyx red.....*H. Sabdariffa*.

Leaves very shallowly or not at all lobate; calyx green.

Leaf blades deeply cordate at the base; bractlets broadly linear.  
*H. clypeatus*.

Leaf blades truncate or subcordate at the base; bractlets oblong-obovate.....*H. lavateroides*.

Bractlets narrowly linear or setaceous, less than 2 mm. wide.

Petals deeply laciniate-lobate; flowers pendent. Cultivated plant.  
*H. schizopetalus*.

Petals not laciniate; flowers erect.

Stems conspicuously aculeate; peduncles hirsute with long spreading hairs.....*H. diversifolius*.

Stems not aculeate or very obscurely so, and the peduncles then glabrate.

- Leaves densely stellate-tomentose beneath.....*H. mutabilis*.  
 Leaves glabrate beneath.  
   Petals 1-2 cm. long; bractlets much longer than the calyx; native plant.....*H. brasiliensis*.  
   Petals 3-8 cm. long; bractlets little exceeding the calyx, or often much shorter; cultivated or introduced plants.  
     Plants herbaceous; flowers subsessile.....*H. cannabinus*.  
     Plants woody, tall shrubs; flowers pedunculate.  
       Peduncles about as long as the petioles; leaves mostly 3-lobate.....*H. syriacus*.  
       Peduncles several times as long as the petioles; leaves not lobate.....*H. Rosa-sinensis*.

**Hibiscus Abelmoschus** L. Sp. Pl. 696. 1753. *Algalia*; *Elvira* (Petén); *Gaumauca* (Izabal).

Wet thickets or in waste or cultivated ground, 650 meters or less; often cultivated for ornament; Petén; Alta Verapaz; Izabal; Santa Rosa; Retalhuleu. Native probably of India but now widely cultivated and often naturalized in tropical regions.

A coarse erect herb, probably annual, usually about a meter high, the stems and leaves densely hirsute or hispid with long, spreading, stiff, mostly simple hairs; leaves long-petiolate, 3-5-lobate, usually deeply so, deeply cordate at the base, mostly 10-15 cm. long, the lobes acute or acuminate, serrate-dentate; flowers long-pedunculate, solitary, the bractlets 8-10, linear, hirsute, 10-12 mm. long; calyx 2.5-3.5 cm. long, 5-dentate, cleft on one side at anthesis and deciduous from a persistent base; petals 4-8 cm. long, bright yellow or sulphur-yellow, with crimson or purplish claws; capsule lance-ovoid, 4-7 cm. long, hirsute, the cells many-seeded; seeds glabrous, striate, with the odor of musk (*almizcle*), 4-5 mm. long.

Called "almizcle" in Salvador, and in British Honduras "hierba de sapo" and "wild okra." The plant is a showy one because of its very large, yellow flowers, which are delicate in texture and fragile. The stems yield a strong fiber that has been utilized in some regions, and the yield per acre, when the plant is cultivated, is said to be very large. The seeds are used in perfumery as a cheap substitute for true musk, of animal origin. They are used also in necklaces, to perfume them. In Petén and elsewhere in Guatemala, as well as in Honduras, a tincture of the seeds is one of the local remedies for bites of snakes and other poisonous animals as well as for colic.

**Hibiscus bifurcatus** Cav. Monad. Diss. 3: 146. *pl. 51, f. 1*. 1787. *Reguilete*, *Chichicaste* (fide Aguilar); *Amapola grande*.

Mostly in open swamps or marshes, often along or near the seashore, 1,400 meters or less; Izabal; Guatemala(?); Huehuetenango.

Southern Mexico; British Honduras to Panama; West Indies; South America.

A coarse erect herb 1-2.5 meters high, the stems and petioles armed with numerous broad-based prickles, also stellate-hispidulous; leaves long-petiolate, deeply 3-5-lobate, mostly 6-12 cm. long, green, rather sparsely stellate-hispid or glabrate, cordate at the base, the lobes acute to long-acuminate, dentate; peduncles stout and 1-3 cm. long, solitary in the upper leaf axils; bractlets 9-13, linear, unequally furcate at the apex, usually longer than the calyx, covered with white tuberculate-based hairs or prickles, 12-20 mm. long; calyx 13-15 mm. long, hispid, enlarged in fruit, the lobes with thickened margins; petals pink or purple, 7-9 cm. long; capsule about equaling the calyx, long-pilose; seeds 3-4 mm. long, minutely tuberculate, glabrous.

In Huehuetenango the plant, i.e., the mucilaginous sap, is said to be used in clarifying sugar sirup.

**Hibiscus brasiliensis** L. Sp. Pl. ed. 2. 977. 1763. *H. phoeniceus* Jacq. Hort. Bot. Vind. 3: 11. pl. 14. 1776.

Mostly in dry rocky thickets, 1,150 meters or less; Zacapa; Chiquimula; Jalapa; Guatemala (Fiscal). Southern Mexico; Salvador; West Indies; South America.

Plants slender, sparsely branched, herbaceous or suffrutescent, commonly a meter high or less, the stems green, sparsely stellate-hispidulous or almost glabrous; leaves slender-petiolate, deltoid-ovate, often shallowly hastate-lobate, 3-8 cm. long, acute or acuminate, truncate or obtuse at the base, coarsely dentate, appearing glabrous but with minute stellate hairs on the upper surface and coarser ones on the lower surface; peduncles solitary, axillary, slender, mostly longer than the leaves; bractlets about 10, linear, equaling or often much longer than the calyx, glabrate; calyx stellate-hispidulous, 10-12 mm. long, deeply lobate, the lobes ovate or lanceolate, acuminate; petals 2 cm. long or less, pink, dark crimson, or white, stellate-hispidulous outside; capsule shorter than the calyx, stellate-hispidulous; seeds black, covered with long cotton-like hairs.

Called "mañanita" in Salvador. The plant appears to be rare in Guatemala, and to be in leaf and flower only during the wetter months.

**Hibiscus cannabinus** L. Syst. Nat. ed. 10. 1149. 1759.

Sometimes cultivated for ornament, and to be expected as an escape. Native of the East Indies, but often planted in other tropical regions, and often escaping to waste ground.

Plants annual, a meter high or less, simple or branched, the stems often aculeolate; leaves slender-petiolate, most of them 3-5-lobate almost to the base, the lobes narrow, serrate, glabrate, the petioles sometimes aculeolate, often longer than the blades; flowers axillary, subsessile; bractlets 7-10, linear, sometimes with a small tooth on one side below the apex, shorter than the calyx and attached on

its base; calyx in fruit 2 cm. long, sparsely stellate-hispid, the lobes linear-attenuate; petals about 4 cm. long, dark red or sometimes yellow; capsule shorter than the calyx, densely setose-hispid.

In India called "Deccan" or "Ambari hemp." The stems yield a stout fiber that is said to be similar to jute but superior for practical purposes.

**Hibiscus clypeatus** L. Syst. Nat. ed. 10. 1149. 1759.

Thickets or open forest, 400 meters or less; Petén. Southern Mexico; Greater Antilles.

A shrub 3-4.5 meters high, the stout branches densely stellate-tomentose with fulvous hairs; leaves long-petiolate, rounded-cordate, 10-20 cm. long, abruptly cuspidate at the base, often 3-angulate or shallowly 3-lobate, rather softly and densely stellate-pilose on both surfaces, more densely so beneath, somewhat undulate-dentate; peduncles axillary, solitary, 1-flowered, about twice as long as the petioles; bractlets 9-11, linear-lanceolate, unequal, much shorter than the calyx; calyx 5-lobate, 3.5-4 cm. long, coarsely and densely stellate-tomentose, the lobes foliaceous, ovate, acute, 5-nerved; petals reddish yellow or dull purple, 4.5-6 cm. long; capsule hirsute-tomentose with yellow hairs; seeds very dark brown, glabrous, 4 mm. long.

The Maya name in Yucatan is reported as "hol."

**Hibiscus costatus** A. Rich. Ess. Fl. Cub. 138. 1845. *H. australis* Rose ex Donn. Smith, Enum. Pl. Guat. 6: 4. 1903, nomen (based on *Tuerckheim* 7823 from Chicoy, Baja Verapaz). *Algodón* (Alta Verapaz).

Mostly in open swamps or marshes 1,000 meters or less; Alta Verapaz; Baja Verapaz; Izabal. Southern Mexico; British Honduras; Cuba.

A coarse herb about a meter high, the branches stellate-hispidulous or glabrate; leaves long-petiolate, ovate-cordate to reniform-cordate, mostly 5-10 cm. long, acuminate, dentate, shallowly cordate at the base, often angulate or shallowly lobate, green, thinly stellate-hispidulous on both surfaces, very rough to the touch; peduncles axillary, solitary, sometimes longer than the leaves; bractlets about 10, equaling or shorter than the calyx, linear, dilated and furcate at the apex, hispid; calyx 2 cm. long, hispid, costate, the lobes long-acuminate; petals 6.5-7.5 cm. long, pale pink or purple; capsule densely long-strigose; seeds glabrous.

The plant is showy because of the large and rather handsomely colored flowers, but it is unpleasant to handle because of the stiff hairs that can penetrate the skin.

**Hibiscus diversifolius** Jacq. Icon. Pl. Rar. 3: *pl.* 551. 1786-93. *Corcho*; *Sipipa*.

Petén, 400 meters or less. British Honduras; Costa Rica; Colombia; Brazil; tropical Africa and Asia.

A large coarse herb, the stems and petioles densely armed with stout broad-based prickles, sparsely or densely hirsute with long soft spreading hairs; leaves long-petiolate, rounded-cordate, mostly 5–12 cm. long, acute or acuminate, shallowly cordate at the base, 3–5-angulate or shallowly lobate, dentate, hirsute or hispid, especially beneath, bearing numerous long soft simple hairs; peduncles axillary, solitary, simple, mostly longer than the petioles, long-hirsute; bractlets almost filiform, 2 cm. long, long-hirsute; calyx in fruit about 4 cm. long, densely long-hirsute, shallowly lobate, the lobes triangular, subulate-acuminate; petals 6–7.5 cm. long, purple, pink, or yellowish; capsule densely hirsute, about equaling the calyx; seeds glabrous.

The Maya name "sicitah" is reported from British Honduras.

**Hibiscus esculentus** L. Sp. Pl. 696. 1753. *Abelmoschus esculentus* Moench, Meth. 617. 1794. *Ocra*; *Gombo*; *Chimbombo*.

Native of the Old World tropics, cultivated occasionally in the lowlands of Guatemala, chiefly near sea level; cultivated generally as a vegetable in warmer parts of the earth.

A coarse annual, usually 1–2 meters high, the stems and leaves glabrous or with a few simple or branched hairs; leaves shallowly or deeply lobate, rounded-ovate or suborbicular, sinuate-dentate; bractlets 8–12, hirsute, linear, 10–13 mm. long; calyx 1.5–2.5 cm. long, 5-dentate, cleft on one side and falling from the persistent base, pubescent; petals 3–6 cm. long, yellow with reddish claws; capsule lance-oblong, 8–12 cm. long, 1.5–2 cm. thick, 5-angulate, hirsute, the cells many-seeded; seeds globose-reniform, striate, 5 mm. long, pilose.

The okra is a favorite vegetable among the West Indian element on the Atlantic coast of Central America, but elsewhere it is grown sparingly. The young tender capsules, the parts eaten, are offered for sale in the markets of central Guatemala but usually in small amounts. It is one of the favorite vegetables of the southern United States and may be grown even far northward, where the summers are not too short. Probably the plant was brought to America from Africa by early slaves, who brought also the name "ocra," and the term "gombo," by which the plant is known in Salvador and elsewhere in Central America. The stems contain a strong fiber. The seeds yield an oil similar to olive oil. In some parts of tropical America, for instance in Mexico, they are used as a substitute for coffee. Like many other Malvaceae, the okra plant contains a mucilaginous sap and this is particularly in evidence in the young capsules, whose excess of rather slimy mucilage is found unpleasant by some people.

**Hibiscus furcellatus** Lam. Encycl. 3: 358. 1789.

Wet thickets or marshy ground, sometimes in pine savannas, little above sea level; Izabal. Veracruz; Florida; Tabasco; British Honduras; West Indies; South America.

A coarse herb or a shrub, 1-2 meters high, the branches densely stellate-tomentose and sometimes sparsely short-aculeolate; leaves long-petiolate, broadly ovate to rounded, mostly 8-12 cm. long, obtuse or acute, cordate at the base, undulate-dentate and often angulate or shallowly lobate, finely and closely stellate-tomentose on both surfaces, more densely so and pale beneath; peduncles axillary, about as long as the petioles, stout; bractlets 10-14, linear, furcate at the apex, hirsute, 10-15 mm. long; calyx 1.5-2 cm. long, costate, stellate-pubescent, the lobes triangular, acute; petals 6-8 cm. long, rose-pink; capsule slightly shorter than the calyx, long-strigose; seeds glabrous, minutely papillate.

**Hibiscus lavateroides** Moric. Mém. Soc. Phys. Genève 7: 263. *pl.* 16. 1836.

Cultivated in garden, San Felipe, Retalhuleu, and perhaps native somewhere in Guatemala. Mexico; Honduras; Jamaica.

A shrub 1-2.5 meters high, the branches slender, stellate-hispidulous; leaves on slender, rather short petioles, deltoid-ovate, 3-9 cm. long, acute, truncate or subcordate at the base, crenate-dentate, often shallowly 3-lobate, stellate-hispidulous on both surfaces, more densely so and paler beneath; peduncles axillary, solitary, often equaling or longer than the leaves; bractlets about 10, spatulate or oblong-obovate, much shorter than the calyx, foliaceous, obtuse, pubescent, often reflexed; calyx stellate-hispidulous, 2 cm. long, the lobes triangular, mucronate-acuminate; petals 3-4 cm. long, rose-colored, sparsely stellate-hispidulous outside; capsule shorter than the calyx, minutely stellate-pubescent or glabrate; seeds dark brown, covered with long cotton-like hairs.

**Hibiscus mutabilis** L. Sp. Pl. 694. 1753. *Amistad; Amor de estudiante; Flor del tiempo; Variedad; Variedad de tiempo.*

Native of China and Japan, cultivated commonly for ornament in Guatemala, chiefly in the mountain regions.

A shrub, sometimes 5 meters high, much-branched, the branches and petioles covered with a dense tomentum composed of very unequal, stellate hairs, some of the hairs viscid; leaves long-petiolate, about as broad as long, truncate or shallowly cordate at the base, crenate-dentate, with 3-5 angles or shallow lobes, the lobes acute or subacute, finely stellate-puberulent on both surfaces, more densely so beneath; peduncles axillary, 1-flowered, mostly 2-3 times as long as the petioles or longer; bractlets 10, linear, much shorter than the calyx, green; calyx 2 cm. long, deeply lobate, densely and closely stellate-tomentose, the lobes triangular-ovate, acute or acuminate; petals 5 cm. long, white or pink at first when the flowers open in the morning, turning dark red by evening; flowers sometimes double.

Called "cortejo" in Yucatan and "variedad" in Salvador. This species is a favorite ornamental shrub in most parts of Central

America, perhaps because it grows well with little attention. Although the flowers are large, they are not especially attractive, but they are curious because of the changes that take place in color of the petals during the day. Plants with double flowers are seen occasionally but they are not common.

**Hibiscus Rosa-sinensis** L. Sp. Pl. 694. 1753. *Clavel; Clavel japonés; Clavelón; Estrella de Panamá; Clavel de Panamá; Catahilutzú* (Cobán, Quechí); *Jazmín de chíspa* (Cobán).

Native of tropical Asia, but now grown extensively in almost all tropical regions of the earth as an ornamental plant, also in hothouses in colder regions. One of the commonest ornamental shrubs of Guatemala, seen everywhere up to 2,300 meters or in small numbers at even greater elevations.

Usually a shrub of 1.5-3 meters, almost glabrous; leaves on rather short petioles, ovate, acuminate, obtuse or rounded at the base, crenate-dentate; peduncles equaling or longer than the petioles; bractlets 6-7, linear, half as long as the campanulate calyx; corolla usually white, red, or purplish, but sometimes yellow, very variable in size; stamen tube longer than the petals; capsules usually not maturing in cultivated plants; flowers sometimes double.

In Honduras sometimes called "mar pacífico," "amapola," and "campana"; "tulipán" (Yucatan). The Chinese hibiscus is one of the favorite ornamental shrubs of all parts of Central America, and of few introduced woody plants are there more numerous individuals. There are many varieties in shape and color of corolla, most of them rather ordinary, although some of the finer varieties of recent development may be seen in a few gardens. The shrub thrives best in the warmer regions, especially on the coastal plains and in the bocacosta. It is said not to grow so high as Quezaltenango, but probably a few individuals may be found even in that chilly climate. There are many miles of hibiscus hedges bordering cafetales along the roads of San Marcos and Quezaltenango. The petals turn black when crushed, and in China are used for blacking shoes and dyeing the hair and eyebrows. They impart to paper a dye that reacts like litmus.

**Hibiscus Sabdariffa** L. Sp. Pl. 695. 1753. *H. cruentus* Bertol. Fl. Guat. 428. pl. 45. 1840 (type from Escuintla, Velásquez). *Jamaica; Rosa de Jamaica*.

Native of the East Indies, but now grown in most tropical and subtropical regions, and sometimes naturalized as a weed in tropical

America. Frequent in the lowlands of Guatemala in cultivation, rarely escaping to waste ground, but probably not persisting.

An erect herb, usually 1-2 meters high, occasionally suffrutescent at the base but essentially annual, the stems dark red, glabrous; leaves on long or short petioles, glabrous, with red nerves, 3-5-lobate almost to the base, the lobes narrow, serrate, the costa bearing a large gland beneath near the base; bractlets united with the calyx, accrescent in fruit and with the calyx forming a large, fleshy, dark red cup; peduncles very short; calyx in flower about 2 cm. long; petals 4-5 cm. long, pale yellow, turning pink or dark red; capsule densely strigose, shorter than the calyx; seeds puberulent.

Called "roselle" and "sorrel" in British Honduras, the former being the name by which the plant is best known in the United States. In Guatemala the plant has been found more or less wild about Puerto Barrios, Ipala (Chiquimula), Estancia Grande (Guatemala), and Ocós (San Marcos). It is most grown in the lowlands, and always is to be expected where there are West Indian immigrants. It is probably one of the plants brought from Africa to America by the slaves. It has been in cultivation in Guatemala at least a century, since Velásquez mentions its use at Escuintla before 1840 in the preparation of a "refresco." The mature calyces are very juicy and mucilaginous, with an agreeable acidulous flavor. They are much used in Guatemala for preparing one of the characteristic "frescos" or "refrescos," similar to lemonade and a favorite remedy for the after effects of drunkenness. Either the fresh or dried calyces are used for the purpose, and they are often carried up into the highlands, where the plant is not grown. The fiber of the stems is said to be much used in India for making cordage. In the United States roselle is often grown in Florida, where it is used to make sirups and jelly.

**Hibiscus schizopetalus** Hook. f. Bot. Mag. *pl.* 6524. 1880.  
*Canastilla; Clavel; Clavel de canastilla; Tulipán* (Petén).

Native of tropical East Africa, but grown for ornament in most tropical regions. Cultivated commonly in Guatemala, especially in the lowlands of both coasts; infrequent at higher elevations, although sometimes seen at 1,500 meters or more.

A slender shrub, usually 2-3 meters high, glabrous or nearly so, in most characters similar to *H. Rosa-sinensis*; leaves slender-petiolate, oblong-ovate or elliptic-oblong, acute, obtuse at the base, serrate-dentate; peduncles solitary in the upper leaf axils, several times as long as the subtending leaves, usually pendent, articulate above the middle; bractlets minute and abortive, few; calyx tubular-campanulate, 2 cm. long, irregularly cleft, the lobes obtuse; petals salmon-red,



4-5 cm. long, reflexed, deeply laciniate-lobate into narrow segments; stamen tube much longer than the petals.

This is much less common in cultivation in Central America than *H. Rosa-sinensis*, and it is much less showy in flower, for generally the flowers are produced in only small numbers. They are, however, odd and rather pretty. Sometimes called "campana" and "viuda alegre" in Honduras.

**Hibiscus sororius** L. f. Suppl. Pl. 311. 1781. *San Antonio* (Petén).

Usually found in marshes or in wet soil along streams, 1,000 meters or less; Petén; Izabal; Jutiapa; Santa Rosa. Tabasco; British Honduras; Panama; West Indies; South America.

A coarse herb or a shrub 1-2.5 meters high, the stems and petioles densely stellate-tomentulose; leaves long-petiolate, cordate-ovate to rounded-cordate, mostly 6-16 cm. long, obtuse or subacute, deeply and narrowly cordate at the base, crenate, sometimes subangulate or obscurely 3-lobate, often broader than long, green above and stellate-puberulent, paler beneath, closely and minutely stellate-tomentulose; peduncles solitary in the upper leaf axils, often longer than the subtending leaves; bractlets shorter than the calyx, linear below, dilated above into an orbicular or subreniform, green appendage; calyx green, 2.5-3 cm. long, thinly stellate-hispidulous, the lobes broadly ovate, obtuse or subacute; petals 4-6 cm. long, rose-pink; capsule shorter than the calyx, densely appressed-hispid; seeds glabrous.

In f. *albiflorus* Standl. (Contr. Arnold Arb. 5: 101. 1933), described from Panama, the petals are white.

**Hibiscus syriacus** L. Sp. Pl. 695. 1753.

Occasionally planted for ornament, as in Jalapa, Guatemala, and Huehuetenango, and doubtless in other localities. Native of western Asia, but cultivated in many temperate or warmer regions of the earth.

A shrub or small tree 3-6 meters high, almost glabrous; leaves short-petiolate, mostly hastate-ovate, 5-10 cm. long, acuminate, obtuse or broadly cuneate at the base; peduncles axillary, very short; bractlets linear, mostly shorter than the calyx; calyx densely stellate-tomentulose; petals 2.5-5 cm. long, pink, lavender, or white with a crimson base; capsule 2-2.5 cm. long.

Usually known in the United States by the name "rose of Sharon." The species is a temperate one, and withstands the winters of the northern United States. It is little grown in Central America, being much inferior in beauty to the Chinese hibiscus. Called "clavel" in Salvador.

**Hibiscus tiliaceus** L. Sp. Pl. 694. 1753.

Mostly in mangrove swamps, or in beach thickets; Izabal; Escuintla; San Marcos; probably in all the coastal departments. Mexico; Florida; British Honduras to Panama; West Indies; South America; widely distributed in the Old World tropics.

A shrub or small tree, sometimes 6 meters high or more; stipules large, oblong, persistent; leaves long-petiolate, ovate-cordate or reniform-cordate, 6-18 cm. long, abruptly acute or short-acuminate, deeply cordate at the base, entire, green above and almost glabrous, whitish beneath and covered with a dense tomentum of unequal stellate hairs; peduncles mostly short, in the upper leaf axils, 1-flowered; bractlets united to form a cup distinct from the calyx, this 6-17 mm. long, 8-11-lobate; calyx 1.5-3 cm. long; petals 4-8 cm. long, yellow, turning red in age, greenish when dried; capsule 1.5-3 cm. long, ovoid, stellate-tomentose; seeds 4 mm. long, glabrous, papillose.

Called "mahoe," "blue moho," and "wild cotton" in British Honduras; known in Honduras as "majagua" and "majao," terms of Antillean, perhaps Carib, origin; "pox" (Tabasco); "xholol" (Yucatan, Maya). The tree is a characteristic one of mangrove swamps, although one often may search in vain for it in mangrove formations. The wood is white, soft, porous, light in weight, and sometimes used as floats or as a substitute for cork. Among the aborigines it was an important source of cordage. It is still used to some extent in America for that purpose, and in the Pacific islands large cables and heavy ropes are often made from it. In quality the fiber is similar to jute, and it has the property of becoming stronger when wet by water. In many parts of the tropics it was used for making mats and coarse cloth. In the Pacific islands the mucilaginous bark was sometimes eaten when food was scarce, and the aborigines of Queensland ate the roots and also the young leaves, which have a slight acid flavor. Dampier records that the Indians of the Mosquito coast made their fish lines from the fiber, and that the privateers often made their rigging of it. The wood is believed to be suitable for making paper.

**KOSTELETZKYA** Presl

Herbs or shrubs, usually with rough stellate pubescence; leaves mostly sagittate or angulate-lobate; peduncles 1-many-flowered, axillary or in terminal racemes or panicles, the flowers pink, purple, or yellowish, the petals spreading or erect and convolute; bractlets at the base of the calyx 7-10, sometimes almost obsolete; calyx 5-lobate or 5-dentate; ovary 5-celled, the cells 1-ovulate; style branches 5, with capitate or dilated stigmas; capsule depressed, 5-angulate, loculicidally dehiscent; seeds reniform, ascending.

About 12 species in America, Africa, and the Mediterranean region. Only one species is known from Central America.

**Kosteletzkya pentasperma** (Bert.) Griseb. Fl. Brit. W. Ind. 83. 1859. *Hibiscus pentaspermus* Bert. ex DC. Prodr. 1: 447. 1824. *K. sagittata* Presl, Rel. Haenk. 2: 131. pl. 70. 1836.

Moist fields or thickets, often near the seacoast in or near salt flats, 1,200 meters or lower; Jutiapa; Escuintla; Guatemala (Amatitlán); Retalhuleu; San Marcos. Mexico; West Indies; northern South America.

A slender herb a meter high or less, often much-branched, the stems green, stellate-hispidulous and often bearing few or many long yellow simple hairs; leaves slender-petiolate, very variable in shape on different parts of the same plant, linear-oblong to deltoid, mostly 3-7 cm. long, long-acuminate to obtuse, more or less cordate at the base, often or usually hastate-lobate, sometimes 3-5-lobate, crenate-serrate, green, sparsely stellate-hispidulous; peduncles slender, shorter than the leaves, 1-flowered; bractlets linear or subulate, green, shorter than the calyx; calyx 4.5-5 mm. long, stellate-hispidulous, green, the lobes ovate, subacute; petals white, 1 cm. long; capsule about 9 mm. broad and 5 mm. high, deeply 5-lobate, the lobes truncate above, acute dorsally, densely hispidulous on the angles; seeds minutely pubescent.

Here belongs presumably *Bernoulli & Cario* 3081, probably from Retalhuleu, reported by Hemsley as *K. hastata* Presl. Some of the Guatemalan specimens could be referred equally well to *K. hastata*, which probably is not clearly separable from *K. pentasperma*.

### LAVATERA L.

Herbs, shrubs, or small trees, tomentose or hirsute with stellate hairs; leaves long-petiolate, angulate or lobate; flowers solitary in the leaf axils or in terminal racemes, mostly large and showy, usually pink or white; bractlets at the base of the calyx 3-6, usually somewhat connate; calyx 5-lobate; ovary many-celled, the cells 1-ovulate; style branches as many as the cells, filiform, longitudinally stigmatose on the inner side; mature fruit depressed, the carpels verticillate about the short axis, separating from the axis but indehiscent; seed ascending.

Species about 20, in California and Lower California, the Mediterranean region, Canary Islands, Australia, and central Asia.

**Lavatera assurgentiflora** Kellogg, Proc. Calif. Acad. Sci. 1: 14. 1854. *Malva real*.

Native of southern California and northern Lower California; rarely planted for ornament in the Occidente of Guatemala, as around San Juan Ostuncalco, San Martín Chile Verde, and Almolonga, also at Antigua (Sacatepéquez); cultivated also in central Mexico.

A tree-like shrub 2-4 meters high with a clean trunk 10 cm. in diameter and a dense crown; leaves long-petiolate, 5-13 cm. long, deeply cordate at the base, usually 5-lobate to the middle or less deeply, the lobes irregularly lobate or dentate, the blades green but finely stellate-pubescent on both surfaces; peduncles numerous, long and slender; bractlets less than half as long as the calyx; calyx campanulate, about 12 mm. long, stellate-tomentulose; petals 3-4 cm. long, purplish red or deep pink veined with red; fruit deeply depressed at the apex, the carpels pubescent.

The shrub is rare in Guatemala but it sometimes appears in the most unexpected places, probably brought long ago from Mexico. It is very handsome when in flower.

### MALACHRA L.

Coarse herbs, annual or essentially so, usually hispid with harsh hairs; leaves mostly long-petiolate, angulate or lobate; flowers white, purple, or yellow, not very conspicuous, in dense, axillary or terminal heads subtended by large foliaceous bracts; bractlets irregularly scattered among the flowers or none; calyx 5-lobate or 5-dentate; stamen column short, truncate or 5-dentate, bearing numerous filaments; ovary 5-celled, the cells 1-ovulate; style branches 10, the stigmas capitellate; mature carpels separating from the central axis, obovoid, membranaceous or coriaceous, indehiscent or subdehiscent along the internal angle; seeds reniform, ascending.

Species about 9, all American, some of them apparently naturalized in Old World tropics. Only the following species are known from Central America.

Outer bracts suborbicular, rounded at the apex; plants stellate-pubescent with small and close, grayish hairs, never hispid with long hairs. Flowers yellow.

*M. capitata.*

Outer bracts ovate, acute or acutish; plants hispid with long, spreading, harsh, often yellowish hairs.

Flower heads terminal, large. Petals pink; leaves deeply lobate. . . . .*M. radiata.*

Flower heads all or chiefly axillary. Petals usually yellow or white.

Petals yellow; calyx 6-8 mm. long. . . . .*M. alceifolia.*

Petals usually white; calyx 4-5 mm. long. . . . .*M. fasciata.*

*Malachra alceifolia* Jacq. Coll. Bot. 2: 350. 1788. *Malva del país*; *Hierba de sapo* (Petén).

Moist or dry plains, fields, or open hillsides, 900 meters or less; reported from Petén; Chiquimula; Jutiapa; Escuintla; Retalhuleu. Southern Mexico; British Honduras to Panama; West Indies; northern South America.

A coarse stout herb 1.5 meters high or less, much-branched or subsimple, usually erect, sometimes procumbent, hispid almost throughout with long, stiff, often yellowish hairs, these simple or stellate; leaves long-petiolate, mostly 6-15 cm. long, rounded or cordate at the base, rounded or broadly ovate, 3-5-angulate

or rather shallowly 3-5-lobate, the lobes obtuse, dentate; stipules 10-15 mm. long; heads produced in the upper leaf axils, sessile or on peduncles as much as 10 cm. long; bracts broadly triangular or ovate, often 3-lobate, acute, deeply cordate at the base, sinuate or dentate, hispid, about 7-nerved; calyx membranous, whitish, the lobes lanceolate, mucronate, hispid; petals yellow, 1.5 cm. long; carpels of the fruit 3-3.5 mm. long, puberulent or glabrate.

Called "wild okra" and "malva" in British Honduras. This is a weedy plant, with long stiff hairs that easily penetrate the skin.

***Malachra capitata*** L. Syst. Nat. ed. 12. 458. 1767.

Mostly in weedy fields or waste ground, 400 meters or less; Petén; Chiquimula; Huehuetenango. Southern Mexico; reported from Panama; West Indies.

A coarse herb 1.5 meters high or less, usually erect, covered throughout with a rather dense tomentum of fine close stellate hairs, the stems often bearing a few long spreading hairs but not hispid; lower leaves about as broad as long, shallowly or often deeply 5-lobate, the upper leaves subangulate or shallowly lobate, sometimes subhastate, usually obtuse or truncate at the base, obtuse or rounded at the apex, crenate-dentate or undulate; stipules 5-15 mm. long; heads few, in the upper leaf axils, mostly on rather long peduncles; bracts more or less rounded, cordate at the base, obtuse or rounded at the apex, entire or with a few teeth, as much as 2 cm. long; calyx 6-8 mm. long, the lobes ovate-lanceolate; petals yellow, 1 cm. long; carpels of the fruit 3-3.5 mm. long, glabrous.

***Malachra fasciata*** Jacq. Coll. Bot. 352. 1788.

Moist or dry fields or thickets, often in waste or cultivated ground, 1,000 meters or less; Petén; Zacapa; Jutiapa; Santa Rosa; Escuintla; Retalhuleu. Southern Mexico; British Honduras; Costa Rica; Panama; West Indies; South America.

Plants usually erect and a meter high or less, hispid throughout with long, often dense, stiff, spreading, yellowish hairs, these simple or stellate; lower leaves angulate or shallowly or often deeply 3-5-lobate, the upper leaves ovate or lanceolate, shallowly lobate or sometimes not at all lobate, dentate, all the leaves obtuse at the base, the lobes obtuse or acute; stipules 1-3 cm. long; flower heads densely long-hispid, axillary, usually short-pedunculate or subsessile; bracts ovate or broadly triangular, long-acuminate, subcordate at the base, often ciliate, as much as 2.5 cm. long; calyx 4-5 mm. long, the lobes lanceolate, long-mucronate; petals white, sometimes pinkish outside, 1 cm. long; carpels of the fruit 3-3.5 mm. long, reticulate; seeds brown, 2.5 mm. long.

Called "wild okra" in British Honduras.

***Malachra radiata*** L. Syst. Nat. ed. 12. 459. 1767. *Torillo*.

Grassy places or damp thickets, 900 meters or less; Chiquimula; Jutiapa; Santa Rosa. Nicaragua; Panama; West Indies; South America; tropical Africa.

Plants coarse, stout, 1-2 meters high, hispid throughout with long stiff spreading yellowish hairs, these mostly stellate; leaves deeply 3-5-lobate, the lobes narrow, acute or obtuse, dentate, usually narrowed toward the base; stipules 1 cm. long; flower heads large and dense, terminal and often surrounded by leaves; bracts rounded-ovate, obtuse or acuminate, obtuse at the base, dentate, 5-7-nerved; bractlets 9-12, filiform; calyx 8-10 mm. long or in age larger, the lobes lance-ovate, acute; petals pink, 11-13 mm. long; carpels of the fruit 4 mm. long, reticulate, glabrous; seeds brown, 3 mm. long.

This has been reported from Petén, but we have seen no specimens from that region.

### MALVA L. Mallow

Mostly annual herbs, erect to prostrate, stellate-pubescent or glabrate; leaves long-petiolate, usually broad, dentate, lobate, or dissected; flowers small or large, mostly purple, pink, or white, mostly solitary in the leaf axils, sometimes forming terminal racemes; bractlets at the base of the calyx 3; calyx 5-lobate; carpels of the ovary few or numerous, 1-ovulate; style branches as many as the carpels, linear, stigmatose along the inner side; carpels verticillate about the central axis, 1-seeded, not rostrate, indehiscent; seeds ascending.

About 30 species, all natives of the Old World, several of them widely naturalized in America. Only the following are known from Central America.

Petals about 2 cm. long, 2-4 times as long as the calyx.....*M. sylvestris*.

Petals 1 cm. long or less, little longer than the calyx.....*M. parviflora*.

*Malva parviflora* L. Amoen. Acad. 3: 416. 1756. *Malva*.

A common weed in waste or cultivated ground, often about dwellings, or in gardens and cafetales, 1,200-3,800 meters; Alta Verapaz; Jalapa; Guatemala; Sacatepéquez; Chimaltenango; Huehuetenango; Quezaltenango; San Marcos. Native of Europe, but widely naturalized in North and South America; frequent in mountain regions of Central America.

Plants annual but often persisting for some time, erect or prostrate, branched from the base, the stems mostly 60 cm. long or less, rather sparsely stellate-pilose or glabrate; leaves long-petiolate, rounded-reniform, mostly 3-7 cm. wide, cordate at the base, shallowly 5-9-lobate, the lobes rounded, crenate, sparsely or densely stellate-pubescent; peduncles solitary or fasciculate in the leaf axils, usually short; calyx lobes broad, obtuse or cuspidate; petals lavender or purplish white, inconspicuous; fruit depressed in the center, 8 mm. wide, pubescent, the carpels about 10, reticulate dorsally.

This is a common weed in many parts of the Guatemalan highlands, especially in the Occidente, where it is often frequent among cobblestones in streets.

*Malva sylvestris* L. Sp. Pl. 689. 1753. *Malva real*.

Often planted in the mountain regions for ornament, as in Alta Verapaz and Chimaltenango; rarely naturalized as a weed in waste or cultivated ground. Native of Europe, but cultivated in many regions, and naturalized in some parts of North America.

Plants biennial or annual, erect or ascending, branched, stellate-pilose or glabrate; leaves long-pedunculate, orbicular or reniform, 4-10 cm. wide, with 5-9 angles or shallow lobes, crenate-dentate, truncate or cordate at the base; flowers reddish purple, in fascicles in the upper leaf axils, forming a terminal raceme, slender-pedunculate; carpels of the fruit about 10, rugose-reticulate dorsally.

Few plants have retained their local names unchanged for so many centuries as have the mallows, which still bear in the Latin-American countries, whither they have been carried by man, the same vernacular name, *malva*, by which they were known to the ancient Romans. They probably were introduced into Central America and Mexico from Spain immediately after the conquest.

### MALVASTRUM Gray

Annual or perennial herbs, sometimes suffrutescent, in appearance much like *Sida*, the pubescence chiefly of stellate hairs; flowers mostly white or yellow, short-pedunculate or subsessile, axillary or in terminal spikes; bractlets 1-3 and small or none; calyx 5-lobate; ovary 5-many-celled, the cells 1-ovulate; style branches as many as the cells, filiform or clavate, truncate or capitate at the apex; mature carpels separating from the short axis, indehiscent or somewhat bivalvate, muticous or short-rostrate at the apex; seeds reniform, ascending.

Because of recent changes in generic alignment, it is difficult to estimate the number of species in this genus, but there are perhaps 50, mostly in tropical America, a few in South Africa. No other species are known in Central America.

Stems strigose, the hairs 4-rayed, the rays in approximate pairs directed forward and backward.....*M. coromandelianum*.  
Stems stellate-pubescent, the rays of the hairs usually more than 4, radiately divergent.

Carpels of the fruit strigose or hispid at the apex; leaves not lobate; flowers in dense or interrupted, terminal spikes.

Carpels bicuspidate at the apex; spikes interrupted; leaves pilose on the upper surface with simple hairs.....*M. guatemalense*.

Carpels rounded at the apex; spikes very dense, not interrupted; leaves stellate-pubescent.....*M. spicatum*.

Carpels of the fruit glabrous or rarely finely stellate-pubescent when young; leaves usually shallowly or deeply lobate; flowers not spicate, mostly in axillary clusters.

- Stems densely and persistently stellate-pilose; flowers short-pedicellate, the pedicels all or chiefly shorter than the calyx.....*M. ribifolium*.  
 Stems soon glabrate; flowers long-pedicellate, the pedicels all or mostly longer than the calyx.....*M. lacteum*.

**Malvastrum coromandelianum** (L.) Garcke, *Bonplandia* 5: 295. 1857. *Malva coromandeliana* L. Sp. Pl. 687. 1753. *Escobillo*; *Chichibé* (Petén, Maya).

Dry or moist fields or thickets or on rocky slopes, often a weed in cultivated or waste ground, 700 meters or less; Petén; Zacapa; Chiquimula; Jutiapa; Santa Rosa; Retalhuleu; Quiché; probably in all the coastal departments. Mexico; British Honduras to Salvador and Panama; West Indies; South America; naturalized in the Old World tropics.

An erect to decumbent herb, essentially annual, a meter high or usually lower, branched, strigose, the hairs closely appressed, mostly 4-rayed, the rays approximate in pairs; leaves slender-petiolate, oblong to rounded-ovate, mostly obtuse or rounded at the apex, obtuse or rounded at the base, 3-6 cm. long, crenate, green, sparsely strigose; stipules lanceolate, 7-9 mm. long, acuminate; flowers mostly solitary in the leaf axils at first, a secondary peduncle appearing later; bractlets about equaling the calyx and inserted on its base; calyx 5 mm. long, costate, sparsely strigose; petals orange or buff, 8-9 mm. long; carpels of the fruit hispid, bearing a short spine at the apex and 2 others dorsally.

Known in Salvador by the names "escobilla," "escobilla de chibolas," and "escobilla lisa"; "totopzots" (Yucatan, Maya); "malva" (British Honduras).

**Malvastrum guatemalense** Standl. & Steyerm. *Field Mus. Bot.* 23: 174. 1944.

Known only from the type locality, Santa Rosa, near Cuilapa, 900 meters, in moist or wet thickets, the type being *Standley* 78534.

An erect branched herb or shrub about 60 cm. high, the branches brown, densely stellate-hispidulous; stipules filiform, 5-6 mm. long; leaves on slender petioles 1.5-4 cm. long, rounded-ovate to elliptic-ovate or broadly elliptic, 4-7.5 cm. long, 2.5-6 cm. wide, acute, rounded or broadly obtuse at the base, unevenly crenate-dentate, sometimes subangulate, green above, hispid with long stiff pale simple hairs, slightly paler beneath, densely stellate-hispidulous; inflorescences spicate, terminal, elongate, many-flowered, much interrupted, leafy below, the flowers mostly short-pedicellate, the bracts linear, inconspicuous, deciduous, the flowers sometimes aggregate in the upper leaf axils; bractlets linear, green, much shorter than the calyx; calyx 6 mm. long or in fruit slightly longer, densely hispid with long stiff simple hairs and also stellate-hispidulous, lobate to the middle or more deeply, the lobes narrowly triangular-ovate, acuminate; petals pale or dull yellow, glabrous, 8-9 mm. long; carpels densely pubescent at and near the apex, shortly bidentate at the apex, the sides transversely rugulose.



**Malvastrum lacteum** (Ait.) Standl. Contr. U. S. Nat. Herb. 23: 770. 1923. *Malva lactea* Ait. Hort. Kew. 2: 448. 1789. *Malva vitifolia* Cav. Icon. Pl. 1: pl. 30. 1791. *Malvastrum vitifolium* Hemsl. Biol. Centr.-Amer. Bot. 1: 100. 1879. *Escoba*.

Moist thickets or open banks, 1,800–2,600 meters; Quiché; Huehuetenango; San Marcos (Tajumulco). Southern Mexico.

A much-branched herb 1–2.5 meters high, sometimes suffrutescent below but essentially annual, the branches glabrous, at least in age; leaves long-petiolate, about as broad as long, shallowly or deeply cordate at the base, usually deeply 3–5-lobate, the lobes acute or subacute, crenate, sparsely or densely stellate-pilose, often almost glabrous above, 5–12 cm. long; flowers slender-pedicellate, forming large terminal leafy panicles; calyx green, 6 mm. long, the lobes broadly ovate, cuspidate-acuminate, sparsely stellate-pubescent outside; petals white, 8–10 mm. long; fruit deeply depressed in the center, 5 mm. broad, the carpels unarmed, glabrous.

Although common in some parts of Mexico, this species seems to be rare in the mountains of Guatemala.

**Malvastrum ribifolium** (Schlecht.) Hemsl. Biol. Centr.-Amer. Bot. 1: 100. 1879. *Malva ribifolia* Schlecht. Linnaea 11: 351. 1837.

Chiefly in moist thickets or fields, 2,000–3,300 meters; Jalapa; reported from Santa Rosa; Guatemala; Chimaltenango; Sololá; Quezaltenango; Huehuetenango. Mexico; Costa Rica.

Plants usually herbaceous and essentially annual, sometimes 2 meters high but usually lower, the branches densely stellate-pilose; leaves long-petiolate, deltoid-ovate to rounded-ovate, usually shallowly 3–5-lobate or at least angulate, 5–12 cm. long, acute, cordate at the base, crenate, sparsely or densely stellate-pubescent; flowers very numerous, sessile or nearly so, in dense axillary many-flowered spike-like inflorescences, or sometimes forming interrupted terminal spikes; calyx densely stellate-pilose, 4 mm. long, the lobes broadly ovate, cuspidate-acute; petals white, 5 mm. long; carpels of the fruit 2 mm. long, rounded dorsally and unarmed, glabrous.

Two collections from Quezaltenango and Huehuetenango of small prostrate plants growing in arid exposed places probably are referable here but may represent a different species.

**Malvastrum spicatum** (L.) Gray, Mem. Amer. Acad. n. ser. 4: 22. 1849. *Malva spicata* L. Syst. Nat. ed. 10. 1146. 1759.

Moist or dry thickets, waste or cultivated ground, 1,300 meters or less; Zacapa; Jutiapa; Santa Rosa; Escuintla; Guatemala; Retalhuleu; Quiché (Sacapulas). Florida; Mexico; Salvador to Costa Rica; West Indies; South America; introduced in the Old World tropics.

An essentially annual, usually erect, branched herb sometimes as much as 2 meters high but usually lower, rarely suffrutescent below, the older stems ferruginous, the young ones densely stellate-pubescent; leaves long-petiolate, mostly ovate or triangular-ovate, 2-8 cm. long, acute to rounded at the apex, mostly obtuse or rounded at the base, not lobate, crenate-dentate, sparsely or densely stellate-pubescent, sometimes rather densely tomentose beneath; stipules filiform, 4-6 mm. long; flowers mostly in very dense and thick, terminal spikes or sometimes heads; flowers sessile, often with foliaceous bracts, these cleft at the apex; bractlets 5-7 mm. long; calyx 5 mm. long or in fruit much larger, hispid; petals deep yellow or buff, 6-8 mm. long; carpels somewhat rostrate, hispid dorsally, without spines.

Sometimes called "olotillo" in Salvador (from *olote*, "corn cob"). A frequent weed in some parts of Central America, but not very plentiful in Guatemala except in some areas of the Pacific coast. The stems contain a strong fiber that is said to be white when cleaned.

### MALVAVISCUS Adanson

*Reference:* Robert W. Schery, Monograph of *Malvaviscus*, Ann. Mo. Bot. Gard. 29: 183-236. 1942.

Shrubs or small trees, the pubescence chiefly of stellate hairs; leaves petiolate, usually dentate and often angulate or lobate; stipules linear or subulate; peduncles mostly solitary in the upper leaf axils, sometimes becoming corymbose or racemose; bractlets at the base of the calyx 5 or numerous, linear or nearly so; calyx 5-lobate, campanulate, part of the lobes sometimes united; petals 5, usually bright red, obovate and unequal-sided, convolute to form a tubular-campanulate corolla; stamen tube longer than the petals; ovary 5-celled, the cells 1-ovulate; styles 10, the stigmas capitate; fruit fleshy, berry-like, the carpels finally separating, indehiscent; seeds ascending.

Three species are recognized by Schery, one South American, one Mexican, and one of wide range with numerous varieties. Other authors in recent years usually have recognized a larger number. There is perhaps no group of Central American and Mexican plants whose taxonomy is so unsatisfactory at present, and it never is likely to be in a more satisfactory state. Extreme forms here referred to *M. arboreus* are often very different, but they are connected by so many intermediate forms that a definite division of them into species or even into clearly marked varieties seems impossible, unless new and better characters for separating them can be found. His separation of forms is the one adopted here, with slight modification. As thus treated, a single species is found in Central America, but in southern Central America there are varieties not represented in Guatemala.

**Malvaviscus arboreus** Cav. *Monad. Diss.* 131. *pl.* 48, *f.* 1. 1787. *Achania pilosa* Swartz, *Prodr. Veg. Ind. Occ.* 102. 1788. *A. mollis* Ait. *Hort. Kew.* 2: 459. 1789. *M. concinnus* HBK. *Nov. Gen. & Sp.* 5: 286. 1822. *M. mollis* DC. *Prodr.* 1: 445. 1824. *M. pilosus* DC. *loc. cit.*

The typical form of the species and its varieties may be separated by the characters indicated in the following key, but some specimens will be found that do not fit well into any of the groups indicated:

- Leaves conspicuously lobate, usually about as broad as long; young branches very densely stellate-tomentose, the tomentum almost or quite concealing the epidermis of the branch.....*M. arboreus*.
- Leaves not lobate or only very shallowly so, usually much longer than broad, when broad the young branches only thinly pilose.
  - Leaves narrow, oblong-lanceolate, 2.5-3.5 times as long as broad; pubescence of the upper leaf surface of chiefly stellate hairs; flowers small, 2-2.5 cm. long (excluding the style).....*M. arboreus* var. *brihondus*.
  - Leaves usually broader, lanceolate to ovate-cordate; pubescence of the upper leaf surface often of chiefly simple hairs; flowers mostly 2.5-5 cm. long.
    - Flowers 23-42 mm. long.....*M. arboreus* var. *mexicanus*.
    - Flowers more than 42 mm. long.....*M. arboreus* var. *penduliflorus*.

**Malvaviscus arboreus**, typical form. *Monacillo*; *Poro* (Jutiapa); *Sobón* (Zacapa); *Amapola*; *Manzanita*; *Tulipancillo* (Petén); *Taman-chich* (Petén, Maya).

Wet to dry thickets or forest, often in roadside hedges or in waste ground, 2,500 meters or less; Petén; Zacapa; Chiquimula; Jalapa; Jutiapa; Santa Rosa; Sacatepéquez; Chimaltenango; Sololá; Quiché; Huehuetenango; Quezaltenango; San Marcos. Mexico; Honduras and Salvador to Costa Rica; West Indies; northwestern South America.

A shrub or small tree, rarely as much as 5 meters high, the branchlets, petioles, and pedicels densely velutinous-pilose or tomentose with pale stellate hairs; leaves usually long-petiolate, generally lobate, densely and softly stellate-pilose beneath, thinly or very densely stellate-pilose on the upper surface, the margins coarsely serrate or sinuate; flowers bright red, 3-5.5 cm. long; involucre usually densely pubescent, the segments linear-lanceolate to spatulate, longer or shorter than the calyx.

Sometimes known in Salvador by the names "manazana," "arito," and "quesillo," the last in reference to the shape of the fruit; "bizil" (Yucatan); "civil" (Tabasco). The shrub is a rather handsome one when in full flower, because of its showy, bright red corollas, but the flowers usually are not produced in great abundance. In former years it was grown as a pot plant in the United States, but is now

seldom seen. The juicy and somewhat mucilaginous fruits are often eaten by children, but they are mawkish in flavor and not appetizing. The shrub is seen sometimes in Guatemalan gardens. In Salvador a decoction or infusion of the leaves is applied to the hair, to make it soft and lustrous.

**Malvaviscus arboreus** var. **brihondus** Schery, Ann. Mo. Bot. Gard. 29: 213. 1942.

Moist or wet forest, at or little above sea level, sometimes, at least, in pine forest; British Honduras (type from Honey Camp, *C. L. Lundell* 480).

A shrub about 2 meters high, the young branches stellate-pubescent, the pubescence close or subappressed; leaves oblong-lanceolate, 2.5-3.5 times as long as broad, not lobate, obtusely dentate or sinuate, sparsely pubescent beneath with large stellate hairs, rather densely covered with appressed stellate hairs on the upper surface; petioles short, 5-30 mm. long; flowers small, bright red, 2-2.5 cm. long; involucels usually widest toward the apex.

**Malvaviscus arboreus** var. **mexicanus** Schlecht. Linnaea 11: 359. 1837. *M. grandiflorus* HBK. Nov. Gen. & Sp. 5: 286. 1821. *M. brevibracteatus* E. G. Baker, Journ. Bot. 37: 347. 1899 (type from Stann Creek, British Honduras, *Robertson* 34, 35). *Manzana*; *Quesillo*; *Poro* (Jutiapa); *Amapola*; *Manzanilla*; *Manzanita*; *Tulipán* (Petén).

Wet to dry thickets or forest, often in second growth or in hedges, sometimes in oak or pine forest, 2,500 meters or lower; Petén; Alta Verapaz; Baja Verapaz; Izabal; Zacapa; Chiquimula; Jutiapa; Santa Rosa; Escuintla; Guatemala; Sacatepéquez; Suchitépéquez; Retalhuleu; Quezaltenango; San Marcos; Huehuetenango. Western Texas; Mexico; British Honduras to Salvador and Panama; West Indies; Colombia.

A shrub or rarely a small tree, the branchlets, petioles, and pedicels variously pubescent or glabrate; leaves lanceolate to ovate, acute or acuminate, not lobate or obscurely so, rounded or cordate at the base, serrate or sinuate, sparsely or densely pubescent, often glabrate; flowers bright red, 23-42 mm. long; involucels linear or nearly so; calyx glabrous or pubescent; mature fruit (as in other species) prussian blue or sometimes whitish, juicy, somewhat broader than high.

In a hedge at Retalhuleu there was collected a form having pure white corollas. This is presumably *M. arboreus* var. *Hintoni* (Bullock) Schery, but it is scarcely more than a form of var. *mexicanus* and hardly worthy of varietal rank. We have never observed a white-flowered *Malvaviscus* elsewhere in Central America. To var. *mexicanus* is probably referable a single collection from Acate-

nango, Sacatepéquez, listed by Schery as *M. arboreus* var. *cubensis* Schlecht. One other mainland collection has been cited by Schery from Oaxaca, but this variety is West Indian. Although the plants of this genus usually are stiffly erect shrubs, the branches are rarely more elongate and somewhat scandent.

**Malvaviscus arboreus** var. **penduliflorus** (Moc. & Sessé) Schery, Ann. Mo. Bot. Gard. 29: 223. 1942. *M. penduliflorus* Moc. & Sessé ex DC. Prodr. 1: 445. 1824. *M. Conzattii* Greenm. Field Mus. Bot. 2: 333. 1912. *Polvo de monte* (Huehuetenango); *Pico de gorrión* (Quezaltenango).

Moist or wet thickets or forest, 2,500 meters or lower; Alta Verapaz; Baja Verapaz; Izabal; Chimaltenango; Sololá; Suchitepéquez; Retalhuleu; Quezaltenango; Huehuetenango. Mexico; Honduras to Panama; Colombia.

A shrub or small tree, the branchlets, petioles, and pedicels coarsely stellate-hirsute or almost glabrous; leaves lanceolate or ovate-lanceolate, on long or short petioles, acute to long-acuminate, rounded or cordate at the base, serrate or sinuate, copiously pubescent or glabrate; flowers bright red, more than 4 cm. long; involucels linear or somewhat spatulate; calyx usually longer than broad, glabrous or sparsely pubescent.

### NEOBRITTONIA Hochreutiner

Large herbs, the abundant soft pubescence of simple and stellate hairs; leaves long-petiolate, 3-5-lobate, broad, thin; flowers axillary, solitary, long-pedunculate; bractlets none at the base of the calyx; calyx 5-lobate; ovary about 9-celled; styles as many as the cells, the stigmas capitate; seeds usually 2-3 in each carpel; mature carpels membranaceous and somewhat inflated, bearing dorsally near the base 2 long stout divergent spines, the spines so placed that they cause the calyx to be reflexed, the carpels finally separating from the central axis but remaining attached to it by a thread-like structure, bivalvate.

The genus consists of a single species.

**Neobrittonia acerifolia** (Lagasca) Hochr. Ann. Conserv. Jard. Bot. Genève 9: 184. 1905. *Sida acerifolia* Lagasca, Gen. & Sp. Nov. 21. 1816. *Abutilon acerifolium* Don, Gen. Syst. 1: 504. 1831. *S. discissa* Bertol. Mem. Soc. Ital. Moden. 23: 305. 1844. *A. discissum* Schlecht. Linnaea 25: 218. 1852.

Usually in wet thickets or in wet mixed forest, 1,300-2,800 meters; El Progreso; Jalapa; Santa Rosa; Escuintla; Guatemala; Sacatepéquez; Chimaltenango; Quezaltenango; San Marcos. Southern Mexico; Salvador; Panama.

Plants much-branched, erect and 1-2.5 meters tall, or often weak and decumbent, the branches slender, green, pilose with long soft spreading hairs, sometimes also stellate-pubescent; leaves on long slender petioles, green, 6-18 cm. broad, deeply cordate at the base, mostly 3-lobate but often 5-lobate, the lobes long-acuminate, coarsely crenate-dentate, pilose above with chiefly simple, long, soft hairs, coarsely stellate-pilose beneath with unequal hairs; peduncles slender, often longer than the subtending leaves, long-pilose, the flowers mostly nutant; calyx green, saucer-shaped, in flower almost 2 cm. broad, the lobes broadly ovate, acute, densely pilose outside; petals purple or rose-purple, the corolla about 4 cm. broad; fruit depressed-globose, 3-4 cm. broad, stellate-hispidulous and long-hirsute, the carpels paper-like, pale green or whitish, the spines 5-10 mm. long, usually directed downward.

The plant is a rather handsome one because of its numerous large, brilliantly colored flowers, but it would not be desirable for cultivation because of its rather ungainly habit and too luxuriant growth. It is frequent in the region of Antigua, especially along the banks of the river between Antigua and Chimaltenango.

### PAVONIA Cavanilles

Herbs or shrubs, sometimes small trees, usually with stellate pubescence; leaves on long or short petioles, entire, dentate, angulate, or lobate; stipules generally subulate; peduncles solitary in the upper leaf axils, sometimes forming corymbs, panicles, or racemes; bractlets at the base of the calyx 4-many, usually herbaceous, free or more or less united with one another or with the calyx; calyx 5-lobate; petals yellow, white, pink, or purple; cells of the ovary 1-ovulate; style with 8-19 short branches, the stigmas thick; mature carpels dry, sometimes with 1-3 spines at the apex, 2-valvate or indehiscent.

About 100 species, mostly in tropical America, a few in the Old World tropics. A few species besides those listed here are known from southern Central America.

Carpels of the fruit with retrorsely barbed spines at or near the apex; leaf blades obtuse at the base, not at all cordate.

Leaves entire or practically so.....*P. integrifolia*.

Leaves irregularly crenate-dentate.....*P. rosea*.

Carpels of the fruit unarmed; leaf blades cordate at the base.

Plants woody; flowers in terminal naked racemes; branches with minute appressed stellate hairs.....*P. spicata*.

Plants herbaceous; flowers not in naked racemes; branches hirsute or pilose with long spreading hairs.

Petals yellow; carpels glabrous or scaberulous.....*P. paniculata*.

Petals red-purple; carpels densely pubescent.....*P. Purpusii*.

***Pavonia integrifolia*** Standl. Field Mus. Bot. 8: 24. 1930.

Wet mixed forest or moist shaded slopes, 1,200-2,000 meters; Alta Verapaz; Huehuetenango. Southern Mexico (Veracruz); Honduras.

Plants erect, herbaceous or suffrutescent, perennial, a meter high or less, the stems usually simple, stout, rather densely leafy, stellate-pubescent; stipules filiform, 1 cm. long or longer; leaves on slender petioles 2.5–5 cm. long, thick-membranaceous, oblanceolate-oblong, mostly 13–22 cm. long and 3.5–6 cm. wide, short-acuminate, gradually attenuate to the narrowly rounded base, entire or nearly so, glabrous above, sparsely and minutely stellate-hispidulous beneath, especially on the nerves, or almost wholly glabrous; inflorescences umbellate-cymose, on slender peduncles usually longer than the leaves, the flowers few, on long stiff pedicels, these as much as 7 cm. long; involucre bracts about 10, connate below, 8 mm. long, linear, stellate-puberulent; calyx about equaling the bracts, the lobes triangular, acute or acuminate, sparsely and minutely stellate-puberulent; petals pink or lilac; fruit 12 mm. broad the 5 carpels rounded at the apex, glabrous, obscurely veined, costate dorsally, bearing 3 retrorse-barbate spines 5 mm. long.

***Pavonia paniculata*** Cav. *Monad. Diss.* 3: 135. *pl.* 46, *f.* 2. 1787. *P. scabra* Presl, *Rel. Haenk.* 2: 129. 1836. *Malache paniculata* Kuntze, *Rev. Gen.* 1: 70. 1891. *Amapola* (Huehuetenango); *Escobillo de montaña*.

Moist thickets, 1,200 meters or less; Alta Verapaz(?); Zacapa; Jutiapa; Santa Rosa; Escuintla; Retalhuleu; Huehuetenango. Southern Mexico; Honduras; Costa Rica; Panama; West Indies; South America.

A somewhat viscid, branched herb 1.5 meters high or less, the branches hirsute and viscid-pubescent; leaves long-petiolate, ovate or rounded-ovate, mostly 5–12 cm. long, acute to abruptly acuminate, usually shallowly cordate at the base, sometimes obscurely 3-lobate, crenate, minutely and sparsely stellate-scaberulous above, stellate-hispidulous beneath; peduncles mostly solitary in the upper leaf axils or sometimes paniculate, short or elongate; bractlets at the base of the calyx 7–12, linear, free, twice as long as the calyx, hispidulous; calyx 5-lobate to the middle, 5–8 mm. long, hirsute with simple hairs; petals twice as long as the calyx, yellow; mature carpels 3–4 mm. long, somewhat 3-angulate, glabrous or nearly so, unarmed; seeds reniform, striate dorsally, 2.5 mm. long.

Here may belong a Skinner collection from Guatemala listed by Hemsley as *Pavonia Mutisii* HBK.

***Pavonia Purpusii*** Brandeg. *Zoe* 5: 250. 1908. *P. Liebmannii* Ulbrich, *Repert. Sp. Nov.* 13: 516. 1915.

Moist or wet fields or thickets, 600–1,000 meters; Alta Verapaz; Izabal (Sierra del Mico). Southern Mexico; Honduras (Dept. Yoro).

Plants erect, branched, herbaceous or perhaps sometimes suffrutescent, the branches hirsute and viscid-tomentose; leaves long-petiolate, ovate-cordate, 3–12 cm. long, acute or acuminate, not at all lobate, coarsely and unequally dentate, stellate-tomentulose, more densely so beneath, green above, somewhat paler beneath, soft to the touch; peduncles axillary, often much longer than the sub-

tending leaves, articulate near the apex; bractlets about 10, linear, longer than the calyx, viscid-pilose; calyx long-pilose, 7 mm. long, deeply lobate, the lobes acute; petals purple, 1.5–2 cm. long; carpels of the fruit unarmed, densely pubescent.

**Pavonia rosea** Schlecht. *Linnaea* 11: 355. 1837. *Malache rosea* Kuntze, *Rev. Gen.* 1: 71. 1891. *Mozote*; *Cadillo*; *Cuayó* (Cobán, Quecchí); *Mozote de caballo*; *Diente de chucho*.

Moist or wet forest or thickets, often in waste ground, 1,500 meters or less, most plentiful at low elevations; Petén; Alta Verapaz; Izabal; Santa Rosa; Escuintla; Guatemala; Chimaltenango; Suchitupéquez; Retalhuleu; Huehuetenango; Quezaltenango; San Marcos. Southern Mexico; British Honduras to Salvador and Panama; West Indies; South America.

An erect, rather stiff herb or shrub, sometimes 1.5 meters high, the branches closely stellate-hispidulous; leaves on short petioles, rhombic-obovate or obovate-oblong, 5–18 cm. long, acute or acuminate, obtuse at the base, irregularly crenate-dentate, green, minutely and usually sparsely stellate-pubescent; peduncles axillary and terminal, mostly 3–10 cm. long, bearing an umbel or corymb of 5–20 flowers on pedicels 5–10 mm. long; bractlets linear, united below, longer than the calyx; calyx 4–5 mm. long, stellate-hispidulous, the hairs mostly appressed; petals 10–13 mm. long, pale purple or whitish; carpels about 6 mm. long, smooth, not rugose, each with 3 stiff spines near the apex, the spines 9 mm. long or shorter.

This is a most disagreeable weed, abundant in many moist lowland regions. The stiff barbed spines of the fruit penetrate the flesh painfully, and because of the barbs it is difficult to remove them. The branches are very tough, and must contain a strong fiber. Here probably belongs *Bernoulli & Cario* 3111, listed by Hemsley as *P. typhalaea* Cav., now called *P. fruticosa* (Mill.) Fawc. & Rendle. That species is very rare in continental North America, and we have seen it only from Panama.

**Pavonia spicata** Cav. *Monad. Diss.* 3: 136. *pl.* 46, *f.* 1. 1787.

Coastal thickets or mangrove swamps of the North Coast, at sea level; Izabal. British Honduras; Honduras; southern Florida; West Indies; northern South America.

A slender shrub 1.5–3 meters high, with few branches, the young branches bearing small scattered stellate hairs but the whole plant appearing glabrous to the naked eye; leaves long-petiolate, ovate to rounded-ovate, 6–15 cm. long, caudate-acuminate, shallowly cordate at the base, inconspicuously undulate-dentate; bractlets 6–10 at the base of the calyx, linear or linear-lanceolate, 1 cm. long; calyx 12 mm. long, 5-lobate, sparsely and minutely stellate-puberulent; petals 1.5–2 cm. long, greenish white or greenish yellow; mature carpels 9–11 mm. long, rugose-venose, cristate above, unarmed; seeds reniform, 5 mm. long, striate dorsally.



Called "cotton" and "wild cotton" in British Honduras. The shrub is a characteristic component of the mangrove and strand formations, but in Central America it is seldom plentiful.

### PSEUDABUTILON R. E. Fries

*Reference:* R. E. Fries, Svensk. Vet. Akad. Handl. 43, no. 4: 96-108. 1908.

Plants herbaceous or suffrutescent, the pubescence chiefly of stellate hairs; leaves mostly long-petiolate, cordate at the base, dentate; peduncles axillary or disposed in terminal spikes or panicles; bractlets none at the base of the calyx; calyx 5-lobate; corolla small; ovary 5-11-celled, the cells 3-ovulate; styles as many as the cells, the stigmas capitate; mature carpels often apiculate or rostrate, sometimes muticous, more or less completely 2-celled by the intrusion of a partial partition from the dorsal wall, finally separating from the central axis and dorsally bivalvate.

Eleven species are known, ranging from Texas through Mexico into South America. Only the following are known in Central America.

Carpels of the fruit 5. . . . . *P. spicatum*.

Carpels of the fruit 6-10.

Inflorescence or its branches long and spike-like. . . . . *P. inornatum*.

Inflorescence openly but narrowly paniculate. . . . . *P. paniculatum*.

**Pseudabutilon inornatum** Standl. & Steyerm. Field Mus. Bot. 23: 15. 1943.

Dry forested mountain sides, about 1,200 meters; Guatemala (type collected near Amatitlán, *Standley* 61425). Veracruz.

A shrub 1.5-3 meters high, the slender branches coarsely stellate-tomentose with very unequal hairs; leaves long-petiolate, thin, broadly ovate or rounded-ovate, 6-17 cm. long, 5-12 cm. wide, acuminate or long-acuminate, shallowly cordate at the base, crenate-dentate, the lower leaves often angulate or shallowly 3-lobate, green above and sparsely and minutely stellate-puberulent, somewhat paler beneath, sparsely or rather densely stellate-hirtellous; flowers arranged in elongate interrupted paniculate racemes, often crowded, short-pedunculate, the peduncles mostly shorter than the calyces; calyx in fruit campanulate, 5 mm. long, closely investing the carpels, densely stellate-hispidulous, shallowly 5-lobate, the lobes broadly ovate, acute; fruit about 5 mm. long and 6 mm. broad; carpels 6-8, broadly rounded at the apex, densely stellate-hirtellous; seeds 1-seriate.

**Pseudabutilon paniculatum** (Rose) R. E. Fries, Svensk. Vet. Akad. Handl. 43, no. 4: 104. 1908. *Wissadula paniculata* Rose, Contr. U. S. Nat. Herb. 5: 178. 1899.

In thickets at edge of forest, about 1,400 meters; Jalapa (Cerro Alcoba east of Jalapa, *Steiermark* 32549). Western Mexico.

An erect slender herb or shrub 1-2.5 meters high, the stems slender, stellate-pubescent or glabrate; leaves thin, on long slender petioles, broadly ovate-cordate, 9 cm. long or smaller, long-acuminate, cordate at the base, crenate-dentate, green, sparsely or densely stellate-pubescent on both surfaces; inflorescence narrowly paniculate, the flowers mostly on long slender pedicels; calyx 6 mm. long, densely stellate-pubescent, the lobes broadly ovate, acuminate or acute; petals orange-yellow, 10-18 mm. long; carpels of the fruit usually 10, short-rostrate, 5 mm. long, densely stellate-pubescent.

***Pseudabutilon spicatum*** (HBK.) R. E. Fries, *Svensk. Vet. Akad. Handl.* 43, no. 4: 98. 1908. *Abutilon spicatum* HBK. *Nov. Gen. & Sp.* 5: 271. 1821. *Wissadula spicata* Presl, *Rel. Haenk.* 2: 117. 1836.

Moist or dry thickets, 900 meters or less; Jutiapa; Santa Rosa; Retalhuleu. Western and southern Mexico; Cuba; South America.

Plants erect, herbaceous or suffrutescent, simple or branched, commonly 1-1.5 meters high, the stems minutely stellate-pubescent; stipules linear-subulate, 6-10 mm. long; leaves thin, long-petiolate, orbicular-cordate, 6-18 cm. long, 5-16 cm. wide, sometimes slightly 3-lobate, abruptly acuminate, deeply cordate at the base, remotely and inconspicuously dentate, green above and sparsely stellate-pubescent, somewhat paler beneath and more densely stellate-pubescent; inflorescence spike-like, greatly elongate and wand-like, naked, usually much interrupted, the flowers remote, subsessile; calyx tomentulose, 3-4 mm. long, the lobes triangular, acute; corolla yellow, the petals 6-7 mm. long; carpels 5 and 4-5 mm. long, stellate-pilose, triangular, not rostrate; seeds globose-cordiform, puberulent.

### ROBINSONELLA Rose & Baker

*Reference:* Eva M. Fling Roush, A synopsis of *Robinsonella*, *Journ. Arnold Arb.* 12: 49-59. 1931.

Large shrubs or small trees, the pubescence all or chiefly of stellate hairs; leaves long-petiolate, palmate-nerved, cordate to rounded at the base, entire or usually dentate or lobate; flowers rather large and showy, white or purple, paniculate or in small clusters on short lateral branches; calyx campanulate, without bractlets at the base; ovary 9-13-celled, the cells 1-ovulate; ovules pendulous; style branches as many as the ovary cells, the stigmas capitate; carpels of the fruit 9-13, obtuse, membranaceous, inflated at maturity; seeds glabrous or sparsely stellate-puberulent.

Six species are known, in Mexico and Central America. One other species is described from Honduras.

Leaves conspicuously lobate, rather coarsely stellate-pubescent beneath; petals whitish with dark purple veins. . . . . *R. divergens*.

Leaves not lobate; petals purple or white.

Petals purple; leaves minutely stellate-puberulent beneath.....*R. cordata*.

Petals white; leaves almost wholly glabrous beneath in age.....*R. discolor*.

**Robinsonella cordata** Rose & Baker, Gard. & For. 10: 244.  
f. 31. 1897.

Brushy or wooded barrancos, 1,600–2,000 meters; Sacatepéquez; Chimaltenango. Mexico.

A tree of 6–9 meters, the young branchlets densely stellate-pubescent; leaves long-petiolate, ovate-cordate, often broadly so, mostly 9–15 cm. long, long-acuminate, shallowly cordate or subtruncate at the base, sometimes shallowly 3-lobate, undulate-dentate, minutely stellate-pubescent or glabrate above, sometimes pilose; flowers in axillary clusters or racemes, the peduncles 1.5–2.5 cm. long; sepals about 12 mm. long, stellate-tomentulose, ovate-lanceolate; petals purple, 2 cm. long; carpels of the fruit 12–13, distinct almost to the base, 1.5 cm. long, densely stellate-pubescent.

The tree is frequent in the barrancos between Dueñas and Calderas, above Antigua, occurring singly or in small groups. During the flowering season the trees can be recognized at a great distance because of the masses of brilliant and distinctive color. Like all other members of the genus this tree is a handsome one and well worthy of cultivation.

**Robinsonella discolor** Rose & Baker, Contr. U. S. Nat. Herb. 5: 181. 1899.

Cultivated in gardens and parks of Huehuetenango (Huehuetenango; Chiantla), about 1,900 meters; probably native in the nearby mountains. San Luis Potosí; Veracruz.

A slender tree of 6–9 meters, the branches glabrous or nearly so; leaves long-petiolate, ovate or broadly ovate, 12 cm. long or less, acute or acuminate, cordate or subcordate at the base, entire or undulate-dentate, green above and almost glabrous, beneath paler and very minutely stellate-lepidote or almost glabrous, pilose beneath at the base; flowers clustered on short lateral branchlets, the peduncles 2 cm. long or less; calyx 8 mm. long, stellate-tomentulose, the lobes oblong-ovate, acute; petals white, 1–1.5 cm. long; carpels of the fruit about 12, stellate-pubescent, 1 cm. long.

Only a few trees of this species were observed in the Huehuetenango region, and none of them wild, but it seems probable that they are to be found in some of the dry mountains close at hand. The Guatemalan material was believed at first to represent an undescribed species, but it is well enough referable to *R. discolor*. All species of the genus are closely related, and it remains to be seen whether further collections will strengthen their now apparently "feeble" characters or necessitate the reduction of several of them.

**Robinsonella divergens** Rose & Baker, Gard. & For. 10: 245. f. 32. 1897. *R. edentula* Rose & Donn. Smith in Donn. Smith, Bot. Gaz. 37: 417. 1904 (type from Cobán, *Tuerckheim* 665). *Abutilon pleiopodium* Donn. Smith, Bot. Gaz. 65: 51. 1913 (type from Finca Sepacuité, Alta Verapaz, *O. F. Cook & R. F. Griggs* 206). *Chaqueta de novia*; *Amapola grande* (Huehuetenango).

Rocky brushy hillsides, sometimes on the borders of swamps or marshes, 750–1,600 meters; Alta Verapaz; Baja Verapaz; Chiquimula; Santa Rosa; Huehuetenango. Honduras; Salvador; Nicaragua; Costa Rica.

A shrub or small tree 2–6 meters high, the branchlets stellate-pilose; leaves up to 15 cm. long, about as broad as long, shallowly cordate at the base, shallowly or deeply 3-lobate, the lobes very obtuse to acuminate, undulate-dentate, finely stellate-pubescent and green above, usually rough to the touch, somewhat paler beneath and densely stellate-pubescent; flowers in lateral cymes or racemes, or sometimes forming rather large panicles, the peduncles 2 cm. long or less, articulate near the apex; calyx 6 mm. long, stellate-pubescent, the lobes lance-oblong, acute, reflexed in fruit; petals 1–1.5 cm. long, white with dark purple veins; carpels 9–10, stellate-pubescent, 10–13 mm. long, divergent.

Recently collected material shows that *R. edentula* differs in no constant respect from *R. divergens* and makes very questionable the distinctions supposed to separate *R. divergens* from *R. Lindeniana* (Turcz.) Rose & Baker of southern Mexico. The tree is planted in the Hempstead garden in Cobán, where it gives a beautiful display of bell-shaped, exquisitely colored flowers in March and April. It is plentiful in places along the *carretera* near the boundary between Alta and Baja Verapaz but is not in flower there during the drier months. The tree has been reported from Guatemala as *Sida Lindeniana* Turcz., a synonym of *Robinsonella Lindeniana*.

### SIDA L.

Herbs or low shrubs, the pubescence chiefly of stellate hairs, or the hairs sometimes simple; leaves on long or short petioles, serrate or lobate, rarely entire; stipules subulate or rarely lanceolate; flowers mostly small, axillary or in terminal racemes, heads, spikes, or panicles; bractlets none at the base of the calyx; calyx with 5 teeth or lobes; petals mostly yellow or white; ovary with 5 or more cells, the cells 1-ovulate; mature carpels usually 2-valvate above, often rostrate at the apex; seed pendulous or attached laterally.

Species perhaps 125, in tropical and warmer regions of both hemispheres. Probably all the Central American species are listed or mentioned here.

- Leaves entire, linear.....*S. linifolia*.
- Leaves dentate.
- Peduncle of the flower adnate to the petiole of a leaf-like bract. Leaves small, mostly 6-15 mm. long, obtuse at the base.....*S. ciliaris*.
- Peduncle of the flower distinct, never adnate to a bract.
- Leaf blades not cordate at the base.
- Carpels of the fruit 5.
- Inflorescences sessile; leaves mostly elliptic.....*S. jamaicensis*.
- Inflorescences short-pedunculate; leaves mostly narrowly oblong-lanceolate.....*S. spinosa*.
- Carpels of the fruit 7-14.
- Leaves linear or nearly so, 7 mm. wide or narrower.....*S. Lindheimeri*.
- Leaves mostly oblong to broadly ovate, usually wider.
- Leaves densely stellate-tomentose beneath, the tomentum lax, velutinous.....*S. cordifolia*.
- Leaves not stellate-tomentose, glabrate beneath or with a tomentum of minute appressed hairs, or the leaves sometimes pilose beneath with simple hairs.
- Leaves green beneath, sometimes pilose with simple hairs, never minutely stellate-tomentulose, conspicuously distichous.  
*S. acuta*.
- Leaves pale beneath, covered with a minute tomentum of stellate hairs, not conspicuously or at all distichous.....*S. rhombifolia*.
- Leaf blades conspicuously cordate at the base.
- Calyx terete, not angulate.
- Peduncles less than twice as long as the calyx; calyx 4.5-5 mm. long.  
*S. pyramidata*.
- Peduncles several times as long as the calyx; calyx 2.5 mm. long.  
*S. paniculata*.
- Calyx conspicuously 5-angulate.
- Carpels of the fruit 7-12. Leaves densely stellate-tomentose.  
*S. cordifolia*.
- Carpels of the fruit 5.
- Flowers sessile or nearly so, densely glomerate in the leaf axils or along the branches of a panicle.
- Leaves very densely stellate-tomentose on both surfaces.  
*S. savannarum*.
- Leaves thinly hirsute with mostly or partly simple hairs...*S. urens*.
- Flowers all or mostly long-pedunculate, never densely glomerate.
- Leaves rounded or obtuse at the apex, mostly 2 cm. long or less.  
*S. procumbens*.
- Leaves acuminate or long-acuminate, usually much more than 2 cm. long.
- Leaf blades usually very asymmetric at the base; plants usually creeping and rooting at the nodes.....*S. decumbens*.
- Leaf blades symmetric at the base; plants erect or ascending, at least not creeping and rooting.
- Branches viscid-pilose above.....*S. glutinosa*.
- Branches usually without any viscid pubescence.....*S. glabra*.

*Sida acuta* Burm. Fl. Ind. 147. 1768. *S. carpinifolia* L. f. Suppl. Pl. 307. 1781. *S. acuta* var. *carpinifolia* K. Schum. in Mart. Fl. Bras. 12, pt. 3: 326. 1891. *Escobilla*; *Escobilla negra*; *Escobillo*; *Chichibé* (Petén, Maya); *Mesbé* (Cobán, Quecchi).

Moist or dry thickets or fields, often in cultivated or waste ground or along roadsides, or on overgrazed land, 1,800 meters or less, most abundant at low elevations; Petén; Alta Verapaz; Izabal; Zacapa; El Progreso; Baja Verapaz; Chiquimula; Jalapa; Jutiapa; Santa Rosa; Escuintla; Guatemala; Suchitepéquez; Retalhuleu; Huehuetenango; San Marcos.

An herb a meter high or less, or rarely 1.5 meters high, sometimes suffrutescent at the base but essentially an annual, usually erect, the stems minutely stellate-pubescent or glabrate; stipules green, 1–1.5 cm. long, linear or narrowly lanceolate, 3-nerved; leaves short-petiolate, oblong-lanceolate to ovate or narrowly lanceolate, somewhat asymmetric, conspicuously distichous, acute or acuminate, rounded or cuneate at the base, serrate, green on both sides, with a few minute stellate hairs and often with numerous long simple ones, especially on the nerves, in age usually almost glabrous; flowers solitary in the leaf axils, pedunculate or subsessile, sometimes accompanied by an accessory branch bearing several flowers; calyx angulate, 6–8 mm. long, with long simple hairs on the margins and nerves, otherwise glabrate, green, the lobes acute or acuminate; petals buff; carpels of the fruit 7–12, at maturity 3–4 mm. long, shortly 2-rostrate at the apex and puberulent with minute stellate hairs; seeds puberulent near the hilum, elsewhere glabrous.

Called "wire weed" and "broom weed" in British Honduras; "escoba," "escobilla negra" (Salvador). This and *S. rhombifolia* are possibly the most abundant weedy plants of all the Central America lowlands. *S. acuta* probably is less frequent than *S. rhombifolia*. Both spring up abundantly in land too closely grazed, often filling great stretches of pasture. Wherever these species occur, one may expect to find ticks, probably because of the presence of cattle rather than any preference of ticks for *Sida*. It is worth noting that about Cobán, where there is a continued heavy rainfall, these plants are not so abundant in the pastures, probably because they cannot compete with the rank-growing grass. The name "escobilla," which is applied most often to these plants, is a diminutive of "escoba" ("broom"), and given because bundles of the tough branches are used generally in the lowlands in place of ordinary brooms and brushes. The stems contain a tough fiber that formerly was much used in Yucatan for making twine and hammocks. Probably it still is used in some of the Mayan regions for the same purpose. The flowers close about midday. *Sida glomerata* Cav., a closely related species, was reported from Guatemala by Hemsley on the basis of *Bernoulli* & *Cario* 3097, but probably the plant so reported

is *S. acuta*, since the two species often are confused. In *S. glomerata* the stipules are broader and usually 5-nerved. It is rare in Central America and we have seen no specimens collected north of Costa Rica.

***Sida ciliaris*** L. Syst. Nat. ed. 10. 1145. 1759. *Mozote*.

Moist or often very dry plains or rocky thickets, 150–1,500 meters; Zacapa; Chiquimula; Jutiapa; Santa Rosa; Guatemala (Fiscal); Huehuetenango. Texas; Mexico; West Indies; South America.

Plants annual or perennial, often with a woody root, the stems 30 cm. long or less, prostrate or spreading, covered with stellate or 4-rayed, appressed hairs; leaves petiolate, oblong to obovate, mostly 6–15 mm. long, obtuse, acute or obtuse at the base, serrate, at least above the middle, stellate-pubescent and also with long simple hairs on the upper surface, sometimes glabrate above; inflorescence terminal, head-like, the short peduncle adherent to the petiole of a leaf-like bract; calyx 4–5 mm. long, hirsute, the lobes triangular; petals usually dark purple-red; carpels of the fruit 7–8, about 2 mm. long, tuberculate-echinate; seeds covered with minute appressed hairs.

The plant is abundant during the wet months on the plains and hillsides about Zacapa, but soon withers when the rains cease.

***Sida cordifolia*** L. Sp. Pl. 684. 1753.

Dry or moist fields or brushy hillsides, sometimes on sandbars, 1,800 meters or less; El Progreso; Zacapa; Chiquimula; Jutiapa; Guatemala; Quiché; Huehuetenango. Mexico; Honduras; Salvador; West Indies; South America; Africa and Asia.

Plants essentially annual but sometimes persistent and suffrutescent, commonly less than a meter high, the stems and leaves very densely and softly stellate-tomentose; stipules filiform, 5–7 mm. long; leaves mostly long-petiolate, ovate to lance-oblong, 3–8 cm. long, obtuse to acuminate, shallowly cordate or obtuse at the base, serrate; flowers axillary and terminal, in dense racemes, corymbs, or fascicles, the peduncles usually short; calyx 6–7 mm. long, angulate, densely stellate-tomentose; petals 1 cm. long, yellow or orange-yellow; carpels of the fruit 7–12, rostrate, 3–4 mm. long, stellate tomentulose, the terminal beaks spine-like, erect, retrorse-barbellate; seeds glabrous except at the hilum.

Called “malva de playa” in Honduras and “escobilla” in Salvador; “zacmizbil” (Yucatan, Maya).

***Sida decumbens*** St. Hil. & Naud. Ann. Sci. Nat. II. 18: 51. 1842.

Moist or dry thickets, sometimes in pine forest, 1,400 meters or less; Zacapa; Jutiapa; Jalapa; Santa Rosa; Escuintla; Suchite-

péquez; Retalhuleu. Southern Mexico; Honduras to Panama; South America.

Plants perennial, usually repent and rooting at the nodes, sometimes subscandent, branched, the stems very slender and flexuous, herbaceous, pilose with very long and slender, spreading hairs; leaves on long slender petioles, broadly and obliquely ovate-cordate, 2-7 cm. long, acute or acuminate, crenate, thin, green, sparsely hirsute with simple hairs; flowers axillary, solitary, the peduncles almost filiform, long; calyx green, 5 mm. long, angulate, sparsely long-pilose; petals buff or pale yellow, longer than the calyx; carpels of the fruit 5, smooth, glabrous, mucous, 1.5 mm. long.

The plant is most frequent in damp shaded places, where it forms thick tangles over the soil.

**Sida glabra** Mill. Dict. ed. 8. 1768. *S. arguta* Swartz, Prodr. Veg. Ind. Occ. 101. 1788.

Reported from Santa Rosa (Cuilapa, 750 meters), and to be expected in other parts of Guatemala. Mexico; West Indies; South America.

Plants herbaceous, much-branched, erect or ascending, a meter high or less, the branches very slender, short-pilose or puberulent; leaves thin, green, on long slender petioles, ovate or lanceolate, 2-7 cm. long, acuminate, cordate at the base, serrate, puberulent, at least on the nerves, or glabrate; flowers mostly solitary in the leaf axils, a flowering branch with small leaves usually developing later in the axil, the slender peduncles 1-4 cm. long; calyx angulate, 5-6 mm. long; petals yellow or orange; carpels of the fruit 5, glabrous, 2.5 mm. long, bearing at the apex 2 beaks 2 mm. long.

The Maya name in Yucatan is recorded as "canzacxiu."

**Sida glutinosa** Commers. ex Cav. Monad. Diss. 1: 16. *pl.* 2, *f.* 8. 1785. *Chichibé macho* (Petén).

Dry or wet thickets, often in cultivated ground, sometimes in oak forest, 1,800 meters or less; Petén; Chiquimula; Jalapa; Jutiapa; Santa Rosa; Guatemala; Sacatepéquez; Chimaltenango; Huehuetenango; Retalhuleu. Mexico; British Honduras; Costa Rica; Panama; West Indies; South America.

Plants herbaceous, much-branched, a meter high or less, erect or procumbent, the slender branches viscid-pilose and with longer simple hairs; stipules filiform, 1-2 mm. long; leaves on long slender petioles, ovate, 2-7 cm. long, acuminate, cordate at the base, serrate, stellate-pubescent on both surfaces, usually very sparsely so, green, often almost glabrous; flowers solitary in the leaf axils, sometimes with an accessory inflorescence developing later from the same axil, the peduncles often forming large terminal leafy panicles, the peduncles 1-2.5 cm. long, usually viscid-pubescent; calyx angulate, 5 mm. long, puberulent, the lobes triangular, acuminate; petals orange or buff, sometimes cream-colored; carpels



of the fruit 5, puberulent above, 2 mm. long, bearing at the apex 2 beaks 1 mm. long; seeds glabrous, dark brown.

***Sida hibisciformis* Bertol. Fl. Guat. 428. 1840.**

Type from Volcán de Agua, Sacatepéquez, *Velásquez*.

Fruticose, the younger branches tomentose; leaves short-petiolate, rather thick, cordate-subrounded, acuminate, closely denticulate, green above, sparsely stellate-pilose, tomentose beneath, 7-nerved and venose, 2.5 cm. long or slightly larger; petioles tomentose; flowers axillary, solitary, subsessile; calyx not bracteolate, tomentose, deeply 5-lobate, the lobes lanceolate, acuminate, carinate dorsally; corolla 3 times as long as the calyx, whitish when dried, red at the base of the petals, these obovate, obtuse, asymmetric; stamens much shorter than the corolla; fruit mucicous, densely tomentose; tomentum yellowish or fulvous.

This is known to us only from the description, which does not agree with any species of *Sida* known from Guatemala. It may well be that the plant belongs to some other genus, but its identity is uncertain.

***Sida jamaicensis* L. Syst. Nat. ed. 10. 1145. 1759.**

Dry rocky thickets, 1,100 meters or lower; Zacapa; Jutiapa; Santa Rosa; Guatemala (Fiscal); Retalhuleu. Southern Mexico; West Indies; South America.

Plants perennial or annual, erect or decumbent, commonly 30–50 cm. high, the branches densely stellate-tomentose; stipules lanceolate to linear, about equaling the petiole; leaves short-petiolate, somewhat oblique, rounded-ovate to ovate or oblong, 2–4 cm. long, obtuse, obtuse or rounded at the base, crenate, minutely stellate-pubescent above, pale beneath and densely stellate-tomentose; flowers almost sessile in the leaf axils, solitary or in subsessile clusters; calyx 6 mm. long, angulate, stellate-tomentose, the lobes acuminate; petals as long as the calyx, white or pale buff; carpels of the fruit 5, reticulate-veined on the sides, 2–3 mm. long, bearing at the apex 2 short beaks; seeds sparsely pubescent.

This seems to be a rare plant in continental North America.

***Sida Lindheimeri* Engelm. & Gray, Bost. Journ. Nat. Hist. 5: 213. 1845.**

Savannas or open hillsides, 1,000 meters or less; Petén (Sabana Zizha, La Libertad); Huehuetenango (between Nentón and Las Palmas). Louisiana and Texas; southern and eastern Mexico.

Perennial from a hard woody root, the stems herbaceous, erect, mostly 30 cm. high or less, stiff and slender, mostly simple, minutely stellate-puberulent or glabrate; stipules subulate, almost equaling the petioles; leaves short-petiolate, linear or oblong-linear, 1.5–4 cm. long, obtuse or acute, obtuse at the base, serrate, glabrous above, green beneath, minutely and usually sparsely stellate-pubescent;

peduncles long and slender, solitary in the leaf axils or subcorymbose and terminal; calyx pale, angulate, 6-7 mm. long, almost microscopically stellate-puberulent, the lobes broadly ovate, cuspidate-acuminate; petals yellow, 12-14 mm. long; carpels of the fruit about 8, minutely puberulent, subacute at the apex.

***Sida linifolia*** Juss. ex Cav. *Monad. Diss.* 1: 14. *pl.* 2, *f.* 1. 1785. *Hoja de lanceta*.

Chiefly in grassy fields, hilly pine forest, or open hillsides, 1,500 meters or less; Petén; Izabal; Zacapa; Chiquimula; Jalapa; Jutiapa; Guatemala. Mexico; British Honduras to Salvador and Panama; West Indies; South America; tropical Africa.

Plants annual, erect, simple or sparsely branched, mostly 75 cm. high or less; stipules linear or narrowly lanceolate, 4-7 mm. long; leaves on very short petioles, linear, 4-10 cm. long, entire, attenuate-acuminate, obtuse at the base, with sparse, simple or bifurcate hairs on both sides; inflorescence terminal, corymbose, few-flowered, dense and often head-like, terminating a long, slender, almost leafless branch; calyx 5 mm. long, pilose, the lobes ovate, acuminate; petals white, usually with a dark purple base, twice as long as the calyx; carpels of the fruit 7-9, at maturity 2.5 mm. long, glabrous, not rostrate; seeds brown, glabrous.

In Central America this is a characteristic plant of savannas and grasslands generally. Called "lengua de pájaro" in Salvador.

***Sida paniculata*** L. *Syst. Nat.* ed. 10. 1145. 1759.

Petén (La Libertad); Alta Verapaz (Chiacám, 750 meters). Veracruz and Oaxaca; West Indies; South America.

An erect herb a meter high or less, probably annual, the branches stellate-tomentose with yellowish hairs or finally glabrate; stipules filiform, 5-8 mm. long; leaves long-petiolate, or the uppermost almost sessile, ovate, mostly 4-8 cm. long, acuminate, shallowly cordate at the base, serrate, stellate-pubescent or glabrate above, densely stellate-tomentose beneath; flowers on very long, filiform peduncles, forming large open panicles; calyx 2.5 mm. long, stellate-tomentose, the lobes triangular, acute; petals crimson or purple; carpels of the fruit 5, acute and sometimes minutely 2-rostrate, 2.5-3.5 mm. long, minutely stellate-puberulent; seeds purplish brown, covered with minute appressed hairs.

A rather rare plant in continental North America, but apparently plentiful in some parts of the Antilles.

***Sida procumbens*** Swartz, *Prodr. Veg. Ind. Occ.* 101. 1788.

Dry or moist plains or fields or brushy rocky hillsides, 200-1,750 meters; Zacapa; El Progreso; Huehuetenango. Texas; Arizona; Mexico; West Indies; South America.

Plants annual or perennial, often with a hard woody root, prostrate, often much-branched and forming large mats, the stems minutely stellate-pubescent.

and pilose with long simple spreading hairs; stipules small, filiform; leaves long-petiolate, ovate to ovate-rounded, 6–15 mm. long, obtuse or rounded at the apex, cordate at the base, crenate, minutely stellate-tomentulose, often also long-pilose beneath; flowers axillary, mostly solitary, the slender peduncles mostly longer than the petioles, sometimes exceeding the leaves, articulate near the apex; calyx 5–6 mm. long, stellate-pubescent and long-pilose, angulate, the lobes ovate, acuminate; petals longer than the calyx, pale yellow or almost white; carpels of the fruit 5, glabrous, 3.3–4 mm. long, shortly 2-rostrate at the apex; seeds dark brown, minutely pubescent or glabrate.

The Maya name in Yucatan is listed as “xauayxiu.”

**Sida pyramidata** Desportes ex Cav. *Monad. Diss.* 1: 11. *pl.* 1, *f.* 10. 1785. *Escobillo*.

Moist or dry thickets, sometimes in rather dry and open coastal forest, 1,400 meters or less, mostly at 200 meters or lower; Petén; Zacapa; Santa Rosa; Escuintla; Guatemala; Retalhuleu. Mexico; British Honduras to Salvador and Panama; West Indies; northern South America.

Usually a much-branched shrub or herb of 1–1.5 meters, the branches densely and minutely stellate-pubescent; stipules linear or subulate, 7–10 mm. long; leaves long-petiolate, broadly ovate or rounded-ovate, 5–10 cm. long, acuminate, shallowly cordate at the base or merely rounded, crenate-serrate, 7-nerved, green above and very sparsely and minutely stellate-pubescent, slightly paler beneath and more densely pubescent; flowers forming large terminal panicles, short-pedunculate; calyx green, 4.5–5 mm. long, stellate-tomentulose, the lobes ovate, acuminate; petals 6–7 mm. long, yellow or buff; carpels of the fruit 5–6, minutely stellate-pubescent, 2.5 mm. long, shortly 2-rostrate; seeds dark brown, glabrous except about the hilum.

In Salvador known as “escobilla blanca” and “malvita.”

**Sida rhombifolia** L. *Sp. Pl.* 684. 1753. *Escobilla*; *Escobillo blanco*; *Escobillo*; *Mesbé* (Cobán, Quecchí); *Saqi-mesbé* (Quecchí).

Moist or dry fields or thickets, often in cultivated ground, common in waste places about settlements or in streets, 1,800 meters or less, most abundant in the tierra caliente; Petén; Alta Verapaz; Baja Verapaz; El Progreso; Izabal; Zacapa; Chiquimula; Jutiapa; Santa Rosa; Escuintla; Guatemala; Sacatepéquez; Suchitepéquez; Retalhuleu; Sololá; Quezaltenango; San Marcos; Huehuetenango. Mexico; British Honduras to Salvador and Panama; West Indies; South America; Old World tropics.

A shrub or herb, but essentially annual, commonly 50–150 cm. high, branched; stipules 4–10 mm. long, subulate; leaves short-petiolate, lanceolate to oblong or rhombic-oblong, usually obtuse, cuneate at the base, 3-nerved, serrate, minutely

puberulent above or almost glabrous, green, pale beneath and covered with a dense, very fine and close, pale tomentum; flowers mostly solitary in the leaf axils, the peduncles often almost as long as the leaves, articulate above the middle; calyx angulate, 6-7 mm. long, minutely stellate-tomentulose; petals yellow or orange-yellow; carpels of the fruit 10-14, with 1-2 short beaks at the apex, 3-4 mm. long; seeds brown, glabrous except at the hilum.

Called sometimes "malva" and "escoba" in Honduras. This species has been discussed above under *S. acuta*, with which it often grows. In Guatemala it is widely disseminated and very abundant in most lower regions. It does not grow in the higher country, as a rule, and we have not observed either of these species around Quezaltenango and Totonicapán. Dieseldorff reports that around Cobán a tea made from the leaves is a domestic remedy for indigestion. When the leaves are macerated in water, a sort of foam or suds is produced, and this often is used for washing clothes, like lather of soap.

***Sida savannarum*** K. Schum. in Mart. Fl. Bras. 13, pt. 3: 308. 1891.

Jalapa, 1,350 meters (Jalapa). Costa Rica; British Guiana.

Plants erect, herbaceous or suffrutescent, the branches densely stellate-tomentose and also pilose with long spreading simple hairs; stipules filiform, 5-8 mm. long; leaves long-petiolate, ovate or broadly ovate, mostly 2-6 cm. long, acute, rather shallowly cordate at the base, dentate, very densely stellate-tomentose and pale on both surfaces; flowers almost sessile, densely glomerate and forming short spikes or heads; calyx 7-8 mm. long, densely fulvous-tomentose, the lobes ovate-triangular, acute; petals 11-12 mm. long; carpels of the fruit 5, short-pilose, rounded at the apex and usually bearing 2 short obtuse projections, 2 mm. long; seeds glabrous.

In general appearance the plant is almost exactly like *S. cordifolia*, with which it can easily be confused.

***Sida spinosa*** L. Sp. Pl. 683. 1753. *S. angustifolia* Lam. Encycl. 1: 4. 1783. *Escobilla*; *Escobillo*.

Dry plains, thickets, or pine forest, often in cultivated fields, 2,000 meters or lower; Alta Verapaz; Baja Verapaz; Zacapa; Jalapa; Jutiapa; Santa Rosa; Guatemala; Chimaltenango; Huehuetenango. United States; Mexico; British Honduras to Salvador and Costa Rica; West Indies; South America; Old World tropics.

Plants annual or essentially so, herbaceous, mostly less than a meter high, sparsely branched, the stems minutely stellate-pubescent; stipules subulate, 5-9 mm. long; 1-2 minute or spine-like tubercles sometimes present just below the insertion of the petiole; leaves short-petiolate, linear-lanceolate to ovate-elliptic,

1-4 cm. long, obtuse to attenuate, truncate or rounded at the base, 3-7-nerved, crenate-serrate, minutely stellate-puberulent above or glabrate, beneath softly and densely stellate-pubescent, usually pale; flowers mostly solitary in the leaf axils, short-pedunculate, sometimes glomerate; calyx angulate, 5-7 mm. long, stellate-tomentose, the lobes triangular, acute; petals yellow or buff, rarely white(?); carpels of the fruit 5, bearing 2 short spines at the apex, 2.5 mm. long, glabrous dorsally; seeds dark brown.

Called "escobilla" in Salvador; "chichibé," "chikichbe-cax" (Yucatan, Maya).

*Sida urens* L. Syst. Nat. ed. 10. 1145. 1759. *Tunillo; Velloja.*

Dry to wet fields and thickets, sometimes in moist forest, often a weed in cultivated ground, 200-1,800 meters; Chiquimula; Jalapa; Jutiapa; Santa Rosa; Escuintla; Guatemala; Sacatepéquez; Chimaltenango; Quezaltenango. Mexico; British Honduras to Salvador and Panama; West Indies; South America; tropical Africa; Java.

Plants annual or essentially so, usually erect and often much-branched, the branches densely hirsute with simple fulvous hairs; stipules linear, 3-6 mm. long; leaves long-petiolate, ovate or oblong-ovate, 3-9 cm. long, long-acuminate, cordate at the base, serrate, thinly or densely hirsute, green; flowers sessile or on very short peduncles, mostly in dense globose clusters, these forming terminal spikes or heads; calyx green, 6-8 mm. long, 5-angulate, hirsute, the lobes long-acuminate; petals buff or yellow, blotched with red at the base; carpels of the fruit 5, about 2 mm. long, glabrous, generally with 2 short teeth at the apex.

Called "malva montés" in Salvador. The plant is disagreeable to handle because of the dense covering of stiff hairs.

### SPHAERALCEA St. Hilairé

Herbs or shrubs, the pubescence wholly or chiefly of stellate hairs; leaves petiolate, often angulate or lobate; flowers pedunculate, solitary or fasciculate, axillary or forming terminal racemes or spikes, usually pink, purple, or red; bractlets at the base of the calyx 3, free or somewhat united; calyx 5-lobate; ovary many-celled, the cells 1-3-ovulate; styles as many as the cells, filiform or clavate, stigmatose at the apex; mature carpels radiating from the persistent axis and separating from it, rounded or truncate at the apex, muticous or dorsally angulate or 2-aristate, bivalvate; seeds reniform.

Perhaps 40 species, all or mostly American, chiefly in Mexico and southwestern United States. Only two species are known in Central America.

Bractlets united below the middle, ovate, about as long as the calyx, deciduous; petals mostly 5.5-6.5 cm. long.....*S. rosea.*

Bractlets distinct, spatulate, much shorter than the calyx, persistent; petals 4 cm. long or shorter.....*S. umbellata.*

**Sphaeralcea rosea** (DC.) Standl. Contr. U. S. Nat. Herb. 23: 767. 1923. *Malva rosea* DC. Prodr. 1: 435. 1824. *Meliphlea vitifolia* Zucc. Abh. Akad. Wiss. Muenchen 2: 359. pl. 9. 1832-36. *S. vitifolia* Hemsl. Biol. Centr.-Amer. Bot. 1: 114. 1879. *Amapola*; *Amanda*; *Mapola*; *Aguamecate*; *Ech* (Huehuetenango).

Cultivated in the mountain regions for ornament, and often found in hedges and roadside thickets; apparently native in ravines of Jalapa and Huehuetenango, and perhaps also in San Marcos, mostly at 2,000-3,000 meters; Alta Verapaz; Jalapa; Guatemala; Sacatepéquez; Totonicapán; Huehuetenango; Quezaltenango; San Marcos. Southern Mexico.

A branched shrub 1.5-3.5 meters high with rather stout branches, these at first densely stellate-tomentose; leaves long-petiolate, mostly 6-18 cm. long and about as wide, deeply cordate at the base, shallowly or deeply cordate, the lobes acute or acuminate, dentate, densely stellate-tomentose on both surfaces, or the pubescence sparser above; peduncles axillary, sometimes 1-flowered but usually bearing 2-4 flowers, these on long or short peduncles; bractlets 3, equaling or shorter than the calyx, tomentose; calyx 2-4 cm. long, densely stellate-tomentose, the lobes ovate or oval-ovate, acute or acuminate; petals 5.5-6.5 cm. long, white or rose-red; carpels numerous, very thin, about 2 cm. long.

As it occurs in Guatemala, this plant is a variable one in leaf shape, quantity of pubescence, size of flowers, and color of petals, but the ample material available for study does not appear readily divisible into two or more species. The shrub is a showy and rather handsome one, thriving with little or no attention under cultivation, and producing great numbers of large flowers that are borne profusely during the dry months, hence perhaps its popularity in Huehuetenango and Totonicapán. The flowers seem to be about as often white as rose-red, and both colors are found on apparently wild plants. This species is the type of the genus *Meliphlea* Zucc., which has good claims to recognition as a genus distinct from *Sphaeralcea*, although it is hard to see what advantage there would be in recognizing such a segregate.

**Sphaeralcea umbellata** (Cav.) Don, Hist. Dichl. Pl. 1: 465. 1831. *Malva umbellata* Cav. Icon. Pl. 1: 64. pl. 95. 1791.

Wet thickets at border of forest, about 1,800 meters; Chiquimula (Montaña Nonojá, east of Camotán, *Steyrmark* 31715). Southern Mexico.

A shrub or small tree 2-6 meters high with a slender stem or trunk, the branches densely stellate-tomentose; leaves long-petiolate, mostly 10-20 cm. long and about as wide, deeply cordate at the base, shallowly lobate, the lobes acute or obtuse,

sinuate-denticulate, green above and sparsely stellate-pubescent, rough to the touch, somewhat paler beneath, densely and softly stellate-tomentose; bractlets much shorter than the calyx, persistent, distinct, narrow below, spatulate-dilated above and green, rounded at the apex; calyx about 2 cm. long, densely stellate-tomentose, the lobes ovate, acute; petals dark blood-red, erect; carpels of the fruit numerous, 1.5 cm. long, stellate-hirsute.

### THESPESIA Correa

Trees or shrubs; leaves long-petiolate, entire or lobate; flowers mostly large and showy, yellow; bractlets 3-5 at the base of the calyx, small or deciduous; calyx truncate and dentate or sometimes 5-lobate; ovary 5-celled, the cells few-ovulate; style clavate at the apex, 5-sulcate or with short branches; fruit capsular, ligneous-coriaceous, loculicidally 5-valvate or almost indehiscent; seeds obovoid, glabrous or tomentose; cotyledons much complicate, usually black-punctate, the radicle short and almost straight.

About 7 species, in the tropics of both hemispheres. Only the following is known in North America.

***Thespesia populnea*** (L.) Soland. ex Correa, Ann. Mus. Hist. Nat. Paris 9: 290. *pl.* 25, *f.* 1. 1807. *Hibiscus populneus* L. Sp. Pl. 694. 1753.

British Honduras, at the edge of mangrove swamps; probably to be found in Izabal, and quite possibly also in cultivation. Sometimes planted for ornament in Central America and in Yucatan; widely distributed in the tropics of both hemispheres.

A shrub or small tree, the younger parts bearing numerous small peltate scales, the whole plant glabrous or nearly so in age; leaves slender-petiolate, ovate-cordate, 5-20 cm. long, acute or acuminate, cordate at the base, 5-7-nerved, entire, with glandular pores beneath at the base of the blade; peduncles axillary, solitary, equaling or shorter than the petiole; bractlets 3-5, equaling the calyx, oblong-lanceolate; calyx cupular, 7-9 mm. long, truncate or with minute teeth; petals 5-6 cm. long, at first yellow, changing to purple; fruit subglobose, 3 cm. in diameter; seeds 8-10 mm. long, more or less tomentose.

Called "majagua" in Yucatan and "cork tree" in British Honduras. This is a characteristic species of mangrove formations, in its wild state.

### URENA L.

Herbs or shrubs, the pubescence all or chiefly of stellate hairs; leaves petiolate, usually angulate or lobate, the costa bearing beneath near its base a long slit-like gland; stipules subulate; flowers small, axillary, solitary or fasciculate, sometimes forming long terminal interrupted spikes; bractlets 5, united, adherent to the calyx; calyx 5-lobate; petals usually pink; stamen tube about as long as the petals; ovary 5-celled, the ovules 1 in each cell, ascending; mature carpels small, indehiscent, covered with barbed spines.

Six species, widely distributed in the tropics of both hemispheres. In Central America one other species occurs, in Costa Rica and Panama.

*Urena lobata* L. Sp. Pl. 692. 1753.

British Honduras, at sea level; Salvador; Panama; Florida; West Indies; Old World tropics.

A branched herb or shrub 1-3 meters high, the branches stellate-tomentose or glabrate, often dark red; leaves on long or short petioles, broadly ovate to suborbicular, mostly 4-10 cm. long, obtuse or acute, subcordate to obtuse at the base, usually shallowly lobate or angulate, dentate, densely stellate-tomentose, at least beneath, often rough above; bractlets 5-7 mm. long, the calyx usually somewhat shorter; petals pink, 2-3 times as long as the calyx; mature carpels 6 mm. long, stellate-hirsute and bearing numerous stiff barbed spines.

Called "wild cotton" in British Honduras and "malvita" in Salvador. In southern Florida, where the plant is apparently introduced and is known as "Caesar bur," it is a pest, sometimes forming thickets of wide extent, and almost prohibitive of cultivation. The "burs," i.e., carpels, adhere to moving objects by their barbed spines and are thus spread widely and efficiently. The stems yield a tough fiber.

#### WISSADULA Medicus

*Reference:* R. E. Fries, Entwurf einer Monographie der Gattungen *Wissadula* und *Pseudabutilon*, Svensk. Vet. Akad. Handl. 43, no. 4: 1-114. pls. 1-10. 1908.

Herbs or shrubs, often annual, the pubescence of stellate hairs; leaves petiolate, entire or dentate, cordate to truncate at the base; flowers axillary or in terminal panicle inflorescences; bractlets none at the base of the calyx; calyx 5-lobate; corolla small or medium-sized; ovary usually 5-celled; ovaries normally 3 in each cell, anatropous, pendulous, 2 in the upper part of the cell, the other in the lower part; mature carpels membranaceous, apiculate or rostrate at the apex, by a lateral constriction imperfectly 2-celled; seeds pilose or villous; embryo curved, the endosperm scant.

About 35 species, mostly American, a few extending into tropical Africa and Asia. One other Central American one, *W. periplocifolia* (L.) Presl, has been collected in Mexico and Panama and is to be expected in Guatemala.

Inflorescence dense and spike-like. . . . . *W. contracta*.

Inflorescence paniculate, lax and open.

Carpels of the fruit 12-14 mm. long. Leaf blades deeply cordate at the base.  
*W. costaricensis*.



Carpels of the fruit 5–10 mm. long.

Leaves glabrous on the upper surface or pilose with simple hairs.

*W. excelsior.*

Leaves usually very densely stellate-pubescent on the upper surface.

*W. amplissima.*

**Wissadula amplissima** (L.) R. E. Fries, Svensk. Vet. Akad. Handl. 43, no. 4: 48. 1908. *Sida amplissima* L. Sp. Pl. 685. 1753. *W. rostrata* Planch. in Hook. Nig. Flora 229. 1849.

Dry or moist thickets, 850 meters or less; Jutiapa; Retalhuleu (Champerico). Western Texas; Mexico; Salvador; Honduras; West Indies; South America; Africa.

Plants erect, herbaceous or suffrutescent, mostly a meter high or less, the branches stellate-tomentulose; leaves long-petiolate, entire, ovate or rounded-ovate, 5–15 cm. long, acuminate or long-acuminate, usually cordate at the base, sparsely or densely stellate-tomentulose above, pale beneath and very densely and closely stellate-tomentose; flowers axillary and in lax terminal panicles, the flowering peduncles 1–2 cm. long; calyx 3–4 mm. long, stellate-puberulent, the lobes ovate-triangular; petals yellow, 4–6 mm. long; fruit stellate-puberulent, the carpels apiculate, 5–10 mm. long.

The Maya name in Yucatan is recorded as “tsunicax.”

**Wissadula contracta** (Link) R. E. Fries, Svensk. Vet. Akad. Handl. 43, no. 4: 60. 1908. *Sida contracta* Link, Enum. Hort. Berol. 2: 204. 1822.

Moist or dry thickets, 750–1,200 meters; Chiquimula (Volcán de Ipala); Jutiapa; Santa Rosa (Cuilapa); Escuintla. West Indies; Venezuela; British Guiana; Brazil.

A tall herb, sometimes suffrutescent, the stems covered with a dense close minute pale tomentum; leaves long-petiolate, orbicular or ovate, 7–13 cm. long, rather abruptly acuminate, shallowly or rather deeply cordate at the base, entire, green above but sparsely stellate-puberulent, whitish beneath and covered with a minute, very close, stellate tomentum; inflorescence paniculate but contracted and spike-like, 10–30 cm. long and 2–3 cm. broad, dense and many-flowered, the peduncles in fruit 1–1.5 cm. long or shorter; calyx stellate-tomentulose, 3–3.5 mm. long, the lobes ovate-triangular; petals pale yellow or white, 3.5 mm. long; carpels 3–6, minutely puberulent, 6–7 mm. long, rostrate-apiculate; seeds globose-pyriform, glabrous but minutely pilose at the hilum, rugulose.

This has been reported from Santa Rosa under the name *Wissadula mucronulata* Gray.

**Wissadula costaricensis** Standl. Field Mus. Bot. 18: 678. 1937.

Brushy rocky hillsides or moist dense forest, 1,200–1,500 meters; Quezaltenango. Costa Rica.

A branched herb 1–2.5 meters high; leaves long-petiolate, entire, thin, broadly ovate-cordate, 5–17 cm. long, long-acuminate, deeply cordate at the base, green above, at first densely and very minutely stellate-puberulent, in age glabrate, slightly paler beneath and more densely stellate-pubescent; flowers mostly in large lax terminal panicles, slender-pedunculate; calyx 5 mm. long, the lobes broadly ovate, subacute; petals yellow, 7–8 mm. long; carpels of the fruit 5, minutely puberulent, 12–14 mm. long, abruptly short-rostrate.

*Wissadula excelsior* (Cav.) Presl, Rel. Haenk. 2: 118. 1836. *Sida excelsior* Cav. Monad. Diss. 27. pl. 5, f. 3. 1785. *W. zeylanica* Medic. var. *guatemalensis* E. G. Baker, Journ. Bot. 31: 70. 1893 (type from Mazatenango, Bernoulli 55). *W. periplocifolia* var. *guatemalensis* Hochr. Ann. Cons. Jard. Bot. Genève 6: 28. 1902. *Curashira* (fide Aguilar).

Usually in moist thickets, 900 meters or lower; Alta Verapaz; Izabal; Jutiapa; Santa Rosa; Escuintla; Suchitépéquez; Retalhuleu. Southern Mexico; British Honduras to Salvador and Panama; Cuba; South America.

A much-branched herb or shrub 1–2.5 meters high, sometimes with thick hard woody stems, the branches stellate-tomentulose; leaves long-petiolate, entire, ovate or oblong-ovate, 6–12 cm. long, long-acuminate, rounded or subcordate at the base, green above, in age almost glabrous, when young sparsely pilose with short simple hairs, whitish or pale ferruginous beneath, covered with a dense close stellate tomentum, often pilose on the nerves; inflorescence paniculate, lax, often very large, the peduncles 1.5 cm. long or less; calyx minutely stellate-puberulent, 2.5–3.5 mm. long, the lobes ovate-triangular, acute; petals greenish yellow, 3.5–4 mm. long; carpels 5, obovate, 8 mm. long, apiculate, puberulent; seeds globose-pyriform, black, minutely puberulent, 2 mm. long.

Called “escobilla blanca” in Salvador. The stems of this and other species contain a tough fine fiber.

### BOMBACACEAE. Balsa Family

Trees or shrubs, sometimes armed with prickles; leaves alternate, simple or digitately compound; stipules free, deciduous, usually small and inconspicuous; flowers perfect, often very large, the peduncles 1-flowered, axillary or terminal, solitary or fasciculate or the inflorescence rarely a cyme of numerous flowers; calyx generally closed in bud, in anthesis cupular to turbinate or tubular, truncate or lobate, persistent; petals 5, often adherent basally to the stamen column; stamens usually indefinite, united into one to several fascicles, the stamen column divided near the base or toward the apex into 5 branches, these bearing each 1–many anthers, or the column subentire with anthers covering it; anthers with 1–2 or more cells, globose to linear or hippocrepiform; ovary 2–5-celled, the cells

2-many-ovulate, the ovules attached at the inner angle; style entire or with as many branches as there are ovary cells; fruit capsular, usually opening by 5 valves, often lanate within, sometimes indehiscent; endosperm usually scant or none, carnose; cotyledons contorted, folded, or plane.

About 25 genera, widely distributed in tropical regions. In southern Central America—Panama and Costa Rica—two other genera are represented, *Bombacopsis* and *Cavanillesia*. The latter is known in Panama by the name "Cuipo," and is remarkable for its large and tall, somewhat swollen trunk.

Leaves simple.

Flowers 10–15 cm. long; fruit 12–20 cm. long, filled with silky fibers. . . . . *Ochroma*.

Flowers and fruit much smaller, the fruit without silky fibers within.

Stamen tube short; flowers usually fasciculate. . . . . *Hampea*.

Stamen tube greatly elongate; flowers mostly solitary. . . . . *Quararibea*.

Leaves digitately compound.

Seeds winged; flowers secund along the branches of a cyme. . . . . *Bernoullia*.

Seeds not winged; flowers solitary, or at least never in cymes.

Flowers mostly 20–30 cm. long; seeds 1.5 cm. long or larger, not imbedded in silky fibers. . . . . *Pachira*.

Flowers mostly less than 15 cm. long; seeds 6 mm. in diameter or smaller, imbedded in silky fibers.

Stamen tube dividing into 5 parts, each of these bearing several sessile anthers at the summit; trunk usually covered with stout sharp spines. . . . . *Ceiba*.

Stamen tube much divided, the anthers solitary on long filaments; trunk unarmed. . . . . *Bombax*.

### BERNOULLIA Oliver

Large trees, almost glabrous but with sparse pubescence of small stellate hairs; leaves long-petiolate, digitately compound, the leaflets membranaceous, petiolulate, entire; flowers small for the family, in many-flowered cymes, secund upon the branches, pedicellate; calyx campanulate, shortly 5-lobate, the lobes deltoid, valvate in bud; petals 5, adnate to the stamen tube, oblong, longer than the calyx, longitudinally veined, revolute at the apex; stamen column exerted, laterally cleft almost to the middle, antheriferous at the apex; anthers 15–20, sessile, 2-celled, the cells linear, longitudinally dehiscent; ovary ovoid, glabrous, 5-celled, the cells many-ovulate; style elongate, glabrous; fruit ligneous, oblong-ellipsoid, acutely 5-angulate, 5-valvate; seeds with a broad thin wing.

The genus probably consists of a single species. Another species described recently from Brazil is suspected to be generically distinct.

*Bernoullia flammea* Oliver in Hook. Icon. Pl. 12: 62. pls. 1169, 1170. 1873. *Uacut* (Petén); *Canté*; *Ala de cucaracha*.

Type collected at Ixtacapa, Suchitupéquez, *Bernoulli* 553. Occasional in the rather dry (during the winter months) forest of the

higher plains and lower foothills of Retalhuleu (San Felipe and elsewhere) and Suchitepéquez; Petén. Oaxaca; British Honduras; Atlantic coast region of Honduras.

A large or medium-sized tree, sometimes 30 meters tall with a trunk a meter in diameter, the bark brown, the trunk tall, the crown somewhat depressed and spreading; leaflets usually 5-6, sometimes only 3, oblong-oblongate, 10-22 cm. long, acute or acuminate, cuneate-attenuate to the base, thin, green, almost or quite glabrous; whole inflorescence bright red or orange-red, sparsely puberulent, the flowers long-pedicellate; calyx 1 cm. long, shallowly lobate; petals recurved; stamen tube long-exserted, the anthers clustered at its apex; fruit very hard, attenuate to each end, about 20 cm. long, glabrous within; seeds, including the long wing, about 5 cm. long.

Called "mapola" in British Honduras (a corruption of "amapola"); known in Oaxaca as "palo calabaza" and "palo de perdiz." The wood is described as soft and spongy. We have seen very few individuals of this species. It is said to be common in the vicinity of San Sebastián, Retalhuleu, but we have seen only a few trees apparently planted in the fincas, and of only medium size. The trees are leafless during at least the latter part of the dry season and are said to open their flowers at the beginning of the rainy season. The bright red flowers are very showy. The seeds are stated to be edible.

### BOMBAX L.

Large trees, often tall and with thick trunks, unarmed; leaves digitate, deciduous, the leaflets 3-9, entire or nearly so; peduncles axillary or subterminal, solitary or fasciculate, 1-flowered, the flowers usually produced when the trees are leafless, white to pink or red, commonly large and showy; calyx cupular, truncate or irregularly and shallowly 3-5-lobate; petals narrow or obovate, commonly pubescent outside; stamen column bearing very numerous (often 1,000 or more) stamens, the anthers solitary at the ends of the filaments; ovary 5-celled, the cells many-ovulate; style clavate at the apex; capsule ligneous or coriaceous, loculicidally 5-valvate, the cells densely lanate within; seeds obovoid or subglobose, imbedded in the wool of the endocarp, the testa crustaceous, smooth, the endosperm thin.

About 50 species, in tropical America, Asia, Africa, and Australia. In continental North America two other species are known, one in Mexico, the other, *B. Barrigon* (Seem.) Dcne., in Costa Rica and Panama.

*Bombax ellipticum* HBK. Nov. Gen. & Sp. 5: 299. 1821. *Carolinea fastuosa* DC. Prodr. 1: 478. 1824. *B. mexicanum* Hemsl. Diag. Pl. Mex. 4. 1878. *Arbol de señoritas*; *arbol de doncellas*; *doncellas*; *señoritas*; *acoque* (Quiché); *pumpo* (Huehuetenango);

*chorrococo* (Alta Verapaz); *chulte*, *chulte colorado* (Petén, Maya); *amapola*, *mapola* (Petén); *muñeco* (Izabal); *ila* (Santa Rosa).

Wet to dry, usually open forest, often scattered through fields and over plains, frequently on open rocky hillsides, ascending from sea level to about 1,800 meters, but growing chiefly at low elevations; Petén; Alta Verapaz; Izabal; Chiquimula; Santa Rosa; Escuintla; Guatemala; Sacatepéquez; Quiché; Huehuetenango; Quezaltenango; Suchitepéquez. Southern Mexico; British Honduras; Salvador.

A large tree, unarmed, with smooth, greenish or gray bark; leaflets short-petiolulate, broadly elliptic to oval or obovate-elliptic, mostly 10–25 cm. long, usually broadly rounded at the apex but often abruptly short-pointed, rounded to acute at the base, rather thick, green, thinly tomentose when young but in age glabrous or nearly so; calyx about 1.5 cm. long, commonly with 10 glands at the base; petals 7–13 cm. long, linear-oblong, varying from white to purple-red, densely pilose or sericeous on both surfaces; stamens purple-pink to white; fruit oblong or ellipsoid, 10 cm. long, the “cotton” dirty white.

Maya names reported from Yucatan are “zaccuyche,” “chacuyche,” and “cuyche”; in Salvador the tree is called “shilo,” “jilinsuche,” “pilinsúchil,” “shilo blanco,” and “shilo colorado,” all names of Nahuatl origin. The tree is a very handsome one when in flower, about the end of the dry season, when the old leaves have long since fallen and new ones are beginning to unfold. The young foliage usually is purplish red and consequently conspicuous. About Cobán the trees blossom in late March and April. It is questionable whether the species is native there, or only planted. It is common enough in some parts of Guatemala and Sacatepéquez, and lower down on the Pacific slopes and plains. The flowers often are used as decorations in houses and churches. A decoction of the bark is a domestic remedy for coughs and catarrh. The cotton-like fiber within the pods is utilized like kapok, for stuffing cushions and pillows. The wood is very brittle when freshly cut, but when seasoned it is satisfactory for fuel and even for making such articles as *bateas* (the Central American equivalent of washboards). It is probably the calyx of this member of the Bombacaceae that is utilized by the Indians of Sololá to make unique tobacco pipes, with diminutive bowls and long slender reed stems, that are seen commonly in the markets of Chichicastenango and other highland towns. This species presumably is the basis for the report from Escuintla of *Bombax mompoxense* HBK.

#### CEIBA Medic.

Trees, often very large, with thick trunks, the trunks and branches usually armed with stout prickles; leaves digitately compound, the leaflets 3–7, entire,

deciduous; peduncles 1-flowered, axillary or subterminal, solitary or fasciculate, the flowers small or large, white or pink; calyx cupular, truncate or irregularly 3-5-lobate; petals oblong, pubescent or lanate; stamen column divided above into 5 branches, each bearing 2-3 anthers at its apex; ovary 5-celled, the cells many-ovulate, the style clavate at the apex, 5-angulate; capsule ligneous or coriaceous, the cells densely lanate within; seeds obovoid or globose, imbedded in the wool of the endocarp, strophiolate or naked at the hilum, the testa crustaceous, smooth, the endosperm very thin or none.

About 20 species in tropical America, one extending to the Old World tropics, where perhaps introduced. Only two species are known from Central America, but two more are known from Mexico.

Petals 3-3.5 cm. long; leaflets entire.....*C. pentandra*.  
 Petals 10-16 cm. long; leaflets usually serrulate.....*C. aesculifolia*.

***Ceiba aesculifolia*** (HBK.) Britt. & Baker, Journ. Bot. 34: 175. 1896. *Bombax aesculifolium* HBK. Nov. Gen. & Sp. 5: 298. 1821. *Eriodendron aesculifolium* DC. Prodr. 1: 479. 1824. *Chorisia soluta* Donn. Smith, Bot. Gaz. 16: 1. 1891 (type from Laguna de Amatitlán, J. D. Smith 1924). *Ceibillo*; *Algodón de monte* (Huehuetenango); *Tinanche*, *Kinin* (Petén, Maya); *Palo lagarto* (fide Aguilar); *Murul* (Zacapa); *Cox* (Huehuetenango).

Chiefly on dry plains or hillsides, common in many localities, especially in the Oriente, mostly at 1,500 meters or less; Petén; Zacapa; Chiquimula; Guatemala; Sacatepéquez (perhaps only in cultivation); Huehuetenango; probably in all the departments of the Oriente and in El Progreso and Baja Verapaz. Widely distributed in Mexico, south to Yucatan; probably also in British Honduras; Honduras; Salvador.

A large or medium-sized tree, the thick trunk armed with stout conic prickles, the trunk usually low, the crown spreading; young branchlets often copiously prickly, glabrous or nearly so; leaflets 5-8, elliptic to oblanceolate or obovate, mostly 5-15 cm. long, long-acuminate or cuspidate-acuminate, serrate or occasionally entire, often glaucescent beneath, glabrous or nearly so; calyx 2-4 cm. long, glabrous and often glaucous; petals 10-16 cm. long, tomentose outside with yellowish or brownish hairs; stamens purple-red or white; capsule ellipsoid, 12-18 cm. long, acuminate, brownish, smooth and glabrous, the abundant "cotton" brownish or white.

Usually called "pochote" in Mexico, from the Nahuatl *pochotl*; Maya name in Yucatan "piim." The tree has attained great importance in recent years in Guatemala, and many thousands of the trees have been planted in various parts of the country. The abundant "silk" or "cotton" filling the pods has been found superior to kapok for many purposes, especially for insulation in ice-boxes, and

is in great demand in the United States. There is good ground for believing that the industry may become one of importance in Central America, since the trees, once established, grow well in dry and rocky regions unsuited for agriculture or other purposes. Substantial amounts of the fiber already are being exported from Guatemala. It long has been used in the country for stuffing pillows and cushions, one tree being reported to yield as much as 15-20 pounds. The Mayas of Yucatan formerly wove *mantas* or blankets from the silky fiber. It was used also as tinder, it being stated that fiber of *C. pentandra* was unsuited for the purpose because it did not catch fire readily. The flowers that fall on the ground are eaten by deer and stock. At least in Yucatan the young tender fruits are sometimes cooked and eaten, and the seeds also are roasted and eaten. The tree flowers during the dry months when it is devoid of leaves. The name "ceiba" has been reported from Guatemala for this species, but probably in error, since the two species of the genus ordinarily are distinguished locally.

*Ceiba pentandra* (L.) Gaertn. Fruct. & Sem. 2: 244. 1791. *Bombax pentandrum* L. Sp. Pl. 511. 1753. *Ceiba casearia* Medic. Malvenfam. 16. 1787. *Eriodendron anfractuosum* DC. Prodr. 1: 479. 1824. *E. occidentale* Don, Hist. Dichl. Pl. 1: 513. 1831. *Ceiba*; *Inup* (Jacaltenango); *Nuo* (Poconchí); *Mox*, *Inup* (Quecchí).

Common on moist or dry plains or hillsides, chiefly at less than 1,000 meters, and most plentiful on the lower plains; often planted at elevations above its natural habitat; Petén; Alta Verapaz; Baja Verapaz; Izabal; Zacapa; El Progreso; Jalapa; Jutiapa; Santa Rosa; Escuintla; Guatemala; Sololá; Suchitepéquez; Retalhuleu; San Marcos. Widely distributed in Mexico, south to British Honduras, and throughout the lowlands of Central America; West Indies; northern South America; also in tropical Asia and Africa, where perhaps introduced from America.

A giant tree, often 50 meters tall or larger, the trunk frequently 2 meters or more in diameter, supported by large buttresses extending widely from the base of the trunk, the crown usually broad and spreading, depressed, the bark light brown or gray, sometimes whitish, more or less densely covered with short sharp hard prickles but otherwise smooth or nearly so; young branchlets thick, unarmed; leaflets 5-7, oblanceolate to oblong or obovate-oblong, 8-20 cm. long, acute or acuminate, acute or subobtuse at the base, petiolulate, rather thick and firm, entire, glabrous or nearly so; petals white or pink, 3-3.5 cm. long; calyx campanulate, 1 cm. long or slightly larger, glabrous or nearly so, very shallowly lobate; petals densely silky-hairy outside; fruit coriaceous, elliptic-oblong, 10-12 cm. long, the large brown seeds imbedded in the silky "cotton."

The ceiba is one of the best-known trees of Central America, where it figures largely in history, legend, and romance. Much sentimental interest is associated with it, and the trees often are regarded with real affection. The tree had some religious significance among the Indian inhabitants, and it is said that even today in Guatemala the Indians never willingly cut a tree. In the ample shade of a ceiba tree the long-established markets formerly were held, and today open-air markets still are held in the shade of a ceiba, wherever the growth of the tree is possible, even at places above its natural range. The Indians of Alta Verapaz, in particular, considered the ceiba sacred, and beneath the trees they held their councils before and long after the conquest. Here public officials were chosen. The Indians often censed the trees with aromatic resins. Particularly celebrated in Guatemala is the ceiba of Palín, which shades the whole market place, and is often said to be the largest one in the country, although we believe we have seen larger ones growing naturally in the Pacific plains. Another one extends widely over the picturesque market of Sacapulas, and another huge one stands in the plaza of Amatitlán. The ceiba is the largest tree of the North Coast, and perhaps of all Guatemala.

The high branches often are covered with coarse orchids and other epiphytes, which are safe from molestation. The leaves fall at the middle of the dry season or later, reappearing toward the end of the *verano* after the flowers have opened. While many trees are at times quite leafless, others, perhaps dependent upon the amount of moisture available, always have at least a few green leaves. The flowers are too small to be very conspicuous. When they fall to the ground, as they do in large quantities, they are eaten by deer and domestic animals. The English name is "cotton tree" or "silk cotton tree." The Maya name in Yucatan is "yaaxche" or "yaxche." The term "ceiba" is of Antillean origin. It figures in dozens of Guatemalan place names, in almost all regions except the highlands. The name "pochote" is applied in some parts of Mexico and Central America to the ceiba, and probably is the Nahuatl term for the tree. Oviedo reports "poxot" as a name given it by the Indians of Nicaragua.

The wood is pinkish white to ashy brown, the sapwood not clearly defined; light and soft but firm and tenacious, with a specific gravity of 0.44, and weight of 27 pounds per cubic foot; grain often irregular; texture coarse; easy to cut, tough and strong for its weight; not durable. Locally the wood is used occasionally for fuel, drums, *bateas*, and other articles. It is considered suitable for paper pulp,



corestock for veneers, packing cases and boxes, toys, and miscellaneous purposes requiring a soft, easily worked wood. It has been used at times for dugout canoes and rafts, but for the latter purpose can not compete with the much lighter balsa wood. It is stated that in 1939 some wood was shipped from Guatemala and elsewhere to Europe, presumably for crates, but its shipment became unprofitable because of a high export duty placed on the wood.

The seeds are reported to yield an oil that has been used in some regions for illumination and soap manufacture. The leaves are said to be edible when cooked. The most important product of the tree, however, is the silk or cotton of the seed pods, known in commerce as kapok. It is very fine, light, and elastic, and does not become matted under pressure. Large amounts are produced in the East Indies and West Africa, and exported for use in filling pillows, life preservers, and mattresses, and also for insulating ice-boxes and other articles. One who has slept upon kapok-stuffed pillows, so common in Central America, will be inclined to doubt some of the claims made regarding its elasticity. The fiber is reported to have been used in England for making felt hats.

### HAMPEA Schlechtendal

*Reference:* Standley, The genus *Hampea*, Journ. Wash. Acad. Sci. 17: 394-398. 1927.

Shrubs or trees; leaves simple, entire or lobate, palmate-nerved; peduncles axillary, short, fasciculate, the flowers small for the family, stellate-tomentose, often polygamous, subtended by 3 bractlets, these adnate to the calyx; calyx truncate or undulately 5-lobate; petals 5, villous within at the base; stamen tube short, separating into numerous slender filaments, each bearing a single anther, the anthers reniform; ovary 3-celled, the cells few-ovulate; fruit a coriaceous or somewhat ligneous capsule, loculicidally dehiscent; seeds obovoid-globose, the funicle expanded into a fleshy aril, the hilum lateral; testa crustaceous, the endosperm very thin.

About 10 species, distributed from southern Mexico to Colombia. Three additional species occur in Costa Rica and Panama.

Leaves in the adult stage glabrous beneath or nearly so, deeply cordate at the base; fruit oval, much longer than broad.....*H. macrocarpa*.

Leaves in the adult stage usually densely stellate-pubescent beneath; fruit, so far as known, globose or nearly so.

Fruit 2.5-3 cm. long. Leaves entire, subcordate at the base, stellate-pilose beneath.....*H. tomentosa*.

Fruit 2 cm. long or shorter.

Pedicels scarcely longer than the flowers, elongating in fruit; capsule coarsely stellate-tomentose, appearing somewhat tuberculate because of the un-

- equal hairs. Leaves entire, broadest at or near the base, usually acute or acuminate.....*H. euryphylla*.
- Pedicels several times as long as the flowers; capsule very minutely and evenly stellate-tomentulose, not appearing tuberculate.
- Leaves very minutely stellate-puberulent beneath, sometimes glabrate, broadest at the base, entire, usually acuminate.....*H. stipitata*.
- Leaves rather coarsely stellate-pilose beneath, usually densely so, mostly broadest at or above the middle, often or mostly shallowly 3-lobate or 3-dentate toward the apex, mostly obtuse or subacute...*H. trilobata*.

**Hampea euryphylla** Standl. Field Mus. Bot. 11: 135. 1932. *Campac* (Alta Verapaz); *Majagua*; *Moho* (British Honduras).

Moist or wet forest, 1,500 meters or lower; Petén; Alta Verapaz; Izabal; Huehuetenango. British Honduras (type from Temash River, *Smart & Stevenson* 142).

A tree, sometimes 15 meters high with a trunk 25 cm. in diameter, the branches rather coarsely stellate-tomentose and appearing tuberculate because of the unequal hairs; leaves on long slender petioles, usually oblong-ovate to rather broadly ovate, rarely rounded-ovate, commonly 12-20 cm. long and 6-13 cm. wide, acute to rather long-acuminate, rarely obtuse or rounded, at the base rounded or shallowly cordate, 5-7-nerved from the base, green and glabrate above, rather coarsely stellate-tomentulose beneath with brownish hairs, in age sometimes glabrate, entire; peduncles fasciculate, in anthesis about equaling the flowers, in fruit stout and as much as 2 cm. long, stellate-tomentose; calyx broadly campanulate, 4 mm. long, densely stellate-tomentose, subtruncate or shallowly lobate; petals about 1 cm. long; capsule subglobose, sessile, 2 cm. long or less, densely covered with a fulvous tomentum of unequal stellate hairs.

Material reported from Petén as *H. tomentosa* is apparently referable here. The specific name is an unfortunate one, for the type seems to be a somewhat abnormal specimen, with leaves of unusual form. A collection from Huehuetenango (*Steyermark* 48709) has been referred here although it is remarkable for its narrow oblong-lanceolate leaves. It is difficult to draw specific lines in this genus and the present arrangement is not altogether satisfactory.

**Hampea macrocarpa** Lundell, *Lloydia* 2: 102. 1939. *H. latifolia* Standl. Field Mus. Bot. 22: 90. 1940 (type from Finca San José Nil, Retalhuleu, *W. R. Hatch & C. L. Wilson* 383).

Frequent in dry thickets of the plains and lowest foothills, sometimes in rocky thickets along streams, mostly at 300 meters or less; Suchitepéquez; Retalhuleu. Chiapas, the type from Las Garzas.

A shrub or small tree, commonly 2-4 meters tall, sometimes elongate and subsucculent, probably at times attaining a greater size, the few branches ochraceous, glabrous or nearly so; leaves membranaceous, on very long, slender petioles,

rounded-ovate or almost orbicular, mostly 10–25 cm. long and often fully as wide, subacute or short-acuminate, usually deeply cordate at the base, entire, often angulate-lobate, almost glabrous above and green, slightly paler beneath, sparsely and minutely stellate-puberulent or almost glabrous, 7-nerved at the base; peduncles about 1.5 cm. long, stellate-furfuraceous, the hairs unequal; calyx 1 cm. long, whitish, densely and minutely stellate-tomentulose, irregularly and shallowly lobate; petals 3.5 cm. long, as much as 2 cm. wide; fruit oval or ellipsoid-oblong, 3–4 cm. long, glabrous within, covered outside with a minute close yellowish tomentum; seeds black, 7 mm. long, the aril conspicuous.

**Hampea stipitata** Watson, Proc. Amer. Acad. 21: 460. 1886.  
*Mano de león.*

Type from Finca Chocón, Izabal, *Sereno Watson* 31. Wet forest or thickets, at or little above sea level; Alta Verapaz; Izabal. Atlantic coast of Honduras; probably also in Panama.

A shrub or a tree, sometimes 15 meters high, usually lower, the slender young branches stellate-tomentulose with brownish hairs; leaves on long slender petioles, membranaceous, ovate to broadly oval-ovate, mostly 14–18 cm. long, abruptly acute to rather long-acuminate, rounded at the base and 5–7-nerved, green and almost glabrous above, somewhat paler beneath and rather densely or sparsely covered with a very minute close stellate tomentum, the margins entire; pedicels long and slender, densely and closely stellate-tomentulose, in age mostly 2 cm. long or longer; calyx 4–5 mm. long, minutely and closely tomentulose; fruit globose, short-stipitate, about 12 mm. in diameter, covered with a minute close yellowish stellate tomentum.

Called “majao” in Honduras. It is stated that in that country the bark is used by some of the remote Indians “to make soap,” in some unexplained manner; perhaps ashes from the bark are employed for the lye. In Guatemala strips of the tough bark are used as a substitute for rope and twine.

**Hampea tomentosa** (Presl) Standl. Contr. U. S. Nat. Herb. 23: 787. 1923. *Thespesia tomentosa* Presl, Rel. Haenk. 2: 136. 1836. *Majao.*

Dept. Guatemala, the locality uncertain, at 1,500 meters or probably at a lower elevation. Type from western Mexico, the species known definitely from Oaxaca and from Salvador, near the Guatemalan border.

A shrub or small tree; leaves long-petiolate, ovate to rounded-ovate, 8–20 cm. long, acute or acuminate, sometimes shallowly 3-lobate or angulate, subcordate at the base, finely stellate-pubescent above, more densely stellate-pilose beneath, in age sometimes glabrate; calyx shallowly lobate, the lobes oval-ovate; petals white or whitish, 1.5 cm. long; fruit globose, 3 cm. in diameter, glabrous within, densely covered outside with an uneven stellate tomentum of somewhat tuberculate appearance.

**Hampea trilobata** Standl. Contr. U. S. Nat. Herb. 23: 787. 1923. *Belhi* (Petén, fide Lundell).

Petén (100 meters, La Libertad, *M. Aguilar H.* 324). Frequent in British Honduras, in forest or thickets, at or little above sea level; Campeche; Yucatan.

A shrub or small tree, the branchlets densely stellate-tomentulose with brownish hairs; petioles slender, often equaling the blades, these very variable in shape, oblong-ovate to mostly rhombic-ovate or rounded-ovate, usually broadest at or above the middle, rounded or subcordate at the base, often with 3 short lobes or angles near the broad apex, sometimes entire and acute, green and glabrate above, rather coarsely stellate-pubescent beneath with brownish hairs; pedicels all long and slender, commonly several times as long as the flowers; calyx 5 mm. long, stellate-tomentulose, the ovate-oval lobes almost as long as the tube; petals white, 1.5 cm. long; fruit subglobose, glabrous within, about 1.5 cm. long, finely tomentulose outside, the cells about 3-seeded.

Maya names are recorded from Yucatan as "toobhoob" and "zacitza," and the name "majahau" is also reported from that state; known in British Honduras by the names "moho," "kajana," "mohara blanca," and "majana." The flowers are white and fragrant, the anthers yellow. The tough bark is said to be much used in Yucatan as cordage.

### OCHROMA Swartz. Balsa

*Reference:* W. W. Rowlee, Synopsis of the genus *Ochroma*, with descriptions of new species, Journ. Wash. Acad. Sci. 9: 157-167. 1919.

Medium-sized trees with very soft, light wood; leaves large, simple, palmately nerved and angulate-lobate; flowers large, terminal, pedunculate; calyx 5-lobate at the apex, the lobes induplicate or imbricate; petals 5; stamen column shallowly 5-lobate at the apex, antheriferous from the middle to the apex, the anthers adnate to the tube; ovary 5-celled, the cells many-ovulate; style spirally 5-sulcate; capsule somewhat ligneous, elongate, loculicidally 5-valvate, densely lanate within; seeds imbedded in the wool of the capsule, obovoid, the hilum basilar, not strophiolate; testa thin coriaceous, the endosperm carnos; cotyledons broad, the margins involute, the radicle short.

The genus consists of probably a single species, distributed from southern Mexico to Bolivia.

**Ochroma lagopus** Swartz, Prodr. Veg. Ind. Occ. 98. 1788. *Bombax pyramidale* Cav. ex Lam. Encycl. 2: 552. 1788; Diss. Bot. 5: 294. 1788. *O. pyramidale* Urban, Repert. Sp. Nov. Beih. 5: 123. 1920. *O. concolor* Rowlee, Journ. Wash. Acad. Sci. 9: 161. 1919 (type from Trece Aguas, Alta Verapaz, *Cook & Doyle* 82). *O. velu-*

*tinum* Rowlee, op. cit. 164 (type from Nicoya, Costa Rica). *O. pyramidale* var. *concolor* R. E. Schultes, Bot. Mus. Leafl. Harvard Univ. 9: 177. 1941. *Balsa*; *Lana*; *Cajeto*; *Jujul*, *Puj* (Alta Verapaz); *Corcho* (Suchitépéquez); *Lanilla*.

Occasional in forest of the Pacific plains, 400 meters or lower, and also in the northern lowlands; Alta Verapaz; Izabal; Santa Rosa; Escuintla; Suchitépéquez; Retalhuleu; Huehuetenango; sometimes planted in fincas, as in Escuintla and Chimaltenango. Veracruz, Oaxaca, and Tabasco; Salvador to Panama; West Indies. Its various forms extend southward to Bolivia.

A tall tree, sometimes 30 meters high, with a trunk a meter in diameter, often buttressed at the base, the bark smooth, pale reddish brown, the crown small or broad and depressed; leaves long-petiolate, ovate-orbicular, mostly 20–30 cm. broad, thin, shallowly or rather deeply cordate at the base and 7-nerved, often shallowly lobate and undulate, rounded to subacute at the apex, green above and glabrate, green beneath and sparsely or densely velutinous-stellate-pilulous; flowers 10–15 cm. long; calyx tubular-campanulate, tomentose or glabrate, the lobes short, unequal; petals whitish; capsule 12–20 cm. long, narrow, densely filled with brown “cotton” in which are imbedded very numerous small seeds.

For an account of the somewhat complicated early synonymy of the species see John H. Pierce, The nomenclature of balsa wood (*Ochroma*), Trop. Woods 69: 1. 1942; also, An evaluation of the type material of *Ochroma*, the source of balsa wood, Trop. Woods 70: 20. 1942. Rowlee, the only monographer of the genus, published in 1919 a paper in which he rather optimistically recognized no less than nine species, most of which were described as new. They were based upon characters known to be of little value, as a rule, in separating species of other Malvales, and as ampler herbarium material accumulates, it becomes increasingly difficult to recognize the forms to which he gave specific names. There do seem, however, to be in Central America two recognizable forms of balsa trees, one in which the leaves are green beneath, the other with leaves densely pale-tomentose beneath. The second may well be treated as a variety of the first, which seems to be *O. lagopus* of the West Indies. In Guatemala all balsa trees of the Pacific coast seem to represent the first type, while both forms occur on the Atlantic watershed. Balsa trees are not so plentiful in Guatemala as in some other Central American countries, and we have seen them in abundance only about Tiquisate, in the Pacific lowlands. Numerous trees grow also along the Río Guacalate northwest of Escuintla, at about 720 meters. In Oaxaca this tree is sometimes called “corcho”; in Salvador “algodón” and “balsa”; in Tabasco “jopi,” “jubiguy,”

and "pomoy"; and in Oaxaca "pata de liebre." The last name, equivalent to the specific name *lagopus* and signifying "rabbit-foot," alludes to the appearance of the inner part of the fruit, which is soft and silky like the paw of a rabbit.

**Ochroma lagopus** var. **bicolor** (Rowlee) Standl. & Steyerm. Field Mus. Bot. 23: 62. 1944. *O. limonensis* Rowlee, Journ. Wash. Acad. Sci. 9: 163. 1919 (type from Costa Rica). *O. bicolor* Rowlee, op. cit. 165 (type from Costa Rica). *Lanillo*; *Cajeto*; *Tambor* (probably an erroneous name); *Guano*.

Moist or wet forest, at or little above sea level; Izabal. British Honduras to Panama, along the Atlantic coast, perhaps extending farther southward.

Similar to the species, differing in its bicolored leaves, bright green and glabrate above, covered beneath with a dense, close, whitish or pale brownish tomentum.

Called "polak" in British Honduras.

The balsa is in several respects one of the most interesting of Central American trees, especially because of its rapid growth and light wood. The statement has often been made that it is the lightest wood known, but the wood of some other trees is known to have even less weight. So light is it that on the docks where it is being loaded on shipboard one sometimes is astonished to see a stevedore without special effort lift to his shoulder what appears to be an ordinary log of considerable size, and easily walk off with it, a feat one would assume only the traditional "strong man" could perform. The wood is said to have come first to the attention of Spanish explorers when used by the Indians in construction of light rafts, which apparently came to be called *balsas*, from the name *balsa* given the tree itself, a name probably of Quechua derivation. Balsa wood is white or whitish, soft and spongy, with a specific gravity of 0.12–0.30, a cubic foot weighing 7.5–12 pounds. It is used extensively in the United States and elsewhere in the manufacture of products requiring buoyancy and insulation, such as lifeboats, hydroplane pontoons, stream-lining of struts and braces in airplanes. It is also used for toys. While the tree does occur in lowland forests of Central America, it is most plentiful in second growth. It is easily recognizable from a distance by its large flowers and leaves, these often bicolored, and by the smooth, mottled, white and gray bark. Usually it flowers toward the end of the dry season, but some flowers, apparently, may be found at almost any time. The

Pods ripen within a comparatively short time after flowers are produced, and when they open, the ground beneath the tree often is covered with a loose mass of the silky cotton. The fibers are short, and the cotton apparently not in demand abroad, but locally it is used for stuffing mattresses, cushions, pillows, and upholstery. The seeds, although rather heavy, often are carried to some distance by wind, because of cotton adhering to them. They germinate quickly when in contact with the soil, and seedlings frequently spring up in great numbers, to form thickets of new plants. However, the seeds sometimes remain for a long time without germinating, to take root in great numbers if the land is burned over. It is reported that in five or six years the trees may attain a trunk diameter of 60–75 cm. and a height of 16–20 meters, the maximum height being reached in about 10 years. The older trees are not desirable for commercial purposes, since their wood is not so light as that of younger ones. Balsa has been planted in considerable amounts in the Atlantic coast of Costa Rica, where the plantations have been successful, at least so far as growth of the trees is concerned. The wood must be milled as quickly as possible after cutting, since it is perishable when exposed to decay, and also is attacked by borers and becomes discolored. (See F. A. Tenny, *Costa Rican balsa*, *Trop. Woods* 15: 34. 1928.)

### PACHIRA Aublet

Small or large trees, growing in wet places; leaves digitately compound, the leaflets 3–9, entire; peduncles axillary, 1-flowered, 2–3-bracteolate, the flowers very large, the petals oblong or linear, whitish or reddish, usually tomentose outside; calyx cupular, truncate or obscurely lobate; stamen column separating above into numerous filaments, each bearing a single anther, the anthers reniform; ovary 5-celled, the cells many-ovulate, the style clavate above, 5-lobulate at the apex; fruit very large and heavy, oblong to ovoid, ligneous or coriaceous, filled with hard pulp, not hairy within, loculicidally 5-valvate or almost indehiscent; seeds very large, irregular, naked, the testa crustaceous; cotyledons carnose, involute-plicate, surrounding the straight radicle.

About 15 species, or perhaps fewer, in tropical America. One other species described from Central America, *P. villosula* Pittier of Panama, may be distinct.

*Pachira aquatica* Aubl. Pl. Guian. 725. pls. 291, 292. 1775. *Carolinea princeps* L. f. Suppl. 314. 1781. *C. macrocarpa* Schlecht. & Cham. Linnaea 6: 423. 1831. *P. macrocarpa* Walp. Repert. Bot. 1: 329. 1842. *Zapotón*; *Pumpunjuche*; *Uacoot* (Petén, Maya); *Zapote bobo* (Petén).

Densely forested or more usually rather open swamps, sometimes in or at the edge of brackish water, chiefly at or near sea level, at higher elevations growing along stream banks, at 300 meters or less; Petén; Izabal; Santa Rosa; Escuintla; Suchitepéquez; Retalhuleu; San Marcos. Southern Mexico to British Honduras and Panama; South America.

A large or small tree, sometimes flowering when only a shrub, commonly 12-20 meters high, seldom more than 60 cm. in diameter, supported by usually narrow and tall buttresses, the bark light brown or grayish, smooth, the crown usually small but sometimes depressed and spreading; branchlets glabrous or nearly so, thick; leaves long-petiolate, the leaflets 5-8, rather thick and somewhat coriaceous, elliptic-oblong to oblanceolate-oblong, 8-20 cm. long, acute or obtuse, attenuate to the base, glabrous above, beneath glabrous to rather densely velutinous-pubescent; calyx 1.5-2 cm. long, densely yellowish-tomentulose, truncate; petals 18-30 cm. long, about 1 cm. wide, often involute, tomentulose outside, white or pale greenish yellow; stamens very long, the stout tube 4.5-12 cm. long, the slender filaments purple or reddish; fruit subglobose or ovoid, mostly 20-30 cm. long, light brown, smooth or nearly so.

Known in British Honduras as "provision tree" and "Santo Domingo"; called "zapote de agua" in Chiapas; "shila blanca" in Salvador; "amapola" in Yucatan; "apompo" in Veracruz and Oaxaca. The Maya name in Yucatan is recorded as "cuyche." The tree is particularly abundant along or near the North Coast, often dominant in shallow open swamps where it forms dense groves. It is conspicuous because of the light-colored smooth bark, and especially on account of the huge, very hard and heavy fruits which occur in such abundance that one wonders how the trees can support such a load.

Fruits are found sometimes on trees no more than 2 meters high. The fruits often weigh six pounds or more, and are filled with solid white flesh in which the many large seeds are imbedded. Sometimes or perhaps usually they remain upon the trees until ripe, when they open, and the brown seeds, often as large as a hen's egg, fall into the water. There they soon germinate and float about with expanded cotyledons until they land on some shoal or bank, where they root. The seeds, called "saba nuts" in Atlantic Nicaragua, are cooked and eaten in some parts of Central America. The young leaves are said to be cooked and eaten in South America. Probably the highest region in which the tree grows in Guatemala is in the vicinity of San Felipe and Retalhuleu, where it is frequent along streams. The exceedingly large flowers are handsome and rather showy, but the petals, of course, are very narrow.



## QUARARIBEA Aublet

*Reference:* W. Vischer, Sur les *Quararibea* Aubl., un genre de Bombacacées à ovaire infère, Bull. Soc. Bot. Genève II. 11: 199-210. f. 1-5. 1920.

Shrubs or trees, the dry foliage with the odor of slippery elm (*Ulmus rubra*); leaves entire or somewhat dentate, penninerved, or 3-5-nerved from the base; peduncles opposite the leaves, short or elongate, 1-flowered, solitary or fasciculate, the bractlets minute, usually remote from the calyx; calyx oblong or narrower, tubular, with 3-5 short teeth or lobes, sometimes winged vertically; petals 5, white or whitish, oblong or linear; stamen tube elongate, the anthers 10-15, apical on its teeth or adnate to the tube near its apex, 1-2-celled, the cells divaricate or divergent, rarely confluent; ovary sessile, 2-5-celled, the ovules 2 in each cell, the style filiform, the stigma capitate or shallowly lobate; fruit subglobose, 1-2-celled, usually indehiscent, the cells 1-seeded, the pericarp coriaceous; seeds erect, without endosperm.

About 30 species, in tropical America. A few others have been found in southern Central America. It is of interest to note that the two genera *Myrodia* and *Quararibea*, now considered to constitute a single genus, were placed in different families by Bentham and Hooker. This, however, is merely one illustration of the difficulties that botanists have encountered in attempting to organize the families of the Malvales.

Leaves not barbate beneath in the axils of the nerves.....*Q. guatemalteca*.  
 Leaves with dense tufts of hairs beneath in the axils of the nerves.  
 Ovary 4-celled.....*Q. funebris*.  
 Ovary 2-celled.....*Q. Gentlei*.

**Quararibea funebris** (Llave) Vischer, Bull. Soc. Bot. Genève II. 11: 205. 1919. *Lexarza funebris* Llave in Llave & Lex. Nov. Veg. Descr. 2: 12. 1825. *Myrodia funebris* Benth. Journ. Linn. Soc. Bot. 6: 115. 1862. *Molenillo*.

Moist or wet forest, 2,100 meters or lower, often in thickets or forest along stream banks; Santa Rosa; Escuintla; Suchitapéquez; Retalhuleu; Quiché; Huehuetenango. Southern Mexico; Salvador; Nicaragua.

A shrub or small tree, in Guatemala seldom more than 10 meters tall, sometimes attaining a height of 20 meters, the trunk sometimes 30 cm. in diameter, the branches often somewhat pendent, the crown broad and depressed, the branchlets minutely stellate-lepidote; leaves short-petiolate, oblong to oval or elliptic, sometimes oblong-obovate, mostly 15-25 cm. long and 6-10 cm. wide, often larger, obtuse to short-acuminate, rounded or obtuse at the base, glabrous except for the small dense tufts of hairs beneath in the nerve axils; flowers mostly solitary, the pedicels 2 cm. long or less; calyx about 2 cm. long, turbinate, greenish, minutely

tomentulose, the lobes very short; petals white, thinly tomentulose, recurved and about equaling the calyx, narrowly lance-oblong; stamen tube twice as long as the calyx, stellate-puberulent; ovary 4-celled; fruit globose, mostly enclosed in the persistent calyx.

Called "canela" in Veracruz, and known in other parts of Mexico as "flor de cacao," "madre de cacao," and "rosa de cacao"; the Nahuatl name was "cacahuaxochitl" ("cacao flower"). The species was described from a tree growing at Izúcar, Puebla, Mexico, to which it is said that the Indians formerly resorted "to mourn their dead." Just what this may mean is uncertain, but the tree evidently had some religious significance. The fragrant flowers are added to "pozonque," a cold beverage made from cacao, to flavor it. In Costa Rica the young shoots of some species of *Quararibea*, with their whorls of side branches, are used to make *molenillos*, utensils with which chocolate and other beverages are beaten to a froth. The wood in this genus is chalky white or slightly yellowish, not highly lustrous, subject to blue-stain; sapwood not clearly defined; rather hard and heavy, straight-grained, medium-textured; tough and strong, easy to work, takes a smooth finish, is not durable when exposed.

**Quararibea Gentlei** Lundell, Contr. Univ. Mich. Herb. 6: 44. f. 2. 1941. *Cincho*, *Coco mamá*.

British Honduras (type from Stann Creek Valley, Blue Mountain Valley, in high ridge, *Gentle* 3236); collected also at Middlesex, Sibun Forest Reserve, at 75 meters; probably extending into Guatemala.

A tree 15 meters high, the trunk 30 cm. in diameter, the young branches minutely stellate-tomentulose, the bark whitish; leaves on petioles 1.5–2.5 cm. long, yellowish when dried (as in other species), oblong or elliptic-oblong, mostly 15–25 cm. long and 6–10 cm. wide, acute or short-acuminate, obliquely obtuse at the base, densely short-barbate beneath in the axils of the nerves but elsewhere almost glabrous, 3-nerved at the base; fruiting peduncles stout, 1–2 cm. long; calyx narrowly campanulate, about 2 cm. long, minutely tomentulose; fruit subglobose, 3 cm. long, rounded and mammillate at the apex, very minutely tomentulose.

This is too closely related to *Q. funebris*, which it matches, so far as the present fruiting specimens show, in every character except the 2 rather than 4 cells of the ovary. Flowers may show some supporting characters, but if not, *Q. Gentlei* will have to be reduced to synonymy, since it is doubted that the number of ovary cells is a constant character, in spite of the importance attributed to it by Vischer.

**Quararibea guatemalteca** (Donn. Smith) Standl. & Steyerm. Field Mus. Bot. 23: 62. 1944. *Myrodia guatemalteca* Donn. Smith, Bot. Gaz. 16: 2. 1891. *Q. Fieldii* Millsp. Field Mus. Bot. 1: 309. 1898 (type from Yucatan). *Moro*.

Wet forest, 1,200 meters or less; Petén; Alta Verapaz (type from Pansamalá, *Tuerckheim* 1410); probably also in Izabal; Santa Rosa; Escuintla; Retalhuleu. Yucatan; British Honduras; Atlantic slope of Honduras.

A small or medium-sized tree, reported to reach a height of 20 meters with a trunk 40 cm. in diameter, the branchlets minutely stellate-tomentulose; leaves short-petiolate, oblong or elliptic-oblong, 15-30 cm. long, acute or acuminate, very obtuse to broadly cuneate and somewhat oblique at the base, 3-nerved from the base, glabrous or nearly so; flowers mostly solitary, on rather short peduncles, the calyx narrowly turbinate, 2.5 cm. long, minutely tomentulose, shallowly lobate, in fruit somewhat larger; petals white, almost twice as long as the calyx, 6-8 mm. wide; fruit oval or ovoid, 3-4 cm. long, usually with a short, very thick beak at the apex, minutely tomentulose.

Called "batidos" and "majahás" in British Honduras, "maha" in Yucatan, and "coco mamá" in Honduras. The species has been reported from Guatemala as *Q. guyanensis* Aubl. Material reported from the North Coast region as *Q. asterolepis* Pittier, a Panama species, presumably is referable here. In Yucatan the flowers are added to chocolate to give it flavor.

## STERCULIACEAE. Cacao Family

Herbs, shrubs, or trees, the pubescence commonly of stellate hairs, these often mixed with simple hairs; leaves alternate, simple and entire, dentate, or lobate, sometimes digitately compound; stipules usually present and deciduous; flowers perfect or sometimes unisexual, the inflorescence axillary or terminal, racemose, cymose-paniculate, or reduced to solitary flowers; calyx usually persistent, the 5 lobes valvate or slightly imbricate (*Chiranthodendron*); petals 5, hypogynous, contorted-imbricate in bud, often marcescent and persistent, sometimes wanting; stamens usually more or less united into a tubular column, this divided at the apex into 5 teeth or lobes (staminodia) alternate with the petals, the anthers borne in the sinuses between the lobes; ovary free, 1-5-celled, the carpels more or less united; ovules 2-many in each cell, anatropous, attached to the interior angle; styles as many as the carpels, or united to form a single style; fruit dry, the carpels sometimes united to form a capsule, loculicidally dehiscent or woody and indehiscent, sometimes spreading into cocci; seeds not lanate.

Genera about 50, the species widely distributed, almost wholly in tropical regions. All the Central American genera are represented in Guatemala.

Petals none; leaves large, digitately compound or very large and lobate. Large trees.

Fruit of distinct carpels; leaves simple or digitate; flowers symmetric or nearly so.....*Sterculia*.

Fruit a woody capsule; leaves simple, lobate; flowers zygomorphic.  
*Chiranthodendron*.

Petals present; leaves simple, not lobate except sometimes on young sterile shoots.

Stipe of the ovary and stamens elongate, in age longer than the fruit; carpels spirally twisted in fruit; flowers red.....*Helicteres*.

Stipe of the ovary short or none; carpels not twisted in fruit.

Petals flat, withering and persistent in fruit.

Seeds numerous in each cell of the fruit; calyx accrescent in age, broadly campanulate, about 1 cm. long.....*Hermannia*.

Seeds 2 in each cell of the fruit; calyx not or scarcely accrescent in fruit, usually much smaller.

Fruit 1-celled; petals yellow.....*Waltheria*.

Fruit 2-5-celled; petals usually white, pink, or purple.

Plants trees, in cultivation or rarely escaping; flowers in globose head-like inflorescences about 10 cm. in diameter.....*Dombeya*.

Plants native herbs or low shrubs; flowers in small inflorescences.  
*Melochia*.

Petals concave or cucullate, not withering and persistent.

Fruit and ovary smooth or at least without spines or wart-like projections; anthers 2 or more in each sinus of the stamen tube.....*Theobroma*.

Fruit and ovary covered with spines or wart-like projections.

Anthers 3 in each sinus of the stamen tube; trees with yellowish flowers.  
*Guazuma*.

Anthers 1 in each sinus of the stamen tube; shrubs or vines with usually brown-purple flowers.

Petals naked on the back or bearing a gland; plants unarmed, herbs or erect shrubs; fruit tuberculate.....*Ayenia*.

Petals ligulate-appendaged dorsally; plants often aculeate, shrubby, often scandent; fruit covered with long spines.....*Byttneria*.

In 1948 there was collected in forest east of Morales, Dept. Izabal, under the name "papo de vieja," leaves and fruit of a tree which can be referred either to the genus *Pterygota* Endl. or to *Basiloxylon* K. Sch. The latter is represented in Brazil by a single species, *B. brasiliensis* (Fr. All.) K. Sch., while the former consists of a few species known from Africa and the East Indies. Both genera have winged seeds, a character distinguishing them from *Sterculia*. However, it is questionable whether the two genera can be maintained as distinct on the basis of the difference in anther characters assigned to them. The present Guatemalan collection has the entire broadly ovate leaves and fruit of the Brazilian *Basiloxylon*, but until flowering material of the Guatemalan tree is avail-

able for study it is impossible properly to evaluate its generic position, with the eventual decision as to whether *Basiloxylon* can be maintained as distinct from *Pterygota*. If the two are found to be congeneric, the earlier described name of *Pterygota* must prevail.

### AYENIA L.

Herbs or shrubs, the pubescence wholly or chiefly of branched hairs; leaves membranaceous, broad or narrow, serrate or dentate; flowers small, pedicellate, fasciculate in the leaf axils or in subsessile cymes; calyx 5-parted; petals 5, long-unguiculate, cucullate, the apex of the petal inflexed and adnate to the stamen tube, naked dorsally or bearing a small pedicellate gland; stamen tube short, the lobes alternate with the petals, truncate, the anthers solitary in the sinuses, 3-celled, the cells parallel; ovary sessile or short-stipitate, 5-celled, the cells 2-ovulate, the style subcapitate or obsoletely 5-lobate; capsule muricate, the carpels separating at maturity, 2-valvate within, 1-seeded; seeds transversely rugose, without endosperm; cotyledons spirally convolute about the radicle.

About 20 species, in the warmer parts of America. Only the following species are known in Central America.

Fruit and ovary sessile; shrub with large leaves. . . . . *A. Palmeri*.  
 Fruit and ovary long-stipitate; annual herb with small leaves. . . . . *A. pusilla*.

**Ayenia Palmeri** Watson, Proc. Amer. Acad. 21: 419. 1886.

Dry brushy rocky slopes or often in moist thickets along streams, 150-1,800 meters; Zacapa; Chiquimula; Jalapa; Jutiapa; Santa Rosa; Guatemala; Huehuetenango. Western Mexico.

A slender shrub 1-3 meters tall with few branches, the older branches blackish-ferruginous, the young ones stellate-pilose with short hairs; leaves on mostly short petioles, thin, rounded-ovate or broadly ovate, mostly 5-12 cm. long and 3-8 cm. wide, abruptly acute or acuminate, rounded or subcordate at the base, sparsely and minutely stellate-pubescent above, thinly or densely stellate-pilose beneath, rather coarsely crenate-dentate, the upper leaves smaller and narrower and on very short petioles or almost sessile; cymes sessile, few-flowered, the pedicels very slender, unequal, sometimes 1 cm. long; flower buds globose-ovoid, usually obtuse, sometimes acutish; sepals spreading, purple-brown within and glabrous, ovate-oblong, acute; capsule 7-12 mm. broad, subglobose, minutely stellate-tomentulose, short-muricate.

A frequent shrub in thickets of the Oriente, doubtless losing its leaves during the dry season.

**Ayenia pusilla** L. Syst. Nat. ed. 10. 1247. 1759.

Plains and rocky brushy hillsides, 150-500 meters; Zacapa; Chiquimula; Santa Rosa; Jutiapa. Mexico; West Indies; South America.

Plants annual, erect or spreading, commonly 30–50 cm. tall, usually branched, the stems slender, pubescent with short, mostly recurved hairs; leaves small, on rather short petioles, lanceolate to broadly ovate, mostly 1–4 cm. long and 1.5 cm. wide or less, rounded to acuminate at the apex, obtuse to cordate at the base, serrate-dentate, green, sparsely pubescent or glabrate; flowers very small, solitary or fasciculate, slender-pedicellate; fruit subglobose, 5–6 mm. broad, pubescent or glabrate, densely covered with long or short, spine-like processes.

Called “pistón-xiu” in Yucatan. The plant probably is common in the dry Motagua Valley, but withers quickly after the rains end.

### BYTTNERIA Loefling

Erect or scandent shrubs, usually armed with prickles; leaves entire or dentate, mostly 3–5-nerved from the base, petiolate; flowers small, green or purple-brown, pedicellate, in axillary, sessile or pedunculate umbels or cymes; calyx 5-parted; petals unguiculate, cucullate, the limb bilobate, its apex inflexed and adnate to the stamen tube, produced dorsally into an elongate, simple or 3-fid ligule; lobes of the stamen tube alternate with the petals, the anthers solitary in the sinuses, sessile or short-stipitate, 2-celled or rarely 3-celled, the cells parallel, distinct; ovary sessile, 5-celled, the cells 2-ovulate; style 5-fid at the apex or entire; capsule globose, small or large, echinate, the carpels separating at maturity, anteriorly bivalvate, 1-seeded; seeds ascending or inverted, without endosperm, the cotyledons spirally convolute about the radicle.

About 50 species, mostly in tropical America, a few in tropical Africa and Asia. Only two species are known in Central America, but one other occurs in Mexico. The generic name is often written *Buettneria*.

Stems unarmed; leaves entire . . . . . *B. catalpifolia*.  
Stems armed with recurved prickles; leaves usually toothed . . . . . *B. aculeata*.

**Byttneria aculeata** Jacq. Stirp. Amer. 76. 1763. *Chaetaea aculeata* Jacq. Enum. Pl. Carib. 17. 1760. *B. carthagenensis* Jacq. Stirp. Amer. Pict. 41. 1780. *B. lateralis* Presl, Rel. Haenk. 2: 144. 1836. *B. guatemalensis* Loes. Verh. Bot. Ver. Brandenb. 55: 171. 1913 (type from Palo Verde, Escuintla, *Seler* 2457). *Zarza hueca*; *Mora pacha* (Huehuetenango).

Chiefly in moist or wet thickets, most often in second growth, frequently a noxious weed in banana plantations, most common in the tierra caliente but ascending to about 1,200 meters; Petén; Alta Verapaz; Izabal; Zacapa; Jutiapa; Santa Rosa; Escuintla; Guatemala; Suchitepéquez; Retalhuleu; San Marcos; Huehuetenango. Mexico to British Honduras and Panama; northern South America.

A shrub with hollow angulate stems, sometimes erect but commonly recurved or scandent, armed on the branches and lower leaf surfaces with sharp recurved

prickles; leaves on long or short petioles, rounded-ovate to oblong-lanceolate, very variable in size, usually thin, acute to long-acuminate, obtuse to cordate at the base, commonly crenate or serrate toward the apex, almost glabrous to densely pubescent; flowers very small, dark brown-purple, sometimes green, the calyx about 3 mm. long, the cymes few-flowered, sessile or often pedunculate and umbelliform; fruit body 7-10 mm. broad, glabrous or densely pubescent, covered with long, slender or stout, hard spines.

Called "zarza" in Salvador; the Maya names in Yucatan are reported as "tezac" and "yax-kix." A collection reported from Guatemala by Hemsley as *B. lanceolata* DC. is doubtless referable here. The usual name for the plant throughout Central America is "zarza hueca," in reference to the hollow stems. The plant, one of the worst weeds in banana plantations, soon becomes impenetrable unless the bushes are cut. Wherever it grows, the shrub is a great pest, since the sharp prickles tear the flesh painfully, so that it is impossible to pass through an infested place without the use of a machete. The shrub is particularly plentiful in thickets of the Pacific plains. Young leaves often are blotched with silver. The species has a wide range and is variable, but no good basis for separating any of the Central American forms is apparent. The most conspicuous of the few Guatemalan forms is a comparatively rare one in which the leaves are densely pilose-tomentose on the lower surface, rather than glabrate.

*Byttneria catalpifolia* Jacq. Pl. Hort. Schoenbr. 1: *pl.* 46. 1797.

Dry or moist thickets, 250 meters or less; Petén; Alta Verapaz; Santa Rosa; Escuintla; Retalhuleu. Southern Mexico; Honduras; Nicaragua; Costa Rica; northern South America.

Usually a large woody vine, unarmed, the stems terete or nearly so, tomentulose when young; leaves on long slender petioles, membranaceous, ovate or broadly ovate, 10-25 cm. long, long-acuminate, rounded or cordate at the base, entire, glabrous above or nearly so, slightly paler beneath, minutely stellate-pubescent or almost glabrous, 5-nerved at the base; cymes axillary or terminal, lax, few-flowered, pedunculate, the flowers whitish; sepals 5-6.5 mm. long; fruit body globose, 2.5-3.5 cm. broad, covered with long slender prickles.

The species is of rather infrequent occurrence in Central America, although sometimes plentiful locally.

#### CHIRANTHODENDRON Larreategui

Tall trees with branched pubescence; leaves large, long-petiolate, cordate, shallowly 5-7-lobate, tomentose beneath; peduncles opposite the leaves, 1-flowered, the flowers very large, 2-3-bracteolate below the calyx; calyx subcampanulate,

deeply 5-lobate, the lobes slightly imbricate; petals none; stamens united to form an oblique 5-fid column, the segments linear, acuminate, bearing outside below the apex 2 long linear anthers, these subparallel; ovary 5-celled, the cells many-ovulate; style stigmatose at the apex; capsule ligneous, deeply 5-lobate, loculicidally 5-valvate; seeds obovoid, with a fleshy strophiole at the lateral hilum, the testa coriaceous, lustrous; endosperm carnose, the cotyledons orbicular, plane, the radicle short and thick.

The genus consists of a single species. Its only very close relative is a tree with somewhat similar flowers growing in southern California and in Lower California.

**Chiranthodendron pentadactylon** Larreategui, Descr. Chiranthod. 17. 1805. *Cheirostemon platanoides* Humb. & Bonpl. Pl. Aequin. 1: 82. pl. 24. 1808. *Chiranthodendron platanoides* Baill. Hist. Pl. 4: 69. 1873. *Mano de león*; *Tayuyo* (Volcán de Agua); *Canac*; *Mano de mico*; *Arbol de las manitas* (fide Bertoloni); *Majagua* (Zacapa).

Abundant at many places in wet mixed forest high on the mountains; often growing also in fields from which forest has been cleared, and probably planted in some rural regions; at 2,000–3,000 meters; El Progreso; Zacapa; Guatemala (probably only in cultivation); Sacatepéquez (Volcán de Agua); Chimaltenango; Sololá; Quiché; Huehuetenango; Totonicapán; Quezaltenango; San Marcos. Mexico, in Morelos, Michoacán, Oaxaca, and Chiapas (perhaps only planted in some of these states).

A large tree, 12–30 meters tall or even larger, the trunk frequently 1–2 meters in diameter; leaves long-petiolate, more or less ovate-rounded in outline, 12–30 cm. long, subacute to acuminate, deeply and narrowly cordate at the base, shallowly lobate or subentire, deep green and glabrate above, densely and loosely brownish-tomentose beneath, palmately nerved; peduncles shorter than the calyx; calyx 3.5–5 cm. long, brown-tomentose outside, glabrous within and dark lurid red, with a large nectariferous pit within at the base of each lobe; stamen column equaling the calyx, bearing at its apex 5 long curved branches, these prolonged into very slender, tapering tips; capsule oblong-ellipsoid, very hard and woody, 10–15 cm. long, deeply 5-lobate, the angles narrow and blunt-edged; aril of the seeds orange.

The Mexican name for this tree was “mapasúchil,” from the Nahuatl *macpal-xochitl*, i.e., “hand-flower,” in allusion to the androecium, colored bright or deep red, which strongly suggests a diminutive hand with long claw-like out-stretched fingers. The resemblance to a hand is so marked that no person observing the flower could fail to be impressed by it. Inevitably this character was looked upon with awe, and some religious significance was attached to it. For a long time the inhabitants of the Valley of



Mexico knew of but one tree, growing at Toluca, from which seeds were taken for propagation in the preconquest botanical garden of the City of Mexico, but it was found later that the tree was plentiful enough in some of the mountains to the southwest. In Guatemala the tree may well be more abundant than in Mexico, and presumably all the wetter, upper or middle slopes of the high mountains were covered with forest in which the tree was dominant, as it still is in many places. On the Volcán de Agua and Volcán de Acatenango *Chiranthodendron* forms very dense forest belts that extend up to about 3,000 meters. This forest belt is dense and wet, with many fallen trunks and in some places a dense undergrowth of shrubs and coarse herbs. It is one of the most difficult types of ground in all Guatemala over which to make one's way. Many of the trees on Agua and Acatenango are huge, tall, and with massive but low trunks, and growing close together. Their branching is irregular and the limbs are thick and heavy and often covered with epiphytes. They flower abundantly, and the fallen flowers often carpet the ground. The blossoms apparently may be found at almost any season of the year. They are odd but not at all handsome. Much of the *Chiranthodendron* forest of the Volcán de Agua has been felled in recent years to clear the land for growing peas. There are *Chiranthodendron* forests also in Quezaltenango and San Marcos, although we did not observe the tree, rather strangely, on Santa María. Probably it is much too dry there for its growth. All through the more densely settled parts of the highlands one comes upon isolated trees of *Chiranthodendron* standing in cornfields and other cultivated places. Some of these probably have been planted, but most of them are trees left when forest was cleared. There is good reason for believing that this tree was at least formerly of religious significance among the highland Indians, and that they still venerate it. Besides, it has some prosaic industrial importance, the soft flexible leaves being used to cover or wrap food in the highland markets. Bunches of the leaves are often sold to be so used. It is reported that an infusion of the flowers is used by the Indians in treating chronic ulcers, ophthalmia, and hemorrhoids, but more probably they use the copious, rather thick nectar that collects in the calyces. Cut stumps of the tree often send up new shoots, and the seeds appear to germinate readily, since quantities of seedlings have been observed in some places. The seeds are large and heavy, and not readily dispersed to much distance. Bertoloni records that the tree was grown and flowered in the botanic garden of Pisa, Italy.

*Cola acuminata* (Beauv.) Schott & Endl., an African tree, is said to be planted in the Cobán region, although we have not seen it. Large quantities of the seeds or "nuts" are imported from Africa into the United States for use in preparation of soft drinks and in medicinal preparations.

### DOMBEYA Cavanilles

Shrubs or trees; leaves palmately nerved, cordate, long-petiolate; flowers rather large and showy, in axillary or terminal cymes, these lax or very dense and headlike; bractlets 3, caducous or minute; calyx 5-parted, finally reflexed; petals 5, inequilateral, persistent; stamen tube short or elongate, bearing at the apex 5 liguliform staminodia; anthers 10-20, in groups of 2-4 alternating with the staminodia, the cells parallel; ovary sessile, 2-5-celled, the cells 2-ovulate; styles 5; capsule loculicidally dehiscent.

About 25 species, all African. Some are grown in other parts of the tropics for their showy flowers.

**Dombeya Wallichii** (Lindl.) Benth. & Hook. ex B. D. Jackson, Ind. Kew. 1: 788. 1895. *Astropaea Wallichii* Lindl. Coll. Bot. pl. 14. 1822. *Dombeya*; *Dombela*; *Donabela*.

Native of Madagascar and eastern Africa, widely cultivated for ornament in tropical regions; planted commonly in many parts of Guatemala, especially in the central mountains, and in the Cobán area and the Pacific bocacosta; in some places apparently becoming naturalized.

A large shrub or small tree, usually with a short trunk and very dense, rounded crown, sometimes as much as 9 meters high; leaves large, on long slender petioles, rounded-cordate, often angulate-lobate, very densely and rather harshly pubescent; inflorescences pendent, about 10 cm. broad, subglobose, very dense and many-flowered, the flowers 2.5 cm. broad, the petals pink, turning brown as they wither.

This shrub or tree is apparently of recent introduction into Central America, but in Guatemala it is becoming common, partly because it is easy of propagation. The inflorescences are usually very numerous, often almost covering the tree, and about the first of December, at the height of the flowering season, it is a strikingly handsome object. A few weeks later the tree is unsightly, and remains so for a long time, because of the persistent drying inflorescences, which maintain their form but turn brown.

### GUAZUMA Adanson

Trees or shrubs, the pubescence of branched hairs; leaves short-petiolate, unequal at the base, dentate; flowers small, in axillary short-pedunculate cymes;

calyx 2-3-parted; petals 5, short-unguiculate, cucullate, the apex inflexed and produced into a linear bifid ligule; stamen tube 5-lobate, the lobes alternate with the petals, acuminate, the anthers in groups of 3 in the sinuses, short-stipitate, the cells divaricate; ovary sessile, 5-lobate, 5-celled, the cells many-ovulate, the styles somewhat connate; capsule oval or globose, ligneous, covered with short hard tubercles or sometimes plumose-setose, imperfectly 5-valvate at the apex; seeds with endosperm, the embryo slightly curved, the cotyledons foliaceous.

About 5 species, all in tropical America. Only one is known in Mexico and Central America.

**Guazuma ulmifolia** Lam. *Encycl.* 3: 52. 1789. *Theobroma Guazuma* L. *Sp. Pl.* 782. 1753. *G. polybotrya* Cav. *Icon. Pl.* 3: 51. *pl.* 299. 1794. *G. tomentosa* HBK. *Nov. Gen. & Sp.* 5: 320. 1821. *Caulote*; *Tapaculo*; *Contamal* (Izabal); *Pixoy* (Petén, Maya); *Xuyuy* (Baja Verapaz).

Dry or moist thickets or second-growth forest, chiefly at or near sea level, but ascending sometimes to 1,200 meters; Petén; Alta Verapaz; Baja Verapaz; Izabal; Zacapa; Chiquimula; Jutiapa; Santa Rosa; Escuintla; Guatemala; Suchitepéquez; Retalhuleu; San Marcos; Huehuetenango. Mexico to British Honduras and Panama; West Indies; South America.

A large shrub or a tree, commonly 12 meters high or less, sometimes as much as 20 meters, the bark pale grayish brown to dark brown, the inner bark pinkish or pale brown, separating into thin flakes; leaves short-petiolate, oblong to broadly ovate, mostly 5-15 cm. long, acute to long-acuminate, rounded to deeply cordate at the base, serrate, green and glabrate or more often densely stellate-tomentose, at least beneath; flowers small, pale yellow, greenish yellow, or whitish, fragrant, in small axillary cymes; calyx stellate-tomentulose; petals 3 mm. long; fruit hard and woody, globose or broadly oval, 2-4 cm. long, green, yellowish, or blackish, densely covered with short hard tubercles, the seeds very numerous, large, and hard.

Called "bay cedar" and "bastard cedar" in British Honduras. Known in Salvador sometimes as "chicharrón," "guácimo," and "caca de mico." The name "guácimo," much used in some parts of Central America, is believed to be of Antillean origin. The term "caulote" appears in the name *Caulotes*, a *caserío* of Suchitepéquez. The tree is common in the Central American lowlands, on both coasts, but especially near the Pacific. It is especially characteristic of second growth, the hard seeds being scattered doubtless by birds and mammals. The fruit contains a small quantity of sweet edible pulp, but it is little eaten except by children. It is much sought by cattle and is said to be a good food for them. The flowers are reported to yield much honey of good quality. The mucilaginous

bark is sometimes used to clarify sirup in the manufacture of cane sugar, and it contains a tough fiber useful for cordage. Both the bark and the powdered seeds are used in domestic medicine. The sap is sometimes added to whitewash to make it adhere better to walls. The wood is light pinkish, without distinctive odor or taste; rather light but tough and strong, of fairly straight grain and rather coarse texture; fairly easy to work, does not split readily, has about the consistency of elm (*Ulmus*); not durable. In various regions it is used to a small extent in carpentry and joinery, for tool handles, interior construction, or even for gunstocks. It is sometimes burned to produce charcoal. It is said that silkworms have been fed upon the leaves, and that stock sometimes browse the foliage and young shoots. Oviedo reports that the Indians of Central America or the Antilles made from the fruit a beverage "on which they fatten like pigs." In early colonial days charcoal from *Guazuma* wood was utilized for making gunpowder. The name "caulote" is a modification of the Nahuatl name of the tree, *quaucholotl*, as written by Hernández. On vigorous juvenile shoots the leaves often are shallowly or deeply lobate, much like those of *Morus*.

### HELICTERES L.

Shrubs or small trees, the pubescence of stellate hairs; leaves petiolate, serrate or entire; flowers rather large, axillary, solitary or fasciculate, the bractlets small, remote from the calyx; calyx tubular, 5-fid at the apex, often asymmetric; petals 5, equal or unequal, unguiculate, the claws all or in part auriculate-appendaged; stamen column elongate, slender, adnate to the gynophore, at the apex truncate, 5-dentate, or bearing 5 sterile laciniae, the anthers solitary in the sinuses, stipitate, the cells divaricate, sometimes confluent; ovary inserted within the stamen column, 5-lobate, 5-celled, borne on a very long, pedicel-like gynophore; styles 5, subulate, more or less united; mature carpels of the fruit usually spirally twisted, sometimes separating at maturity; seeds verruculose, with scant endosperm; cotyledons foliaceous, convolute about the radicle.

About 30 species, in tropical America. Another species is known from Panama. The fruit is quite unlike that of any other tropical American plant. It is hard and somewhat woody, and the tube-like subterete carpels are spirally twisted together to form a screw-like structure.

Flowers erect, regular or nearly so; calyx 1.5–2 cm. long; fruit erect on its gynophore and pedicel, glabrate.....*H. mexicana*.

Flowers horizontal or declined, zygomorphic; calyx about 3 cm. long; fruit recurved or pendent, very densely and coarsely tomentose.....*H. baruensis*.

*Helicteres baruensis* Jacq. Enum. Pl. Carib. 30. 1760. *Lengua de vaca* (Chiquimula, almost certainly an erroneous name).

Chiquimula (1,200–1,400 meters, near Quezaltepeque, *Steyermark* 31403). Southwestern Mexico and Yucatan; British Honduras; Colombia to British Guiana.

A shrub 2–3 meters tall, the young branches covered with a dense felt-like tomentum; leaves on short or rather long petioles, broadly oval-ovate to elliptic-ovate, mostly 6–12 cm. long, short-acuminate to subobtusate, shallowly cordate at the base, irregularly dentate, green above but minutely stellate-pubescent, pale beneath and covered with a very dense, fulvous tomentum; calyx about 3 cm. long and 1 cm. broad, densely tomentose, the lobes very unequal; petals red, linear; gynophore in fruit 8–12 cm. long, slender but stiff, curved; fruit 3–5 cm. long, 1 cm. thick, densely and coarsely fulvous-tomentose.

The Maya name in Yucatan is recorded as “zutup” and “zuput.”

**Helicteres mexicana** HBK. Nov. Gen. & Sp. 5: 305. 1821. *H. carpinifolia* Presl, Rel. Haenk. 2: 138. 1836. *H. retinophylla* R. E. Fries, Svensk. Vet. Akad. Handl. 42, no. 12: 23. 1908. *Quesillo*; *Capulin*, *Monecillo* (reported names, of doubtful application to this plant); *Tsubil* (Quechí).

Moist or dry thickets, most often in second growth, sometimes in hilly pine forest, 800 meters or less; Petén; Alta Verapaz; Izabal; Santa Rosa; Escuintla; Retalhuleu; Huehuetenango. Western and southern Mexico to British Honduras and Panama; Colombia.

A shrub 1–2.5 meters tall, the slender branches stellate-hispidulous or stellate-tomentose; leaves short-petiolate, often almost sessile, oblong-ovate or elliptic-ovate, mostly 5–9 cm. long, acute or acuminate, rounded or subcordate at the base, green above and sparsely stellate-pubescent or almost glabrous, beneath somewhat paler but green, usually stellate-hispidulous or sometimes rather densely and softly stellate-tomentose, often glabrate; calyx 1.5–2 cm. long, narrowly tubular, with short triangular acute lobes, stellate-hirtellous or finely stellate-pubescent, usually rather thinly so; petals deep or bright red, spatulate, longer than the calyx; gynophore long-exserted; fruit 2–3 cm. long and 8 mm. thick, finely stellate-pubescent or stellate-hirtellous, in age glabrate.

Vernacular names in adjacent regions are “barrenillo” (Honduras); “tornillo,” “barreno” (Salvador); “sacatrapo” (Tabasco). The nomenclature of this Guatemalan plant is not altogether satisfactory, and can not be decided finally until more collections are available from western Mexico. All Mexican and Central American collections have been referred in recent years to *H. guazumaefolia* HBK., described from the Río Orinoco. As strictly interpreted, however, that species is probably distinct from *H. mexicana*, and is confined to northern South America and Panama. It is distinguished by having a minute close pale tomentum on the lower leaf surface. The characters of *H. retinophylla* are well understood, and

that name applies to all the Guatemalan material. Fries considered *H. mexicana* a distinct species, having small leaves densely stellate-tomentose beneath. No available Mexican specimens exactly match a photograph of the type. Fries does not take into consideration the name *H. carpiniifolia*. All the Mexican material we have examined appears to be conspecific, and we believe that it should be called *H. mexicana*. Further collecting in Mexico may show *H. mexicana* and *H. retinophylla* to be distinct species, but it seems that there is probably too much variation in the pubescence of plants from Mexico and Central America to permit their segregation on pubescence alone, a character notoriously unreliable in the Malvales. The bark of this shrub, as in most related genera, contains a tough fiber suitable for coarse cordage.

### HERMANNIA L.

Perennial herbs or low shrubs, usually with stellate pubescence; leaves petiolate, dentate; stipules foliaceous or rarely small or none; peduncles axillary, 1-few-flowered, sometimes forming terminal racemes or thyrses, the flowers generally yellow, sometimes red; calyx 5-cleft or 5-dentate, sometimes accrescent in age; petals 5, obovate or oblong, marcescent or deciduous, unguiculate; stamens 5, opposite the petals, connate at the base, not accompanied by staminodia, the filaments oblong, or dilated above, the anther cells parallel; ovary sessile or short-stipitate, the cells many-ovulate; styles 5, more or less united below; capsule loculicidally 5-valvate, naked or 5-corniculate at the apex.

About 120 species, almost all of them in southern Africa. Four are known from Mexico and southwestern United States, one of them extending southward into Guatemala.

***Hermannia inflata*** Link & Otto, Icon. Pl. Rar. 55. pl. 28. 1828.

Dry rocky slopes, about 1,600 meters; Huehuetenango (above San Ildefonso Ixtahuacán, *Steiermark* 50657). Southern Mexico (Puebla and Oaxaca).

A shrub of 1.5-2.5 meters, densely stellate-pubescent throughout; leaves rather thick, short-petiolate, rhombic-ovate, 2-6 cm. long, acute to rounded at the apex, rounded at the base, crenate-dentate, slightly paler beneath; flowers forming subracemose terminal inflorescences, mostly subtended by leaves, short-pedunculate, solitary; calyx accrescent and somewhat inflated in age, broadly campanulate, densely stellate-pubescent, salmon-red, the broad obtuse lobes much shorter than the tube; petals 1 cm. long, dark rose-red; capsule 10-12 mm. long, the apical spines slender, glochidiate.

### MELOCHIA L.

Herbs or shrubs, the pubescence chiefly of stellate hairs; leaves serrate; flowers mostly small, glomerate in the leaf axils, in spiciform thyrses, or in axillary

or terminal cymes or panicles; calyx 5-lobate or 5-dentate, campanulate, sometimes inflated; petals 5, spatulate or oblong, marcescent; stamens 5, opposite the petals, connate at the base or to the middle, the staminodia none or minute and denti-form; anther cells parallel; ovary sessile or short-stipitate, 5-celled, the cells 2-ovulate; styles 5, free or united at the base, stigmatose and often thickened above; capsule loculicidally 5-valvate, the cells 1-seeded; seeds ascending, ob-ovoid, with endosperm; embryo straight, the cotyledons plane.

About 60 species, in the tropics of both hemispheres but mostly American. One or two additional species may occur in southern Central America.

Capsule pyramidal.

Leaves pale, densely and finely stellate-tomentose on both surfaces.

*M. tomentosa.*

Leaves green, glabrous or sparsely stellate-pubescent. . . . . *M. pyramidata.*

Capsule depressed-globose.

Calyx in fruit accrescent and membranous, as much as 1 cm. broad. Flowers in axillary fascicles. . . . . *M. lupulina.*

Calyx not accrescent in fruit, small.

Flowers all or mostly on long pedicels, the inflorescence lax and open.

Leaves appressed-pilose beneath on the nerves, otherwise glabrous; calyx and capsule hispidulous. . . . . *M. kerriaefolia.*

Leaves very minutely stellate-puberulent beneath on the nerves or almost glabrous without simple hairs; calyx and fruit stellate-puberulent.

*M. Bernoulliana.*

Flowers sessile, the clusters sessile in the leaf axils or forming terminal spikes.

Branches bearing sparse gland-tipped hairs, otherwise glabrous.

*M. glandulifera.*

Branches without gland-tipped hairs, often pubescent.

Bracts of the inflorescence subulate, green. . . . . *M. hirsuta.*

Bracts of the inflorescence lanceolate to ovate, dry, brown.

Stamens longer than the styles; leaves usually densely appressed-pilose beneath. . . . . *M. urticaefolia.*

Stamens shorter than the styles; leaves usually glabrate beneath, at least not densely appressed-pilose. . . . . *M. nodiflora.*

**Melochia Bernoulliana** Donn. Smith, Bot. Gaz. 35: 2. 1903.

*Escobilla.*

Moist or dry thickets, sometimes on cliffs or in thickets along streams, 800 meters or less; Santa Rosa; Escuintla; Retalhuleu (type from Retalhuleu, *Bernoulli & Cario* 3112, 3113). Chiapas; Salvador.

A slender shrub about 1.5 meters high with few long branches, the branches brown, very minutely puberulent, appearing glabrous; leaves thin, slender-petio-late, lance-ovate to broadly ovate, mostly 8-13 cm. long, very long-acuminate, rounded at the base, coarsely serrate, appearing glabrous but with obscure pubes-cence of minute stellate hairs; inflorescences cymose, few-flowered, lax and open, the flowers mostly on long slender pedicels, these often elongating in fruit; calyx

4 mm. high, minutely tomentulose, the lobes acuminate; petals 6 mm. long, purple; capsule short-stipitate, depressed-globose, 4 mm. long, deeply lobate, pilose.

**Melochia glandulifera** Standl. Contr. U. S. Nat. Herb. 23: 803. 1923. *Escobillo rojo*.

Dept. Escuintla, the locality not indicated, *J. E. Aguilar* 1605. Chiapas, the type from Tonalá.

An erect branched herb, the branches bearing scattered gland-tipped hairs, otherwise glabrous; leaves slender-petiolate, thin, deltoid-lanceolate or lance-ovate, 6–10 cm. long, acute or acuminate, rounded at the base, serrate-dentate, glabrous or with a few scattered hairs on the upper surface; flowers in axillary or terminal, head-like cymes, these on short peduncles or sessile, the flowers usually densely aggregate, sessile or short-pedicellate, the bracts linear, ciliate, greenish; calyx lobes shorter than the tube, cuspidate-acuminate; petals purple, 5 mm. long; fruit subglobose, 4.5 mm. in diameter, setulose-hirtellous and bearing slender gland-tipped hairs.

**Melochia hirsuta** Cav. Monad. Diss. no. 6: 323. *pl. 175, f. 1.* 1788. *Riedlea serrata* Vent. Choix Pl. Cels *pl. 37.* 1803. *M. serrata* St. Hil. & Naud. Ann. Sci. Nat. II. 18: 36. 1842. *R. Jurgensenii* Turcz. Bull. Soc. Nat. Moscou 31, pt. 1: 211. 1858. *R. tenella* Turcz. op. cit. 212. 1858. *M. tenella* Hemsl. Biol. Centr.-Amer. Bot. 1: 132. 1879. *Malva* (Petén).

Moist or wet fields or grassy slopes, often in savannas or pine-lands, 800 meters or less; Petén; Alta Verapaz; Izabal; Santa Rosa; Huehuetenango. Mexico to British Honduras and Panama; West Indies; South America.

Plants probably perennial, herbaceous or suffrutescent at the base, usually 60 cm. tall or less, branched or simple, the stems hirsute with long spreading hairs; leaves short-petiolate or almost sessile, oblong to rhombic-ovate, 2–7 cm. long, acuminate to obtuse, rounded or cordate at the base, serrate, green, usually densely pilose, sometimes glabrate; flowers in dense sessile clusters, these usually forming an interrupted terminal spike, this leafy-bracted below or naked; petals purple or pink, 8–12 mm. long; capsule concealed in the calyx.

**Melochia kerriaefolia** Triana & Planch. Ann. Sci. Nat. IV. 17: 341. 1862.

Damp or wet thickets or in hilly pine forest, 100–600 meters; Alta Verapaz (Pantín); Izabal (Quiriguá). Southern Mexico; Colombia and Brazil.

An erect herb a meter high or less, apparently annual, the stems slender, reddish brown, sparsely hirsute and glandular-pilose; leaves thin, on slender, usually



short petioles, narrowly lanceolate to broadly ovate, mostly 3–6 cm. long, acute or acuminate, serrate, thinly pilose or glabrate; flowers purple, mostly slender-pedicellate and forming few-flowered long-stalked open cymes in the leaf axils or at the ends of the branches; calyx deeply cleft, with narrow segments, usually hispidulous; petals pink or purple, 6 mm. long; capsule 5 mm. broad, exposed in the calyx, densely hispidulous, depressed-globose.

This species has not been recorded previously from North America, so far as we know. In *Trees and shrubs of Mexico* (Contr. U. S. Nat. Herb. 23: 803. 1923) it was listed as *M. interrupta* (Schlecht.) Hemsl., which proves to be a different species.

**Melochia lupulina** Swartz, Prodr. Veg. Ind. Occ. 97. 1788.

Moist thickets, 1,050 meters or less; Alta Verapaz; reported from Suchitpéquez; doubtless in San Marcos, since collected in Chiapas on Volcán de Tacaná. Chiapas; British Honduras to Panama; Colombia to Peru.

Plants erect, slender, branched, herbaceous or at the base suffrutescent, reported to be at times scandent (in Jamaica), the young stems stellate-pilose; leaves slender-petiolate, ovate, thin, mostly 5–9 cm. long, acute or acuminate, rounded or subcordate at the base, serrate, rather densely and softly stellate-tomentose on both surfaces, more densely so and paler beneath; flowers slender-pedicellate, numerous, densely clustered in the leaf axils; calyx 4–4.5 mm. long in flower, in age accrescent and pale; petals white, with a yellow central spot; fruit concealed in the calyx, puberulent, 3 mm. high.

**Melochia nodiflora** Swartz, Prodr. Veg. Ind. Occ. 97. 1788.

*Escobillo.*

In moist or dry thickets or fields or in open forest, chiefly in the lowlands, ascending from sea level rarely to 1,800 meters; Zacapa; Jutiapa; Santa Rosa; Escuintla; Guatemala; Sacatepéquez; Retalhuleu. Southern Mexico to British Honduras and Panama; West Indies; South America.

Plants slender, branched, erect, sometimes 1.5 meters high but usually lower, often suffrutescent below, the stems ferruginous, stellate-puberulent when young or hispidulous; leaves thin, green, on slender, long or short petioles, chiefly ovate and 3–10 cm. long, acute or acuminate, rounded or subcordate at the base, serrate, conspicuously veined beneath, commonly glabrate but when young often abundantly pubescent; flowers mostly in dense sessile axillary clusters, these sometimes pedunculate, the conspicuous bracts brown, dry and thin; calyx 3.5–4 mm. long, the lobes triangular-lanceolate, acuminate; petals 4.5 mm. long, pink or white striped with rose, short-unguiculate, obovate-oblong; ovary sessile; capsule hispidulous, depressed-globose, 3 mm. high, exposed in the calyx; seeds black.

Called "mozote" in Salvador. A common weedy plant in many regions of Central America.

*Melochia pyramidata* L. Sp. Pl. 774. 1753. *Escoba roja* (fide Aguilar).

Dry or moist fields or thickets, sometimes in wet ground, often a weed in waste places, ascending from sea level to about 1,200 meters; Alta Verapaz; Zacapa; El Progreso; Jutiapa; Santa Rosa; Escuintla; Guatemala; Retalhuleu; Huehuetenango. Mexico to British Honduras; Honduras; Salvador; West Indies; South America.

Plants herbaceous or suffrutescent, usually erect, a meter high or less; leaves slender-petiolate, oblong to rounded-ovate, 3–7 cm. long, acute or obtuse, rounded at the base, thin, green, serrate, often glabrous but frequently sparsely or even rather densely stellate-pubescent; flowers mostly pedicellate, cymose-umbellate, the cymes sessile or pedunculate in the leaf axils; calyx 3.5–4 mm. long, the lobes lance-subulate; petals 6–8 mm. long, violet or rose; capsule 5–6 mm. long and somewhat broader, broadly pyramidal, the angles somewhat broadened at the base, acute, and spreading, glabrous or stellate-puberulent.

Known in Salvador by the names “coralillo,” “escobilla colorada,” “escobilla,” and “escobilla morada.” The Maya name is reported from Yucatan as “chichibe.” Although often an abundant weed in Mexico and in some regions of Guatemala, such as the Pacific plains, this widely dispersed species is scarce in Central America south of Guatemala, and altogether absent from many wide areas. The stems, as in other species, contain a tough fiber.

*Melochia tomentosa* L. Syst. Nat. ed. 10. 1140. 1759.

Brushy or grassy, rocky slopes, 200–600 meters; Zacapa. Almost throughout Mexico; Honduras; Nicaragua; West Indies; South America.

Plants erect, usually shrubby and 1–2.5 meters tall, the branches densely stellate-tomentose, the whole plant grayish; leaves rather thick, on long or short petioles, oblong to broadly rhombic-ovate, mostly 3–8 cm. long, rounded to sub-acute at the apex, rounded or subcordate at the base, coarsely crenate or dentate, usually densely stellate-tomentose on both surfaces, paler beneath; flowers in loose or dense, axillary and terminal cymes, mostly pedicellate; calyx 6 mm. long, the lobes linear-acuminate; petals 8–18 mm. long, pink to violet; fruit broadly pyramidal, long-rostrate, the lobes rounded to acutish below.

The plant is scarce in Central America, although common in many parts of Mexico and the West Indies. The Maya name in Yucatan is recorded as “zacchichibe.”

*Melochia urticaefolia* (Turcz.) Standl. Contr. U. S. Nat. Herb. 23: 804. 1923. *Riedlea urticaefolia* Turcz. Bull. Soc. Nat. Moscou 31, pt. 1: 209. 1838.

Brushy slopes, sometimes in oak forest, 1,400–1,800 meters; Zacapa; Jalapa; Jutiapa; Escuintla; Huehuetenango. Western Mexico, the type from Oaxaca.

A slender shrub 1–2 meters tall, the stems dark ferruginous, pilose and stellate-puberulent; leaves slender-petiolate, ovate-lanceolate to broadly ovate, mostly 4–8 cm. long, acute or acuminate, rounded or subcordate at the base, closely dentate, thin, green above, paler beneath, conspicuously nerved beneath, the upper surface sparsely or densely pilose with simple subappressed hairs; flowers forming large dense glomerules in the leaf axils, sessile or nearly so; bracts conspicuous, large, brown, thin; corolla purple or pinkish white, 8–10 mm. long; capsule concealed in the calyx.

There is some question as to whether the name here used is really applicable to the plant described, which seems to be rare in both Guatemala and Mexico.

### STERCULIA L.

Trees; leaves simple and lobate or digitately compound; flowers unisexual or polygamous, rather large, paniculate or racemose, commonly axillary; calyx 5-lobed or 5-parted, generally colored; petals none; stamen column bearing at its apex 15 or rarely 10 crowded anthers; carpels of the ovary 5, almost free, 2–many-ovulate; style peltate or lobate at the apex; mature carpels distinct, stellately spreading, ligneous-coriaceous or thinner, tardily dehiscent by an introrse suture; seeds 1–many in each carpel; endosperm present, adherent to the cotyledons and often simulating thick cotyledons; cotyledons plane or undulate, thin.

About 90 species, in the tropics of both hemispheres. From continental North America two species are known besides those listed below, in Costa Rica and Panama.

Leaves simple, palmately lobate.....*S. apetala*.  
Leaves digitately compound.....*S. mexicana*.

***Sterculia apetala*** (Jacq.) Karst. Fl. Columb. 2: 35. 1869.  
*Helicteres apetala* Jacq. Stirp. Amer. 238. pl. 181. 1763. *S. carthaginensis* Cav. Monad. Diss. 353. 1790. *Castaño*; *Bellota*; *Mano de león* (North Coast, perhaps an erroneous name).

Moist or dry forest or thickets, chiefly at 300 meters or less; Petén; Alta Verapaz; Zacapa; El Progreso; Santa Rosa; Escuintla; Suchitépéquez; Retalhuleu; San Marcos. Southern Mexico; Honduras to Panama; West Indies; northern South America.

A tall tree, sometimes 30 meters high, with a depressed, spreading, densely leafy crown and usually a tall clean thick trunk; leaves on very long petioles, deciduous, 15–50 cm. wide or even larger, membranaceous, 5-lobate, deeply cordate at the base, glabrate above, stellate-tomentose beneath when young but soon

glabrate, the lobes entire, rounded to subacute at the apex; panicles many-flowered, open or dense, equaling or shorter than the petioles; calyx open-campanulate, 2.5-3 cm. wide, yellow within, spotted with dark purple; carpels of the fruit about 10 cm. long, tomentulose outside, hispid within, sessile; seeds oval, 2 cm. long, castaneous, lustrous.

The name of the tree is used in the names of two *caseríos* of Guatemala, El Castaño in Escuintla and Castaños in Suchitepéquez. "Castaño" is the usual name for the tree in most parts of Central America, the seeds being called "castañas." The name "pepetaca" is recorded from Veracruz. In Panama the tree is known by the name "panamá," and it is believed that the name of the country was taken from the term for the tree, which is abundant in the Isthmus region. The tree is particularly abundant in the Pacific plains of Guatemala, where often it is a conspicuous element of the forest, towering above most of the other trees. The trees are full of flowers in middle February, but also bloom at other times. Toward the end of the dry season most of the leaves fall, and the ground is often deeply covered with them. The ground seeds sometimes are used in Guatemala to make a refreshing beverage. The fallen seeds are said to be a favorite food of pigs. The bark is reported to be used in Guatemalan domestic medicine as a supposed remedy for malaria. The stiff bristles lining the inside of the carpels penetrate the skin readily, causing irritation and itching. The trunk often is supported by buttresses. The bark is greenish brown; sapwood creamy yellow, the heartwood pinkish brown. Little or no use is made of the soft wood.

***Sterculia mexicana*** R. Br. in Horsf. Pl. Jav. Rar. 227. 1838-52. *Castaño*.

Moist or wet forest, 1,500 meters or lower; Chimaltenango (Volcán de Fuego); Suchitepéquez (Finca Mocá); Sololá (slopes of Volcán de Atitlán). Veracruz, Chiapas, and Tabasco, the type from Chiapas; British Honduras.

A tall tree, about 30 meters high, the trunk a meter in diameter, buttressed at the base, the bark slightly rough at the base, smooth on the upper part of the trunk and on the branches; leaves on very long petioles; leaflets 7-9, oblong-lanceolate or obovate-oblong, mostly 13-35 cm. long, on rather long petiolules, short-acuminate or rounded and apiculate, penninerved, entire, sparsely stellate-pilose at first but soon glabrate; panicles about 30 cm. long, many-flowered, lax, the branches thinly stellate-pilose; calyx 2 cm. broad, tomentulose, pale pink, cream, or red, lobate almost to the base, the lobes lance-oblong, obtuse or acutish; ripe follicles dull orange outside, red within.

Called "bellota" and "picapica" in Veracruz. The stiff hairs inside the pods are said to cause intense irritation. Schipp states that this is the largest tree of the Temash River region of British Honduras. On the slopes of the Volcán de Atitlán it is one of the dominant species of the mixed forest.

**THEOBROMA L.**

Small or large trees; leaves large, oblong or broader, simple or digitately compound, the simple leaves 3-5-nerved from the base; flowers small, the peduncles axillary or often borne on the trunk, 1-flowered or fasciculate, or branched and many-flowered; calyx 5-fid or 5-parted; petals 5, unguiculate, cucullate, the blade inflexed and produced into a spatulate appendage; stamen tube 5-lobate, the lobes opposite the sepals, linear or lanceolate, the anthers 2-3 in each sinus of the tube, short-stipitate, their cells divergent or divaricate; ovary sessile, 5-celled, the cells many-ovulate; styles filiform, more or less connate; fruit usually very large, drupaceous, the putamen woody, 5-celled; seeds imbedded in pulp, without endosperm; cotyledons thick, lobulate-corrugate, the radicle very short.

About 20 species, all in tropical America. Besides the ones listed below, *T. Bernoullii* Pittier, related to *T. angustifolium*, has been described from Panama. *T. purpureum* Pittier of Costa Rica and Panama is distinguished by having digitately compound leaves and very small fruits. *T. simiarum* Donn. Smith of the Atlantic coast of Costa Rica is a giant forest tree with sausage-like fruits borne upon the slender trunk.

Leaves green beneath and glabrous or nearly so.

Fruit acutely 5-angulate.....*T. pentagonum*.

Fruit subterete or obviously 10-sulcate.

Fruit subterete or obtusely 5-angulate, almost smooth.....*T. leiocarpum*.

Fruit somewhat 10-sulcate, with 5 deep furrows and 5 shallower ones.

*T. Cacao*.

Leaves covered beneath with a very dense, white, minute and close tomentum.

Leaf blades obtuse at the base; petals longer than the calyx...*T. angustifolium*.

Leaf blades deeply or shallowly cordate at the base; petals shorter than the calyx.....*T. bicolor*.

**Theobroma angustifolium** DC. Prodr. 1: 484. 1824. *Cacao de Costa Rica*.

Planted occasionally in the Pacific coast or bocacosta, in the tierra caliente; tending to become naturalized in moist forest near plantations; noted in Santa Rosa and Suchitépéquez, and doubtless in all the Pacific coast departments, as well as in Alta Verapaz. Chiapas and Tabasco; Salvador; Costa Rica; Panama; chiefly in cultivation, scarcely known in a truly wild state.

A small tree with a spreading crown, the bark smooth; leaves on very short petioles, oblong or oblong-oblancoate, mostly 15–25 cm. long and 10 cm. wide or narrower, abruptly acuminate, obtuse or narrowly rounded and oblique at the base, entire, green above and glabrous or nearly so, covered beneath with a minute white tomentum, the nerves usually brown; inflorescences borne in the leaf axils on the young branches, stellate-tomentulose, about equaling the petioles; flowers yellow, 2 cm. broad; fruit irregularly ovoid or obovoid, about 15 cm. long and 7–8 cm. broad, obsoletely 5-sulcate, covered with a close brownish tomentum, glabrate in age; seeds slightly larger than those of *T. Cacao*.

Known in Salvador as “cushta” or “cacao de la India.” The native region of this cacao is unknown, although Bernoulli (Neue Denkschr. Allg. Schweiz. Gesell. 24: 13. 1871), who had field experience in Central America, was inclined to believe it was native in southern Central America. In Costa Rica it is called “cacao de mico” and sometimes “cacao silvestre.” The species is much planted in southwestern Mexico, especially in Chiapas, as a source of commercial cacao, and the product from Soconusco was used for many years to supply the royal family of Spain. The pulp of the fruit is edible raw, as is that of other species.

**Theobroma bicolor** Humb. & Bonpl. Pl. Aequin. 1: 104. *pl.* 30. 1808. *Patashte*; *Pataxte*; *Balam*, *Balamte* (Quecchí); *Pec* (Poconchí).

Native region uncertain, but the tree is said to grow wild in Tabasco; found apparently wild in dense wet forest in Huehuetenango (near Ixcán); known, in cultivation at least, from Chiapas and Tabasco southward to Colombia; planted in many parts of the Guatemalan lowlands, especially along the base of the Pacific bocacosta, and noted from Alta Verapaz, Chiquimula, Santa Rosa, Suchitepéquez, and Quezaltenango; said to be planted in Suchitepéquez more than elsewhere.

A slender tree, the upright shoots each ending in a cluster of 3 lateral branches; leaves dimorphous, those of the upright shoots rounded-cordate, very large, sometimes 50 cm. long, long-petiolate, deeply cordate at the base; leaves of lateral branches short-petiolate, oblong-ovate, 15–30 cm. long, abruptly short-pointed, shallowly cordate at the base, green and almost glabrous above, covered beneath with a dense close white tomentum; flowers reddish purple, in small lax panicles, borne in the leaf axils on the young branches; fruit broadly ellipsoid or oval, about 15 cm. long, pale green or grayish, handsomely ribbed and irregularly reticulate, becoming dark in age, with a thick woody shell, the pulp white.

Sometimes called “cacao blanco” in Chiapas. For a rather detailed account of the species see O. F. Cook, Branching and flowering habits of cacao and patashte, *Contr. U. S. Nat. Herb.* 17: 609–625. *pls.* 44–54. 1916. The native country of this species is

quite as uncertain as that of most other cultivated members of the genus. The seeds are used like those of *T. Cacao*, being known in commerce as "tiger," "wariba," or "patashte" cacao. In Central America the cacao obtained from this species is considered decidedly inferior. The fresh pulp of the green fruits is sometimes eaten. The fruits are very handsome, because of the curious white and green network covering the shell, reminding one somewhat of certain varieties of muskmelons. In general appearance they are very unlike the fruits of any other cultivated species.

**Theobroma Cacao** L. Sp. Pl. 782. 1753. *Cacao*; *Xau* (Maya); *Cacau* (Yucatan); *Caco* (Poconchí); *Kicou*, *Kicob* (Poconchí); *Cuculat* (Pipil of Salamá); *Pacxoc* (Huehuetenango; wild plants).

One of the best known and most important plants of the American tropics, cultivated in Mexico probably since very remote times, and perhaps also in other parts of tropical America, but the native region a matter of uncertainty; now planted in most tropical regions, and in some regions on a very large scale as a source of cacao and its derivative, chocolate; cultivated on a small scale throughout the warmer parts of Guatemala, mostly at 450 meters or less; seen as scattered bushes at somewhat higher elevations.

A small tree, 6-8 meters high or sometimes larger, with spreading branches, the lateral branches in clusters of 5 or rarely 4 or 6, the young shoots hirsute or hirtellous; leaves short-petiolate, elliptic-oblong or obovate-oblong, 15-30 cm. long, abruptly acuminate, rounded or obtuse at the base; inflorescences small, borne along the naked trunk and main branches, the flowers long-pedicellate; calyx pink, its lobes lance-acuminate, 6-7 mm. long; petals yellowish; fruit glabrous, ovoid-oblong, gradually attenuate to the apex, 10-sulcate, 5 of the furrows more conspicuous than the other 5, the ridges irregularly rugose-tuberculate; seeds ovoid.

*Theobroma Cacao* is here interpreted in the sense in which the name was taken up by Bernoulli (Neue Denkschr. Allg. Schweiz. Gesell. 24: 5. 1871), after intensive study of the cacao grown in Guatemala and elsewhere in tropical America. This is the "cacao criollo" of Guatemala and Costa Rica, from which the best grades of cacao of those countries are obtained. The seeds are yellowish white or pale rose in cross section, and with scarcely any flavor, in contrast to those of *T. leiocarpum*, which have a purple cross section and bitter flavor. The classification of the cacaos of Central America is still imperfectly understood, but the notes given here are based upon the observations of Bernoulli and of Pittier, who have known more about the Theobromas of this region than any

other persons. *T. Cacao*, *T. leiocarpum*, and *T. pentagonum* can be separated only by fruit characters, so far as known at present, hence ordinary herbarium specimens must all be referred to *T. Cacao*, of which the other two are perhaps better treated as varieties. Commercially the fruit and seed differences are important.

The word "cacao" is the name of the plant and its crude product, i.e., the seeds. Cocoa and chocolate are manufactured products obtained from the seeds. The word "cacao" is derived from the Nahuatl "cacahuatl" or "cacahoatl," a term in modern Mexican language corrupted into "cacahuate," the name now applied to the peanut! Of all the products of the New World perhaps none except gold received more attention from the Spanish conquerors or won more prompt acceptance in Europe, where it attained high favor immediately after the conquest. Oviedo, who wrote the first important account of the natural history of the New World, states that cacao was not found in the Antilles but only on the continent, where he terms it "the most precious tree of the Indians and the most highly esteemed." Cacao must have been known in the wild state to the early inhabitants of Mexico and it was introduced into cultivation, to what extent is unknown. Still less is known of its early use in Central America. In Mexico, use of the beverage prepared from the seeds was confined chiefly to the nobility. It must have been partly on this account that the seeds came into use as a medium of exchange, and they were, indeed, the basis of the Mexican financial system. Such use of cacao seeds continued in remote parts of Mexico until relatively recent times (in Yucatan up to 1850 at least), and it is recorded that in Guatemala in the region of Jocotán, Chiquimula, they were used in place of small coins until about 50 years ago. When used as a substitute for coins, the seeds were assigned a conventional value much greater than their value as a source of chocolate. (For a more detailed account of the use of cacao seeds as money see Standley, *Trees and shrubs of Mexico*, Contr. U. S. Nat. Herb. 23: 806. 1923.) Similar use of cacao seeds was made far south of Mexico, and Oviedo reports that in Nicaragua a slave was worth about 100 seeds, a rabbit 10 seeds.

*Theobroma Cacao* and the related forms, especially *T. leiocarpum*, are the principal sources of the chocolate and cocoa of commerce. Chocolate is a preparation from roasted and ground cacao seeds, with a large proportion of the original fat retained. Cocoa is prepared in the same manner, but most of the fat is removed from it. The sun-dried seeds have an agreeable flavor, more so after roasting, and they are sometimes sold in the markets for eating. The original



inhabitants of Mexico used the seeds in a drink known as *xocoatl*, signifying "sour water," this being the term from which the word "chocolate" is obtained. The unsweetened decoction of the seeds is unpleasantly bitter, but it was improved by adding honey, chile, maize, ceiba seeds, and many other more or less spice-like substances. Before being drunk, the beverage was beaten into a foam that dissolved almost imperceptibly upon the tongue. In Mexico the drink was reserved for the nobility, who consumed immense quantities of it. There are no records regarding its use among the early Guatemalans, who were less luxurious in their habits, but must have been acquainted with the cacao produced in the lowlands. Since one of the early accounts of Salvador mentions destruction of cacao plantations early in the sixteenth century by volcanic eruptions, there must have been extensive plantations of the tree both there and in Guatemala at the time of the conquest.

So delicious a beverage as chocolate naturally won favor among the earliest Spanish invaders, and it was mentioned by Cortés in his letters to the King of Spain. After the conquest it was an esteemed drink among the Spanish settlers, and it is recorded that in Chiapas the ladies had it brought to them even in the churches, until the bishop forbade the servants who brought it to enter the churches.

In Guatemala, as in other parts of Central America, cacao is grown probably in much smaller quantities than formerly, principally because it is now less profitable. There is at present too great competition from tropical regions of the Old World, where labor is exceedingly cheap (although it is hard to imagine that it is cheaper than in some parts of Guatemala). The Dirección de Agricultura reports the production of cacao for 1938-39 as 10,747 quintales or hundredweight. The departments producing most of this were Suchitepéquez (6,414 quintales), Escuintla (2,170), and Alta Verapaz (1,041). The plantations of Suchitepéquez, in the lower hills of the bocacosta or on the edge of the plains, are rather extensive and conspicuous, this being the only part of the country in which cacao is at all conspicuous. In the vicinity of San Felipe, San Antonio, and Mazatenango, at about 300 meters or lower, cacao was much exploited for export to Spain during the latter half of the sixteenth century, but by 1600 its importance was already declining, and soon its production was insufficient for even local demands. The tree requires a moist warm climate, and always is grown under fairly dense shade. The best cacao of Guatemala is reputed to be that of Cuyotenango in Suchitepéquez. While the beverage chocolate

usually can be obtained in the towns of Guatemala, it is not popular, and a tourist, for example, probably will never see it unless he asks to have it prepared. A favorite beverage upon holiday occasions, especially at *ferias*, is a *batido*, drunk hot, and made of water, cacao, and various condiments, especially cinnamon. Most of the locally grown cacao is utilized in the preparation of candy and other sweetmeats. Much of it is sold in large thin cakes, which may be either sweet or unsweetened, and often have butter added to them. Bonbons similar to those of Europe and the United States are made with chocolate in local factories. Mills for grinding the seeds sometimes are seen in the markets beside those in which maize is ground for tortillas.

In the lowlands of Guatemala cacao sometimes is found more or less wild in the forest, especially in Alta Verapaz. It is not improbable that the tree is or was native in the wet North Coast region, but it may well be that these apparently wild plants are relics of early cultivation. Since cacao cultivation and use seem to have been more highly developed by the aborigines in southern Mexico than elsewhere in America, it is reasonable to suppose that it is native in this region, as it apparently is also in some parts of South America.

**Theobroma leiocarpum** Bernoulli, Neue Denkschr. Allg. Schweiz. Gesell. 24: 6. 1871. *Cacao*, *Cacao calabacillo*; *Cumacaco* (Costa Grande, Guatemala, fide Bernoulli).

Planted in the lowlands of the Pacific slope, and also cultivated in other parts of Central America and in more remote regions. Described from the Costa Grande, probably Retalhuleu or Suchitepéquez, Guatemala, in cultivation; scarcely known in a wild state.

Similar in vegetative characters to *T. Cacao*, the flowers and fruits smaller; leaves sometimes hirsute on the upper surface, somewhat paler beneath; peduncles 1-2-flowered, articulate above the base; calyx lobes narrowly lanceolate, glabrous, with ciliate margins; fruit coriaceous-cartilaginous, ovoid, obsoletely 5-sulcate, smooth; seeds ovoid.

Bernoulli reports the species as being scattered through plantations of *T. Cacao* in Guatemala. Pittier states that it produces an inferior grade of cacao, although in former years and in certain regions it was believed, through some error, to produce the best grade of all. It is a form said to be much cultivated in the Orient. There is apparently no basis for believing that this species, if it should be treated as such, grows wild anywhere. There is the possibility that it may be a mutant that has arisen in plantations of *T. Cacao* after long years of cultivation.

**Theobroma pentagonum** Bernoulli, Neue Denkschr. Allg. Schweiz. Gesell. 24: 6. 1871. *Cacao lagarto*.

Described from plants studied by Bernoulli in the Costa Grande of Guatemala, probably in Retalhuleu or Suchitepéquez. Little is known regarding the plant, except that it is found planted at times with *T. Cacao*.

Similar to *T. Cacao* in most characters, except in the fruit, but the flowers said to be only half as large as in that species; leaves hirsute above, glabrous beneath; calyx lobes lanceolate, glabrous, ciliate; ovary 5-angulate, minutely and sparsely glandular; fruit ovoid-oblong, long-attenuate to the apex, acutely 5-angulate, with prominent angles, the furrows irregularly and coarsely verrucose-tuberculate; seeds ovoid.

### WALTHERIA L.

Herbs or shrubs, the pubescence chiefly of stellate hairs; leaves petiolate, serrate, the stipules small and narrow; flowers mostly small, glomerate in the leaf axils or cymose or capitulate and in terminal racemes or panicles; calyx 5-fid; petals 5, spatulate, marcescent; stamens 5, connate at the base, opposite the petals, without staminodia; anther cells parallel; ovary sessile, 1-carpellate, 1-celled, 2-ovulate; style excentric, clavate or fimbriate above; capsule bivalvate dorsally, 1-seeded.

About 30 species in the tropics, mostly in America. One other species occurs in Central America, as close as Salvador, and is to be expected in Guatemala.

**Waltheria americana** L. Sp. Pl. 673. 1753. *W. indica* L. loc. cit. *Escobillo blanco*; *Malva*; *Babo de araña* (Jalapa); *Escobillo botán*, *Mozote de caballo* (fide Aguilar); *Escobilla*.

Chiefly in dry or moist thickets, often growing in sand, along roadsides, or in waste ground, sometimes in pine forest, ascending from sea level to 2,000 meters, but most common at low elevations; Petén; Baja Verapaz; Izabal; Zacapa; El Progreso; Jalapa; Jutiapa; Santa Rosa; Escuintla; Guatemala; Sacatepéquez; Chimaltenango; Huehuetenango; Retalhuleu; San Marcos. Mexico to British Honduras and Panama; West Indies; South America; naturalized in the Old World tropics.

Plants herbaceous or suffrutescent, usually a meter high or lower, erect or decumbent; leaves thick, on long or short petioles, oblong to rounded-ovate, mostly 3-6 cm. long, obtuse or rounded at the apex, obtuse to subcordate at the base, crenate-dentate, pale and very densely stellate-tomentose on both surfaces; flowers sessile in dense head-like clusters, these sessile or pedunculate; calyx 4-5 mm. long, the lobes lance-subulate; petals 6 mm. long, unguiculate, bright yellow; capsule 2 mm. long.

A common and conspicuous weed in many places, especially about Zacapa and Jutiapa, showy because of the abundant, bright yellow flowers. The plant is more attractive from a distance than close at hand. The flowers are sweet-scented. The foliage is said to be eaten by stock. The Maya names are reported from Yucatan as "zacmizib" and "zacxiu"; called "malva de monte" in Yucatan and "escobilla" in Salvador.

### SAURAUICEAE

Shrubs or trees, the pubescence variable, consisting of hairs, bristles, or scales; leaves alternate, simple, usually serrate, membranaceous or coriaceous, with stout lateral nerves; stipules none; flowers usually perfect, small or rather large, white, the peduncles axillary or lateral, many-flowered and paniculate or sometimes shorter and few-flowered; bractlets small, remote from the calyx; sepals 5, strongly imbricate; petals 5, imbricate, free or connate; stamens numerous, adnate to the base of the petals, the anthers small, versatile, opening by an apical pore or by a short slit; ovary superior, 3-5-celled; styles 3-5, free or variously united, sometimes united to the apex; ovules numerous in each cell, anatropous, the placentae axile; fruit baccate, 3-5-celled, sometimes almost dry and somewhat dehiscent; seeds small, immersed in thin pulp; endosperm copious; embryo axile, straight or somewhat incurved, the cotyledons short.

The family consists of a single genus. By Bentham and Hooker it was referred to the Ternstroemiaceae (Theaceae), where obviously it is out of place. More recent authors have placed *Saurauia* in the Dilleniaceae, a group with which it agrees no better. Hutchinson probably is correct in considering it the type of a small and aberrant family.

### SAURAUIA Willdenow

The genus consists of perhaps 75-100 species, the true number very uncertain, chiefly in tropical America, with a fair number of species in tropical Asia. Other species besides those listed here are known in southern Central America, particularly in Costa Rica. There has been only one monograph of the genus, by Buscalioni, published in volumes 25-30 of *Malpighia*. A century ago Italian botanists produced taxonomic botanical works of importance, but in more recent years their product has been scant and often of inferior quality. Probably there never has been published a systematic botanical work that contained so many faults as this "monograph" of *Saurauia*, from the wretched paper on which it is printed to the typography, innumerable misspelled geographic and personal names, and last but not least the taxonomy, which is presented in a diffuse and incoherent style. The author multiplied the North

American species inordinately. It will be impossible to form any clear concept of the alignment of the North American species until all the available material, including that used by Buscalioni, is brought together and studied with great care by some competent botanist. The matter is complicated by the fact that the individual specimens exhibit considerable variation, although probably not so much as in many other groups of tropical plants. It is difficult to decide which characters really are of value for separating the species, and it is evident that Buscalioni paid too much attention to specimens and not enough to species.

The following treatment of the Guatemalan species is not offered with any confidence, but it is believed that it indicates the approximate number of specific units represented in the country. It is not altogether clear what some of them should be called, since it has been impossible to examine authentic material of all of Buscalioni's numerous new species and varieties. Furthermore, it is by no means certain that the key characters used here for separating the species are the best ones or that they are even dependable. We have had for study ample material of most of the species we have recognized as valid entities.

The Saurauias, especially those with large flowers, are handsome and decorative plants when in flower, and the foliage of some species is showy and of striking appearance. Their fruits are edible and are sometimes sold in the markets of Guatemala and other Central American countries. The fruits have no decided flavor but they are sweet and not unpleasant. The so-called pulp is very thin and in consistency much like the white of a raw egg.

Adult leaves densely pilose or hispid on the upper surface or merely scabrous, sometimes only thinly setose or pilose, usually very rough to the touch over the whole surface, the lower surface densely or thinly hispid, setose, or stellate-pubescent; outer sepals always abundantly setose.

Leaves stellate-pubescent on the lower surface, sometimes also with setae along the nerves but the pubescence predominantly stellate.

Leaf blades small, mostly 2-4 cm. wide.....*S. latipetala*.

Leaf blades large, mostly 5.5-14 cm. wide.

Leaves minutely and sparsely stellate-puberulent beneath; setae of the inflorescence usually closely appressed.....*S. pseudorubiformis*.

Leaves very densely and softly velutinous-stellate beneath; setae of the inflorescence chiefly spreading.....*S. villosa*.

Leaves hispid or setose beneath, usually densely so, the stellate hairs absent or few.

Leaf blades rounded at the base, broadest at or below the middle, rather densely setose on the upper surface with very long, bulbous-based hairs.  
*S. cuchumatensis*.

Leaf blades narrowed to an obtuse or narrowly rounded or even acute base, evidently broadest above the middle, variously pubescent on the upper surface.

Hairs of the upper leaf surface evidently dilated at the base, short.

*S. subalpina.*

Hairs of the upper leaf surface not enlarged at the base, very long.

Setae of the petioles closely appressed.....*S. oreophila.*

Setae of the petioles widely spreading.

Sepals densely covered with very thick and short, puberulent setae.

*S. perseifolia.*

Sepals covered with long and relatively slender setae, these glabrous except sometimes at the base.....*S. veneficorum.*

Adult leaves glabrous on the upper surface or with a few remote appressed setae along the costa, smooth to the touch, the lower surface glabrous or sparsely appressed-setose on the nerves and veins; outer sepals often glabrous.

Leaves with dense tufts of yellowish or brownish, floccose tomentum beneath in the nerve axils; leaf blades usually rounded or narrowly rounded at the base.....*S. pseudoscabrida.*

Leaves not floccose-tomentose beneath in the nerve axils, naked or sometimes somewhat barbate or tomentose with white hairs; leaf blades usually acute at the base, never narrowed to a rounded base.

Leaves sparsely strigose beneath on the lateral nerves and also along the costa.

Leaves small, mostly 2 cm. wide or narrower and 5-9 cm. long, barbate beneath in the axils of the nerves.....*S. Waldheimia.*

Leaves larger, mostly 3-6 cm. wide and 10-15 cm. long or larger, not barbate beneath in the axils of the nerves.....*S. oreophila.*

Leaves glabrous beneath on the lateral nerves, glabrous on the costa or with a few scattered, very short setae.

Flowers large, mostly 2-2.5 cm. broad; sepals glabrous or glabrate.

*S. Kegeliiana.*

Flowers small, about 1 cm. broad or smaller; sepals usually densely pubescent or setulose.....*S. belizensis.*

### **Saurauia belizensis** Lundell, Field & Lab. 13: 7. 1945.

Moist or wet, mixed forest, 1,150 meters or lower; Alta Verapaz; Izabal; Quezaltenango; Huehuetenango. Chiapas; British Honduras (type collected between Monkey River and Cockscomb, Toledo District, *P. H. Gentle* 4439); Atlantic lowlands of Honduras.

A shrub or tree, sometimes 15 meters high with a trunk 25 cm. in diameter, the branches rather slender, stellate-puberulent or furfuraceous, soon glabrate; leaves on rather long, slender petioles, chartaceous, oblanceolate-oblong to elliptic-oblong or elliptic, mostly 10-18 cm. long and 3.5-7.5 cm. wide, acuminate or abruptly short-acuminate, acute or attenuate at the base, subentire or serrulate or sometimes crenate-dentate, green and glabrous above, slightly paler beneath, glabrous or usually with a few appressed setae along the costa; inflorescences equaling or often much shorter than the leaves, lax, many-flowered, long-pedunculate, the peduncles slender, sparsely stellate-furfuraceous or glabrate, the flowers on short slender pedicels, the pedicels stellate-puberulent, the flowers small, 1 cm.

broad or narrower; sepals rounded-ovate, about 4 mm. long, rounded at the apex, glabrous outside or nearly so, or often stellate-puberulent at first; petals white, little longer than the sepals; anthers little more than 1 mm. long, the cells opening by a large apical pore; styles distinct to the base.

Called "wild orange" in British Honduras; "chilindrón" (Honduras). The flowers are said to be fragrant. This species has been reported from British Honduras as *S. pauciserrata* Hemsl., to which it is closely related.

***Saurauia cuchumatanensis*** Standl. & Steyer. Field Mus. Bot. 23: 215. 1944.

Wet mixed mountain forest, 2,000–3,000 meters; endemic; Huehuetenango (type from Cruz de Limón, between San Mateo Ixtatán and Nucá, Sierra de los Cuchumatanes, *Steyermark* 49810; also on Cerro Huitz).

A shrub of 1.5 meters, the branches very thick, densely setose-hirsute with very long, spreading, ferruginous hairs; leaves rather large, short-petiolate, subcoriaceous, the stout petioles 2–3.5 cm. long, densely setose-hirsute like the branches; leaf blades oblong or elliptic-oblong, 17–25 cm. long, 6.5–8.5 cm. wide, acuminate, somewhat narrowed to the rounded base, finely and unequally salient-serrate with spreading teeth, rather densely setose-hirsute on the upper surface with bulbous-based ferruginous hairs, slightly paler beneath, thinly setose-hirsute on the nerves and veins with stiff ferruginous hairs, the veins strongly elevated and closely reticulate; inflorescences half as long as the leaves or sometimes equaling them, long-pedunculate, small and condensed or sometimes consisting of a many-flowered open panicle 16 cm. long and 12 cm. broad, the branches and rachis densely setose-hirsute with ferruginous hairs, the large flowers on long or short pedicels; sepals very densely covered with long spreading ferruginous bulbous-based hairs and completely concealed by them, becoming about 8 mm. long; petals white, rounded, 9 mm. long; anthers 2 mm. long or slightly longer, opening by large terminal pores; styles distinct to the base.

In the fresh state the costa and nerves of the leaves are rose-red, like the bristles of the pale green calyx.

***Saurauia Kegeliana*** Schlecht. Bot. Zeit. 694. 1853 (described from living plants at Halle, Germany, that grew from seeds in soil found about the roots of plants imported from Guatemala). *S. pauciserrata* Hemsl. Diag. Pl. Mex. 3. 1878; Biol. Centr.-Amer. Bot. pl. 7. 1888 (type from Volcán de Fuego, Chimaltenango, *Salvin*). *S. Maxonii* Donn. Smith, Bot. Gaz. 42: 292. 1906 (type from Secanquím, Alta Verapaz, *Maxon & Hay* 3221). *S. pauciserrata* var. *Kegeliana* Buscalioni, Malpighia 25: 13. 1912. *S. pauciserrata* f. *crenata* Buscalioni, loc. cit. 1912; op. cit. 29: 11. 1921 (type collected in

Guatemala, *Bernoulli & Cario* 3347). *S. leucocarpa* var. *Smithiana* Buscalioni, op. cit. 13. 1912; 28: *pl. 1, f. 25*. 1917; 29: 232. 1922 (type from Pansamalá, Alta Verapaz, *Tuerckheim* 1445). *S. intermedia* Buscalioni, *Malpighia* 25: 13. 1912; 26: *pl. 10, f. 21*. 1913; 29: 23. 1921 (type from Barranco de Pinula, Guatemala, *Skinner*). *S. Zahlbruckneri* Buscalioni, *Malpighia* 25: 14. 1912; 26: *pl. 9, f. 18*. 1913; 29: 433. 1923 (type from Alta Verapaz, *Tuerckheim* 1286). *Moco*; *Moquillo*; *Capulín*.

Moist or wet forest or thickets, 600–2,300 meters, or sometimes at or near sea level; Petén; Alta Verapaz; Baja Verapaz; Izabal; Santa Rosa; Escuintla; Guatemala; Sacatepéquez; Chimaltenango; Sololá; Retalhuleu; Quezaltenango; San Marcos. Chiapas and probably elsewhere in southern Mexico; Honduras.

A shrub or tree, sometimes 15 meters high but usually much lower, glabrous almost throughout, the branches slender; leaves on short or somewhat elongate, slender petioles, obovate-lanceolate to elliptic, variable in size but mostly 9–20 cm. long and 3.5–8 cm. wide, acute or short-acuminate, attenuate to obtuse at the base, subentire to serrate or crenate, somewhat paler beneath, glabrous on both surfaces or usually barbate beneath in the axils of the nerves; inflorescences mostly lax and few-flowered, equaling or shorter than the leaves, mostly on long slender peduncles, the flowers white, 2–2.5 cm. broad, pedicellate, fragrant, the pedicels and branches of the inflorescence stellate-pubescent or stellate-furfuraceous or often almost glabrous; sepals rounded-ovate, about 6 mm. long, obtuse or rounded at the apex, usually glabrous or glabrate, ciliate; petals broadly obovate, commonly 10–12 mm. long; filaments pubescent, the anthers yellow, 2–2.5 mm. long; styles distinct; fruit glabrous, globose, almost 1 cm. in diameter when dry, depressed at the apex, green or pale green or becoming whitish.

Called “zapotillo” in Honduras; “capulín montés,” “capulín de montaña,” “alais,” “cresta de gallo” (Salvador). This has been reported from Guatemala as *S. anisopoda* Turcz. and *S. pedunculata* Hook. Buscalioni, quite contrary to all rules, treated *S. Kegeliana* as a variety of the much later *S. pauciserrata*. In treating this group of *Saurauia* species, with glabrous or nearly glabrous leaves, Buscalioni let his fancy run free, and published not only the names listed above, based on Guatemalan material, but a good many others from Mexico and elsewhere that probably should be reduced under a single species. It is difficult from his publications to determine upon just what characters he based his species and varieties. There is some question as to whether *S. pauciserrata* and *S. Kegeliana* are distinct from the still older *S. leucocarpa* Schlecht., but a photograph and fragments of authentic material of that species seem to indicate that it is a sufficiently different plant.



**Saurauia latipetala** Hemsl. *Diag. Pl. Mex.* 4. 1878. *Chupe*.

Moist or wet, mixed forest or thickets, 1,500–2,600 meters; Chimaltenango; Quiché; Huehuetenango. Chiapas.

A shrub or small tree of 2.5–6 meters, setulose with stout appressed hairs and densely stellate-furfuraceous; leaves short-petiolate, chartaceous, lanceolate or oblanceolate, mostly 7–15 cm. long and 2–4 cm. wide, acuminate or acute, acute at the base or subobtusate, finely appressed-serrate, scabrous-hispidulous on the upper surface with short broad-based appressed hairs, rather densely and finely stellate-pubescent beneath, appressed-setulose on the costa and nerves; inflorescences rather few-flowered, shorter than the leaves, often less than half as long, on short or elongate, slender peduncles, the flowers slender-pedicellate, about 1.5 cm. broad, white, the pedicels and peduncles appressed-setulose and stellate-furfuraceous; sepals about 6 mm. long, ovate-rounded, obtuse or rounded at the apex, thin, pale green, sparsely appressed-setulose with short thick subappressed hairs, these often pubescent near the base, the sepals also sparsely stellate-pubescent, at least near the base; petals about 1 cm. long, broad, glabrous; fruit green or whitish when fresh, when dry oval, about 12 mm. long, glabrous; anthers 2 mm. long or slightly longer, yellow; styles distinct to the base.

**Saurauia oreophila** Hemsl. *Diag. Pl. Mex.* 3. 1878. *S. leucocarpa* var. *stenophylla* Buscalioni, *Malpighia* 25: 13, 223. 1912; 29: 104. 1921, at least in part (based in part upon *Tuerckheim* 8380 from Tactic, Alta Verapaz). ?*S. leucocarpa* var. *stenophylla* f. *Veranii* Buscalioni, *op. cit.* 25: 223. 1912; 29: 107. 1921 (based, at least in part, on *Seler* 3103 from San Martín, Huehuetenango). ?*S. oreophila* f. *rubra* Buscalioni, *op. cit.* 25: 219. 1912; 26: 142. 1913. ?*S. Conzattii* var. *Arthuriana* Buscalioni, *op. cit.* 30: 430. 1927 (type from Chinautla, Guatemala, *E. W. D. Holway* 1815). *Moco*.

Moist or wet, mixed mountain forest, 1,500–3,300 meters; endemic, so far as known, but to be expected in Chiapas; Alta Verapaz; El Progreso; Zacapa; Chiquimula; Jalapa; Guatemala; Sacatepéquez; Chimaltenango (type from Volcán de Fuego, at 3,150 meters, *Salvin*); Quezaltenango; San Marcos.

A shrub or tree, sometimes 9 meters high, usually lower, the branches stout, densely appressed-setose and stellate-furfuraceous; leaves on short slender petioles, thick-membranaceous or chartaceous, oblanceolate-oblong or oblanceolate, mostly 7–21 cm. long and 3–8 cm. wide, acuminate or acute, narrowed to the acute or obtuse base, finely or coarsely serrate, sparsely appressed-setose above with long or short hairs, densely setose on the nerves, beneath scarcely paler, thinly stellate-pubescent, densely appressed-setose on the costa and nerves; inflorescences few-flowered, much shorter than the leaves, slender-pedunculate, the flowers white, pedicellate, about 1.5 cm. broad, the pedicels and peduncles densely short-setulose with broad-based hairs and stellate-furfuraceous; sepals ovate-elliptic, 4–5 mm. long, sparsely setulose-furfuraceous or almost glabrous, very obtuse or rounded at the apex; petals oblong-obovate, almost free, about 8 mm. long; filaments

barbate at the base, the anthers 2 mm. long or somewhat larger; styles distinct to the base, glabrous; dry fruit globose, about 8 mm. in diameter, glabrous, rounded or somewhat depressed at the apex.

The fruit in this genus changes greatly in drying, being much larger in its fresh state. This species has been reported from Guatemala as *S. leucocarpa* Schlecht.

***Saurauia perseifolia*** Standl. & Steyerl. Field Mus. Bot. 23: 216. 1944.

Known only from the type, Izabal, along Río Tameha, Cerro San Gil, 50 meters, *Steyermark* 41784.

A tree of 10 meters, the branchlets stout, densely stellate-pubescent or tomentose and densely setose with long, brown, ascending or subappressed setae; leaves on stout petioles about 2 cm. long, the petioles pubescent like the stems; leaf blades membranaceous, oblong-obovate or obovate, 17–22 cm. long, 7.5–10 cm. wide, acute or subacute, somewhat narrowed to the narrowly rounded base, almost entire or finely and closely serrate above the middle, densely setose on the upper surface with spreading or subappressed, fulvous hairs, somewhat paler beneath, very densely and rather softly setose-pilose with spreading hairs, the hairs yellowish, dilated at the base; inflorescences rather few-flowered and dense, 9 cm. long or shorter, long-pedunculate, the peduncles very densely short-setose and stellate-puberulent, the flowers borne on stout elongate pedicels, white, about 13 mm. broad or somewhat larger; sepals 4.5 mm. long, rounded-ovate, obtuse or rounded at the apex, very densely furfuraceous with short thick puberulent setae; petals broadly ovate or obovate, obtuse or rounded at the apex, about 6 mm. long, glabrous; filaments pilose at the base, the anthers almost 2 mm. long, opening by large apical pores.

Although known from a single collection in not the best of condition, this seems to represent a quite distinct specific type.

***Saurauia pseudorubiformis*** Buscalioni, *Malpighia* 25: 11, 221. 1912; 27: 149. 1916 (type from Costa Rica). *S. pseudorubiformis* var. *guatemalensis* Buscalioni, *Malpighia* 25: 11, 221. 1912; 27: 155. 1916 (type from Cobán, Alta Verapaz, *Tuerckheim* 8498).

Moist or wet, mixed mountain forest or thickets, sometimes at least on limestone, 1,200–1,500 meters or sometimes at lower elevations; Alta Verapaz; perhaps also elsewhere in Guatemala. Costa Rica.

A shrub or small tree, the branches and petioles stellate-puberulent and densely covered with short thick appressed setae; leaves membranaceous, short-petiolate, oblanceolate-oblong or usually obovate-oblong, mostly 16–26 cm. long and 5.5–12 cm. wide, abruptly short-acuminate, gradually narrowed to a narrowly rounded base, closely and finely serrate, scabrous on the upper surface and very rough to the touch, minutely and densely or sparsely stellate-scabrous beneath, bearing

numerous short appressed thick setae along the costa and nerves; inflorescences mostly rather lax and few-flowered, long-pedunculate, generally much shorter than the leaves, the flowers white, 1.5 cm. broad or larger, the pedicels very densely covered with short thick appressed setae; sepals about 5 mm. long, ovate-rounded, rounded or very obtuse at the apex, densely stellate-puberulent and densely covered with short thick appressed setae; anthers about 2 mm. long; styles distinct.

This has been reported from Guatemala as *S. macrophylla* Linden.

**Saurauia pseudoscabrida** Buscalioni, *Malpighia* 25: 10. 1912 (type from Costa Rica).

Moist or wet, mixed mountain forest or thickets, often or usually on limestone, 500–2,500 meters; Alta Verapaz; Huehuetenango. Costa Rica.

A large shrub or a tree, sometimes 12 meters high, the young branches and petioles densely covered with short appressed setae having broad thick bases, usually also stellate-pubescent; leaves coriaceous, on stout or slender, short or elongate petioles, oblong or obovate-oblong or oblanceolate-oblong, mostly 11–25 cm. long and 4–9.5 cm. wide, acute to rounded at the apex, gradually narrowed to the narrow rounded base, serrulate or subentire, thinly appressed-setulose and stellate-pubescent on the upper surface or glabrate, weakly stellate-pubescent beneath, appressed-setulose along the costa and nerves; inflorescence racemiform-paniculate, equaling or shorter than the leaves, long-pedunculate, the white flowers about 1.5 cm. broad, pedicellate, the pedicels and branches densely appressed-setulose and stellate-furfuraceous or puberulent; sepals rounded, 4–4.5 mm. long, rounded at the apex, densely stellate-puberulent and covered with short thick appressed fulvous setae, densely ciliate; petals rounded-obovate, about 7 mm. long; filaments pilose at the base, the yellow anthers 2 mm. long or slightly longer.

The use of the name *pseudoscabrida* for this plant is more than a little questionable, but we have been unable to find another name for it, and until the Central American species have been carefully monographed, it is undesirable to add new names whose status is more than ordinarily questionable.

**Saurauia subalpina** Donn. Smith, *Bot. Gaz.* 42: 292. 1906. *Moco; Moquillo.*

Moist or wet, mixed mountain forest or thickets, 1,400–3,300 meters; Zacapa; Chiquimula; Jutiapa; Sacatepéquez (type from Volcán de Agua, at 3,300 meters, *J. D. Smith* 2171); Suchitepéquez; Quezaltenango; San Marcos; Huehuetenango. Chiapas.

A large shrub or a tree, commonly 6–12 meters high, the branches and petioles very densely setose with long, spreading or somewhat reflexed, rufous hairs; leaves on short stout petioles, thick-membranaceous, obovate-oblong or oblanceolate-oblong, mostly 15–35 cm. long and 4–14 cm. wide, acute or acuminate, narrowed to the acute or obtuse base, unevenly serrate, very densely setose on

the upper surface with short broad-based fulvous hairs, very densely and softly fulvous-setose beneath with rather short, soft hairs; inflorescences paniculate, small and dense or large and open, usually many-flowered, generally much shorter than the leaves, long-pedunculate, the flowers white or pinkish white, 1.5 cm. broad or larger, on short and thick or elongate and more slender pedicels, the pedicels very densely yellowish-setose with stout hairs; sepals ovate-rounded, 5-6 mm. long, very densely setose-furfuraceous with stout, often puberulent setae; petals broadly obovate, rounded at the apex, glabrous, 7-8 mm. long; anthers yellow, 2 mm. long, the filaments pilose at the base; fruit depressed-globose, when dry about 8 mm. broad, depressed at the apex, glabrous, the styles distinct.

A frequent and sometimes abundant, small tree in the mountains of the Occidente. Because of the large, brownish or yellowish, velvety leaves and the abundant panicles of rather large, white or pinkish flowers, it is a conspicuous and handsome plant, and sometimes is seen in cultivation about houses.

**Saurauia veneficorum** Standl. & Steyerl. Field Mus. Bot. 23: 217. 1944. *Achotillo* (Alta Verapaz).

Moist or wet forest, 300-2,000 meters; endemic; Alta Verapaz; Chiquimula (type collected on Cerro Brujo, between Montaña Norte and El Jutal, *Steyrmark* 31081).

A tree about 6 meters high, the branches and petioles very densely setose with long, slender, stiff, spreading or somewhat reflexed, brownish hairs; leaves thick-membranaceous, on rather slender petioles 1.5-2 cm. long, obovate-oblong, mostly 9-16 cm. long and 4-6 cm. wide, acute to rounded at the apex, gradually narrowed to the subacute or narrowly rounded base, thinly setose on the upper surface with long slender spreading hairs, densely brownish-setose beneath with long slender hairs, often densely barbate in the axils of the nerves, irregularly or finely and evenly serrate; inflorescences lax and few-flowered, on long slender peduncles, mostly half as long as the leaves or shorter, sometimes more elongate, the flowers white, 1.5 cm. broad or larger, on slender or stout pedicels, the pedicels very densely long-setose with brownish hairs; sepals oval or rounded, 6-8 mm. long, very obtuse or rounded at the apex, densely setose with long slender spreading brownish bristles; styles glabrous, distinct; dry fruit about 1 cm. in diameter, globose or depressed-globose, thinly pilose with long slender soft hairs.

**Saurauia villosa** DC. Mém. Soc. Phys. Hist. Nat. Genève 1: 420. 1822. *S. macrophylla* Linden ex Lindl. & Paxt. Fl. Gard. 2: 27. 1852. *S. Selerorum* Buscalioni, Malpighia 25: 8. 1912; 26: 100. 1913 (type from San Martín, Huehuetenango, *C. & E. Seler* 2819). *Moco*; *Moquillo*; *Moco blanco*; *Moco de chucho*; *Sho'ot* (Cobán, Quecchí).

Moist or wet, mixed or pine forest or thickets, 750-2,700 meters; Alta Verapaz; Zacapa; Santa Rosa; Guatemala; Sacatepéquez;

Chimaltenango; Quiché; Huehuetenango; Quezaltenango. Southern Mexico; Honduras.

A large shrub or a small tree, sometimes 12 meters high, the branches stout, the young branches and petioles densely stellate-pilose and very densely setose with long stout stiff spreading fulvous hairs; leaves large, thick-membranaceous, on long or short, stout petioles, broadly obovate to obovate-oblong, mostly 16–35 cm. long and 5–14 cm. wide, acute or subacute, somewhat narrowed to the narrowly rounded or obtuse base, evenly or unequally serrate, densely short-setose on the upper surface with broad-based fulvous hairs, very densely stellate-pilose beneath and also setose-pilose along the costa and veins with short, mostly appressed hairs; panicles long-pedunculate, usually many-flowered, dense or open, sometimes 25 cm. long but generally much shorter than the leaves, the flowers white or pinkish white, about 1.5 cm. broad, on stout pedicels, the pedicels and branches of the inflorescence very densely short-setose and finely and densely stellate-paleaceous; sepals ovate-rounded, 5–6 mm. long, very densely setose-furfuraceous with appressed yellowish setae; petals glabrous, broadly obovate, about 1 cm. long; anthers 2–2.5 mm. long, the filaments pilose at the base; capsule glabrous; styles distinct.

Called “cerbatana” and “confite” in Honduras. In Huehuetenango and elsewhere in Guatemala the straight branches are hollowed and used as blowguns for killing small birds. Doubtless this use of the branches is widespread, for the Honduran name “cerbatana” evidently alludes to the same use.

*Saurauia Waldheimia* Buscalioni, *Malpighia* 25: 12, 223. 1912; 28: 488. *pl.* 18. 1920.

Moist or wet, mixed or pine forest or thickets, 2,000–2,500 meters; Zacapa (Sierra de las Minas). Nicaragua, the type from Matagalpa, at 1,000 meters.

A shrub or small tree of 3–7 meters, the branches slender, the young branchlets and petioles sparsely setose with appressed broad-based setae or glabrate; leaves small, on short slender petioles, narrowly oblanceolate to oblanceolate-oblong, mostly 5–9 cm. long and 1–2 cm. wide, acute to narrowly long-acuminate, attenuate to the acuminate to narrowly obtuse base, firm-membranaceous, deep green above, glabrous except for a few short appressed setae along the costa, slightly paler beneath, glabrous except for a very few appressed setae along the costa and nerves, usually with conspicuous tufts of soft hairs in the axils of the lateral nerves, rather coarsely serrate; inflorescences usually with very few flowers, slender-pedunculate, sometimes almost equaling the leaves but usually much shorter, the flowers white, short-pedicellate, about 1.5 cm. broad, the pedicels and branches appressed-setulose; sepals rounded, 4–4.5 mm. long, rounded at the apex, sparsely stellate-puberulent and setulose with very short, appressed hairs; petals rounded-obovate, about 18 mm. long, glabrous; filaments pilose at the base, the anthers 2.5 mm. long.

At first we believed this to be an undescribed species, but the five available collections agree perfectly with a photograph of the

type of *S. Waldheimia* and agree with Buscalioni's description. The range from Nicaragua to eastern Guatemala is a natural one, and the species doubtless will be found sooner or later in Honduras.

## INDEX

- Abutilon, 326  
 Acalypha, 28  
 Acer, 230  
 Aceraceae, 229  
 Adelia, 47  
 Alchornea, 48  
 Allophylus, 235  
 Althaea, 335  
 Amanoa, 50  
 Ampelocissus, 293  
 Anacardiaceae, 177  
 Anacardium, 178  
 Anoda, 336  
 Apeiba, 303  
 Aquifoliaceae, 196  
 Astrocasia, 51  
 Astronium, 179  
 Ayenia, 405  
  
 Bastardia, 338  
 Belotia, 304  
 Berchemia, 278  
 Bernardia, 52  
 Bernoullia, 387  
 Billia, 233  
 Blighia, 238  
 Bombacaceae, 386  
 Bombax, 388  
 Bredemeyera, 5  
 Buxaceae, 172  
 Buxus, 172  
 Byttneria, 406  
  
 Calatola, 226  
 Callitrichaceae, 171  
 Callitriche, 171  
 Caperonia, 55  
 Cardiospermum, 239  
 Carpodiptera, 306  
 Ceanothus, 279  
 Ceiba, 389  
 Celastraceae, 201  
 Celastrus, 202  
 Chiranthodendron, 407  
 Christiana, 307  
 Cissus, 294  
 Cleidion, 57  
 Cnidoscolus, 58  
 Codiaenum, 63  
 Colubrina, 280  
 Comocladia, 181  
 Corchorus, 308  
  
 Coriaria, 174  
 Coriariaceae, 174  
 Croton, 64  
 Crumenaria, 282  
 Cupania, 240  
 Cyrilla, 196  
 Cyrillaceae, 195  
  
 Dalechampia, 81  
 Dalembertia, 86  
 Dichapetalaceae, 22  
 Dichapetalum, 23  
 Ditaxis, 87  
 Dodonaea, 246  
 Dombeya, 410  
 Drypetes, 88  
  
 Elaeodendron, 204  
 Euonymus, 205  
 Euphorbia, 90  
 Euphorbiaceae, 25  
 Exothea, 247  
  
 Garcia, 118  
 Gaya, 338  
 Gayoides, 339  
 Gossypium, 340  
 Gouania, 283  
 Guazuma, 410  
 Gymnanthes, 119  
  
 Hampea, 393  
 Helicteres, 412  
 Heliocarpus, 310  
 Hermannia, 414  
 Hibiscus, 345  
 Hieronyma, 121  
 Hippocastanaceae, 233  
 Hippocratea, 219  
 Hippocrateaceae, 218  
 Hippomane, 122  
 Hura, 124  
  
 Icacinaceae, 225  
 Ilex, 197  
 Impatiens, 276  
 Impatiensaceae, 275  
  
 Jatropha, 126  
 Julianaia, 176  
 Julianiaceae, 175  
 Julocroton, 130

Karwinskia, 286  
 Kosteletzkya, 354  
 Krugiodendron, 287

Lavatera, 355  
 Luehea, 312

Mabea, 132  
 Malachra, 356  
 Malva, 358  
 Malvaceae, 324  
 Malvastrum, 359  
 Malvaviscus, 362  
 Mangifera, 182  
 Manihot, 133  
 Mappia, 227  
 Matayba, 249  
 Maytenus, 206  
 Meliosma, 273  
 Melochia, 414  
 Metopium, 184  
 Microtropis, 208  
 Monnina, 6  
 Mortoniodendron, 315  
 Mosquitoxylum, 184  
 Muntingia, 315

Neobrittonia, 365

Ochroma, 396  
 Oecopetalum, 228  
 Omphalea, 138  
 Ophellantha, 139

Pachira, 399  
 Parthenocissus, 299  
 Paullinia, 250  
 Pavonia, 366  
 Pedilanthus, 140  
 Pera, 143  
 Perrottetia, 210  
 Phyllanthus, 144  
 Pistacia, 185  
 Plukenetia, 155  
 Polygala, 8  
 Polygalaceae, 5  
 Pseudabutilon, 369

Quararibea, 401

Rhacoma, 210  
 Rhamnaceae, 277  
 Rhamnus, 288  
 Rhus, 186

Ricinus, 156  
 Robinsonella, 370

Sabiaceae, 273  
 Sageretia, 291  
 Salacia, 222  
 Sapindaceae, 234  
 Sapindus, 255  
 Sapium, 158  
 Sarcococca, 173  
 Saurauia, 428  
 Saurauiaceae, 428  
 Schinus, 190  
 Sebastiania, 161  
 Securidaca, 21  
 Serjania, 256  
 Sida, 372  
 Sloanea, 316  
 Sphaeralcea, 381  
 Spondias, 191  
 Staphyleaceae, 223  
 Sterculia, 419  
 Sterculiaceae, 403  
 Stillingia, 163

Talisia, 267  
 Tapirira, 195  
 Tetrorchidium, 166  
 Theobroma, 421  
 Thespesia, 383  
 Thinouia, 269  
 Thouinia, 270  
 Thouinidium, 271  
 Tiliaceae, 302  
 Tragia, 167  
 Trigonina, 1  
 Trigoniaceae, 1  
 Triumfetta, 320  
 Turpinia, 223

Urena, 383  
 Urvillea, 272

Vitaceae, 293  
 Vitis, 300  
 Vochysia, 3  
 Vochysiaceae, 2

Waltheria, 427  
 Wimmeria, 215  
 Wissadula, 384

Zinowiewia, 217  
 Zizyphus, 292













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