Biology

FLORA OF GUATEMALA

PAUL C. STANDLEY

AND

LOUIS O. WILLIAMS

THE
LOGANIACEAE

BY

DOROTHY N. GIBSON

FIELDIANA: BOTANY

VOLUME 24, PART VIII, NUMBER 4

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PART VIII

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AND

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CONTORTAE[1]

The plants are herbs, shrubs or trees often of great size, the leaves are usually opposite and entire although pinnately compound leaves are to be found, especially in Oleaceae; they are estipulate or stipulate. The corolla is sympetalous or the petals nearly free, or sometimes none, with lobes convolutive, the flowers bisexual or unisexual (then petals may be missing), the stamens usually 2, 4 or 5, the ovary is bilocular and superior.

The families here called "the Contortae" were treated by Engler and Prantl as a group of six families of which five are to be found in Guatemala—Oleaceae, Loganiaceae, Gentianaceae, Apocynaceae and Asclepiadaceae. The sixth family, Salvadoraceae, was removed and eventually the Desfontaineaceae added to the order. The recent (12th) edition of the *Syllabus der Pflanzenfamilien* divides the order into two as Oleales and Gentianales, discarding the name "Contortae." The families remain the same with the notable addition of the Rubiaceae to the Gentianales. The Rubiaceae follows later in the system which we are using.

Hutchinson in the second edition of his *Families of Flowering Plants* places the families mentioned in the paragraph above into three orders: the Loganiales, the Apocynales and the Gentianales. The first of these, the Loganiales, is divided into seven families (of which five in Guatemala) but essentially the Loganiaceae and Oleaceae of our flora; the second, the Apocynales, consists of the Apocynaceae and Asclepiadaceae; the third, the Gentianales, divided into two families is the Gentianaceae of this flora.

Many ornamental plants belong in this order, perhaps the best known in the temperate regions is the lilac. Olives are perhaps the most important of the economic food plants of the group; there are many that produce alkaloides used in medicine or for other purposes,

[1] Much of the field work; work in the herbarium and library; and assistants for the principal investigator (and junior author) have been made possible by continuing grants from National Science Foundation.

strychnine is one of the better known ones. Timbers are to be found in the group. Some grow into large trees in the wet tropics.

OLEACEAE

Reference: Knoblauch, Oleaceae in Engler & Prantl, Pflanzenf. IV, 2: 1–16. 1895.

Trees, shrubs or herbs, often scandent. Leaves usually opposite, rarely alternate or verticillate, simple or pinnately compound; stipules absent; flowers actinomorphic, bisexual or rarely unisexual, borne in racemose, paniculate or thyrisiform terminal or lateral inflorescences; calyx usually 4-lobed (sometimes more or none); corolla sympetalous or the petals free or nearly so, with usually 4 lobes imbricated or induplicate-valvate in bud; stamens 2, rarely 4, epipetalous, bilocular, the loculi opening lengthwise and the cells usually back to back, often muticious; disk none; ovary superior, bilocular, style simple with a thickened or bifid stigma; ovules usually 2 in each cell, rarely 1 or 4–8; fruit capsular and loculicidally bivalvate, or indehiscent, often of samaras, or baccate or drupaceous, embryo straight.

A small family of some 30 genera and 500 species in temperate and tropical regions of the world. The most important species of the family is the olive, *Olea europea* L., from which the fruit is eaten when pickled. Olive oil, one of the best food and cooking oils, is expressed from the ripe fruits.

Olives were said to have been planted in Guatemala as early as 1600 but the cultivation apparently was not successful. So far as we know there are now no olive trees in the country. Several fine ornamentals belong in the family, lilacs perhaps the best known in temperate regions.

Fruit a samara; leaves pinnate; trees ..... *Fraxinus.*
Fruit not a samara; leaves simple—or pinnate in one cultivated species of *Jasminum*; trees, shrubs or woody vines.
  Fruits didymous; cultivated shrubs or vines; leaves simple or pinnate. *Jasminum.*
  Fruits entire, not didymous; trees or shrubs, never vines; leaves simple and entire.
    Calyx none or minute; corolla none or of one or two petals ..... *Forestiera.*
    Calyx well developed; corolla sympetalous or of four separate or nearly separate petals.
      Corolla of separate or nearly separate linear petals; native trees.. *Linociera.*
      Corolla sympetalous; native or cultivated trees or shrubs.
        Corolla lobes imbricate; inflorescence axillary; native trees.. *Osmanthus.*
        Corolla lobes induplicate-valvate; inflorescences terminal; cultivated street trees ..... *Ligustrum.*

FORESTIERA Poiret

Dioecious trees or shrubs. Leaves opposite, often on short branches, usually deciduous, entire or denticulate; inflorescence a fascicle of one to few flowers, rarely

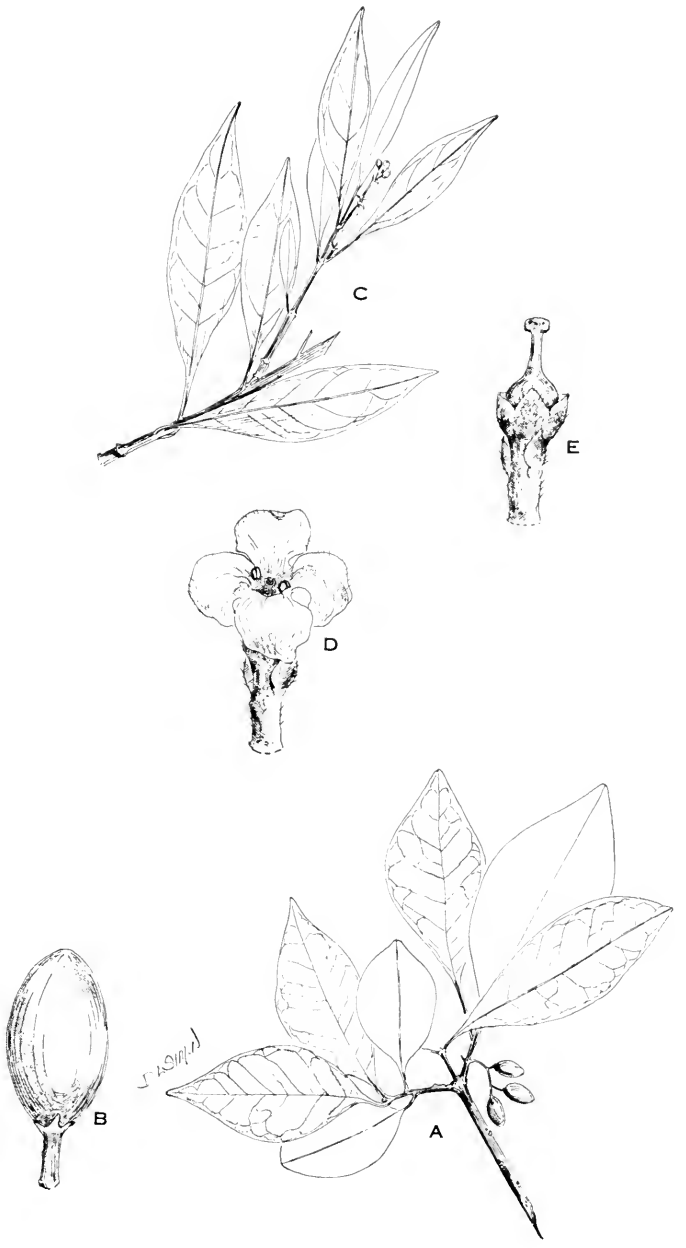

FIG. 72. *Forestiera rhamnifolia*. A, habit, × ½; B, fruit, × 3. *Osmanthus mexicana*. C, habit, × ½; D, flower, × 5; E, pistil and calyx, × 5.

a few-flowered raceme, borne on old wood or in the axils of leaves, bracteate, flowers small, commonly imperfect; calyx tube short, the limb 4–6-lobate; corolla none or sometimes of 1–2 small, free petals; stamens 2 or 4; ovary 2-celled, usually with 2 seeds in each cell; stigmas thickened, sometimes bilobate; fruit drupaceous, usually 1-seeded.

The genus is an uncommon one in Central America, three species are known, each from one or few collections. There are several species in Mexico.

Forestiera rhamnifolia Griseb. Cat. Pl. Cub. 169. 1866.

Along the edge of mangrove swamps; British Honduras (Cornhouse Creek, *H. H. Bartlett 11283*). Reported from Socorro Islands, west coast of Mexico; Tamaulipas; West Indies.

Small dioecious trees, in Cuba as much as 12 m. high, the branchlets minutely puberulent or glabrous, the older ones with numerous large pale elevated lenticels; leaves membranaceous, short-petiolate, broadly elliptic to lance-oblong, 5–8 cm. long, 2–5 cm. broad, usually abruptly contracted at the apex, with an obtuse tip, rarely attenuate, acute at the base or abruptly contracted, entire or remotely and obscurely crenulate, glabrous above, glabrous or pubescent beneath and with numerous small scattered pores; flowers unisexual, very small, in small few-flowered racemes mostly from defoliated nodes, the racemes glabrous, little if at all longer than the petioles; staminate calyx almost obsolete; filaments rather thick, much longer than the subglobose anthers; fruit ellipsoid, purple, glaucous, about 8 mm. long, obtuse at each end, often tipped by the slender short persistent style.

FRAXINUS L. Ash

Reference: A. Lingelsheim, Oleaceae-Oleoideae-Fraxineae, Pflanzenreich IV. 243, I: 1–65. 1920.

Small or large, deciduous trees; leaves opposite, pinnate, with few or numerous leaflets, or simple, these usually dentate, usually appearing before the flowers; flowers small, perfect or unisexual; calyx small, 4-parted or 4-lobate or wanting; corolla of 2–6, usually 4, distinct petals, sometimes none; stamens generally 2; ovary 2-celled, with 2 stigmas, ovules 2 in each cell; fruit a 1-seeded nutlet or samara, commonly with an elongate wing at the apex; seed 1, oblong, with endosperm.

Species about 65, in the northern hemisphere, in America extending southward to Honduras. The wood of ash (Spanish "fresno") is dark brown, often hard, heavy, tough and strong, rather coarse in texture, of excellent working qualities, not durable. In the United States it is much used for tool handles, agricultural implements, bent work, oars, kitchen furniture and interior trim. In Central America the trees are not common enough to be of economic importance. Although we have collected material of this genus assiduously in Guatemala, the amount at hand is disappointingly small and unsatisfactory.

Only rarely have we found the trees with flowers or fruit. If a large amount of material in good condition could be collected, it would be possible to present a much more satisfactory account of the few Central American species.

Lateral leaflets sessile ..... *F. vellerea.*
Lateral leaflets petiolulate.
Fruits 4.5–5 cm. long ..... *F. cavekiana.*
Fruits 1.5–3 cm. long.
Fruit 2.5–3 cm. long ..... *F. uhdei.*
Fruits about 1.5 cm. long ..... *F.* sp.

Fraxinus cavekiana Standl. & Steyerm. Field Mus. Bot. 23: 74. 1944.

Usually along stream banks, sometimes in moist mixed forest, 1,500–2,000 m.; endemic; Guatemala; Quiché (type from Nebaj, *Skutch 1660*).

A small or large tree, sometimes 23 m. high, the branchlets thick, at first puberulent, soon glabrate, blackish-brown, bearing sparse large pale lenticels; leaves large, 5–9-foliolate, the leaflets all petiolulate, the petiolules often much elongate; leaflets ovate to oblong-lanceolate, mostly 8–14 cm. long and 3–7 cm. broad, acuminate to narrowly long-acuminate, usually acute at the base or abruptly contracted, membranaceous, green above and somewhat lustrous, glabrous, the costa and nerves impressed, somewhat paler beneath, glabrous or sparsely pubescent, often barbate along the costa, the nerves very prominent, the veins prominulous, laxly reticulate; fruiting panicles large, about 22 cm. long, lax, the short pedicels filiform; fruit 4.5–5 cm. long, the seed-bearing portion 1.5 cm. long, subterete, the wing obtuse, 6–7 mm. broad, decurrent to the middle of seed-bearing portion.

Only two collections with fruit are available, and the determination of some of the others referred here is therefore uncertain. The species name is derived from Cavek, the name of the royal house of Quiché, from its foundation until its overthrow by the Spaniards.

Fraxinus uhdei (Wenzig) Lingelsheim, Bot. Jahrb. 40: 221. 1907. *Fraxinus americana* var. *uhdei* Wenzig, Bot. Jahrb. 4: 182. 1883. *Fraxinus chiapensis* Lundell, Contrib. Univ. Mich. Herb. 7: 45. 1942. *Madre de agua.*

Usually along stream banks, 800–2,000 m.; Guatemala; Huehuetenango. Western and southern Mexico.

A tree of 12–15 m., the young branchlets puberulent, soon glabrous; leaves large, mostly 5–7-foliolate; leaflets mostly long-petiolulate, firm-membranaceous, lanceolate, oblong-lanceolate or elliptic, mostly 8–15 cm. long, long acuminate, obtuse or rounded at the base and often abruptly contracted, the terminal leaflet usually acute at the base, obscurely serrulate, green and glabrous above, the vena-

FIG. 73. *Fraxinus uhdei*. A, a leaf, × ½; B, fruiting inflorescence, × ½; C, fruit, × 2½.

tion prominulous and closely reticulate, little paler beneath, almost glabrous or often densely velutinous-pubescent; panicles lax or dense, mostly much shorter than the leaves; calyx minute, acutely 4-dentate; fruit 2.5–3 cm. long, the wing about 5 mm. broad, obtuse or rounded at the apex, decurrent to about the middle of the seed-bearing portion.

The available Mexican material of this species is not ample enough for satisfactory study. In some of the Guatemalan specimens the leaflets are glabrous, in others, not otherwise distinguishable, they are densely pubescent beneath.

Fraxinus vellerea Standl. & Styerm. Field Mus. Bot. 23: 74. 1944 (type, *Standley 76162* from Jutiapa); *F. bicolor* Standl. & Steyerm. l.c. 73 (type, *Standley 80408* from Guatemala).

Moist or dry rocky hillsides, 800–1,400 meters; Chiquimula; Jutiapa; Guatemala. Mexico (Chiapas).

Small trees (or shrubs) to 10 m. or perhaps more. Leaves from densely pubescent below to quite glabrous; leaflets 5–7, the lateral ones sessile, broadly ovate to oblong-ovate, 4–8 cm. long and 2–4 cm. broad, acute or acuminate, from almost entire to serrate along the whole margin, lower surface lighter in color than the upper surface; fruit (from *Deam 6067*, not type) 2.5–3 cm. long and 0.4–0.5 cm. broad, acute or obtuse, the seed-bearing portion about 1 cm. long.

Guatemalan material, mostly sterile, determined as *F. vellerea*, *F. bicolor* and *F. purpusii* Brandegee has been placed together. This brings together material that is vegetatively similar but from almost glabrous to densely puberulent. The group is in need of monographic study.

Fraxinus sp.

Guatemala: Finca Nacional La Aurora.

Leaf 40 cm. long; leaflets 9, lanceolate to ovate-lanceolate, acuminate, serrate above the middle, glabrous or pilosulose along the veins below, petiolulate, the petiolule about 15 mm. long, leaflets 10–15 cm. long; inflorescence paniculate, about 20 cm. long; fruits about 15 mm. long and 3 mm. broad, narrowly elliptic, acute, the seed up to 5 mm. long.

A single specimen from a tree on the national farm, where possibly introduced.

JASMINUM L. Jasmine

Erect or scandent shrubs; leaves usually opposite, simple, 3-foliolate, or odd-pinnate; flowers arising from the ends of the branches or from scale buds, solitary or usually cymose, often showy, usually fragrant, white or yellow or red outside; calyx 4–9-dentate or lobate; corolla salverform, the tube cylindric, the limb spread-

ing, with 4–5 or more numerous lobes, these obtuse, imbricate; stamens 2, included, the filaments short; anthers dorsifixed near the base, the connective commonly mucronate; ovary 2-celled, the style filiform, the stigma oblong or capitate, generally bifid in age; ovules 2 in each cell or rarely 3–4, affixed laterally near the base; fruit baccate, didymous, one of the carpels sometimes abortive, the pericarp carnose or membranaceous; seeds usually solitary, erect; endosperm none.

About 200 species, in the Old World tropics or in subtemperate regions. Several of them are cultivated for their showy or fragrant flowers. The generic name is said to be of Arabic derivation.

Leaves pinnate..... *J. grandiflorum.*
Leaves simple.
Leaves glabrous or nearly so, barbate in the axils beneath, rounded at the apex; flowers single or double..... *J. sambac.*
Leaves softly pubescent beneath, acute or acuminate; flowers not double. *J. multiflorum.*

Jasminum grandiflorum L. Sp. Pl. ed. 2: 9. 1762. *Jazmín.*

Planted commonly for ornament, at middle and low elevations. Native of India but widely cultivated in other warm regions.

A sarmentose or scandent shrub, sometimes 10 m. long, usually smaller, the slender branchlets glabrous or nearly so; leaves pinnate, the leaflets usually 5 or 7, elliptic-ovate to oblong-ovate, 1–5 cm. long, acuminate to obtuse, entire, sessile, the terminal leaflet larger and short-stalked, glabrous; flowers white, fragrant, slender-pedicellate, in 2–10-flowered terminal cymes; calyx teeth linear; corolla limb 3–4 cm. broad, the 4–5 lobes oblong or obovate, about equaling the slender tube.

This is perhaps best treated as a form of *J. officinale* L., *J. officinale* var. *grandiflorum* (L.) Kobuski. In El Salvador it is called "jazmín de parra." In Guatemala this species is particularly common in the region of Cobán, where the flowers are sold in the market.

Jasminum multiflorum (Burm. f.) Andr. Bot. Repos. 8: *t. 496.* 1807. *Nyctanthes multiflora* Burm. f. Fl. Ind. 5. *t. 3, f. 1.* 1768. *N. pubescens* Retz. Obs. Bot. 5: 9. 1789. *J. pubescens* Willd. Sp. Pl. 1: 37. 1797. *Jasmín; jazmín de novia.*

Native of India; planted commonly in the lowlands of Guatemala, chiefly on the Pacific plains and foothills and in the North Coast, probably also sometimes at higher elevations; grown for ornament in most tropical regions.

Usually a shrub of 1.5–2 m., erect, the stems and leaves densely pubescent; leaves short-petiolate, ovate or broadly ovate, 4–7 cm. long, acute or acuminate, usually subcordate at the base; flowers clustered at the ends of the branches, almost sessile, white; calyx lobes numerous, filiform, 1 cm. long, densely pubescent; corolla 3 cm. long, the lobes about 10, acuminate, as long as the slender tube.

Jasminum sambac (L.) Ait. Hort. Kew. 1: 8. 1789. *Nyctanthes sambac* L. Sp. Pl. 6. 1753. *Gemela; diamela; jazmín de Amelia* (Petén).

Native of tropical Asia, now grown for ornament in most tropical regions; planted commonly in Guatemalan gardens at low and middle elevations; one of the common ornamental shrubs.

An erect shrub, 1–2 m. high, the stout branches sparsely or densely pubescent; leaves almost sessile, mostly verticillate, broadly oval to oval-obovate, generally 5–7 cm. long, rounded at the apex, rounded or subcordate at the base, glabrous or nearly so but barbate beneath in the axils of the nerves, the nerves coarse and conspicuous beneath, lustrous; flowers white, fragrant, densely clustered at the ends of the branches, sessile or short-pedicellate; calyx lobes numerous, less than 5 mm. long, pubescent; corollas simple or very "double," with numerous crowded lobes, these often longer than the conspicuously costate tube.

Both the single and double form of this species are found in Guatemala. The doubled form is the more common and the corolla lobes are so numerous and so crowded that the flowers resemble small double roses.

LIGUSTRUM L.

Deciduous or evergreen shrubs or trees; leaves opposite, petiolate, entire; flowers perfect, small, white, in terminal panicles; calyx campanulate, 4-dentate; corolla salverform, the tube usually short, the 4 lobes spreading, induplicate-valvate; stamens 2, included or exserted; style cylindric, not exceeding the stamens; ovary 2-celled, the cells 2-ovulate; fruit drupaceous, 1–4-seeded, black or bluish black.

Species about 50, mostly in eastern Asia. Several are cultivated for ornament in temperate and tropical America.

Leaves coriaceous, usually acuminate and 7–13 cm. long; tree.....*L. lucidum.*
Leaves membranaceous, obtuse or rounded at the apex, commonly 3–4 cm. long; shrub.....*L. vulgare.*

Ligustrum lucidum Ait. Hort. Kew. ed. 2. 1: 19. 1810. *Trueno.*

Native of eastern Asia; planted commonly in Guatemala from sea level up to 2,500 m. or perhaps even higher.

A large shrub or tree, sometimes 12 m. high or more, with a rather short and thick trunk, the crown broad and rounded, very dense, the lower branches often somewhat pendent, glabrous or nearly so; leaves on stout petioles, coriaceous, broadly ovate to ovate-oblong, acuminate, rounded at the base, the margins and costa often reddish, the lateral nerves indistinct, 4–5 pairs; flowers creamy white, scarcely 4 mm. long, forming dense panicles 6–15 cm. long, short-pedicellate; tube of the corolla longer than the calyx; stamens exserted; fruit bluish black, oval or subglobose, 6–8 mm. long.

This is one of the commonest street trees of Guatemalan cities, and is admirably suited to that purpose. It withstands neglect and

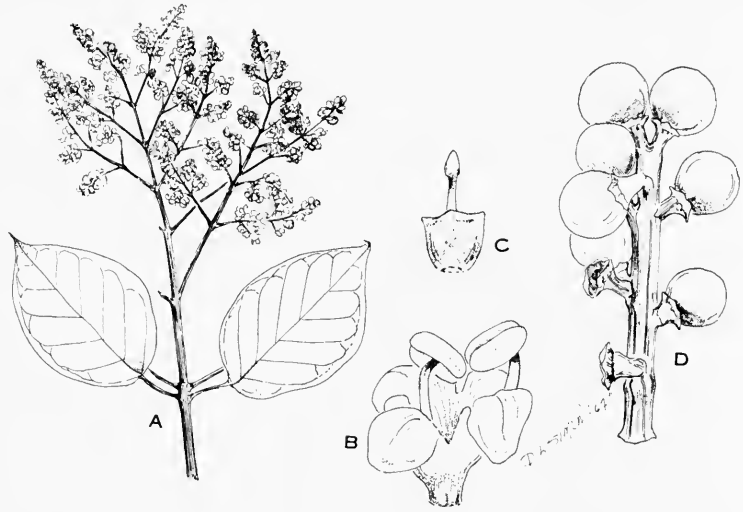

FIG. 74. *Ligustrum lucidum*, a cultivated Asian plant. A, habit, × ½; B, corolla, × 5; C, calyx and style, × 5; D, fruits, × 2.

ill treatment, also the long dry season, and when even fairly well grown is a handsome tree, with dense, deep green foliage. Although it grows well at lower elevations, it is seen at its best in such places as Guatemala, Chimaltenango, Quezaltenango and San Marcos, where there are many long avenues. The finest trees of the country are probably those in the northwestern part of the city of Quezaltenango in the suburb known as Garibaldi.

Ligustrum vulgare L. Sp. Pl. 7. 1753. *Júpiter blanco; jazmín de Persia; privet.*

Native of Europe and northern Africa; cultivated as a hedge plant in many temperate and subtropical regions; planted occasionally for ornament or hedges in Guatemala, especially about Cobán, but not common.

Usually a densely branched shrub of 1–2 m. but often larger, the branchlets and panicles minutely puberulent; leaves short-petiolate, oblong-lanceolate to ovate, mostly obtuse, glabrous; flowers white or greenish white, in rather dense, narrow panicles 3–6 cm. long; anthers short-exserted; fruit subglobose or ovoid, 6–8 mm. long, black, lustrous.

In the United States this is the shrub much grown as a hedge plant, at least in cities. If allowed to grow untrimmed, it becomes a rather straggling bush, but if trimmed closely, it makes a dense and handsome hedge, shedding its leaves in winter.

LINOCIERA Swartz

Large shrubs or trees; leaves opposite, entire, more or less coriaceous; inflorescence thyrsoid (ours), umbellate, capitulate, cymulose, racemose-paniculate or racemose-fasciculate, lateral and terminal; calyx small, 4-fid or 4-dentate; petals 4, free or nearly so, linear or oblong, induplicate-valvate; stamens normally 2, affixed to the bases of the sepals, the filaments short; anthers ovate to linear, the connective apiculate or naked; ovary 2-celled, the style short, the stigma oblong, clavate, or subglobose, entire or emarginate; ovules 2 in each cell, laterally affixed near the apex, pendulous; fruit drupaceous, ovoid to oblong or subglobose, the endocarp usually hard and osseous; seeds usually solitary, pendulous, the testa thin or thick; endosperm carnose, subcartilaginous, or none; cotyledons flat or thick-carnose, the radicle short, superior.

Species 50 or more, in the tropics of both hemispheres. One other Central American species is known, in Costa Rica and Panama.

Petals rather broadly linear; petioles mostly 1.5–3 cm. long.....*L. domingensis.*
Petals filiform; petioles mostly 5 mm. long or shorter.....*L. oblanceolata.*

Linociera domingensis (Lam.) Knobl. Bot. Centralbl. 61: 87. 1895. *Chionanthus domingensis* Lam. Tabl. Encycl. 1: 30. 1791.

Moist or wet, mixed forest, 1,500 m. or less; Izabal; Quezaltenango. British Honduras; West Indies.

A tree of 9–12 m., glabrous except in the inflorescence, the trunk sometimes 70 cm. in diameter, the bark smooth, gray; leaves elliptic-lanceolate, chartaceous or subcoriaceous, on long slender petioles, 16 cm. long and 6 cm. broad or smaller, acuminate, gradually attenuate into the petiole, usually with barbate pits in the axils below; panicles small or large, terminal and axillary, glabrous or sparsely pubescent, sometimes equaling the leaves, many-flowered, the pedicels 2 mm. long or shorter; calyx glabrous, scarcely 2 mm. long; petals white or pink, flat, 15–20 mm. long, 1.5 mm. broad, rounded or very obtuse at the apex; drupes oval or ellipsoid, 1.5–2 cm. long.

Linociera oblanceolata Robinson, Proc. Am. Acad. 49: 504. 1913. *Cachicha macho.*

Upland forest, 700 m. or less; Petén. Mexico (Tabasco); British Honduras (type from upper Moho River, *M. E. Peck 719*).

A large shrub or tree, sometimes 17 meters high with a trunk 25 cm. in diameter, glabrous almost throughout; leaves subcoriaceous, on petioles mostly 3–4 mm. long, oblanceolate to obovate-elliptic, 10–17 cm. long, 3–7 cm. broad, narrowly long-acuminate or merely abruptly short-acute, usually attenuate to the base and there abruptly and narrowly obtuse, not decurrent, usually barbate beneath in the axils of the nerves; panicles lax, arising in the axils of the upper leaves, 6–10 cm. long, many-flowered, the branches almost filiform, puberulent, the pedicels 3–5 mm. long; calyx puberulent, the lobes ovate, acuminate, 1.2 mm. long; petals white or greenish, 7–10 mm. long, filiform, involute; connective of the anther not produced at the apex; fruit broadly ellipsoid, 1.5–2 cm. long, bluish black.

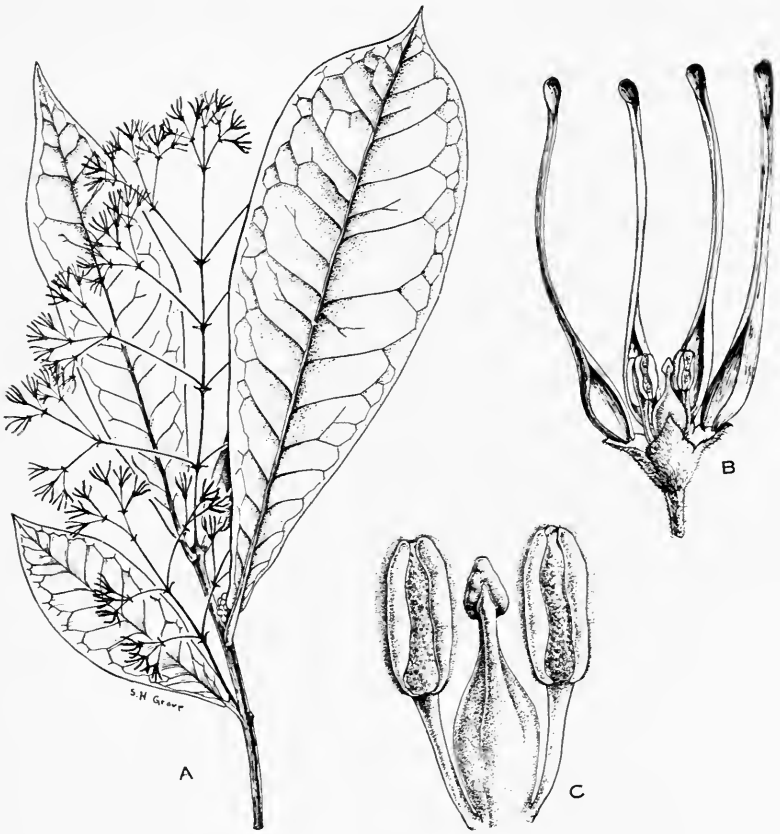

FIG. 75. *Linociera oblanceolata*. A, branch showing leaves and inflorescence, × ½; B, flower, × 8; C, stamens and pistil, × 22.

In general appearance this is much like *L. caribaea* (Jacq.) Knobl., with which it was compared by Robinson, but it seems to differ constantly in its muticous rather than appendaged anther connective and in having shorter petiolate, less coriaceous leaves.

OSMANTHUS Loureiro

Trees or shrubs. Leaves opposite, entire (ours) or dentate; inflorescence in congested racemes, thyrses or fascicles, terminal or lateral (ours); calyx short, 4-dentate or divided; corolla 4-lobate, campanulate; the lobes imbricate; stamens 2, rarely 4; anthers subextrorse; ovary 2-celled, the style short, stigma entire; ovules 2 in each cell; fruit an ovoid or globose drupe, the exocarp fleshy, the endocarp hard and bone-like.

A small genus of not more than ten species in both hemispheres, two others in America in temperate regions; one of these, *Osmanthus americana* (L.) B. & H., extending to northern Mexico, is similar to ours.

Osmanthus mexicana Lundell, Phytologia 1: 308. 1939.

Native of Chiapas, Mexico (type, *Matuda 2023*) not far from Guatemala and to be expected.

Small trees 6–7 m. tall. Leaves narrowly lanceolate or oblanceolate, acuminate, decurrent on the petioles, coriaceous, glabrous, 4–9 cm. long and 1–2.5 cm. broad; petioles 1–2 cm. long; inflorescences short, axillary, few-flowered thyrse; sepals 4, about 1 mm. long, the lobes ciliolate, triangular, obtuse; corolla subcampanulate, about 4 mm. long, the lobes ovate, obtuse, glabrous or obscurely ciliolate; stamens 2, attached at about the middle of the corolla; stigma capitate; fruit ellipsoid, about 13 mm. long and 8 mm. in diameter.

Dr. Lundell thought the flowers to be unisexual but those on our specimen seem to be perfect.

The common lilac, *Syringa vulgaris* L., has been tested in Guatemala but, like some other shrubs of temperate regions, will not grow well here, or elsewhere in the tropics. Señorita Díaz of Cobán told the senior author that many years ago she asked a friend to obtain seed for her, wishing a small packet for trial purposes. He sent her from France five pounds of lilac seed, with a rather fantastic bill. The seeds germinated well and many young plants were raised and distributed widely in the Cobán region. They never reached a height of more than a meter, then would die down to the roots. During the winter they shed their leaves, and the gardeners, thinking the plants were dead, would dig them out of the ground, so that within a few years all were gone, and none of them ever flowered.

LOGANIACEAE. Logania Family

Dorothy N. Gibson

References: Endlicher, Gen. Pl. 574. 1840. A. DC. Prodr. 9: 1–37. 1845; 10: 432. 1846. Bentham & Hooker, Gen. Pl. 2: 786. 1876. Solereder in Engler & Prantl, Pflanzenf. IV (2): 19–30. 1892. Klett, Umlang und Inhalt der Familie der Loganiaceen. Bot. Arch. 5: 312–338. 1924. Raymond J. Moore, Cytotaxonomic Studies in the Loganiaceae, I–III. Journ. Bot. 34: 527–538. 1947; 35: 404–410. 1948; 36: 511–516. 1949.

Herbs, shrubs, vines and lianas or trees; leaves opposite or rarely verticillate, simple, entire or dentate, connected by a transverse line or stipular sheath; inflorescences terminal or axillary, normally 2–3 times dichotomous and cymose, sometimes paniculate; flowers regular or nearly so, bisexual, usually bracteate; calyx 4–5 parted, usually short, the segments imbricate; corolla gamopetalous, variously colored, funnelform, salverform, rarely campanulate or rotate, the lobes valvate, imbricate, or contorted; stamens as many as the corolla lobes and alternate with them, inserted in the throat or tube of the corolla, the filaments usually short; anthers introrse, dorsifixed, the 2 cells distinct and parallel, dehiscing longitudinally; ovary superior (rarely half-inferior), usually 2-celled (rarely 1, 3 or 5); style simple or bifid; ovules usually many (rarely 1), amphitropous or anatropous, placentation axile; fruit usually capsular and septicidally bivalvate, sometimes baccate or drupaceous and indehiscent; seeds variable in form, sometimes winged; endosperm carnose or cartilaginous, usually copious; embryo small, usually straight, rarely incurved.

The Loganiaceae are well represented in the tropical and warm temperate regions of both hemispheres. Seven of the 32 genera occur in Guatemala; an eighth, *Potalia*, is known from Costa Rica.

An interesting discussion of the obviously close relationship between this family and the Rubiaceae is P. Jovet's "Aux confins de Rubiacées et des Loganiacées" in Not. Syst. 10: 39–53. 1941.

Herbs or subshrubs.

Leaves broad; flowers 5–merous; corolla lobes valvate.

Corolla conspicuous, tubular-campanulate to funnelform; style 1; capsule circumcissile above the persistent cupular base ..... *Spigelia.*

Corolla inconspicuous, urceolate; styles 2, connate at summit with a common stigma but divergent after anthesis; capsule 2-horned, dehiscent along inner margin of each ..... *Cynoctonum.*

Leaves linear; flowers 4–merous; corolla lobes imbricate ..... *Polypremum.*

Shrubs, vines, lianas or trees.

Stigmas entire, or nearly so.

Shrubs or trees, never vining; leaves pinnate-nerved with stellate indumentum; fruits capsular, less than 1 cm. in diameter ..... *Buddleia.*

Vines or lianas developing from erect shrubs; leaves 3–5 plinerved, indumentum (if present) never stellate; fruits baccate, globose, at least 4 cm. in diameter ..... *Strychnos.*

Stigmas 4 (style bifid, each branch bilobate).

Leaves lanceolate to ovate, acuminate; corolla yellow; capsule oblong-ovate, 2.5 cm. long or less, beaked; seeds not linear, flat, apically winged. *Gelsemium.*

Leaves elliptic-oblong or oval-oblong, obtuse; corolla purplish-magenta; capsule linear, 5–9 cm. long, not beaked; seeds linear, bearing tuft of long hairs at apex ..... *Plocosperma.*

BUDDLEIA L.

References: Linnaeus, Sp. Pl. 112. 1753; Linnaeus, Gen. Pl. ed. 5. 51. 1754. Eliane M. Norman, The genus *Buddleia* in North America, Gentes Herb. 10(1): 1–116. [1966] 1967.

Shrubs or trees to 30 m. tall, the bark usually furrowed, the young branches usually tomentose; leaves opposite, decussate, petiolate or sessile, with stipules often reduced to a line, sometimes foliaceous, the blades membranaceous to coriaceous, stellate-pubescent, often glandular, rarely glabrous, lanceolate, elliptic or ovate, serrate, serrulate, crenate, dentate, or entire; inflorescences paniculate, subtended by small leaves, bracts or bracteoles; flowers in dichasial capitate clusters, usually fragrant; calyx 4-parted, the lobes usually shorter than the tube; corolla campanulate, funnelform, or salverform, usually stellate-tomentose outside, the inner surface more or less pubescent with long, unicellular, pitted hairs, the lobes usually smaller than the tube; stamens 4, sessile or with short filaments inserted below the throat of the tube, directly below the sinuses; style short, the clavate to to clavellate stigma obscurely to clearly bilobate; ovary superior, usually ovoid but may be short-cylindrical or subglobose, bilocular, with numerous ovules multiseriate on the placentae; mature capsule small (3–6 mm. long in our species), partially puberulent to tomentose, dehiscing septicidally and loculicidally (rarely indehiscent); seeds numerous, oblong or ovoid, yellow or brown, the testa often extended into wings; endosperm carnose, the embryo usually small and straight.

America, Africa, and Asia.

Corolla lobes imbricate, with scattered hairs on inner surface and in throat of tube.

Flowers borne in capitate clusters 1.2–2 cm. in diameter ..... *B. megalocephala.*

Flowers borne in capitate clusters less than 1.2 cm. in diameter.

Flowers 10–15 in each cluster; corollas usually less than 3 mm. long. *B. skutchii.*

Flowers 2–8 in each cluster; corollas 3–5 mm. long.

Stigma clearly divided, the lobes incurved ..... *B. euryphylla.*

Stigma undivided, clavellate.

Leaves lanceolate or ovate, average width 4–13 cm.; inflorescence large, averaging 20 cm. long, 18 cm. across; capsule glabrescent .. *B. cordata.*

Leaves oblong-lanceolate, average width 0.5–3 cm.; inflorescence small, averaging 8 cm. long, 7 cm. across; capsule tomentulose. . . *B. nitida.*

Corolla lobes valvate, with crescent-shaped line of hairs on inner surface.

Upper surface of leaves glabrate to stellate-pubescent, with loose stellate tomentum on lower surface; leaf bases attenuate, acute or obtuse. . *B. americana.*

Upper surface of leaves usually stellate-tomentose, with very thick, floccose tomentum on lower surface; leaf bases truncate, cuneate, subcordate, auriculate or amplexicaul. . . . . *B. crotonoides.*

Buddleia americana L. Sp. Pl. 112. 1753 (as *Buddleja*). *B. occidentalis* L. Sp. Pl. ed. 2. 162. 1762. *B. spicata* R. & P. Prodr. 1: 53, *t. 81.* 1798. *B. callicarpoides* HBK. Nova Gen. & Sp. 2: ed. qu. 350, ed. fol. 282. 1818. *B. dentata* HBK. *l.c.*, ed. qu. 352, ed. fol. 283. *B. floribunda* HBK. *l.c.* *B. verbascifolia* HBK. *l.c.*, ed. qu. 351, ed. fol. 283. *B. cana* Willd. ex J. A. & J. H. Schultes, Mant. 3: 94. 1827, *in syn.* *B. rufescens* Willd. *l.c.* 97. *B. americana albiflora* Gómez, Anal. Hist. Nat. Madrid 19: 259. 1890. *B. americana* var. *Rothschulii* Loes. Bot. Jahrb. 23: 118, 129. 1896. *Arnica* (Huehuetenango); *Sactzam* (Alta Verapaz); *Salvia* (Jutiapa and Sacatepéquez); *Salva santa* (Guatemala and Izabal).

Usually in dry or damp thickets, sometimes in waste ground or in oak forests, 80–2,100 m.; Alta Verapaz; Baja Verapaz; Chimaltenango; Escuintla; Guatemala; Huehuetenango; Izabal; Jalapa; Jutiapa; Petén; Quiché; Sacatepéquez; San Marcos; Santa Rosa; Zacapa. Southern Mexico, Central and South America to Bolivia; West Indies.

Shrubs or small trees 2–5 m. tall (rarely 10 m.), the young branches tomentose; leaves subsessile or with petioles to 2 cm. long, blades membranaceous, serrate or entire, upper surface glabrate or stellate-pubescent, lower surface with loose stellate-tomentum underlain by glandular trichomes, narrowly lanceolate, elliptic, lance-ovate, or ovate, averaging 10–15 cm. in length (4–26 cm.), usually 5–8 cm. broad (2–13 cm.), acuminate, base often decurrent but may be attenuate, acute, or obtuse; inflorescences 8–22 cm. long, the flowering clusters lowest on the branches usually short-pedunculate, the remaining ones sessile, fragrant; calyx 1.5–2 mm. long, tubular with lanceolate, acuminate lobes, stellate-tomentose outside; corolla 4–5 mm. long, funnelform, the lobes about equalling the tube, yellow inside, whitish outside, stellate-tomentose outside, the inner surface of lobes with a crescent-shaped line or tuft of pitted hairs; stamens inserted at sinuses or just below; ovary ovoid, 1–1.5 mm. long, tomentose on upper half, style short, the clavate stigma obscurely bilobed; mature capsule short-cylindrical to ovoid, 3.5–5 mm. long, septicidally dehiscent for half its length, loculicidally usually only at apex; seeds numerous, oblong, 0.8–1 mm. long, the testa reticulate, extending into short wings.

This is the most abundant and variable species in Central America and is often weedy.

Buddleia cordata HBK. Nova Gen. & Sp. 2: ed. qu. 348, ed. fol. 280, *t. 185.* 1818 (as *Buddleja*). *B. acuminata* HBK. *l.c.*, ed. qu.

349, ed. fol. 281, *t. 187*, not *B. acuminata* Poiret. *B. Humboldtiana* J. A. & J. H. Schultes, Mant. 3: 93. 1827. *B. decurrens* Schlecht. & Cham. Linnaea 5: 105. 1830. *B. floccosa* Kunth, Ind. Sem. Hort. Berol. 1844 and in Linnaea 18: 500. 1844. *B. macrophylla* Kunth, *l.c.* *B. ovalifolia* Kunth, *l.c.* *B. propinqua* Kunth, Ind. Sem. Hort. Berol. 1844 and in Linnaea 18: 501. 1844. *B. spectabilis* Kunth & Bouché, Ind. Sem. Hort. Berol. 1845: 11. 1845, and in Ann. Sci. Nat. ser. 3, Bot. 5: 358. 1846. *B. cordata* var. *teposan* Loes. Verh. Bot. ver. Brand. 53: 73. 1911. *B. floccosa* var. *crassifolia* Loes. *l.c.* 72. 1944. *B. astralis* Standl. & Steyerm. Field Mus. Bot. 23: 72. 1944. *B. cordata* subsp. *cordata* Norman, Gent. Herb. 10: 67. 1967.

The only Guatemalan collection seen is from a brushy field, southern slopes of Volcán de Tajumulco, San Marcos, 1,400–1,700 m., *Steyermark 37276*, and is the type of *B. astralis* Standl. & Steyerm. In Mexico, it grows on rocky ledges and barrancas in oak and pine forests, 1,500–3,000 m.

Shrubs or trees, 2–20 m. tall (a tree of 12 m. in Guatemala), the branches densely tomentose; leaf blades usually 4–23 cm. long with petioles usually 1–4 cm. long (ours is 19–27 cm. long, 9–11 cm. wide, with petioles 5–7 cm. long), ovate to lanceolate, acuminate, acute at base, entire in ours but may be serrulate, green above and almost glabrous, covered beneath with closely appressed tomentum and with lax, floccose candelabra hairs, prominently veined; inflorescences terminal, paniculate, 6–30 cm. long (ca. 25 cm. in ours), the heads few-flowered and lax; calyx tubular, puberulent to stellate tomentose, ca. 2 mm. long, the lobes broadly triangular, obtuse; corolla yellow, campanulate, twice as long as the calyx, stellate-tomentulose outside, with pitted hairs on inner surface of lobes sometimes extending down into upper part of tube; stamens subsessile or with short filaments, inserted near throat; ovary ovoid, 1–1.8 mm. long, tomentulose on upper part, the style to 1.4 mm. long, the clavellate stigma obscurely bilobate; mature capsule short-cylindrical, 3.5–5 mm. long, septicidally dehiscent for half its length, locolicidally only at apex, glabrescent (fide Norman); seeds numerous, 1.2–2 mm. long, the reticulate testa extended into prominent wings.

Buddleia crotonoides A. Gray, Proc. Am. Acad. Sci. 5: 165. 1861. *B. tuxtlica* Loes. Verh. Bot. Ver. Brand. 53: 73. 1911. *B. purpusii* Standley, Journ. Wash. Acad. Sci. 16: 15. 1926. *B. stenoptera* Standl. & Steyerm. Field Mus. Bot. 23: 70. 1944. *B. amplexicaulis* Standl. & Steyerm. *l.c.* 71. *B. crotonoides* subsp. *amplexicaulis* Norman, Gentes Herb. 10: 87–89. 1966. *Salvia* (Huehuetenango and Quezaltenango).

Usually on rocky slopes in pine-oak forests, sometimes in wet or dry thickets, 1,200–2,500 m.; Baja Verapaz; Chimaltenango; Guatemala; Huehuetenango; Jalapa; Quezaltenango; Quiché; Sacatapé-

quez; San Marcos; Totonicapan. Mexico (where it sometimes grows near sea level); Honduras; Costa Rica.

Shrubs or small trees 2–5 m. tall, the young branches densely covered with lax tomentum; leaves short-petiolate or sessile or amplexicaul, the blades lanceolate, elliptic-ovate or broadly ovate, closely dentate or serrate, 4.5–20 cm. long, 1–8 cm. broad, usually stellate-tomentose above (rarely puberulent), densely covered beneath with floccose tomentum underlain by glandular trichomes, acute or acuminate at apex, base subcordate, truncate, cuneate, or broadly spatulate to auriculate and clasping the stem; inflorescences 6–18 cm. long, the flower clusters sessile, 0.5–1.2 cm. in diameter, usually interrupted but occasionally continuous along the branches, the first pair of heads on all except the lowermost lateral branches borne close to the main axis; calyx tubular, stellate-tomentose outside, 2–3.5 mm. long, the lobes lanceolate or subobtuse; corolla greenish-white to pale yellow, 3–5 mm. long, funnelform, stellate-tomentose outside, the lobes acute or obtuse, with pitted hairs in tufts, often in a lunate line inside the lobes; stamens inserted near sinuses; ovary ovoid or short-cylindrical, 1–1.5 mm. long, usually densely tomentose (sometimes woolly, rarely glabrate) on upper part, style short, with clavellate stigma; mature capsule ovoid, 2.5–3.5 mm. long, opening septicidally for half its length, loculicidally at apex; seeds numerous, to 0.7 mm. long, the reticulate testa extended into short wings.

The collections with obviously amplexicaul and/or auriculate leaves cited by Norman as *B. crotonoides* subsp. *amplexicaulis* were carefully studied and compared with two recent collections not seen by her (*Breedlove 8570* from Huehuetenango and *Raven & Breedlove 20041* from Chiapas) before it was decided to place these plants with variant leaf form in synonymy. The Chiapas plant, on which most of the leaves are auriculate and amplexicaul, possesses one pair of leaves with petioles 0.5 cm. long. The Guatemalan plant, on which many leaves are merely sessile with attenuate or cuneate bases, possesses three pairs of leaves with broadly spatulate bases, two of which have very small auricles and are definitely clasping. Therefore, as only one character differs and it appears to be somewhat unstable, neither subspecific nor varietal rank seems justified.

Two additional variant specimens were observed, both from Jalapa: *Steyermark 32083*, with leaf blades long-attenuate and 9–15 lateral veins (other specimens of *B. crotonoides* average only 5–9 lateral veins), and *Standley 76774*, with only 5–6 flowers in each cymule (other specimens average 12–20 flowers).

Buddleia euryphylla Standl. & Steyerm. Field Mus. Bot. 23: 223. 1947.

Forested ravines or hillsides, 2,000–3,000 m.; known only from the type locality, Sierra de las Minas, on Montaña Piamonte, El Progreso.

Trees 7–15 m. tall, branches stout, obtusely tetragonous, densely stellate-tomentose, the tomentum brownish, lax; leaves membranaceous, large, the blades entire, broadly ovate to ovate-elliptic, 15–26 cm. long, 8–15 cm. broad, on stout petioles 3–7 cm. long, subacute to short-acuminate, base obtuse or acute, upper surface glabrous or nearly so at maturity, lower surface densely tomentose with both appressed and floccose stellate hairs, prominently veined; inflorescences paniculate, ca. 30 cm. long and as broad, much branched, the flowers short-pedunculate in lax cymules, fragrant; calyx 2–3 mm. long, densely stellate-tomentose, the lobes broadly triangular, obtuse; corolla golden yellow, 3–4 mm. long, the lobes rounded, densely stellate-tomentose outside with pitted hairs within on lower part of lobes, extending into upper tube; stamens inserted ca. 0.5 mm. below sinuses; ovary ovoid, 1.5 mm. long, tomentulose, style to 1.3 mm. long with stigma clearly divided, the 2 lobes arching toward each other; mature capsule not seen, immature seeds numerous, winged.

Buddleia megalocephala Donn.-Sm. Bot. Gaz. 23: 10. 1897. *B. megalocephala* f. *albilantha* Moldenke, Phytologia 2: 363. 1947. *B. hypsophila* I. M. Johnston, Journ. Arn. Arb. 19: 127. 1938. *Salvia, Patushé* (Quezaltenango).

High mountain forests, often in association with *Pinus, Abies, Cupressus* or *Juniperus,* sometimes forming small, dense stands, 2,400–4,050 m.; Chimaltenango; Huehuetenango; Quezaltenango; San Marcos; Sololá; Totonicapán. Mexico.

Trees to 12 m. high, usually with a thick trunk, sparsely branched, the stout branches covered with dense tomentum; leaves subcoriaceous, lanceolate or elongate-lanceolate, entire, acute to acuminate, obtuse at base, petioles 1–2 cm. long, the blades 7–20 cm. long, 2–5 cm. wide, lustrous, green and glabrate above, lower surface covered with dense, whitish to brown stellate tomentum; inflorescences terminal, 6–30 cm. long, the heads very dense, globose, 1.5–2 cm. in diameter at maturity, long-pedunculate, usually in short, simple racemes, or the racemes branched at the base; calyx tubular, densely tomentose, 3–4.5 mm. long, the lobes acuminate or narrowly triangular, ca. 2 mm. long; corolla 6–8 mm. long, deep orange inside, paler outside, funnelform, stellate tomentose outside, with scattered, pitted hairs inside on upper part of tube, fragrant; stamens inserted ca. 1 mm. below sinuses; ovary ovoid, 1.5–2 mm. long, tomentulose, style 2–3 mm. long, stigma clavate; mature capsule ovoid, glabrous or stellate-puberulent, 4.5–6 mm. long, primarily septicidally dehiscent; seeds numerous, to 2 mm. long, the reticulate testa extended into wings.

I believe that Johnston's *B. hypsophila* is a hybrid between *B. megalocephala* and *B. nitida.* It differs from those specimens cited by Norman as possible hybrids (*Standley 84407* and *Breedlove 8489*) only in having more leaves with an acute apex. *Breedlove 8489* has several leaves with acute apices rather than acuminate. The type of *B. hypsophila, Skutch 843,* has the same short, broadly triangular

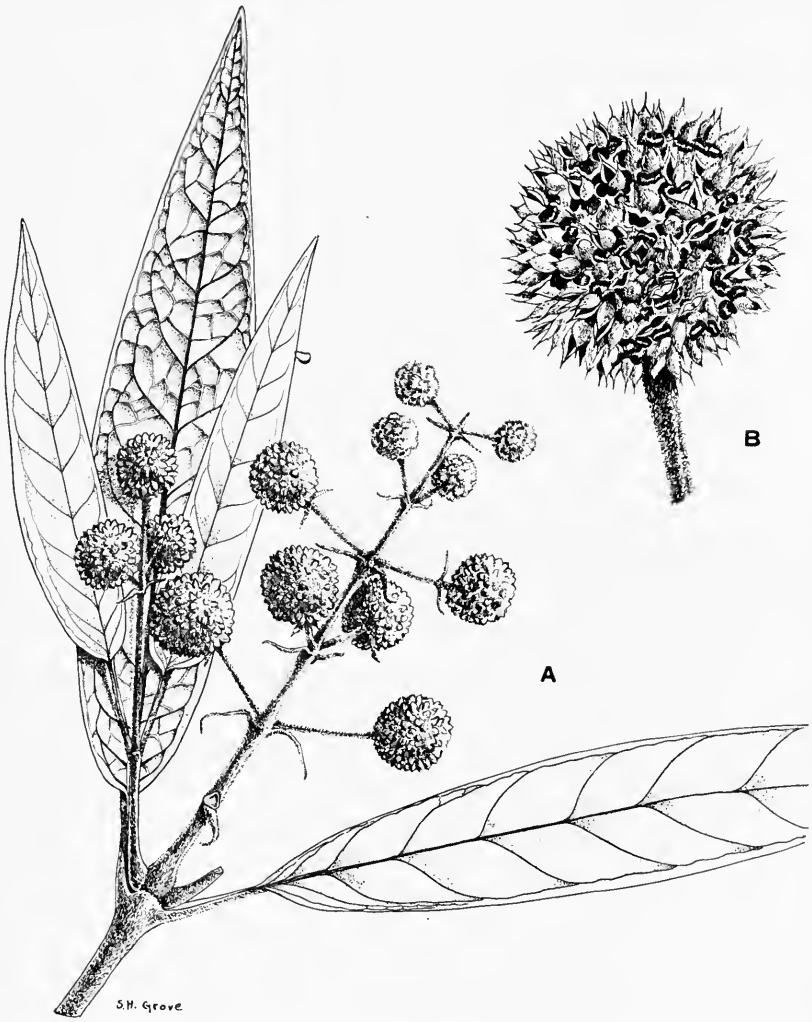

FIG. 76. *Buddleia megalocephala*. A, branch with inflorescence, × ½; B, fruiting "head," × 1½.

calyx lobes as those of the supposed hybrids, and a few specimens which are obviously *B. megalocephala* exhibit thinner, appressed indument and smaller leaves than typical.

Buddleia nitida Bentham in DC. Prodr. 10: 437. 1846. *B. alpina* Oersted, Vid. Medd. Nat. For. Kjoebenh. 5: 25–26. 1853. *Sacumis* (Huehuetenango).

On open or brushy, limestone, sand, or lava slopes and paramos, frequently in oak, oak-pine, or *Cupressus* forests, sometimes in *Baccharis* forests, 2,000–4,000 m.; Chimaltenango; El Progreso; Guatemala; Huehuetenango; Jalapa; Quezaltenango; Quiché; Sacatepéquez; San Marcos; Sololá; Totonicapán. Southern Mexico to Panama.

Shrubs or trees usually 4–10 m. high (rarely to 15 m.), usually densely branched, the young branches covered with dense, closely appressed, white or brownish tomentum, becoming glabrescent; leaves subcoriaceous, deep green and glabrate above (sometimes with scattered stellate hairs), covered beneath with dense, closely appressed, usually silvery-white but may be brownish, stellate tomentum, oblong-lanceolate or elongate-lanceolate, the blades usually 5–7 cm. long, 1.5–2 cm. broad (rarely to 10 cm. long, 3 cm. broad, or in the dwarfed form[1] only ca. 1 cm. long, 0.4 cm. broad), acute to long acuminate, base acute or obtuse, entire (rarely serrulate), petioles 0.5–3 cm. long; inflorescences terminal, paniculate, usually 7–8 cm. long, 5–7 cm. broad (rarely 3–14 cm. long, 3–10 cm. broad), the flowers in short pedunculate cymules, fragrant; calyx tubular-campanulate, 1.5–2.4 mm. long, stellate-tomentose outside, the lobes short, broadly triangular; corolla yellow to orange, 3.7–5 mm. long, campanulate-funnelform, stellate-tomentose on outside of lobes and upper part of tube, with pitted hairs in throat and on lower part of lobes; stamens inserted just below the sinuses; ovary subglobose, 1–1.5 mm. long, tomentulose on upper part, style 1–1.5 mm. long, the clavellate stigma obscurely bilobate; mature capsule oblong or ellipsoid, 4–5 mm. long, tomentulose, septicidally dehiscent for most of its length, loculicidally only at apex; seeds numerous, to 1.7 mm. long, the reticulate testa extended into prominent wings.

Buddleia parviflora HBK of Mexico is much like *B. nitida* but the flowers of *B. parviflora* are distinctly smaller. As noted by Norman, there is evidence that *B. nitida* crosses with *B. skutchii* Morton and *B. megalocephala* Donn.-Sm.

Buddleia skutchii Morton, Phytologia 1: 148. 1935. *B. matudae* Standl. Field Mus. Bot. 22: 96. 1940. *Saclajac* (Huehuetenango), *Salvia, Salvia blanca, Flor de Santa María* (Quezaltenango).

Usually in pine-oak or *Cupressus* forests, sometimes in open fields, hedgerows, or on brushy slopes, 1,600–3,800 m.; Chimaltenango; Guatemala; Huehuetenango; Quezaltenango; Quiché; San Marcos; Totonicapán. Chiapas, Mexico.

Trees, 6–16 m. tall, the young branches densely covered with whitish stellate tomentum; leaves subcoriaceous, usually entire (rarely serrulate), lanceolate or ovate-lanceolate, petioles 2–3.5 cm. long, the blades 6–20 cm. long, 2–7 cm. broad,

[1] There is now no doubt that certain dwarfed and usually sterile specimens from Guatemala and Costa Rica with leaves ca. 1 cm. long, are indeed *B. nitida*. Fertile specimens (*J. R. Johnston 1725, Standley 85252*, and *Sharp 25406*) check in all other characters and a few branches bear larger leaves, to 3.8 cm. The dwarfing is thought to be due to browsing.

usually acuminate, sometimes acute, base obtuse or cuneate, green and glabrate above, covered beneath with whitish to brownish tomentum, the outer layer of floccose candelabra hairs; inflorescences terminal, paniculate, ca. 8–15 cm. long, 8–20 cm. broad, the flowers 10–15 in each small, dense, short-pedunculate cymule, fragrant; calyx tubular-campanulate, 1.5–2.5 mm. long, tomentulose, the lobes broadly triangular; corolla yellow to orange, 2–3 mm. long, campanulate, the lobes spreading, stellate tomentose outside, with pitted hairs sparsely scattered inside on lobes and in tube; stamens inserted near the sinuses; ovary ovoid, 0.5–1 mm. long, tomentulose at least on upper part, style 0.5–0.7 mm. long, with clavellate stigma; mature capsule ovoid, 3–4 mm. long, tomentulose or glabrescent, septicidally dehiscent for half its length, loculicidally at apex; seeds numerous, to 1.8 mm. long, the reticulate testa extended into prominent wings.

CYNOCTONUM J. F. Gmel.

Reference: J. F. Gmelin, Syst. Nat. 443. 1791.

Erect annual or perennial herbs; leaves opposite, entire, minutely ciliate, lanceolate to ovate, membranaceous, the petioles connected by a narrow membrane or by small stipules; inflorescences terminal or axillary in pedunculate, dichotomous cymes, the flowers secund along the branches, almost sessile, usually bracteate; calyx 5-parted, the lobes lanceolate; corolla urceolate, exceeding the calyx, the tube ventricose, contracted at the throat, the 5 lobes short, valvate; stamens 5, included, inserted on the corolla tube, filaments short, anthers ovate, cordate at base, the cells parallel; styles 2, short, connate below the small capitate pilose stigma, divergent after anthesis; ovary superior, bilocular, broad at the apex; ovules numerous, peltately affixed; capsule broad, compressed contrary to the septum, truncate or bilobate at apex, the carpels divergent above, erect or incurved, dehiscent along inner margin; seeds subglobose or compressed, tuberculate-rugose; endosperm carnose, embryo linear.

A genus of chiefly tropical regions, it ranges from the southern United States through Mexico, the West Indies, Central and South America, and in the East Indies, India, northern Australia and Madagascar. Two of the three species occur in Guatemala.

The genus very closely resembles *Ophiorrhiza* of the Rubiaceae, from which it differs only by the superior ovary, and there is certainly justification for confusion of the two in the past.

Lobes of capsule widely divergent; calyx lobes 1-nerved; corolla lobes short, a quarter to a third the length of corolla; throat of corolla with a ring of minute hairs . . . . . *C. mitreola.*

Lobes of capsule curved toward each other; calyx lobes 3-nerved, corolla lobes elongate, one-half the length of corolla; sinuses with minute fringe of hairs. *C. petiolatum.*

Cynoctonum mitreola (L.) Britton, Mem. Torr. Bot. Club 5: 258. 1894. *Ophiorriza Mitreola* L. Sp. Pl. 150. 1753. *C. mitreola* vars. *intermedia* and *orthocarpa* Hochr. Bull. N. Y. Bot. Gard. 6(21): 284. 1910. *C. oldenlandioides* (A. DC.) Robinson, Proc. Am. Acad.

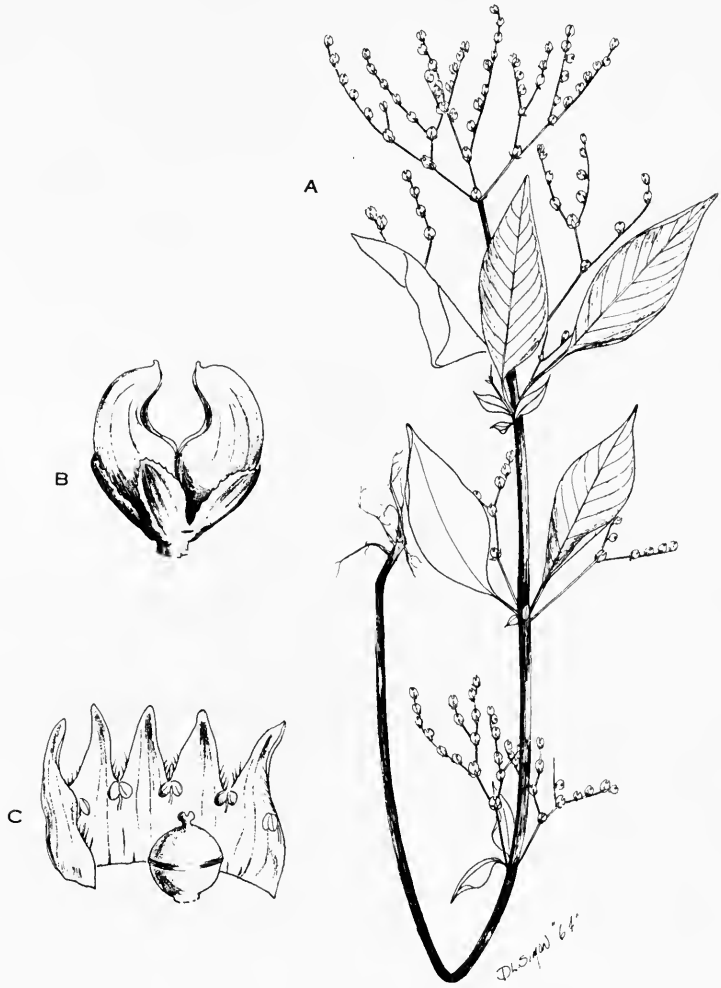

FIG. 77. *Cynoctonum petiolatum*. A, habit, fruiting plant, ½ natural size; B, capsule, after Bentham in Hooker, Icon. 9: *t. 828*. 1852; C, corolla dissected to show stamens and pistil, after Bentham, l.c.

45: 396. 1910. *C. pedicellatum* (Benth.) Robinson, *l.c. Mitreola oldenlandioides* A. DC. Prodr. 9: 9. 1845; Hooker, Icon. 9: *t. 827*. 1852. *M. pedicellata* Bentham, Journ. Linn. Soc. 1: 91. 1857. *Altanecia* (Petén, fide Lundell).

In damp thickets and along streams and lakes, 150–1,700 m., Chiquimula; Huehuetenango; Petén; Santa Rosa. Southeastern United

States, Mexico to Panama; East and West Indies; northwestern South America; northern Australia; Madagascar; tropical Africa.

A slender, erect annual, 15–75 cm. tall, sparsely branched, the stems usually pale, glabrous; leaves almost sessile or on slender petioles 1–2 cm. long, appearing entire but actually very minutely ciliate, lanceolate to ovate, 1.5–8 cm. long, acute or acuminate, rounded at the bases and decurrent, forming narrow wings on the petioles, almost glabrous, paler beneath; cymes long-pedunculate, terminal and arising in the upper leaf axils, few–many flowered; calyx lobes 1-nerved; corolla white, 1–2 mm. long, ca. 1.5 mm. broad, sessile or nearly so along one side of the slender, elongate branches, lobes short, ¼ – ⅓ corolla length, the tube of the corolla with a ring of minute hairs at the throat; ovary glabrous or at least the upper half minutely puberulous or tuberculate; capsule 2–3 mm. long, the lobes mitre-shaped, separate, widely divergent or upright and spreading outward.

Cynoctonum petiolatum J. F. Gmel. Syst. Nat. 2: 443. 1791. *C. mitreola* var. *campylocarpa* Hochr. Bull. N. Y. Bot. Gard. 6(21): 284. 1910. *C. paniculatum* (A. DC.) Robinson, Proc. Am. Acad. Sci. 45: 396. 1910. *Mitreola petiolata* T. & G. Fl. N. Amer. 2: 45. 1841. *M. paniculata* A. DC. Prodr. 9: 9. 1845; Hooker, Icon. 9: *t. 828*. 1852. *M. paniculata* var. *glabra* Hoehne, Comm. Linh. Telegr. Estrat. Matto Grosso, Annexo 5, Bot. pt. 6: 68. 1915.

In damp thickets, along stream banks, 220–1,000 m., Santa Rosa. Mexico; Honduras; West Indies; South America (Brazil, Colombia, Ecuador and Peru); India.

Differs from *C. mitreola* by the 3-nerved calyx lobes, slightly smaller corolla, 1–1.5 mm. long, ca. 0.5 mm. broad, elongate corolla lobes about equalling the tube, a minute fringe of hairs appearing only in the sinuses, not ringing the throat as in *C. mitreola*, and by the strongly incurved capsule lobes which are almost connivent, so that the capsule often appears nearly globular.

The marked differences in the two species are well illustrated by Hooker, in *Icones Plantarum* 9: *t. 827* and *828*, 1852.

GELSEMIUM Juss.

Reference: A. L. de Jussieu, Gen. Pl. 150. 1789.

Perennial woody, evergreen vines, the stems and branches glabrous; leaves opposite, entire, membranaceous or chartaceous, glabrous except for some minute puberulence on under surface near leaf bases, lanceolate to ovate, the petioles connected by a transverse line; flowers dimorphic, often fragrant, large and showy, in terminal or axillary, 1–5-flowered cymes subtended by several small bracts; calyx 5-parted, the imbricate segments appearing dry, with submembranaceous margins; corolla funnelform, dilated at the throat, the 5 lobes ovate to oblong, imbricate; stamens 5, included, inserted on corolla tube, the anthers linear-oblong, bilobate at

FIG. 78. *Gelsemium sempervirens*. A, habit, ½ natural size; B, pistil, with calyx and bracts, × 4; C, corolla dissected to show stamens, × 3; D, capsule, × 2.

base, the cells parallel, the filaments slender (the short filaments accompanying the long style and the long ones accompanying the short style); style filiform or subulate-filiform, bifid, each branch bilobate; ovary superior, seated on a disc, oblong, bilocular, with numerous ovules, 3–4 seriate upon a linear placenta; mature capsule ovoid to oblong, obcompressed, beaked, the 2 carpels dehiscent at the apex, the seeds usually numerous, compressed, orbicular, tuberculate-rugose, sometimes winged; endosperm carnose, embryo straight or slightly curved.

One species, *G. elegans* Benth., is known only from eastern Asia; of the remaining two, *G. rankinii* Small is apparently confined to the coastal plain of the southeastern United States, and only *G. sempervirens* (L.) Persoon ranges through the southern United States to Mexico and Guatemala.

Gelsemium sempervirens (L.) Persoon, Syn. Pl. 1: 267. 1805. *Bignonia sempervirens* L. Sp. Pl. 623. 1753. *Gelseminum sempervirens* Catesby, Nat. Hist. Carolina, Edwards rev. 1: 53. 1754. *Gelsemium nitidum* Michx. Fl. Bor. Am. 1: 120. 1803. *G. sempervirens* (Catesby) Jaume-Saint-Hilaire, Exposition des Fam. Nat. 1: 338. 1805. *G. sempervirens* Ait. f. Hort. Kew. 2(2): 64. 1811.

In damp thickets or forest, 1,200–2,600 m.; Alta Verapaz; Baja Verapaz; Quiché; Zacapa. Southern United States; southern Mexico.

Perennial, woody vine, glabrous throughout; leaves short-petiolate, subcoriaceous or chartaceous, the venation inconspicuous, dark green and lustrous above, lanceolate or lance-oblong, 3–8 cm. long, 1–4 cm. broad, acuminate or attenuate, rounded or obtuse at the base, entire; sepals ovate, 3–4 mm. long, often very minutely ciliate; corolla bright yellow, 2–3.5 cm. long, the lobes less than half as long as the tube; stamens included, adnate near base of tube; ovary oblong; mature capsule oblong-ovate, 14–23 mm. long, 8–11 mm. wide, greenish-brown, prominently veined, with a beak 1.3–3 mm. long; seeds ca. 7 in each locule, flat, tuberculate-rugose, variously notched, winged apically.

PLOCOSPERMA Benth.

References: G. Bentham in Benth. & Hook. Gen. Pl. 2: 789. 1876. Solereder in Engler & Prantl, Pflanzenf. IV(2): 19–30. 1892. Leeuwenberg, Acta Bot. Neerl. 16(2): 56–61. 1967.

Stiff, erect, glabrous shrubs or small trees; leaves opposite, coriaceous, lustrous, apices usually obtuse to retuse, occasionally acute; flowers axillary, in clusters of 2–4, the pedicels short, filiform; calyx small, 5–6 parted (rarely 4), the segments lanceolate; corolla funnelform-campanulate, the tube short, the throat broad, the broad lobes imbricate; stamens 5, the filaments slender to filiform, affixed to the tube of the corolla; anthers ovate, cordate at the base, the cells parallel; ovary 1-celled, contracted and stipitate at the base, the style filiform, twice bifid, the ultimate branches stigmatose; ovules 4, affixed to the walls of the cell in decussate or superposed pairs; capsule elongate, subterete, multicostate, 2-valvate from the

FIG. 79. *Plocosperma buxifolium*. A, fruiting branch, ½ natural size; B, flower, × 2; C, corolla opened to show stamens and pistil, after Bentham in Hooker, Icon. 12, *t. 1195*. 1876.

apex; perfect seed 1, linear, subterete, bearing at the apex a dense tuft of long hairs, the testa subcoriaceous; endosperm thin, carnose; embryo linear, straight.

One species, southern Mexico and Guatemala.

Plocosperma buxifolium Bentham in Hooker, Icon. 12: 82, *t. 1195*. 1876. *P. microphyllum* Baill. ex Solereder, Bull. Mens. Soc. Linn. Paris 780. 1899. *P. anomalum* Blake, Contr. U. S. Nat. Herb. 24: 17. 1922. *Frutilla* (Zacapa).

Dry, brushy slopes and hillsides, 200–650 m.; El Progreso; Jalapa; Santa Rosa; Zacapa. Mexico.

A shrub or small tree of 2–5 m., the young branches puberulent, becoming glabrous; leaves sessile or on petioles 1–2 mm. long, the blades coriaceous, elliptic-oblong, oblong-ovate or lanceolate-ovate, 1.5–5 cm. long, 1–2.5 cm. wide, usually narrowly rounded and submarginate at the apex (very rarely acute), rounded and slightly unequal at the base, somewhat lustrous above, dull beneath, sparsely pilosulous, puberulent, or glabrate; pedicels 2–13 mm. long; calyx 1–3 mm. long, 5–6 parted (rarely 4), the sepals lanceolate or lance-oblong, subacute, ciliate; corolla blue-violet to purplish-magenta, the tube 5–9 mm. long, the limb 13–25 mm. in diameter, with 5–6 rounded lobes; stamens included, the filaments inserted 3–5 mm. above the base of the corolla; capsule linear, 5–9 cm. long, 2–4 mm. thick, glabrous, finely costate; seeds subterete or compressed, 1.2–2.3 cm. long, the tuft of hairs 7–15 mm. long.

The shrub seems to be rare, and only a few collections of it have been obtained.

POLYPREMUM L.

Reference: Linnaeus, Sp. Pl. 111. 1753.

Herbaceous annuals, glabrous, low, diffusely branched from base, the branches dichotomous; leaves opposite, linear, connected by their dilated bases; flowers very small, solitary and subsessile in the forks of branches and in leaf axils, or 2–4 in terminal, cymose clusters; calyx 4-parted (rarely 5-parted), the segments linear-subulate, erect, green, somewhat rigid; corolla shorter than the sepals, tubular-campanulate, villous within throat, the lobes usually 4, sometimes 5, obtuse, imbricate; stamens 4 (rarely 5), the short filaments inserted at a point just above the middle of the corolla tube, the anthers ovate, the cells parallel; ovary superior, bilocular, the style short, with the capitate stigma entire or obscurely bilobate; ovules numerous on the oblong placentae which are affixed at the base to the septum; capsule ovoid or obovoid, somewhat bilobate, subcompressed contrary to the septum, loculicidally bivalvate; seeds numerous, small, subglobose, smooth, the endosperm carnose, the embryo straight.

Polypremum procumbens L. Sp. Pl. 111. 1753.

Usually in dry, sandy soil, open fields or on open slopes, sometimes on gravel along streams, occasionally in oak or pine-oak forests,

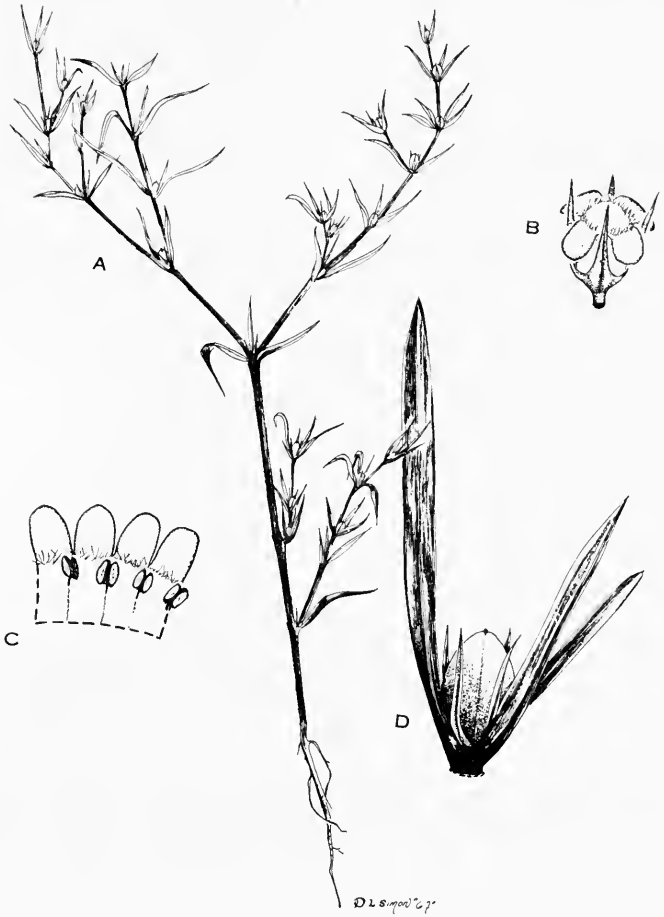

FIG. 80. *Polypremum procumbens*. A, habit of plant, natural size; B, flower, × 5; C, corolla opened to show stamen insertion; D, capsule, × 10.

sea level to 2,500 m.; Chimaltenángo; Escuintla; Guatemala; Huehuetenango; Izabal; Jalapa; Quezaltenango; San Marcos; Sololá. Eastern and southern United States; Mexico; West Indies; Central America; northern South America.

A low annual, usually 8–20 cm. high, stems diffusely branched, often dense, erect or becoming prostrate, the branches rather stiff, 4-angulate, leaves narrowly linear, 4–20 mm. long, acute, sessile, minutely serrulate on the margins, often with fascicles of smaller leaves in the axils; flowers sessile, axillary or 2–4 in terminal, cymose clusters, subtended by bracts similar to the leaves; calyx segments 2–3 mm. long, with strong midrib and scarious margins; corolla white, to 2 mm. long; cap-

sule crustaceous, obovoid, ca. 2 mm. in diameter, somewhat bilobate; seeds numerous, subglobose, minute.

A common plant throughout Central America, and perhaps one of the least conspicuous.

SPIGELIA L.

References: Linnaeus, Sp. Pl. 149. 1753; Progel in Martius, Fl. Bras. 6(1): 253. 1868; Solereder, Pflanzenf. 4, Abt. 2: 32. 1892; L. B. Smith, Wrightia 2: 90. 1960.

Annual or perennial herbs or subshrubs, glabrous or pubescent, with stems terete or tetragonous; leaves simple, entire, decussate or in whorls at stem apices, connected at base of petioles by a transverse line or by interpetiolar stipules; inflorescences usually terminal, unilaterally spicate with several to many flowers, or 1–2-flowered in forks of branches, the flowers essentially sessile; calyx persistent, 5-parted, the segments narrow, with 2 or more linear glands inside at the base of each; corolla tubular-campanulate to funnelform, the short lobes valvate in bud; stamens 5, equal, the filaments inserted on the corolla tube, anthers oblong or lanceolate, the 2 cells parallel, dehiscing longitudinally; ovary superior, bilocular, the style filiform, the upper stigmatose portion soon caducous, the lower segment persistent on mature capsule; ovules several to many on the peltate placentae; capsule bilobate, more or less compressed contrary to the septum, loculicidal and septicidal, circumcissile above the persistent, cupular base; seeds usually few, turbinate or obliquely ellipsoid to ovoid, tuberculate, verrucose or reticulate; embryo short and straight, endosperm copious.

Probably about 50 species, all American, six of which occur in Guatemala. A seventh species, *S. splendens* Wendl. ex Hook., is known from southern Mexico and Costa Rica and is therefore included.

Capsules muricate or muriculate.
- Plants 20–40 cm. tall; upper surface of leaf blades minutely scaberulous; capsules 4–6 mm. broad; persistent style segment considerably exceeding lobes of capsule ..... *S. anthelmia.*
- Plants 6–14 cm. tall; upper surface of leaf blades smooth; capsules 2 mm. broad; style articulate at apex of capsule ..... *S. pygmaea.*

Capsules smooth, never muricate.
- Leaves linear to linear-lanceolate, usually 1–2 cm. long; corollas 2–3 mm. long. *S. polystachya.*
- Leaves ovate or lanceolate or obovate, never linear.
  - Corollas rose-red, showy, 25–30 mm. long; stamens attached to tube by short filaments directly below the sinuses ..... *S. splendens.*
  - Corollas white or pallid, 20 mm. long or less; stamens attached to tube by short filaments inserted about midway of tube.
    - Average length of leaf blades 3–8 cm.
      - Leaves thin; persistent style segment longer than sepals, exceeding apex of capsule ..... *S. humboldtiana.*
      - Leaves thick and succulent; persistent style segment equalling or shorter than sepals, not exceeding apex of capsule ..... *S. carnosa.*
    - Average length of leaf blades 1–2 cm. ..... *S. coulteriana.*

Spigelia anthelmia L. Sp. Pl. 149. 1753; Sims in Curtis Bot. Mag. 50: *t. 2359.* 1823; A. DC., Prodr. 9: 7. 1845; Leeuwenberg, Acta Bot. Neerl. 10: 460. 1961. *S. quadrifolia* Stokes, Bot. Mat. Med. 1: 307. 1812. *S. nervosa* Steud. Flora 26: 764. 1843. *S. anthelmia* var. *obliquinervia* A. DC. Prodr. 9: 7. 1845. *S. fruticulosa* Lam. Illust. 1: 478. 1851. *S. stipularis* Prog. in Martius, Fl. Bras. 6(1): 262. 1868. *S. anthelmia* var. *nervosa* (Steud.) Prog. *l.c.* *S. domingensis* Gandoger, Bull. Soc. Bot. Fr. 70: 921. 1923.

In damp thickets, 500 m. or less; Chiquimula; Santa Rosa; Zacapa. Southern Florida, Mexico and Central America; West Indies; Colombia, Venezuela, British and French Guiana, Peru and Brazil; naturalized in tropical Africa and Indonesia.

Annuals, erect, simple or sparsely branched, usually 20–40 cm. high, the stems glabrous, stipules inconspicuous; leaves entire, the blades thin, papyraceous when dry, minutely ciliolate, lanceolate or ovate-lanceolate, attenuate, the lower ones opposite, short-petiolate, the upper ones usually in a whorl of 4 (2 decussate pairs), sessile or nearly so, 4–15 cm. long, one pair considerably larger than the other, the blades deep green and minutely scaberulous above, pale and glabrous beneath; inflorescences terminal, usually in slender secund spikes of 10–20 bracteolate flowers (occasionally only 1 or 2 flowers); calyx segments linear-lanceolate, 2–3 mm. long; corolla white or pale pink (rarely light yellow), 5–10 mm. long, tubular-campanulate, the lobes short, ovate, acute; stamens included, the glabrous filaments inserted about midway of tube; ovary nearly globose, style equalling the corolla or slightly exserted, considerably exceeding calyx; capsule 3–5 mm. long, 4–6 mm. broad, bilobate, finely muricate, with persistent portion of style to 2 mm. long, exceeding lobes of capsule; seeds 12–15 per capsule.

Spigelia carnosa Standl. & Steyerm. Field Mus. Bot. 23: 72. 1944.

Dense, wet, mixed forest, 1,300–2,000 m.; endemic. Alta Verapaz, Huehuetenango.

Perennials, erect or decumbent, the lower portion often prostrate and rooting, glabrous throughout; stems terete, stipules persistent, triangular, 1.5–3 mm. long; leaves opposite or the uppermost quaternate, short-petiolate, the blades thick and fleshy when fresh, almost coriaceous when dry, deep green above, much paler beneath with nerves often obscure, elliptic to elliptic-oblong, ovate or obovate, 4–10 cm. long, short-acuminate to obtuse, acute at base; inflorescences spicate, 4–13 cm. long, usually many-flowered, the flowers sessile; calyx segments ca. 5 mm. long, linear-lanceolate, subrecurved; corolla 1.5 cm. long, white, pinkish, or pale lavender outside, white within; stamens included, the short filaments inserted about midway of tube; ovary nearly globose; style in flowers from which the corolla has just fallen equalling or shorter than the sepals, equalling the apex of the mature capsule; capsule 4–5 mm. broad, smooth, glabrous; seeds 10–12 per capsule, yellow or brown, ca. 2.5 mm. long, minutely reticulate.

Spigelia coulteriana Bentham, Journ. Linn. Soc. 1: 90. 1857.

Huehuetenango, Sierra de los Cuchumatanes, 1,400–2,100 m. Mexico.

Plants perennial, small, 5–8 cm. high, the erect stems tetragonous, arising from a prostrate base; leaves opposite, decussate, the uppermost quaternate, the blades obovate to ovate, 1.5–2.8 cm. long, 1.5–2.5 cm. broad, acute or subobtuse; spicate inflorescences terminal or 1–3 from leaf axils, simple or branching, 3–10-flowered, the flowers sessile or subsessile; calyx segments linear, 2–3 mm. long, ciliolate, longer than the persistent style segment; corolla 1.5–2 cm. long, white with lavender outside; stamens included, the short filaments inserted about midway of the tube; ovary subglobose, persistent style segment ca. 1.5 mm. long; capsule bilobate, smooth, 2–3 mm. long, 3–4 mm. broad.

Spigelia humboldtiana Cham. & Schlecht. Linnaea 1: 200. 1826. *S. scabra* Cham. & Schlecht. *l.c.* 202. *Lombricera* (Quezaltenango); *Lombriz quen* (Alta Verapaz).

Wet forests or thickets, along streams and on gravel bars, rarely in open ground, sea level to 2,000 m.; Alta Verapaz; Chimaltenango; Chiquimula; Guatemala; Huehuetenango; Izabal; Jalapa; Petén; Quezaltenango; Sacatepéquez; San Marcos; Santa Rosa; Zacapa. Southern Mexico to Panama; South America.

Perennial from long, horizontal rootstocks, erect or decumbent, 12–40 cm. high (usually 20 cm. or more), usually glabrous except for scattered puberulence on stems, petioles, and lower surface of leaves, the stems tetragonous or subterete, simple or branched; leaves short-petiolate or sessile, opposite, the uppermost quaternate, the blades thin, lance-oblong to ovate, minutely ciliolate, 2.5–14 cm. long (usually 3–7 cm.), 1.5–4 cm. wide, acuminate to subobtuse, rounded and abruptly decurrent at the base or attenuate or obtuse, paler beneath; stipules small, triangular or ovate-triangular; inflorescences terminal, solitary or binate, usually few-flowered, the flowers sessile or subsessile; calyx segments linear-lanceolate, 1.5–3.5 mm. long; corolla 8–10 mm. long, usually white or cream, sometimes pale pink or tinged with purple, red or green; stamens included, the short filaments inserted about midway of tube; ovary nearly globose; style remnant conspicuously longer than the calyx; mature capsule 4–6 mm. wide, bilobate, glabrous; the persistent style segment extending beyond the lobes of the capsule; seeds grayish.

Although an inconspicuous plant, this is well known in Central America because the rootstocks are often used in decoction to expel intestinal parasites in man. It has been stated that excessive doses of this and other species may result in death.

Spigelia polystachya Klotzsch ex Prog. in Martius, Fl. Bras. 6(1): 265. 1868.

Wet plains, borders of swamps, mud flats, 50–950 m.; Jutiapa, Petén. Honduras; El Salvador northern South America.

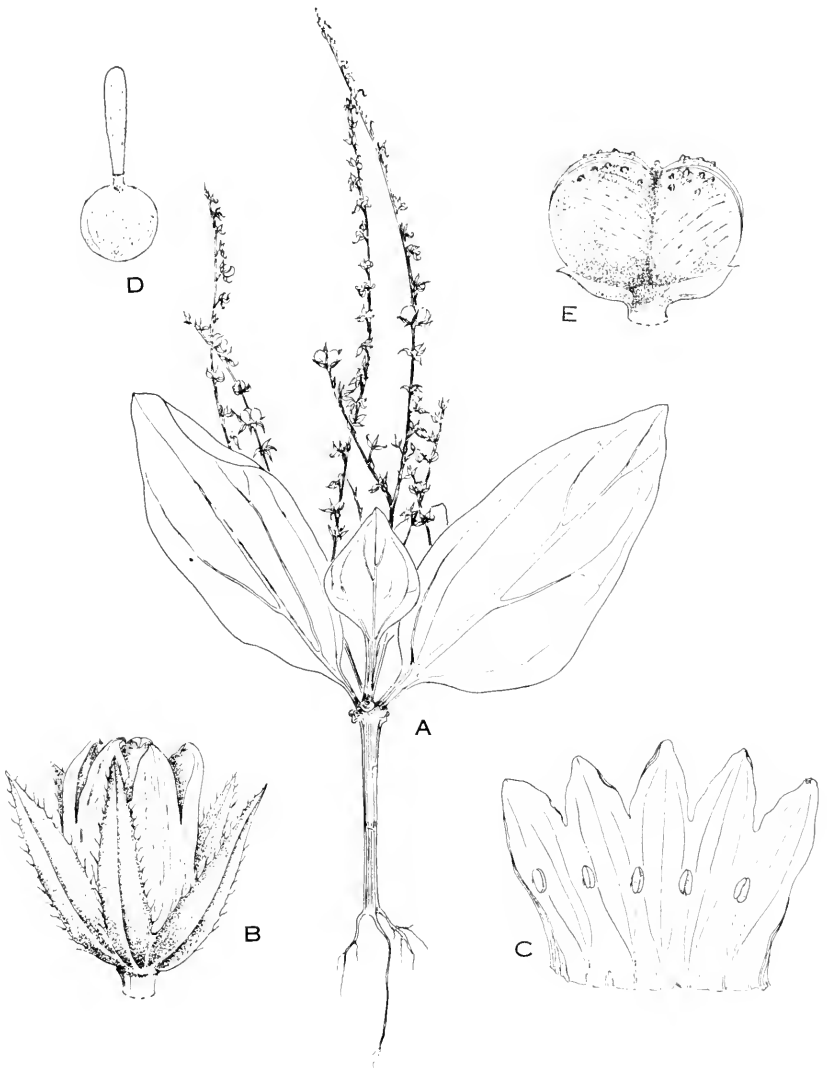

FIG. 81. *Spigelia pygmaea*. A, habit, × 1; B, flower, × 15; C, corolla dissected to show stamens, × 15; D, pistil, × 15; E, capsule showing muriculate apex, × 10. Drawing by Davida Simon.

Plants annual, small, erect, usually 6–10 cm. high but may attain 20 cm., glabrous, the stems branching, tetragonous; leaves opposite, the blades linear, linear-oblong, or linear-lanceolate, usually 1–2 cm. long, 0.1–0.2 cm. broad, but may attain 3.5 cm. × 0.5 cm., subacute, attenuate to the sessile base; spicate inflorescences solitary in the leaf axils, 5 cm. long or shorter, usually many-flowered, the

flowers sessile; calyx ca. one-third as long as the corolla, ca. one-half as long as the mature capsule, the segments ovate-lanceolate, subobtuse, glabrous; corolla subcampanulate, 2–3 mm. long, villous within; stamens included, the very short filaments inserted about midway of the tube; ovary subglobose, style articulate at or very near apex of capsule; mature capsule bilobate, 1.5–2 mm. long, 2–3 mm. broad, smooth, glabrous, seeds ridged.

Spigelia pygmaea D. Gibson, Fieldiana: Botany 32: 5, *t.* 1968.

In *zapotal,* on La Gloria Road, Dos Lagunas, ca. 7 km. west of village, Petén. Endemic.

Plants annual or possibly perennial, the lower portion sometimes creeping and rooting, small, erect, 6–14 cm. tall (average height 6–8 cm.), the stems short, 1–3 cm. long, tetragonous, the stipules broadly triangular; leaves decussate or in a whorl of 4 (2 decussate pairs), one pair much larger than the other, the blades glabrous, entire, tapering to the short, narrowly winged petioles, thin, obtuse, those of one pair ovate-rhombate, the second and larger pair oblong-ovate or oblong-elliptic, obtuse to acute, the smaller pair 1–2 cm. long, 0.8–1.5 cm. broad, the larger pair 2–5 cm. long, 1.5–2.5 cm. broad, deep green above, paler beneath, the nerves prominent, few; inflorescences multispicate, the flowering spikes erect, some arising from near the base, others, especially on older plants, from leaf axils, sometimes branching, 1.5–9 cm. tall (averaging 4–6 cm.), minutely granular-verrucose, many-flowered, the flowers sessile or subsessile, bracteolate; sepals lanceolate, ciliolate, minutely granular, especially along the midnerve, ca. 1 mm. long; corolla white, ca. 1.5 mm. long, subcampanulate, smooth within, the lobes broadly lanceolate, acute; stamens included, the very short filaments inserted just below the middle of the tube; ovary subglobose, the style minute, the stigma articulating directly above the apex of the capsule; mature capsule bilobate, muriculate, 1–1.5 mm. long, ca. 2 mm. broad; seeds ridged.

Although about the same height as *S. polystachya,* and with the same minute style segment, *S. pygmaea* may be readily separated by its broad leaves, multispicate inflorescences, and muriculate capsules.

Spigelia splendens Wendl. ex Hooker, Bot. Mag. *t. 5268.* 1861. *S. platyphylla* Prog. in Martius, Fl. Bras. 6(1): 256. 1868.

In shaded, moist places, wooded or shrubby slopes, 1,500 m. or less; Mexico and Costa Rica.

Perennials, erect, herbaceous, the simple stems 45 cm. high or less, subterete, usually more or less villous; leaves thin, sessile or short-petiolate, ovate or broadly obovate-rounded, 7–20 cm. long, 5–12 cm. wide, acute or cuspidate, cuneate at base or broadly and abruptly contracted, sparsely villous or nearly glabrous, minutely ciliate, conspicuously nerved, 4 leaves in a whorl near the apex of the stem, occasionally an additional pair of smaller leaves shortly below the top whorl, and the lowermost pair usually reduced to scales; spicate inflorescences 1–10, flowers short-pedicellate, the upper ones sessile; calyx segments linear-lanceolate, 4–5 mm. long; corolla tubular, 2.5–3 cm. long, glabrous or minutely puberulent, rose-red;

anthers conspicuous but not exceeding the corolla, the short filaments attached to tube shortly below the sinuses; ovary globose, the persistent portion of the style becoming 1–1.5 cm. long; capsule 5–6 mm. broad, glabrous or minutely puberulent, smooth; seeds reticulate-rugose.

Although no specimens from Guatemala were seen, it is to be expected there.

STRYCHNOS L.

References: Linnaeus, Sp. Pl. 189. 1753 and Gen. Pl. ed. 5. 86. 1754. B. A. Krukoff and J. Monachino, The American species of *Strychnos,* Brittonia 4: 248–322. 1942. B. A. Krukoff, Supplementary notes on the American species of *Strychnos,* VII, Mem. N. Y. Bot. Gard. 12(2): 1–94. 1965.

Woody plants, erect shrubs in the juvenile stage and in open situations but becoming lianas in moist woods, usually with spines or tendrils or both; leaves opposite, simple, entire, the petiole bases connected by stipular lines, the blades longest toward the ends of the branchlets, those near the bases of branchlets sometimes reduced to cataphylls, membranaceous to coriaceous, 3–5 plinerved (usually 2 principal nerves, one on each side of the midrib, in ours); inflorescences terminal or axillary, short-thyrsoid or corymbose-paniculate, composed of 1–3-flowered cymes, calyx usually 5-parted (sometimes 4); corolla salverform or rotate, the 5–4 lobes valvate; stamens 5 or 4, the short filaments affixed in the throat of the corolla, anthers ovate (in ours), dorsifixed; ovary bilocular (rarely unilocular), the style filiform (in ours), stigma more or less capitate and obscurely bilobate at the apex; ovules axile, numerous; fruit baccate, globose or nearly so, often very large, indehiscent, the exocarp usually rather thick and hard, the endocarp sometimes developing a wool that adheres to the testa of the seed; seeds usually many, variable in shape, sometimes irregularly 3-sided, discoid, spheroid, or elliptic-oblong.

Of the some 200 reported species generally distributed in tropical regions, 64 are American, with five occurring in Guatemala. The genus *Strychnos* is well known as the source of various alkaloids having paralyzing and poisonous properties. The best known species is the Indian *S. Nux-vomica* L., source of strychnine and Nux-vomica.

Unfortunately, the bulk of the collections from Guatemala is sterile material. I have therefore accepted Krukoff's annotations and my treatment of the genus follows his interpretation of the species.

Corolla equalling or shorter than the calyx; plants often armed with stout spines; leaf blades usually lanceolate and usually less than 8 cm. long . . . *S. nigricans.*

Corolla much longer than the calyx; plants always unarmed.

Inflorescences axillary; mature leaf blades usually elliptic-oblong and large, to 30 cm. long, usually twice as long as broad . . . . . *S. peckii.*

Inflorescences terminal.

Filaments not distinct; styles pilose; leaf blades long-lanceolate or elliptic-obovate, to 17 cm. long, usually 3 or more times longer than broad. *S. chlorantha.*

Filaments distinct (much longer than anthers); styles glabrous; leaf blades variable but most often ovate to broadly lanceolate.

Corolla glabrous outside ..... *S. panamensis.*

Corolla pubescent outside ..... *S. tabascana.*

Strychnos chlorantha Prog. in Martius, Fl. Bras. 6(1): 273. 1868.

Wet, mixed forest, on limestone, about 900 m.; Alta Verapaz. Costa Rica.

Unarmed woody vines; leaves short-petiolate, the blades coriaceous, lustrous, glabrous, elliptic-obovate to lanceolate, 5–17.5 cm. long, 2.5–5 cm. broad, acuminate to long-acuminate, attenuate or acute at the base; inflorescences in terminal cymes, corymbose, sparsely puberulent, the pedicels 4 mm. long or less; calyx lobes broadly ovate, 1 mm. long, rounded or obtuse, ciliate; corolla tube 1.5 cm. long, glabrous, not papillose, the lobes 4 mm. long; anthers subsessile, partly exserted, 2.7 mm. long or less; styles pilose; fruits globose, ca. 6 cm. in diameter, with shell nearly 1 cm. thick.

Strychnos nigricans Prog. in Martius, Fl. Bras. 6(1): 280. 1868. *S. brachistantha* Standl. Field Mus. Bot. 12: 412. 1936. *Ichbolay* (Alta Verapaz).

Wet forests, wooded bluffs, sea level to 800 m.; Alta Verapaz; Huehuetenango; Izabal; Petén. Southern Mexico; Honduras; Nicaragua; Panama; Venezuela; southern Brazil.

Woody vines, the branches minutely puberulent, often armed with stout, recurved spines 5–20 mm. long; leaves chartaceous or membranous, short-petiolate, the blades lanceolate, ovate-lanceolate or ovate-elliptic, 3–12 cm. long (usually less than 8 cm. long), 1–3 cm. broad, acuminate to long acuminate, rounded or acute at the base, with sparse puberulence often on midribs and petioles; inflorescences small, terminal, many-flowered, glabrous or puberulent, pedicels equalling or shorter than the calyx; calyx lobes ovate-lanceolate, ca. 1 mm. long, acute or acuminate, glabrous; corolla equalling or shorter than the calyx, the lobes obscurely papillose outside, barbate within; anthers glabrous or pilose; ovary and style glabrous; fruits globose, 5 cm. or more in diameter, shell 5–6 mm. thick, seeds numerous, ca. 17 mm. long, pale brown to orange.

Strychnos panamensis Seem. Bot. Voy. Herald 166. 1854. *S. hachensis* Karst. Fl. Columb. 2: 75. 1863. *S. longissima* Loes. Repert. Sp. Nov. 9: 357. 1911. *S. tepicensis* Standl. Contr. U. S. Nat. Herb. 23: 1142. 1924. *Aguacate de mico* (Santa Rosa).

Damp thickets or forests of lowlands, sometimes in rocky thickets along stream banks, rarely in dry thickets (in shrubby form), 100–1,600 m.; Escuintla; Quezaltenango; Retalhuleu; Sacatepéquez; San

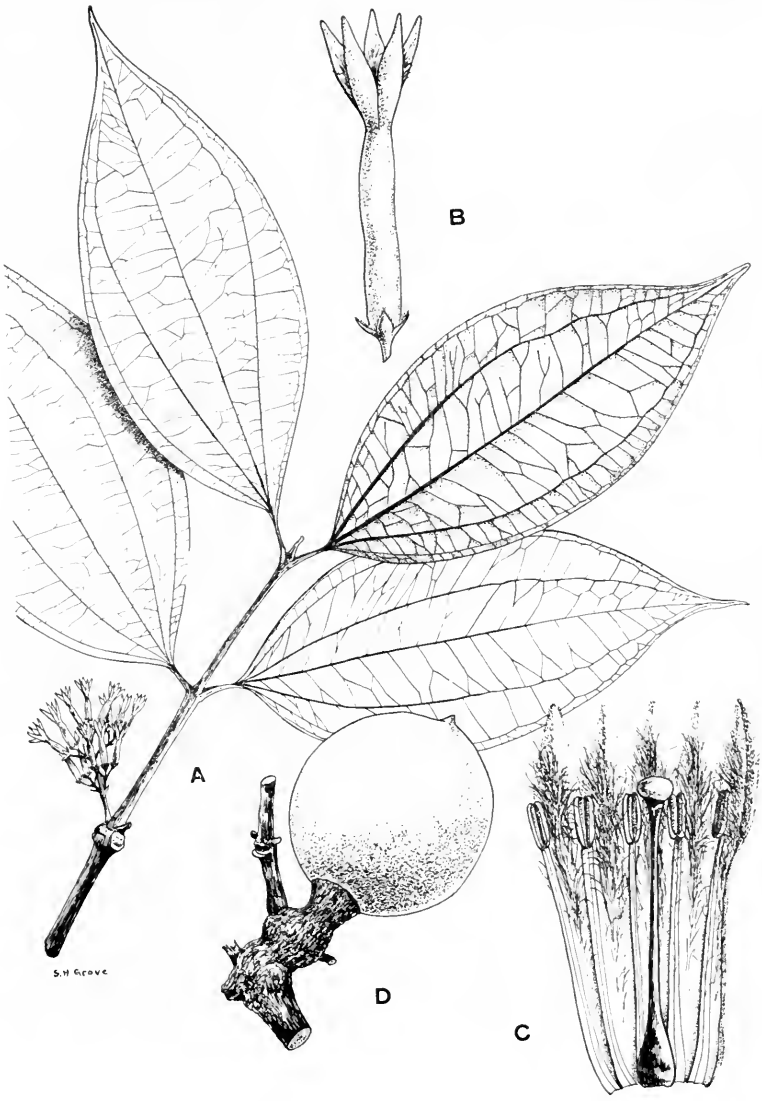

FIG. 82. *Strychnos peckii*. A, flowering branch, × ½; B, flower, × 2½; C, corolla dissected to show interior, stamens and pistil, × 4; D, fruit, × ½.

Marcos; Santa Rosa. Western Mexico to Panama. Northeastern Venezuela and northern Colombia.

Unarmed woody vines, the stems sometimes attaining a diameter of 10 cm. or more, the branches and tendrils often puberulent to hirsute; leaves on short, often pubescent petioles, the petioles 1–5 mm. long, the blades quite variable, ovate to elliptic or lanceolate, 4–13 cm. long, 1.5–6 cm. wide, acute or acuminate, rounded, subcordate or acute at the base, membranaceous to chartaceous, sparsely pubescent beneath along base and midrib or quite glabrous; inflorescences in terminal cymes, corymbose, the branches hirsutulous, the pedicels 3 mm. long or less, usually hirsutulous; calyx lobes lanceolate, acuminate, 2–3 mm. long, ciliate; corolla white or yellowish, 1.5–2 cm. long, papillose and glabrous outside, the tube pilose within but the lobes densely papillose within and glabrous; stamens exserted, the filaments more than twice as long as the anthers; style glabrous; fruit globose, 4–8 cm. in diameter, many-seeded.

This is probably the most frequently collected species in Central America. Sterile collections may be confused with *S. nigricans*, which when young may also be unarmed; however, the leaf blades of *S. panamensis* are usually broader and more ovate than those of *S. nigricans*.

Strychnos peckii Robinson, Proc. Am. Acad. Sci. 49: 504. 1913.

Wet forest or thickets, at or a little above sea level; Izabal; Petén. Honduras; Costa Rica. South America.

Unarmed woody vines, attaining a diameter of 15–20 cm., the branchlets puberulent; leaves on puberulent petioles 5–18 mm. long, the blades elliptic to elliptic-oblong or lance-oblong, 7–30 cm. long, 3.5–15 cm. wide, acuminate, rounded to obtuse at the bass, coriaceous, minutely puberulent beneath when young, becoming almost glabrous with age; inflorescences axillary, cymose, many-flowered, fulvous-puberulent, the pedicels 2 mm. long or less; calyx lobes broadly ovate-triangular, ca. 1 mm. long, subacute, densely puberulent, ciliate; corolla pale yellowish-green, the tube 6–9 mm. long, densely papillose outside and pubescent, lanate within; anthers subsessile, included except at the tip, 1.5 mm. long or less; style glabrous; fruit globose, 6 cm. or more in diameter, buff; seeds many.

Strychnos tabascana Sprague & Sandw. Kew Bull. 128. 1927. *S. panamensis* var. *hirtiflora* Standl. Field Mus. Bot. 11: 138. 1932. *S. hirtiflora* Lundell, Bull. Torr. Bot. Club 64: 556. 1937.

Wet forest or thickets, sea level to 900 m.; Alta Verapaz, Izabal, Petén. Mexico; Honduras; Costa Rica.

Unarmed woody vines, the branchlets and tendrils often puberulent or hirsutulous; leaves on pubescent petioles 1–3 mm. long, the blades ovate to elliptic-lanceolate, 5–11 cm. long, 2.5–5 cm. wide, acuminate, cuneate to obcordate at the base, often puberulent beneath when young, but glabrous or nearly so in age, membranaceous; inflorescences in terminal cymes, corymbose, the branches hirsutulous,

the pedicels 1–3 mm. long, hirsutulous; calyx lobes lanceolate, 2–3 mm. long, papillose, ciliate; corolla white or cream, 11–17 mm. long, the lobes and upper third of tube pilose to subsetulose outside, white-lanate within; stamens exserted, the filaments about twice as long as the anthers; style glabrous; fruit globose, 4–8 cm. in diameter, many seeded.

GENTIANACEAE. Gentian Family

PAUL C. STANDLEY
AND
LOUIS O. WILLIAMS

Annual or perennial herbs, glabrous throughout, with usually bitter sap; leaves opposite (except in Nymphoides), often connate at the base or connected by a transverse line, without stipules,[1] rarely reduced to scales, entire, the whole plant sometimes destitute of chlorophyll, but the plants usually with normal green leaves; inflorescence various in form but most often several times dichotomous; flowers large or small, various in color, regular or nearly so, perfect, rarely polygamous; calyx inferior, the tube campanulate or often very short or none, the teeth or lobes 4–5, imbricate or open in bud; corolla gamopetalous, funnelform, salverform, campanulate, or rotate, the limb 4–5-lobate, the lobes usually dextrorsely contorted; stamens as many as the corolla lobes and alternate with them, inserted in the throat or tube of the corolla, the filaments filiform or dilated at the base; anthers dorsifixed above the base, erect, versatile, or reflexed, bilobate at the base, the cells distinct, parallel, dehiscent by longitudinal slits; disk none, or annular or 5-glandular, inconspicuous; ovary superior, usually sessile, generally 1-celled, with 2 parietal placentae; style simple, the stigma terminal, capitate or bilamellate or shallowly bifid at the apex; ovules usually numerous, 1–many-seriate on the placentae, anatropous or amphitropous; fruit capsular, membranaceous or indurate, usually bivalvate; seeds globose, angulate, or rarely compressed, sometimes narrowly winged, the testa membranaceous or crustaceous, often foveolate, reticulate, or tuberulate; endosperm usually copious; embryo small, subterete or conic, the radicle usually superior.

Genera about 80, best represented in temperate regions of both hemispheres, but species rather numerous also in the tropics, at low or high elevations. Two other genera, *Symbolanthus* and *Enicostema*, are represented in southern Central America (Costa Rica) and Panama.

Plants without chlorophyll; leaves reduced to small scales.

Capsule dehiscent by longitudinal slits between the apex and base, but not through the base and apex; plants very slender and delicate, the leaf scales inconspicuous, few, closely appressed to the stem; seeds with elongated wings ..... *Leiphaimos.*

[1] In some Lisianthus the connate leaf bases appear very much like the interpetiolar stipules to be found in Rubiaceae.

Capsule dehiscent through its whole length; stems stout, the leaf scales numerous and conspicuous, not appressed but loose and somewhat spreading; seeds wingless..... *Voyria.*

Plants with normal green leaves.

Leaves alternate; corolla lobes induplicate-valvate; aquatic plants with mostly orbicular or reniform leaves..... *Nymphoides.*

Leaves all of chiefly opposite; corolla lobes contorted or rarely imbricate; plants not aquatic, the leaves not orbicular or reniform.

Stigma capitate.

Plants small and rather delicate; flowers about 5 mm. long; leaves linear. *Curtia.*

Plants large and coarse; flowers much larger; leaves lanceolate to broadly ovate.

Plants tricotomously branched, rarely simple; corolla not gibbous on one side..... *Lisianthus.*

Plants usually simple or dichotomously branched; corolla gibbous ventrally..... *Chelonanthus.*

Stigma bilamellate.

Anthers in age spirally twisted; corolla usually pink..... *Centaurium.*

Anthers unchanged in age, or sometimes recurved.

Inflorescence spicate..... *Coutoubea.*

Inflorescence not spicate.

Corolla foveolate within near the base below each lobe, often calcarate or saccate, green or greenish yellow..... *Halenia.*

Corolla not foveolate, never calcarate or saccate, usually blue, pink or purplish, rarely green (if yellow, see *Halenia*).

Corolla usually pink, rarely yellowish; plants annual; calyx conspicuously costate or winged..... *Schultesia.*

Corolla blue or bluish, rarely white; plants annual or perennial; calyx not at all or not conspicuously costate, not winged.

Style very short; plants perennial or annual; flowers large or small; lobes of the calyx shorter than the tube or but little exceeding it. *Gentiana.*

Style slender and much elongate; plants annual; flowers large; lobes of the calyx several times as long as the short tube..... *Eustoma.*

CENTAURIUM Hill

Slender annual herbs, glabrous, erect or diffusely and dichotomously branched; leaves opposite, small, sessile or amplexicaul; inflorescence a dichotomously branched, determinate or indeterminate few-to-many-flowered arrangement; flowers small to rather large, usually pink, sometimes white or yellowish; calyx 4–5-fid, the lobes usually carinate; corolla with a short tube or one as long as or longer than than the lobes, usually diaphanous and marcescent, the corolla lobes usually 5, spreading at anthesis, contorted in the bud and often after anthesis; stamens 5, attached near the throat of the corolla tube, the anthers usually oblong, often spirally twisted in age, or sometimes unchanged; ovary 1-celled, the placentae often strongly intruded; seeds small, suborbicular to ovoid, numerous.

There are perhaps 50 or more species in temperate and tropical regions of both hemispheres. The genus is in need of revision and should provide a most interesting problem in distribution.

The generic name *Erythraea* has often been used for this group of plants. The proper name seems to be *Centarium* of Hill.

Calyx lobes ovate or lance-ovate, shorter than the capsule or corolla tube. *C. strictum.*

Calyx lobes linear-lanceolate, equaling or longer than the ovary or corolla tube.

Leaves mostly linear to oblong or elliptic.

Plants diffusely dichotomously branched; flowers at anthesis 7–9 mm. long. *C. quitense.*

Plants much branched above; flowers at anthesis 10–13 mm. long... *C. rosans.*

Cauline leaves subulate or narrowly linear.

Plants to about 10 cm. tall; basal leaves broadly elliptic or ovate; corolla 6–7 mm. long ..... *C. setaceum.*

Plants 15–35 cm. tall; basal leaves subulate, minute; corolla about 9 mm. long. *C. pringleanum.*

Centaurium pringleanum (Wittr.) Robinson, Proc. Am. Acad. 45: 397. 1910; *Erythraea pringleana* Wittr. Bot. Gaz. 16: 85. 1891.

Grassy slopes or meadows, often in the pine forest, 900–1,400 m. To be expected in Guatemala. Mexico; Honduras.

Strict, slender annual herbs 15–35 cm. tall. Stems about 1 mm. in diameter, with 4 narrow wings or ridges originating from the bases of the leaves, these less prominent below; leaves 5–8 opposite pairs, subfiliform, thickened but somewhat flattened, acute, 2–18 mm. long and 0.5–0.8 mm. broad, largest pair subtending the inflorescence; inflorescence few–20-flowered, an indeterminate dichotomous dichasioid arrangement or ultimately a simple dichasium, the bracts similar to the leaves and often quite large; flowers long pedicellate, the pedicels bibracteate or bractless, to about 1 cm. long; calyx 5-lobed, free to the base, the lobes linear-subulate, carinate, margins scarious below, about 5 mm. long and 0.7 mm. broad; corolla tube about 5 mm. long, diaphanous and marcescent, the lobes elliptic-oblong, obtuse, somewhat cucullate, obscurely apiculate, about 4 mm. long and 2 mm. broad, probably spreading at anthesis; stamens alternate with the lobes and attached in the throat, the anther oblong and about 1.2 mm. long and 0.6 mm. broad, somewhat twisted with age, the filaments about as long as the anthers, very slender; maturing ovary ellipsoid, about 5 mm. long; style about 1.5 mm. long, the stigma obscurely bilamellate; mature capsule exceeded by or about as long as the calyx lobes; seeds minute, ovoid, about 0.12 mm. in diameter.

It is curious that this species jumps from the Mexican plateau to Honduras but I find no difference in the material available. The species should be found in Guatemala.

Centaurium quitense (HBK.) Robinson, Proc. Am. Acad. 45: 397. 1910. *Erythraea quitensis* HBK. Nov. Gen. & Sp. 3: 178. 1818.

E. tetramera Schiede, Bot. Zeit. 13: 919. 1855. *E. divaricata* Schaffner ex Schiede, l.c. 920.

Grassy, usually moist fields, often in marshy places or on sandbars along streams, rarely in dry rocky places, frequently in oak-pine forest, 400–2,500 m.; Alta Verapaz; Baja Verapaz; El Progreso; Chiquimula; Jalapa; Santa Rosa; Guatemala; Sacatepéquez; Chimaltenango; Quiché. Mexico; Honduras to Panama; West Indies; western South America.

An annual, 30 cm. high or less, usually erect and diffusely branched, the stems slender, angulate; lower leaves oblong to elliptic, the principal cauline leaves oblong or lanceolate, the lower ones obtuse, the upper acute to attenuate, mostly 1–3 cm. long, sessile; flowers usually very numerous, the slender pedicels 1–3.5 cm. long, spreading or ascending; flowers at anthesis 7–9 mm. long; calyx 4.5–5 mm. long, the segments linear-lanceolate, long-attenuate; corolla dull pink or dirty pink, the tube equalling the calyx, the lobes obtuse, much shorter than the tube; capsule linear-oblong, 5–6 mm. long.

A common and often rather weedy plant at middle elevations or lower. The available material is slightly variable, but it is believed that it represents a single species. Plants growing in wet places often are very lax and have weak stems, while their leaves are relatively broader and unusually thin. Most remarkable of the Guatemalan collections is one (*Standley 80599*) from high up on the active cone of Volcán de Pacaya. The plants are only 5 cm. high, very densely and compactly branched, and many-flowered, the flowers on short pedicels. It was believed at first that this represented a new species, but apparently it is only a much stunted plant, influenced by the cold and dry soil that prevail in this locality. This is the more probable because the normal form of *C. quitense* has been collected at the same place. This species was reported from Guatemala by Bentham in *Plantae Hartwegianae* as *Erythraea chilensis* Pers.

Centaurium rosans Standl. & Steyerm. Field Mus. Bot. 23: 75. 1944.

Open, moist or rather dry banks or open forest, most often in pine-oak forest, 1,600–3,000 m.; Alta Verapaz; Sacatepéquez; Chimaltenango; Sololá; Quezaltenango (type from Volcán de Zunil, *Steyermark 34609*); Huehuetenango; Santa Rosa. Honduras; possibly Nicaragua.

An erect annual, densely and rather laxly branched from the base, 10–30 cm. high, the stems slender, often diffusely branched, angulate; leaves spreading, broadly linear or oblanceolate, 1–2 cm. long, sessile but usually attenuate to the base, acute; flowers in anthesis 11–13 mm. long, long-pedicellate, the pedicels

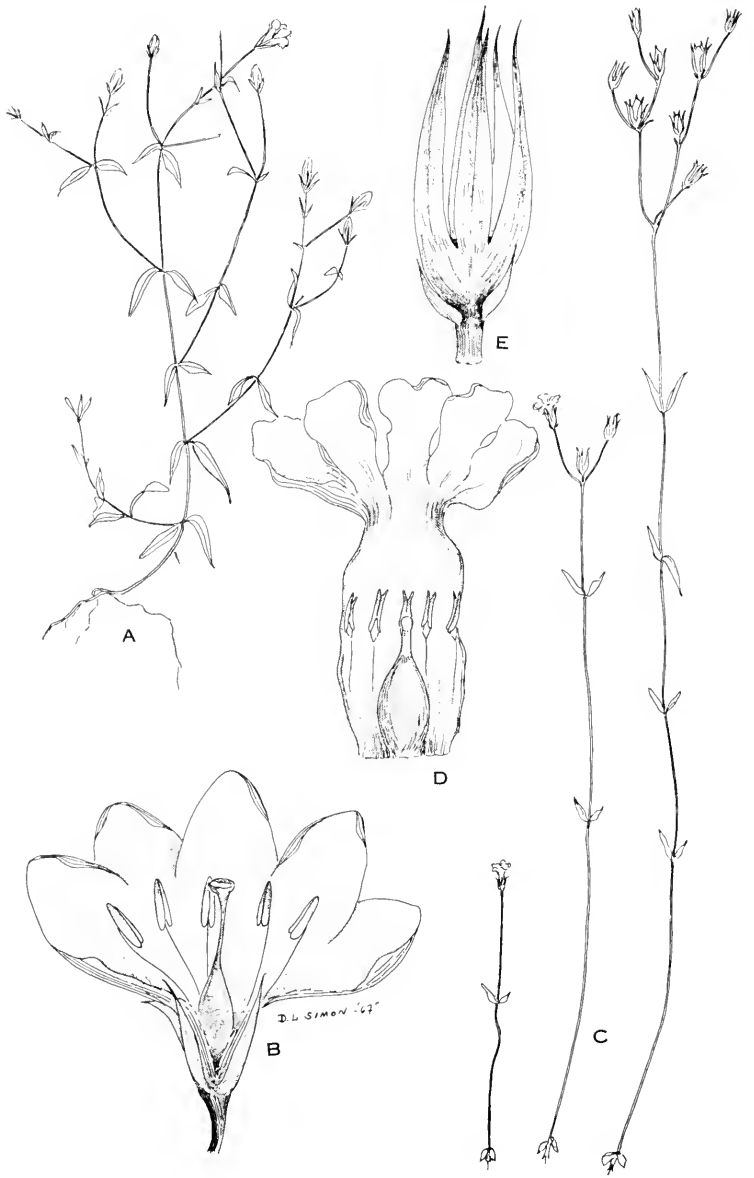

FIG. 83. *Centaurium rosans*. A, habit, × ½; B, flower dissected, × 3. *Curtia tenella*. C, three plants, natural size, to show variation; D, corolla dissected open to show pistil and stamens, × 10; E, calyx with subtending bract, × 10.

1–2 cm. long, straight, ascending, not erect; calyx 6 mm. long, the segments linear-lanceolate, long-attenuate; corolla tube equalling the calyx, the lobes broadly ovate, spreading, usually bright pink, obtuse, slightly longer than the tube; seeds very numerous, minute, brown.

Centaurium setaceum (Benth.) Robinson, Proc. Am. Acad. 45: 397. 1910. *Erythraea setacea* Benth. Bot. Voy. Sulph. 128. 1846.

Grassy open places in pine forest, 1,200–1,400 m.; Chiquimula (Caracol Mountain, 1.5 miles northwest of Quezaltepeque, *Steyermark 31384*). Mexico (Jalisco).

An erect annual, 10–20 cm. high, laxly and rather sparsely branched above the base, the branches widely ascending; radical leaves 4 mm. long, obovate, soon withering; cauline leaves few pairs, linear-setaceous, 15 mm. long or shorter, spreading; flowers few or rather numerous, on long slender pedicels, 8–9 mm. long; calyx 5 mm. long, the segments linear-lanceolate, long-attenuate; corolla bright pink, the tube equaling the calyx, the lobes elliptic-oblong, obtuse, slightly shorter than the tube; capsule oblong, equaling the calyx, the seeds very numerous, minute.

The known range for the species is curious,—from the Mexican highlands near Guadalajara (although the type is said to be from Acapulco, which seems unlikely) to Guatemala.

Centaurium strictum (Schiede) Druce, Rept. Exch. Club Brit. Isles 1916: 614. 1917.

Wet to dry, open or shaded banks, grassy hillsides, sometimes in open rocky places, or in *Alnus* or oak-pine forest, 1,300–3,000 m.; Zacapa; Jalapa; Guatemala; Sacatepéquez; Quiché; Chimaltenango; Sololá; Huehuetenango; Quezaltenango; San Marcos. Central and southern Mexico; El Salvador; Costa Rica; Panama.

An erect annual, 40 cm. high or less, the stems mostly simple or with a few erect branches; leaves spreading or the upper ones suberect or ascending, 10–18 mm. long, broadly linear to linear-lanceolate or oblanceolate, acute or obtuse, not narrowed at the base; flowers rather few, 12–14 mm. long, pink or dull dirty pink, on stout, erect or suberect pedicels, all the flowers produced in the upper half of the plant or higher; calyx segments lance-ovate, much shorter than the corolla tube, acute, conspicuously carinate; lobes of the corolla acute, slightly shorter than the tube; capsule oblong, 8–9 mm. long.

We have not seen authentic material of this species and are not sure that our material belongs here, nor that all the Central American material is this species.

CHELONANTHUS Gilg

Mostly annuals, the stems erect, usually simple, often angulate; leaves penninerved; inflorescence a terminal once or twice bifurcately branched dichasium, the

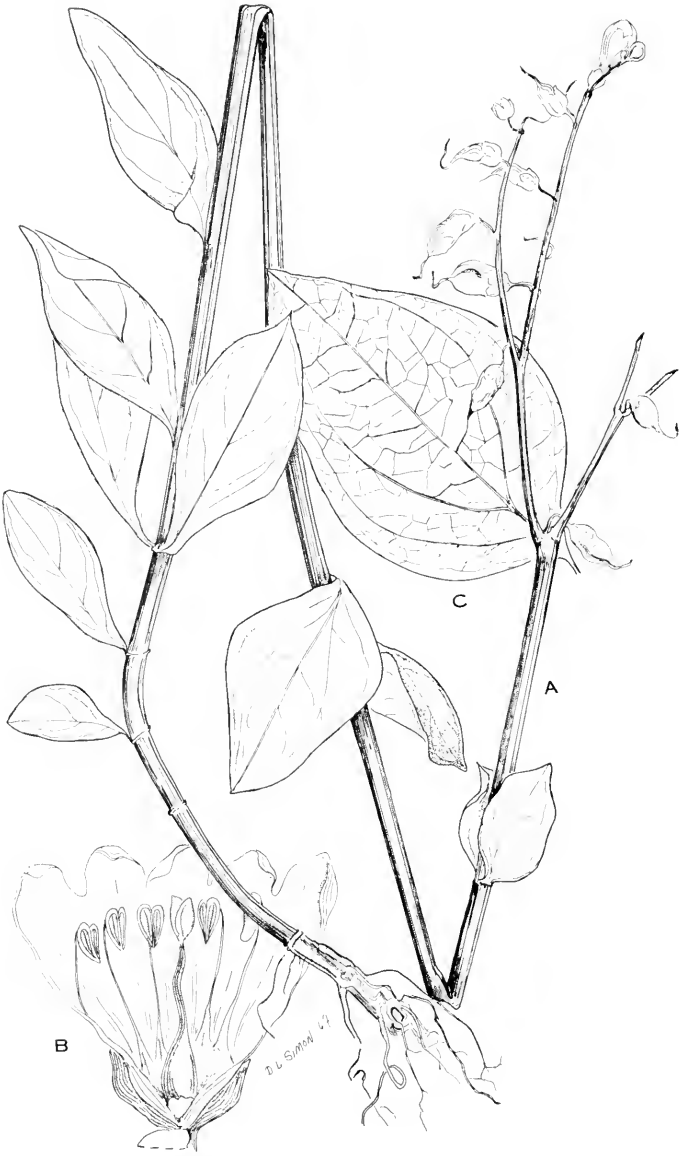

FIG. 84. *Chelonanthus alatus*. A, habit of plant, × ½; B, flower dissected to show pistil and anthers, × 2; C, a larger leaf showing venation, × ½.

ultimate branches being few–many-flowered secund racemes; flowers green, yellowish or pinkish; calyx cupular or campanulate, the five lobes imbricated; corolla funnelform, the tube swollen ventrally, the limb 5-parted; style persistent, the stigma bilamellate; capsule globose or ovoid, twice as long as the calyx or longer.

About 15 species in South America with one species ranging north to Mexico. Species of this genus have often been included in Lisianthus but they seem to be adequately distinct. See Williams, Fieldiana: Bot. 31: 406. 1968.

Chelonanthus alatus (Aubl.) Pulle, Enum. Vasc. Pl. Surin. 376. 1906. *Lisianthus alatus* Aubl. Hist. Pl. Guian. 1: 204, *t. 89.* 1775. *L. acutangulus* Ruiz & Pavón, Fl. Peruv. 2: 14. 1799. *L. tetragonus* Benth. Pl. Hartweg. 68. 1840. *Excacahue* (Suchitepéquez); *tabaquillo* (Izabal).

Moist or wet thickets, often on open or brushy, steep banks, 2,000 m. or less; Alta Verapaz; Baja Verapaz; Izabal; Escuintla; Suchitepéquez; Quezaltenango; San Marcos. Southern Mexico; British Honduras; Honduras; Nicaragua; Costa Rica and Panama. South America.

A coarse erect glabrous herb, sometimes 3 m. high but usually about a meter high or lower, generally simple, the stems sharply 4-angulate below; leaves remote, sessile, ovate, elliptic-ovate, or very broadly ovate, mostly 5–15 cm. long, acute, rounded to attenuate at the base; inflorescence large, terminal, corymbiform, composed of few or numerous, one or twice dichotomously branched, secund racemes 20 cm. long or less, the flowers numerous, remote, on pedicels longer than the calyx; the pedicels reflexed, at least in age; calyx green, 8 mm. long, lobate to the middle, the lobes rounded-ovate, erose-denticulate; corolla pale green, 2 cm. long, somewhat fleshy; style 1 cm. long, complanate, persistent on the fruit; capsule oblong, 1.5 cm. long, somewhat compressed, narrowed at the apex; seeds very numerous, minute, irregularly cubical.

A very common and characteristic plant of roadside banks at middle elevations on the Pacific slope in Quezaltenango and San Marcos. The green flowers are rather conspicuous but not at all decorative or handsome.

COUTOUBEA Aublet

Erect glabrous herbs, probably annual, simple or branched, with strongly ascending branches, the stems terete; leaves opposite or ternate, sessile and often amplexicaul; flowers small, white, sometimes tinged with blue or purple, in dense or interrupted, terminal spikes or racemes; calyx bibracteolate, deeply 4-(5-)fid, the segments narrow, attenuate, scarious-marginate; corolla tube short-cylindric, the 4(–5) lobes spreading, narrow, contorted; stamens 4(–5), affixed to the corolla tube, the filaments filiform, dilated at the base; anthers oblong, erect, deeply bifid,

unchanged in age or finally recurved; ovary 1-celled, the placentae strongly intruded, the style filiform, the stigma bilamellate; capsule bivalvate; seeds numerous, globose, foveolate-reticulate.

Three species, in tropical America. Only one is found in continental North America.

Coutoubea spicata Aubl. Pl. Guian. 72, *t. 27*. 1775.

Wet savannas, 200 m. or less; Alta Verapaz; Izabal. Mexico (Chiapas); British Honduras; Costa Rica; Panama; northern South America.

Plants erect, a meter high or less, the stems simple below, with few or numerous, strongly ascending branches above; leaves opposite, sessile and often amplexicaul at the base, oblong-obovate to narrowly lanceolate, 2.5–8 cm. long, obtuse to attenuate at the apex, penninerved; flower spikes few or numerous, sometimes only 1, as much as 25 cm. long, the flowers very numerous, fragrant, white, often with a bluish throat, sessile, more or less verticillate, the whorls crowded or rather remote; calyx 6 mm. long, parted almost to the base, the segments linear-lanceolate, erect; corolla persistent in fruit, the tube as long as the calyx, the lobes slightly shorter, acute or acuminate, spreading or often reflexed; filaments equalling or slightly longer than the corolla tube, the anthers 2.5 mm. long; capsule enclosed in the costate persistent corolla tube.

CURTIA Chamisso & Schlechtendal

Reference: E. Knoblauch, Bot. Centralbl. 60: 356–358. 1894.

Very slender, erect, small annuals with almost filiform branches; leaves opposite or 3–4-nate, small and narrow, sessile; flowers small, white, pink or yellow, corymbose-cymose or laxly paniculate; calyx usually 5-parted, the segments narrow, acute, carinate; corolla subfunnelform, the tube cylindric, little ampliate above, the limb 5-lobate, the lobes short, ovate or lanceolate, contorted; stamens 5, affixed to the corolla tube, the filaments filiform, the anthers usually included, ovate or oblong, often coherent, the connective broad or narrow; ovary falsely 2-celled by the strongly intruded placentae, the style filiform or very short, the stigma capitate, short-clavate, or dilated, not divided; capsule bivalvate; seeds numerous, small, foveolate.

About ten species, mostly in northern South America, only the following one in North America.

Curtia tenella (Mart.) Cham. Linnaea 8: 13. 1833. *Schuebleria tenella* Mart. Nov. Gen. & Sp. 2: 117. 1827.

Dry rocky slopes, 1,200–1,500 m.; Chiquimula (Montaña Castilla, 3 miles southeast of Quezaltepeque, *Steyermark 31218*). British Honduras; Honduras; Costa Rica; Panama; northern South America.

Plants very slender, 5–35 cm. high, usually simple below, corymbosely branched above, glabrous; cauline leaves opposite, linear, 5–12 mm. long, usually spreading,

FIG. 85. *Coutoubea spicata*. A, habit of part of plant, × ½; B, flower, × 4. *Eustoma exaltatum*. C, habit, × ½; D, dissected flower to show stamens and pistil.

the radical leaves cordate-ovate, acute; inflorescence dichotomously branched, few-many-flowered; calyx 3.5–4 mm. long, the segments linear-lanceolate, attenuate; corolla white or yellowish, 5–6 mm. long, the lobes much shorter than the slender tube, ovate, subacute; capsule cylindric, rostrate by the persistent style, about equalling the calyx.

One of the characteristic savanna plants of Costa Rica and Panama.

EUSTOMA Salisbury

Erect herbs, usually or always annual, often more or less glaucous, glabrous; leaves opposite, sessile and often amplexicaul; flowers large, long-pedunculate, blue, purplish or white; calyx deeply 5–6-fid, the segments narrow, acuminate, carinate; corolla campanulate, the tube short, the limb deeply 5–6-lobate, the lobes oblong or obovate, contorted; stamens 5–6, affixed to the throat of the corolla, the filaments filiform, the anthers oblong, versatile, finally recurved; ovary 1-celled, the placentae little intruded; style filiform, usually persistent in fruit, the stigma broadly bilamellate; capsule ovoid or oblong, bivalvate; seeds very numerous, small, foveolate.

Three species, in temperate and tropical North America and northern South America. A single species occurs in Central America, another in Mexico.

Eustoma exaltatum (L.) Salisb. Parad. Lond., *t. 34*. 1806. *Gentiana exaltata* L. Sp. Pl. ed. 2. 331. 1762.

Quiché (*José Ignacio Aguilar 1270*). Southern United States; Mexico; British Honduras; Nicaragua; West Indies; Colombia and Venezuela.

An erect, somewhat glaucous annual, sometimes a meter high but usually about 50 cm. or less, simple or often copiously branched, the stems terete; leaves mostly oblong, often narrowly oblong or oblanceolate, 3–8 cm. long or larger, generally rounded or very obtuse and apiculate at the apex, sessile and more or less amplexicaul, or the lowest leaves attenuate to the base; flowers few or numerous, on very long, slender, erect peduncles, blue or pale purplish blue, 2–3.5 cm. long; calyx 10–15 mm. long, the segments lance-linear, narrowly long-attenuate, united only at the base; tube of the corolla somewhat shorter than the calyx, the lobes longer than the tube, broad at the apex and abruptly contracted into a short tip, or sometimes acuminate; capsule oblong or oval, 1.5 cm. long, rounded at the apex.

GENTIANA L. Gentian

Glabrous herbs, annual or perennial, various in habit; leaves opposite, sessile; flowers small or large, axillary and terminal, sessile or rarely pedunculate, bibracteolate or naked, usually blue, violet or purple, sometimes white or yellow or even red; calyx tubular, 5-fid or rarely 4-fid or 6–7-fid, winged, carinate, or naked, sometimes spathaceously cleft; corolla salverform, funnelform, tubular-campanulate, or

rarely subrotate, the tube often with hairs or scales in the throat, the lobes spreading, contorted, usually 5, the sinuses often plicate-appendaged; stamens as many as the corolla lobes, affixed to the tube and included or rarely exserted; anthers ovate, oblong, or linear, muticous or the connective apiculate, connate or free, usually extrorsely dehiscent, sometimes versatile; ovary 1-celled, the placentae parietal; style short or almost none, the stigmas 2, laminar, spreading or revolute; capsule sessile or stipitate, bivalvate; seeds numerous, sometimes winged.

About 300 species, mostly in arctic and temperate regions, in the tropics confined to the higher mountains. Only the following are known in Central America but *G. adsurgens* Cerv. ex Griseb. has been found in nearby Chiapas and may be expected in Guatemala. In North America the species are rather few, but they include some of the most beautiful of flowers. In the South American Andes the species are very numerous.

Flowers 6–12 mm. long; plants annual.
- Flowers 8–11 mm. long; stems elongate, mostly 6–10 cm. long, not completely covered by the leaves ..... *G. sedifolia.*
- Flowers about 6 mm. long; plants 2.5 cm. high or less, the stems completely hidden by the leaves ..... *G. pumilio.*

Flowers 25–35 mm. long; plants perennial.
- Flowers 2.5 cm. long; calyx lobes 4–7 mm. long ..... *G. lewisiae.*
- Flowers 3.5 cm. long; calyx lobes about 10 mm. long ..... *G. guatemalensis.*

Gentiana guatemalensis Standl. & Steyerm. Field Mus. Bot. 23: 75. 1944. L. Wms. Fieldiana, Bot. 31: 405. 1968.

Moist alpine meadows, 3,300 m.; endemic; Huehuetenango (type from region of Chémal, Sierra de los Cuchumatanes, *Standley 81113*; known only from this region).

Perennial from a thick woody caudex, the stout stems procumbent, numerous, 5–15 cm. long, 1–3-flowered, densely leafy; leaves spreading, sessile, oblong, 1.5–2.5 cm. long, 4–6 mm. broad, obtuse or narrowly rounded at the apex, slightly narrowed at the base, without obvious nerves, minutely scaberulous on the margins; flowers terminal or subterminal, sessile, 3.5 cm. long, purplish blue; calyx tube obconic, 8 mm. long, the 5 lobes unequal, narrowly lance-oblong, about 10 mm. long, subacute, scaberulous on the margins; corolla campanulate, 2.5 cm. long, the lobes rounded-ovate, almost 1 cm. long, rounded at the apex, the plicae much shorter than the lobes, bilobate, the lobes triangular, acute or acuminate, irregularly and sparsely serrate.

This and the following species, *G. lewisiae,* are perhaps too much alike and the distinctions tend to disappear with additional collections.

Gentiana lewisiae Standl. & Steyerm. Field Mus. Bot. 23: 76. 1944.

Wet meadows, 3,100–3,200 m.; endemic; Totonicapán (type from mountains above Totonicapán, *Standley 84556*).

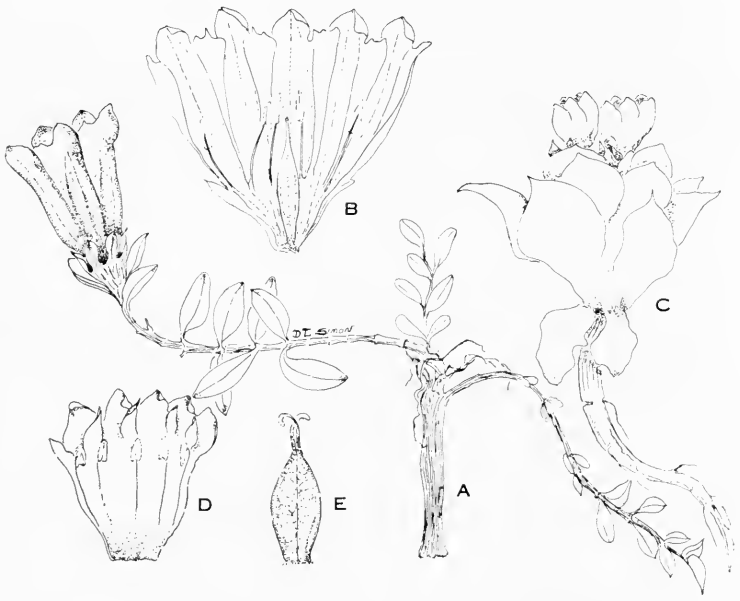

FIG. 86. *Gentiana lewisiae*. A, natural size; B, dissected flower, natural size *Gentiana pumilio*. C, habit, × 2; D, dissected corolla, × 2; E, ovary and styles, × 3.

A prostrate perennial, the stems slender, 6–13 cm. long, simple, 1–few-flowered; leaves sessile, spreading, oblong, 8–13 mm. long, 4–5 mm. broad, very obtuse or rounded at the apex, subacute at the base, 1-costate, slightly paler beneath; flower terminal, sessile, subtended by 2 leaves; calyx tube narrowly obconic, 5–6 mm. long, the 5 lobes oblong or narrowly spatulate-oblong, 4–7 mm. long, subacute, erect; corolla deep blue, campanulate, 2–2.5 cm. long, the lobes 3 mm. long, rounded-ovate, very obtuse, the plicae much shorter than the corolla lobes, shallowly bilobate, the lobes rounded, entire.

The species was named for Mrs. B. E. Lewis of Guatemala, a devoted student of the plants of Guatemala, who has contributed a great deal to our present knowledge of them.

The plant is a common one in most wet meadows on the mountain summits of the Sierra Madre during December and January.

Gentiana pumilio Standl. & Steyerm. Field Mus. Bot. 23: 76. 1944.

Moist subalpine slopes or meadows, 3,000–4,100 m.; Totonicapán; Huehuetenango; San Marcos (type from Volcán de Tajumulco, *Steyermark 35489*). Mexico (Chiapas, Volcán de Tacaná).

A dwarf annual, usually only 1–2 cm. high, simple or densely branched at the base, the stems forming compact subglobose tufts, 1–few-flowers, very densely leafy, the leaves usually closely imbricate and concealing the stems; radical leaves about 4, much larger than the others, oblong-obovate, as much as 15 mm. long and 6 mm. broad, obtuse or subacute; cauline leaves highly variable in size and shape, the lower ones broadly obovate, the upper much smaller ones broadly ovate or almost reniform and amplexicaul, all the cauline leaves broadly white-marginate, 2–7 mm. long, carinate, broadly obtuse and often mucronate; flowers sessile among the leaves, or sometimes short pedicellate, 6–7 mm. long; calyx almost tubular, the 5 teeth oblong, short, very obtuse, separated by rather wide sinuses, the margins minutely scaberulous, the teeth erect and subequal; corolla pale blue or white, funnelform, the limb rotate, the lobes short, rounded-ovate or obovate, 3.5 mm. long, rounded at the apex, the plicae shorter than the corolla lobes, emarginate or shallowly bilobate; capsule narrowly oblong, protruded above the leaves, 6 mm. long.

This is probably the most plentiful of the Guatemalan gentians, a diminutive plant that is hard to find except when its flowers are fully open in bright sunshine. They at first remind one of tiny daisies because of their much lobed limb, which is of a rather pale sky-blue or white. The corolla is greenish outside, and has a pale yellow throat. Plants have been found in flower in December, January, February and March. It may be that *G. pumilio* is only an extreme form of *G. sedifolia,* but the 12 collections at hand are fairly uniform, and they are not matched by any South American material we have seen.

Gentiana sedifolia HBK. Nov. Gen. & Sp. 3: 173, *t. 225.* 1819.

Along rivulets in subalpine meadow, 2,500–3,700 m.; Huehuetenango; Totonicapán. Costa Rica; Andes of South America.

Annual or possibly sometimes perennial, usually much branched and bearing numerous flowers, procumbent or prostrate, the stems as much as 10 cm. long, densely or sparsely leafy; leaves sessile, subconnate, lanceolate, oblong-lanceolate, or oblanceolate, acute or obtuse, 1-nerved, usually narrowed to the base, mostly 4–6 mm. long, white-marginate; flowers terminal at the ends of the branches, solitary, erect, about 11 mm. long, purple-blue; calyx tubular-campanulate, the 5 lobes linear-lanceolate, very short, erect, subequal; corolla funnelform, the limb almost equally 10-lobate, the corolla lobes rounded-ovate, obtuse, the plicae rounded at the apex; capsule oblong, acute, protruded above the leaves, bivalvate.

On general principles it might be expected that the Guatemalan plant would constitute a distinct species, but good characters for separating it from the highly variable South American plants have not been discovered.

HALENIA Boerckhausen

Reference: Caroline K. Allen, A monograph of the American species of the genus *Halenia,* Ann. Mo. Bot. Gard. 20: 119–220, *tt. 8–12.* 1933.

Glabrous herbs, annual or perennial, simple or branched; leaves opposite, sessile or petiolate, usually 3–5-nerved; inflorescence terminal or axillary, cymose and usually subumbellate, rarely racemose or spicate; calyx 4-lobate, the lobes foliaceous, linear to ovate or spatulate; corolla 4-lobate, white, green, yellow or purplish, persistent, campanulate, the lobes dextrorsely convolute, often auriculate; stamens 4, included, adnate to the corolla tube, the filaments linear, the anthers ovate or oblong, versatile; stigma sessile, composed of 2 oblong or ovate lobes; capsule compressed, lanceolate to ovate, septicidally dehiscent from the apex; seeds globose or somewhat compressed, brown or greenish tan-colored, granular or reticulate.

About 60 species, mostly in America, chiefly in the mountains of the tropics, a few species in Asia. Several other species are known in Mexico and southern Central America.

Corolla not calcarate at the base, merely obscurely saccate.
  Leaves mostly basal, the stems scape-like; plants perennial.....*H. alata.*
  Leaves mostly cauline, the stems not scape-like; plants annual...*H. brevicornis.*
Corolla conspicuously calcarate at the base, the spurs short or elongate.
  Spurs of the corolla very short and somewhat spreading; plants mostly 10 cm. high or less and usually with numerous, stout branches from the base, forming dense clumps of stems.....*H. crassiuscula.*
  Spurs usually well developed and directed downward or even incurved.
    Stems scapiform, the cauline leaves few and reduced; radical leaves numerous, from a rather thick, perennial caudex.....*H. shannonii.*
    Stems leafy, the cauline leaves numerous pairs; radical leaves few or none. *H. decumbens.*

Halenia alata (Mart. & Gal.) Hemsl. Biol. Centr. Amer. Bot. 2: 351. 1882. *Exadenus alatus* Mart. & Gal. Bull. Acad. Brux. 11, pt. 1: 372. 1844.

Subalpine meadows, frequently in open *Juniperus* forest, 3,200–3,500 m.; Huehuetenango (Sierra de los Cuchumatanes); Mexico (Veracruz, Volcán de Orizaba).

Perennial from a thick caudex, the stems several, erect, 13–22 cm. high; radical leaves numerous, 5 cm. long or less, 3–4 mm. broad, obtuse, long-attenuate to the slender petiole, 3-nerved; cauline leaves few pairs, linear or oblanceolate-linear; flowers terminal, umbellate, the pedicels 4-angulate; calyx slightly shorter than the corolla, the lobes oblong, acute; corolla pale yellow, small, about 6 mm. long, not calcarate, the lobes ovate, obtuse; capsule broadly ovoid, 6–7 mm. long; seeds yellow-brown, globose, granular.

An unusually well marked species, or perhaps appearing so because little material of it has been collected.

Halenia brevicornis (HBK.) G. Don, Gen. Hist. 4: 177. 1838. *Swertia brevicornis* HBK. Nov. Gen. & Sp. Pl. 3: 174. 1818. *H. tuerckheimii* Briq. Candollea 4: 317. 1931 (type from Alta Verapaz, *Tuerckheim 2041*). *H. brevicornis* var. *tuerckheimii* Allen, Ann. Mo. Bot. Gard. 20: 145. 1933.

Brushy or grassy slopes, often in pine-oak forest, sometimes in moist subalpine meadows, 1,000–3,200 m.; Alta Verapaz; El Progreso; Zacapa; Jalapa; Guatemala; Sacatepéquez; Chimaltenango; Quiché; Huehuetenango; Quezaltenango. Central and southern Mexico; Honduras; Nicaragua; Costa Rica.

A slender annual, generally 15–45 cm. high, the stems simple below, usually with a few branches above; leaves all or mostly cauline, linear or lanceolate, 3 cm. long and 4 mm. broad or smaller, 1-nerved, the upper leaves shorter; inflorescence racemiform or narrowly paniculate, with usually several whorls of flowers, the pedicels elongate or short; calyx segments lanceolate, one-half to two-thirds as long as the corolla; corolla green or greenish yellow, 5–8 mm. long, the lobes broadly or narrowly ovate, acute, somewhat auriculate at the base, not calcarate; capsule ovoid, 8 mm. long; seeds minute, brownish, finely reticulate.

Allen recognizes seven varieties of *H. brevicornis* in Mexico and Central America, but they appear to have slight if any systematic importance. Var. *tuerckheimii* is noteworthy for its slender stems and elongate pedicels. This is the common unspurred species in the highlands.

Halenia crassiuscula Robinson & Seaton, Proc. Am. Acad. 28: 113. 1893.

Moist or dry, open, rocky wind-swept alpine summits, sometimes in alpine pine forest, 3,700–4,200 m.; Quezaltenango (Volcán de Santa María); San Marcos (Volcán de Tajumulco; Volcán de Tacaná). High volcanoes of central and southern Mexico.

Plants densely cespitose, dwarf, perennial or biennial, somewhat fleshy, the stems numerous or very numerous, mostly 5–10 cm. high, stout; radical leaves oblanceolate, 3-nerved, 2 cm. long, obtuse, attenuate to the petiole; cauline leaves 1–3 pairs, narrowly oblanceolate; inflorescence dense and compact, umbelliform, the flowers mostly terminal, sometimes axillary, pedicellate, often nutant after anthesis; calyx lobes lanceolate or oblanceolate, 4.5–6 mm. long, obtuse; corolla 15 mm. long or shorter, the lobes oblong-elliptic, acute, the spurs 4 mm. long, slender, slightly curved upward; capsule lance-oblong, acute, 14 mm. long; seeds globose, light yellow-brown, granular.

This reduced plant is common about the summits of the volcanoes of western Guatemala. Most of the plants are dry and dead during the winter months, when we have visited those localities, but

the withered stems with the persistent capsules often are seen in abundance.

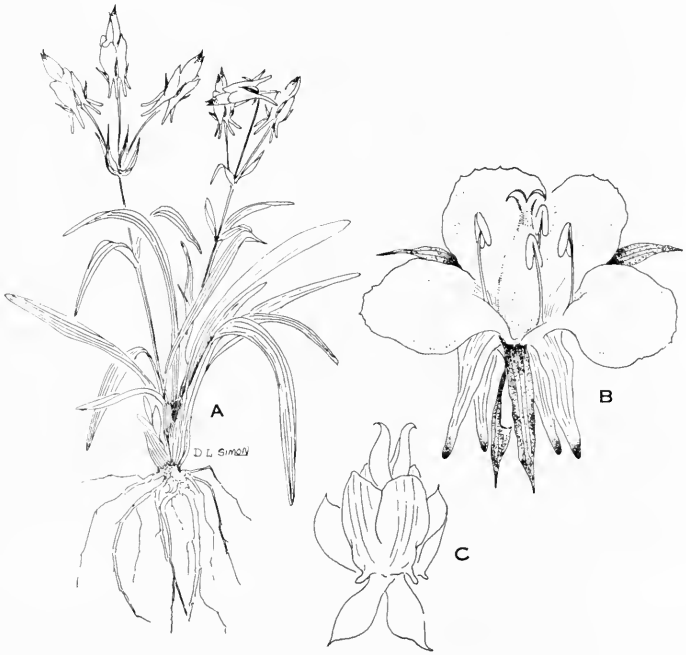

FIG. 87. *Halenia crassiuscula*. A, habit, natural size; B, flower partially dissected, × 3; C, another flower from the same collection to show variation, × 2.

Halenia decumbens Benth. Pl. Hartw. 67. 1840. *H. guatemalensis* Loes. Verhandl. Bot. Vereins Brandenb. 55: 182. 1913 (type Huehuetenango, *Seler 2728*). *H. plantaginea* var. *latifolia* Loes. l.c. (type from Huehuetenango, *Seler & Seler 3086*). *H. guatemalensis* var. *latifolia* Allen, Ann. Mo. Bot. Gard. 20: 180. 1933. *H. caleoides* Allen, l.c. 173 (type from Sacatepéquez, *Maxon & Hay 3675*). *H. platyphylla* Allen, l.c. 173 (type from Sacatepéquez, *Smith 2170*).

Common in open moist forests and in the subalpine meadows of the highlands 2,300–4,200 m.; Sacatepéquez; Chimaltenango; Sololá; Quiché; Huehuetenango; Totonicapán; Quezaltenango; San Marcos. Mexico (whence the type).

Plants erect or decumbent, perennial or apparently often annual or biennial, mostly 20–40 cm. high, the stems simple or often sparsely branched, slender, bearing usually numerous pairs of thin leaves; basal leaves oblanceolate, 3–6 cm. long, mostly 1–1.5 cm. broad, acute and often apiculate; cauline leaves mostly 3-nerved,

obtuse or acute, the upper ones elliptic-lanceolate or lanceolate, sessile; flowers terminating the stems or branches, umbellate, the pedicels 3 cm. long or often much shorter; calyx lobes obovate-spatulate, two-thirds as long as the corolla, mucronate; corolla pale green or yellow-green, 12–20 mm. long, the lobes ovate, subacute, the spurs about half the length of the whole corolla or shorter, incurved at the tip; capsule ovoid, 15–18 mm. long; seeds globose, granular.

This is common *Halenia* of the highlands of Guatemala that has the corollas obviously spurred. There is considerable variation in the species but it is easy to recognize. We have not followed Miss Allen's treatment for we feel that both the keys and the systematic account are quite unrealistic.

Halenia shannonii Briq. Candollea 4: 321. 1931. *H. shannonii* f. *compacta* Allen, Ann. Mo. Bot. Gard. 20: 178. 1933 (type from Huehuetenango, *Cook 45*).

Moist subalpine meadows or open, pine or *Juniperus* forest, sometimes on limestone, 2,000(?)–4,000 m.; Sacatepéquez (type, *Shannon 3613* or *?3630*); Totonicapán; Huehuetenango; San Marcos; so far as known, endemic.

Plants perennial from a rather thick caudex, the stems cespitose, mostly 12–20 cm. high, erect, usually simple; basal leaves somewhat fleshy, narrowly oblanceolate, 7 cm. long and 3–6 mm. broad or smaller, acute or obtuse, 3-nerved; cauline leaves 2–3 pairs or none, oblanceolate to linear-lanceolate, acute, sessile; inflorescences mostly terminal, several-flowered, umbelliform, the pedicels 2.5 cm. long or much shorter; calyx one-half to two-thirds as long as the corolla, the lobes oblong-elliptic, 6–9 mm. long; corolla greenish, almost 15 mm. long, the lobes ovate, obtuse or subacute, the spurs divaricate, slightly incurved at the tip.

This has been reported from Guatemala as *H. gracilis* Griseb. It probably represents little more than small specimens of *H. decumbens*.

LEIPHAIMOS Schlechtendal & Chamisso

Small saprophytic herbs, without chlorophyll, simple-stemmed, 1–several-flowered, the leaves reduced to opposite scales; flowers small or rather large, mostly white, yellow, blue or purple, solitary or in cymes; calyx campanulate or almost tubular, with 4–5 teeth or lobes; corolla salverform or funnelform, the lobes spreading, obtuse or acute, contorted, persistent in fruit; stamens 4–5, inserted in the upper half of the tube, included, the filaments filiform, usually very short; anthers oval, cordate, or elongate, free or connivent by their margins, introrse, obtuse or acute at the base, sometimes appendaged; ovary 1-celled, with 2 parietal placentae, the style filiform, the stigma capitate; capsule usually elongate, septicidally dehiscent by slits between (but not reaching to) the top and bottom; seeds fusiform or winged; endosperm very scant.

About 30 species, mostly in tropical America, two in tropical Africa. About six additional ones are known from southern Central

America. The following list includes all species known from Mexico. The plants are often rather handsome, in spite of their usually small size, for the flowers are conspicuously colored. In habit they remind one much of the Burmanniaceae of similar habit.

Stems terminated by a cyme of several flowers ..... *L. parasitica.*
Stems, or their branches, each terminated by a single flower.
Corolla blue, about 1.5 cm. long ..... *L. simplex.*
Corolla yellow, about 3 cm. long ..... *L. aphylla.*

Leiphaimos aphylla (Jacq.) Gilg, Nat. Pflanzenfam. IV. 2: 104. 1895. *Gentiana aphylla* Jacq. Enum. Pl. Carib. 17. 1760.

Wet mixed forest, 1,500 m. or less; Izabal (Punta Palma, across the bay from Puerto Barrios); Chiquimula (Cerro Tixixí, north of Jocotán). Mexico (Oaxaca); Costa Rica(?); West Indies; South America.

Stems simple, very slender and weak, white; leaf scales few pairs, remote and very inconspicuous, linear-lanceolate, narrowly attenuate; calyx almost tubular, about 5 mm. long, the lobes narrow, attenuate; corolla tube very slender, yellow or whitish, about 25 mm. long, the lobes bright yellow, 5 mm. long, acute or acuminate; capsule narrowly oblong, 10–15 mm. long.

It is probable that *L. lutea* Morton, described from Costa Rica, is synonymous with *L. aphylla.*

Leiphaimos parasitica Schlecht. & Cham. Linnaea 6: 387. 1831. *Voyria mexicana* Griseb. Gen. & Sp. Gent. 208. 1838.

Among decaying leaves in wet mixed forest, 350 m.; Petén; Alta Verapaz; Izabal. Southern Mexico; British Honduras; Nicaragua.

Plants very slender, white throughout, 6–20 cm. high, the stems weak; leaf scales few pairs, very small and inconspicuous, acute or obtuse, more or less appressed; flowers small, few or numerous, in a compact small terminal cyme, this usually bifurcate from the base, with a single flower between the branches, the white flowers secund along the branches of the cyme, sessile or nearly so, about 9 mm. long, the calyx narrow, 3 mm. long, with narrow acute lobes; corolla lobes scarcely 1 mm. long, rounded; capsule ellipsoid, 5–6 mm. long.

Leiphaimos simplex (Griseb.) Standl. Contr. U. S. Nat. Herb. 20: 199. 1919. *Voyria simplex* Griseb. in Seem. Bot. Herald 170. 1854.

Wet forest, among rotting leaves, 1,000 m. or less; Alta Verapaz; Izabal; Huehuetenango. British Honduras; Costa Rica; Panama.

Plants very slender and delicate, the stems white, mostly 6–15 cm. long, 1-flowered; leaf scales very small and inconspicuous, closely appressed to the stem,

few; calyx narrow, 3 mm. long, appressed to the corolla base, the lobes narrow, entire; corolla pale blue, the tube 8 mm. long, the lobes spreading, narrow, obtuse, 3–4 mm. long; capsule 5 mm. long.

LISIANTHUS L.

Reference: J. Perkins, Monog. Ubersicht der Gattung Lisianthus, Bot. Jahrb. 31: 489–498. 1902; Louis O. Williams, Fieldiana, Bot. 31: 406–411. 1968.

Erect, often rather tall, tricotomously, diffusely branched herbs, occasionally suffrutescent. Leaves reduced upward but present in the inflorescences, often with connate bases similar to interpetiolar stipules; inflorescence essentially thrysoid, or dichasioid, sometimes tending to be scorpioid; flowers small or large, mostly yellow but sometimes almost black; calyx 5-lobate, the lobes longer than the short tube; corolla funnelform or salverform, the 5 lobes spreading; stamens 5, inserted on the lower part of the corolla tube, the filaments filiform, the anthers oblong; ovary 1-celled, the style filiform, the stigma subcapitate; capsule enclosed in the persistent corolla, bivalvate; seeds commonly tuberculate or muricate.

About 15 species in Mexico, Central America and the West Indies with one species extending to Colombia, South America. Most South American species referred to this genus belong in *Chelonanthus*, or to other related genera.

Flowers single [rarely 2–3] in the axils of leaves; corolla dull red ..... *L. axillaris.*
Flowers few to many in the axils of reduced leaves or bracts; corolla yellow, red or "black."
  Corolla lobes widely flaring; flowers less than 20 mm. long; flowers probably yellow or reddish ..... *L. saponarioides.*
  Corolla lobes mostly erect, not flaring; flowers 25 mm. or mostly much longer.
    Calyx lobes ovate, acute or obtuse.
      Corolla lobes obtuse; corolla 3–3.5 cm. long; leaves sessile ... *L. viscidiflorus.*
      Corolla lobes acute; corolla 4–6 cm. long; leaves petiolate ..... *L. skinneri.*
    Calyx lobes linear to lanceolate, acuminate.
      Corolla 3–4.5 cm. long, the lobes long acuminate; flowers "black." *L. nigrescens* & var. *cuspidatus.*
      Corolla 2.5–4 cm. long, the lobes acuminate; flowers yellowish or greenish.
        Corolla lobes about 5 mm. long ..... *L. brevidentatus.*
        Corolla lobes about 10 mm. long ..... *L. auratus.*

Lisianthus auratus Standl. Trop. Woods 37: 29. 1934.

Mixed woods and pine savannas, 50–1,000 m. Chiquimula. British Honduras; Honduras (type from Siguatepeque, *Edwards P-556*); Nicaragua.

Annual herbs to about 2.5 m. tall, sometimes suffrutescent, terete or obscurely angles above, nearly simple or often profusely tricotomously branched, branching is indeterminate; leaves elliptic to elliptic-lanceolate or lanceolate-ovate, acumi-

nate, with 2 pairs of lateral nerves, membranaceous, 2–9 cm. long and 1–2.5 cm. broad, short petiole 3–5 mm. long, clasping the stems and joined; inflorescence a single axillary flower to axillary few-flowered cymes, these sometimes short pedunculate, the pedicels 6–16 mm. long; flowers yellow, subdiaphanous; calyx divided to near the base, the lobes linear-lanceolate, acute, about 4–8 mm. long; corolla constricted above the ovary then expanding and tubular above, about 25–35 mm. long, the lobes lanceolate-ovate, acuminate, about 5–10 mm. long; stamens exserted, the anther oblong-ovate, cordate, about 2 mm. long; style as long as or longer than the corolla, the stigma capitate; capsule narrowly ovoid, vernicose, 6–12 mm. long at maturity.

The species is known from two collections from British Honduras and one from Guatemala. The collections known from Nicaragua are with smaller flowers than others. The areolar markings in the membranaceous leaves, due to the veinlets, are distinctive.

Lisianthus axillaris (Hemsl.) O. Kuntze, Rev. Gen. Pl. 2: 429. 1891 (type British Honduras, *Barlee*); *L. francisiae* Sprague, Kew Bull. 1929: 8. 1929 (type British Honduras, *Francis 1*).

Often in pine savannas or in forest clearings, usually at 600 m. or lower; Petén. British Honduras where apparently frequent.

An erect herb, or sometimes suffrutescent below, stem simple or branched, slender; leaves sessile or short-petiolate, lance-ovate to elliptic-lanceolate or oblong-lanceolate, 5–11 cm. long, 2–4 cm. broad, long-acuminate, acute to somewhat rounded at the base, the lateral nerves generally 2 pairs; flowers axillary, solitary in each axil or very rarely in 2–3-flowered dichasia, the pedicels mostly 1.5–2 cm. long; calyx segments lance-linear, 9–10 mm. long, long-attenuate, carinate; corolla 3.5–4 cm. long, the tube very slender, the throat abruptly dilated, 5–6 mm. broad, dull red, the lobes ovate-oblong, caudate-acuminate, green, 8–10 mm. long; stamens slightly longer than the corolla tube but shorter than the lobes; style about equalling the corolla lobes; capsule ellipsoid-oblong, 1 cm. long.

Called "red chilar" in British Honduras.

Lisianthus brevidentatus (Hemsl.) O. Kuntze, Rev. Gen. Pl. 2: 429. 1891. *Leianthus brevidentatus* Hemsl. Biol. Cent. Am. Bot. 2: 344. 1882 (type from Izabal, *Bernoulli 924*). *Lisianthus quichensis* Donn.-Sm. Bot. Gaz. 52: 51. 1911 (type from Quiché, *Heyde & Lux 2921*). *Lisianthus collinus* Standl. Carnegie Inst. Wash. Publ. 461: 81. 1935 (type from British Honduras, *Schipp 1205*). *Lisianthus calciphilus* Standl. & Steyerm. Field Mus. Bot. 22: 267. 1940 (type from Alta Verapaz, *Wilson 356*). *L. elatus* Standl. & Steyerm. l.c. (type from Izabal, *Steyermark 38562*). *Lisianthus petenensis* Standl. & Steyerm. Bull. Torr. Bot. Club 84: 46. 1957 (type from Petén, *Lundell 3153*).

Banks, grassy slopes and open woods, mostly 500–1,500 m.; Petén; Alta Verapaz; Chiquimula; Huehuetenango. Mexico (Chiapas); British Honduras.

Simple or usually diffusely branched herbs, the stems stout, terete, to 1.5 m. tall. Leaves sessile to subamplexicaul on the lower part of the stem, elliptic to lanceolate-oblong, the upper ones attenuate to the base, the lower ones broader at the base and subamplexicaul, acute to long acuminate, usually with two pairs of lateral nerves, principal ones 9–15 cm. long and 2–4 cm. broad, much reduced and becoming bract-like above; inflorescence few-flowered to many-flowered, diffusely branched, densely flowered to open few-flowered dichasia or cymes; flowers yellow-green or yellow, borne on short (2 mm.) to long (30 mm.) pedicels; calyx deeply 5-lobed, the lobes lance-attenuate, acuminate, the margins scarious, 6–10 mm. long; corolla 27–40 mm. long, the tube strong costate at the base and marcescent in age, the throat 4–6 mm. broad, lobes erect, ovate to broadly ovate, acuminate and apiculate, 2.5–5 mm. long; stamens about as long as or slightly exceeding the corolla; stigma globose; capsule ovoid to subglobose, vernicose, apparently viscid.

We have not seen authentic material of *L. brevidentatus* but the description indicates that it is this most common of the Guatemalan species. The several synonyms indicated above seem to be based mostly on growth forms. The plant when it begins to flower is quite a simple one, becoming diffusely branched and coarse with age. There are also differences in the compactness of the inflorescences as well as differences in the size of the flowers and especially in length of the corolla lobes. Monographic studies may indicate a more liberal view of these plants.

Lisianthus nigrescens Schlecht. & Cham. Linnaea 6: 388. 1831. *Leianthus nigrescens* Griseb. Gen. & Sp. Gent. 199. 1838.

On limestone along river (*Cook 65*). Huehuetenango. Eastern and southern Mexico.

Coarse, erect herbs, usually about a meter high, branched above, the stems terete; leaves sessile, lance-oblong to narrowly lanceolate, broad and somewhat amplexicaul at the base or cuneately narrowed to the base; inflorescence cymose-paniculate, large and many-flowered, open, the bracts leaf-life but reduced, the flowers on short or much elongate pedicels, these usually recurved in age; calyx green, 8–10 mm. long, the segments lanceolate, long-attenuate; corolla purple-black, 3–3.5 cm. long, cuspidate in bud, the tube 3–4 mm. broad near the apex, the lobes 7–10 mm. long, cuspidate-acuminate; capsule ellipsoid, 10–12 mm. long, very lustrous.

A most unusual plant, notable for its almost black corollas—a yellow-flowered variety occurs in Chiapas, Mexico.

Lisianthus nigrescens var. **cuspidatus** (Bertoloni) L. Wms. Fieldiana, Bot. 31: 408. 1968. *Lisianthus cuspidatus* Bertoloni,

Comm. Acad. Bonon. 4: 408, *t. 37*. 1840 (type collected in Guatemala, the locality not indicated but possibly between Esquintla and Guatemala, *Velásquez*).

Open dry or moist slopes or plains, 1,000–1,800 m.; El Progreso (Volcán Siglo); Guatemala; Chimaltenango; Quiché; Huehuetenango. Mexico.

Similar to the species but the flowers larger and more showy. Corolla purple-black, 4–5.5 cm. long, the tube 5–6 mm. broad at the throat, the lobes 12–18 mm. long, long attenuate or cuspidate-acuminate; capsule ellipsoid, about 12 mm. long.

The flowers are the nearest to black of any known to us in Guatemala. The plant is a handsome one when in full flower.

Lisianthus saponarioides Schlecht. & Cham. Linnaea 6: 389. 1831. *Leianthus saponarioides* Griseb. Gen. & Sp. Gent. 198. 1838. *Petasostylis saponarioides* Griseb. in DC. Prodr. 9: 71. 1845. *Lisianthus meianthus* Donn.-Sm. Bot. Gaz. 52: 51. 1911 (type from Alta Verapaz, *Tuerckheim 1436*). *Lisianthus congestus* Standl. Carnegie Inst. Wash. Publ. 461: 82. 1935 (type from Petén, *Lundell 2479*).

Apparently a plant of the savannas; Petén; Alta Verapaz. British Honduras; Mexico.

An erect herb, the stems branched, terete; leaves short-petiolate, ovate or lance-ovate, 2.5–4 cm. long, 1–1.5 cm. broad or larger, acuminate or long-acuminate, obtuse or somewhat rounded at the base, the lateral nerves obsolete; flowers yellow, in dense head-like cymes, these terminating short branches, subtended at the base by normal leaves, very dense and many-flowered, sessile or nearly so; calyx 8 mm. long, the segments lance-linear, long-attenuate; corolla tube slender, striate, 9–10 mm. long, the lobes spreading, ovate, cuspidate-acuminate, 5 mm. long; stamens and style short-exserted; capsule oblong, 7 mm. long.

Perkins referred to this species the collection later made the type of *L. quichensis* Donn.-Sm., but that, in its open lax inflorescence, does not at all agree with the original description of *L. saponarioides*. Of that we have seen no authentic representation, but its description agrees fully with the plant described as *L. congestus*. Since the later plant comes from a region far removed from Veracruz, it is still possible that it may be a valid species, but by description alone the two described species cannot be separated.

Lisianthus skinneri (Hemsl.) O. Kuntze, Rev. Gen. Pl. 2: 429. 1891; L. Wms. Fieldiana, Bot. 31: 411. 1968. *Leianthus skinneri* Hemsl. Biol. Cent. Am. Bot. 2: 345. 1882 (type: Guatemala, *Skinner*). *Lisianthus arcuatus* Perkins in Engler, Bot. Jahrb. 31: 492. 1902.

FIG. 88. *Lisianthus nigrescens* var. *cuspidatus*. A, portion of upper part of plant showing method of branching in inflorescence, × ½; B, a leaf from lower part of stem, × ½; C, ultimate part of inflorescence showing a flower, natural size; D, corolla dissected to show stamens, × 1½; E, calyx, × 3; F, pistil, × 2; G, stigma, × 20.

Edges of clearings or in wet forests, from near sea level in north of range to about 1,000 m. in the south. "Guatemala." Honduras; Costa Rica; Panama. To be expected in Nicaragua.

Herbs to 1.5 m. tall or perhaps more, the stems sometimes suffruticose. Leaves oblong-lanceolate to narrowly obovate, acute to acuminate, up to 25 cm. long and 10 mm. broad and rather long petiolate (to 6 cm.), reduced upward and those of the inflorescence nearly sessile, usually with two pairs of prominent lateral nerves; inflorescence corymbose, mostly with ten or fewer flowers; flowers yellow, the pedicels 2 cm. long or the flowers nearly sessile; calyx 5–7 mm. long, tubular below, the lobes 2–4 mm. long, ovate-lanceolate to ovate, acute; corolla tubular, slightly arcuate, 4–6 cm. long, the lobes ovate, acute, 3–4 mm. long; stamens equalling the corolla or slightly exserted; style exserted in mature flowers.

Lisianthus viscidiflorus Robinson, Proc. Am. Acad. 45: 398. 1910.

Open forest or brushy hillsides, on limestone, 200–1,400 m.; Alta Verapaz (type from Cobán, *Tuerckheim II.1308*); collected at various other localities in this department. Mexico (Oaxaca).

A tall and rather coarse annual, about a meter high or sometimes taller, the stems terete, simple below, branched above; leaves sessile and amplexicaul, lanceoblong, 7–12 cm. long and 1–2.5 cm. broad or often considerably larger, acuminate, the lateral nerves 2 pairs; flowers numerous and forming a very large, open, much-branched panicle, most of the bracts much reduced and lanceolate to subulate, the dull red flowers on short or much elongate pedicels, very viscid; calyx lobes ovate, obtuse or acute, 4–7 mm. long; corolla 3–3.5 cm. long, the tube dull red, the lobes green with purple at the base, the lobes broad, obtuse or rounded at the apex, about 5 mm. long, erect; stamens included, the style short-exserted.

NYMPHOIDES Séguier

Aquatic perennial herbs with rootstocks; leaves on greatly elongate petioles, broadly ovate or orbicular, cordate at the base, entire or repand; flowers small, yellow or white, umbellate at the ends of the stems or axillary; calyx 5-parted; corolla subrotate, deeply 5-lobate, the lobes induplicate-valvate in bud, often with fimbriate margins; stamens 5, inserted on the base of the corolla, the anthers sagittate, versatile; ovary 1-celled, the style short or none, the stigma bilamellate; capsule indehiscent or irregularly ruptured.

About 20 species, in tropical and temperate regions of both hemispheres. Only one is found in Central America.

Nymphoides humboldtianum (HBK.) Kuntze, Rev. Gen. Pl. 2: 429. 1891. *Villarsia humboldtiana* HBK. Nov. Gen. & Sp. 3: 187. 1818. *Limnanthemum humboldtianum* Griseb. Gen. & Sp. Gent. 347. 1838. *Cebolla de agua; Corazón de agua.*

FIG. 89. *Nymphoides humboldtianum.* A, habit, × 1; B, calyx and ovary, × 3; C, flower dissected, × 2; D, anthers, × 8; E, cross-section of ovary, × 8. B–E, after Gilg in Engler, Pflanzenf. IV, 1: 197, *fig. 48.* 1891.

Floating on ponds or lakes or sometimes submerged or on mud, 2,000 m. or less; Petén; Izabal; Chiquimula; Jalapa; Jutiapa; Santa Rosa; Esquintla; Quiché; Huehuetenango; probably also in other departments. Mexico; British Honduras to Panama. West Indies. South America.

Plants glabrous, with elongate rootstocks, fleshy, the stems stout, often spongious, mostly 40 cm. long or shorter; leaves solitary, orbicular or orbicular-reniform, 3–12 cm. broad, deeply cordate at the base; flowers white or yellow, in a sessile umbel at the base of the petiole, the pedicels few or numerous, very unequal, 3–10 cm. long, deflexed in fruit; calyx segments linear-lanceolate, 8 mm. long; corolla lobes fimbriate, twice as long as the calyx, recurved; capsule somewhat shorter than the calyx; seeds numerous, smooth, globose.

The plants sometimes are found upon mud, where the water has receded. The leaves are often purplish beneath. In Guatemalan plants the flowers are either white or yellow. The plants of this alliance sometimes are placed in a separate family Menyanthaceae.

SCHULTESIA Martius

Erect annuals; leaves opposite, sessile or nearly so; flowers large or small, usually pink or white; calyx tubular, 4-costate or often 4-winged, 4-lobate, the tube as long as the lobes or longer; corolla funnelform, the tube narrowed upward, the limb 4-lobate, the lobes contorted in bud; stamens 4, inserted on the corolla tube, the anthers oblong; ovary 1-celled, the style filiform, the stigma 2-lamellate; capsule bivalvate; seeds small, foveolate.

About 20 species, one in tropical Africa, the others in tropical America.

The genus *Schultesia* is a small one in Central America. The names used here, except *S. peckiana*, are all based upon South American types and most of them have extensive ranges. We have followed traditional usages here which is the best that we can do until such time as a revision is written of the genus.

Calyx 5–10 mm. long, not winged or very obscurely so.
- Calyx at anthesis 9–10 mm. long; flowers all or nearly all on slender pedicels 8–30 mm. long, the inflorescence lax and usually many-flowered. *S. peckiana.*
- Calyx at anthesis 6–7 mm. long; flowers, at least many or most of them, sessile, the inflorescence generally dense and many-flowered..... *S. lisianthoides.*

Calyx 15–30 mm. long or larger, the sepals often narrowly winged dorsally.
- Corolla 4–5 cm. long; calyx about 3 cm. long..... *S. brachyptera.*
- Corolla 1.5–2 cm. long; calyx about 1.5 cm. long..... *S. guianensis.*

Schultesia brachyptera Cham. Linnaea 8: 8. 1833.

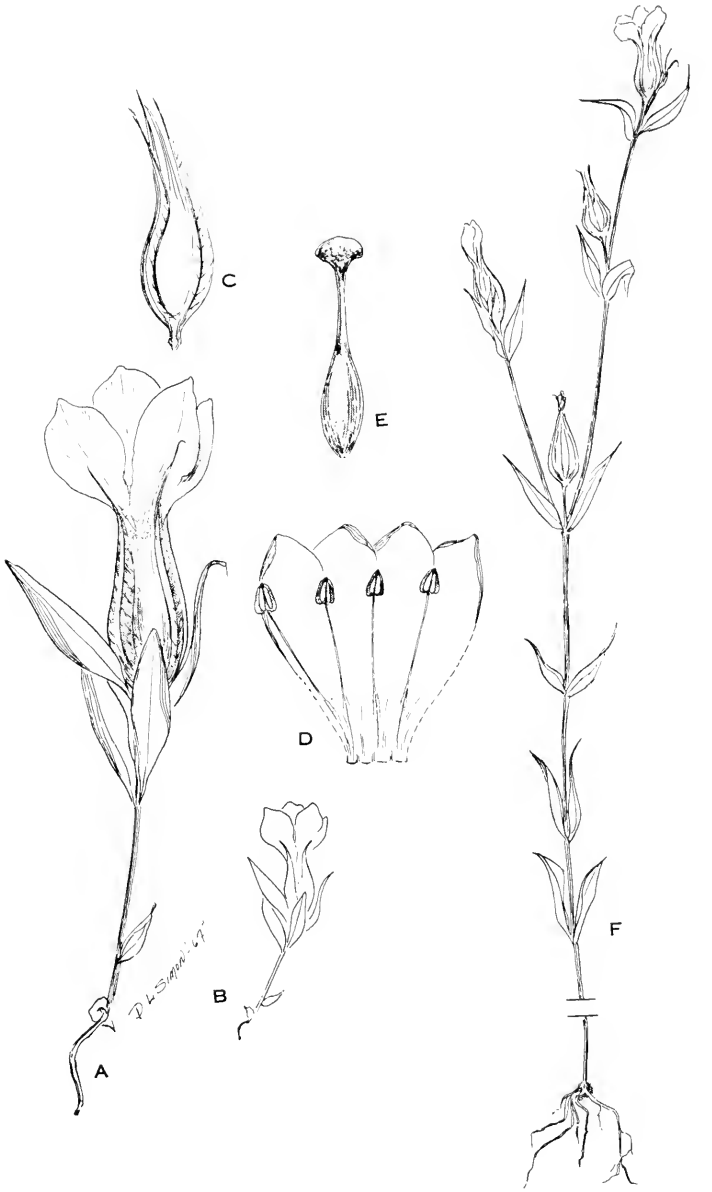

FIG. 90. *Schultesia guianensis*. A, habit of plant from subalpine region, × 3; same plant, natural size; C, calyx, × 3; D, corolla dissected, × 3; E, pistil, × 3; F, plant from the lowlands with 4 cm. of stem left out, natural size.

Savannas or open pine forest, usually in very wet soil, at or little above sea level; British Honduras. Mexico; Honduras; Panama; South America.

Plants slender, erect, 25–70 cm. high, simple or with a few erect branches above; leaves sessile, linear or oblong-linear, obtuse to attenuate, 3-nerved below, 2.5–6 cm. long; flowers usually 1–5, solitary at the ends of the branches, each subtended by 2 leaves, sessile or nearly so; calyx about 3 cm. long, lanceolate, attenuate upward, conspicuously carinate and sometimes very narrowly winged along the angles, the nerves between the angles none or obscure, the lobes linear-attenuate, shorter than the tube, not appressed but slightly outcurved; corolla 4–5 cm. long, rose-pink, the lobes rounded, inconspicuously apiculate.

This is an unusually beautiful plant when it occurs in abundance, the flowers being large and of an exquisite shade of pink. It is typically a species of wet savannas, and often grows in shallow water. The Central American plant has been called *S. heterophylla* Miq. in recent publications. It is very close to that species, but is better referred perhaps to *S. brachyptera*. It is questionable whether these two species can be maintained, and the name used here has priority.

Schultesia guianensis (Aubl.) Malme, Arkiv. Bot. 3, no. 12: 9. 1904. *Exacum guianense* Aubl. Pl. Guian. 68, *t. 26, f. 1*. 1775. *S. stenophylla* Mart. Nov. Gen. & Sp. 2: 106, *t. 182*. 1826. *S. mexicana* Wats. Proc. Am. Acad. 26: 144. 1891. *S. chiapensis* Brandeg. Univ. Calif. Publ. Bot. 10: 413. 1924 (type from Chiapas).

Wet or moist meadows, sometimes in glades in oak forest, 1,100–1,800 m.; Chiquimula; Jalapa; Santa Rosa; Huehuetenango. Central and southern Mexico; British Honduras; El Salvador; Honduras; Costa Rica; Panama; West Indies; South America.

A low annual, usually 30 cm. high or less, often only 2–3 cm. high, simple or sparsely branched above, 1–few-flowered; leaves sessile, linear to lanceolate or oblong, the lowest ones mostly shorter and broader than the upper, obtuse to attenuate; flowers short-pedicellate, usually of a faded dirty pink to yellowish; calyx about 15 mm. long, conspicuously winged on the angles, the wings green, the tube conspicuously veined, the lobes subulate-attenuate, somewhat shorter than the tube; corolla 1.5–2 cm. long; capsule oblong-ovoid, 12 mm. long.

Known in El Salvador as *"hierba de la vida," "conchalagua"* and *"sulfatillo."* Although its flowers are rather large, this is not a pretty or showy plant. A color form is f. *lutescens* Standl. & Steyerm. Field Mus. Bot. 23: 77. 1944 (type from meadow in oak forest, near Jalapa, *Standley 76561*), in which the corolla is pale buff or cream-colored. It has been found also in Honduras (Siguatepeque).

Schultesia lisianthoides (Griseb.) Benth. & Hook. ex Hemsl. Biol. Cent. Am. Bot. 2: 348. 1882. *Xestaea lisianthoides* Griseb. Linnaea 22: 36. 1849.

Wet to dry thickets or open forest, often in stony fields, on open banks, or in pine-oak forest, 1,000 m. or less; Alta Verapaz; Izabal; Santa Rosa; Escuintla; Suchitepéquez; Retalhuleu; San Marcos. British Honduras; Southern Mexico to Panama; Colombia and Venezuela.

Plants erect, 70 cm. high or less, usually with few or numerous suberect branches; leaves thin, sessile, or the lowest contracted at the base into a short petiole, the lower ones mostly obovate or obovate-oblong, the upper ones ovate-oblong or ovate, obtuse to acuminate, the upper ones amplexicaul; flowers usually very numerous, distributed almost throughout the length of the plant, in small open cymes, sessile or on very short pedicels, the bracts lanceolate to subulate, small; calyx green, at anthesis 5–7 mm. long, often longer in fruit and then distended by the capsule, lobate almost to the base, the segments linear-lanceolate, carinate but not winged, white-marginate, attenuate; corolla dirty pink, 10–14 mm. long; capsule ellipsoid-oblong, about 8 mm. long.

Known in El Salvador by the names "*sulfatillo*" and "*sulfato de tierra.*" A rather weedy plant, with small and inconspicuous flowers.

Schultesia peckiana Robinson, Proc. Am. Acad. 45: 399. 1910.

Open places, at or little above sea level; endemic; British Honduras, the type collected about plantations and in openings in forest near Manatee Lagoon, *M. E. Peck 318*; collected also at All Pines, and at Woods Bank, Sibun River.

Plants erect, similar in habit to *S. lisianthoides*, 60–75 cm. high, rather sparsely and openly branched; leaves sessile, lance-ovate to elliptic, acute or the lower ones obtuse, rounded at the base; inflorescence lax, repeatedly branched, the central flowers of the cymes solitary, usually on long slender pedicels, these sometimes 3 cm. long but usually shorter, the pedicels mostly naked but sometimes bracteolate; calyx lobes narrowly lanceolate, scarious-marginate, carinate; corolla dirty pink, the lobes ovate, acute, much shorter than the tube.

This species is evidently closely related to *S. lisianthoides*, perhaps too closely so, but it appears to be distinct by the characters contrasted in the key.

VOYRIA Aublet

Small saprophytic plants without chlorophyll, the stems mostly simple and 1-flowered, stout; leaf scales much larger than in *Leiphaimos*, not appressed to the stem but loose and somewhat spreading; flower subtended at the base by several bractlets; calyx campanulate, 5-dentate, the teeth usually broad; corolla elongate-cylindric, dilated at the middle, the limb 5-lobate, the lobes ovate to lanceolate,

spreading; stamens 5, inserted in the upper part of the corolla tube, the filaments very short, the anthers elongate, obtuse; ovary sessile, with 2 parietal placentae; style elongate and filiform; capsule usually enclosed in the persistent corolla, elongate, septicidal from base to apex; seeds globose or angulate, obscurely reticulate, wingless; endosperm none.

Species about ten, in Central and South America. See Williams in Fieldiana, Bot. 31: 411–415. 1968 for a discussion of this and allied genus *Leiphiamos*.

Capsule truncate at the apex ..... *V. truncata.*
Capsule not truncate at the apex.
Calyx 3–4 mm. long; corolla about 10 mm. long; stigma without lateral membranaceous appendages ..... *V. alba.*
Calyx 4–6 mm. long; corolla 10–15 mm. long; stigma with lateral membranaceous appendages ..... *V. thalesioides.*

Voyria alba (Standl.) L. Wms., Field Mus. Bot. 31: 411. 1968. *Leiphaimos alba* Standl. Contr. U. S. Nat. Herb. 20: 198. 1919.

Saprophytic herbs in wet forests near sea level. British Honduras; Honduas; Nicaragua; Panama; Colombia.

Slender, leafless saprophytic herbs but with prominent cauline bracts, 6–16 cm. tall. Inflorescence a simple to compound dichasium, 3–several usually sessile flowers; flowers white, 9–12 mm. long; calyx 3–4 mm. long, cleft to the middle, the tube campanulate, the lobes linear-lanceolate, acuminate, corolla about 10 mm. long and 1 mm. in diameter, cylindric, lobes lanceolate, acute, ascending or spreading, 1.5–2.5 mm. long; capsule 6–8 mm. long, slender, dehiscing from base to apex; seeds minute, trigonous to globose, not winged.

The smallest of the Voyrias of Central America and superficially similar in aspect to *Leiphaimos parasitica* with which it has been confused.

Voyria thalesioides (Standl.) L. Wms. Fieldiana, Bot. 31: 414. 1968. *Leiphaimos thalesioides* Standl. Contr. U. S. Nat. Herb. 20: 198. 1919.

Small saprophytic plants on the floor of wet lowland forests. British Honduras (*Gentle 5182*); Panama.

Small yellow saprophytic herbs to 12 cm. tall. Leaves none, the stem with several pairs of perfoliate bracts about 4 mm. long, the lobes triangular, interval between nodes about 1 cm. or less; inflorescence a few-several-flowered corymb; flowers yellow, 1–1.5 cm. long, pedicels 3–5 mm. long; calyx about 4–6 mm. long, divided to about the middle, the tube broadly campanulate, the lobes becoming linear or linear-lanceolate and alternated from a broad base; corolla 5-lobed, the tube narrow, about 8–10 mm. long, persistent and becoming marcescent over the swelling ovary, the lobes spreading, oblong-lanceolate, acute, 2–3 mm. long; stamens inserted in the throat of the corolla, suborbicular, nearly sessile, about 0.75 mm. long; ovary subcylindric, style elongated and the capitate stigma reaches to

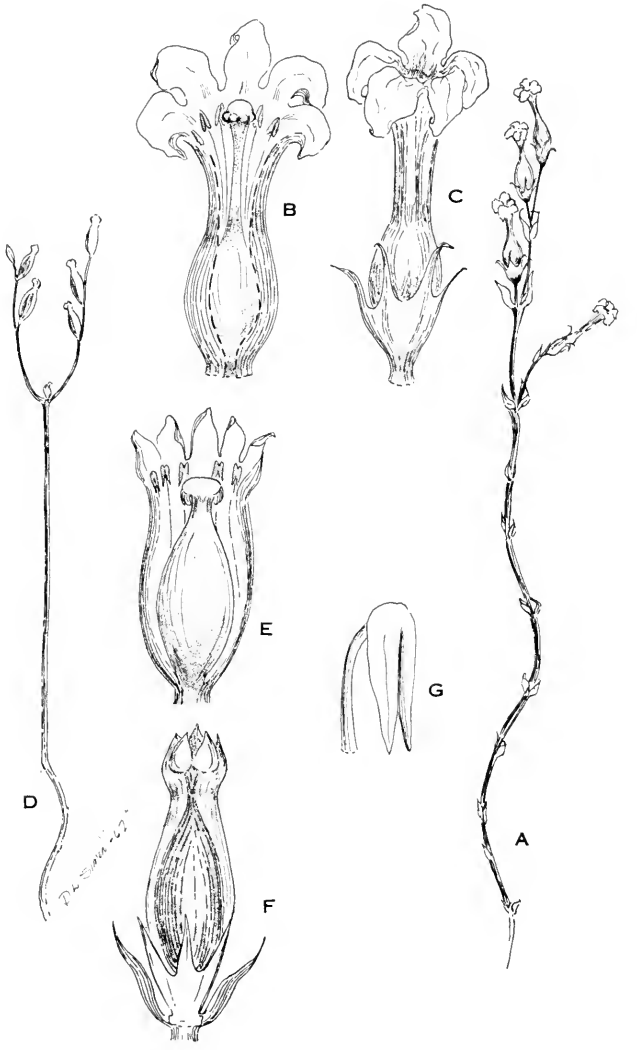

FIG. 91. *Voyria thalesioides*. A, habit of plant, natural size; B, corolla dissected showing pistil and anthers, × 3; C, flower in natural position, × 3. *Leiphaimos parasitica*. D, habit of plant, natural size; E, corolla dissected to show pistil and stamens, × 5; F, flower, × 5; G, anther, × 20.

the throat of the corolla, stigma with 5–6 small lateral membranaceous flaps; seeds ovoid to reniform, wingless, about 0.2 mm. long.

Voyria truncata (Standl.) Standl. & Steyerm. Field Mus. Bot. 23: 78. 1944. *Leiphaimos truncata* Standl. Contr. U. S. Nat. Herb. 20: 196. 1919. *V. allenii* Steyermark, Ann. Mo. Bot. Gard. 28: 460. 1941.

Moist or wet soil among rotting leaves, 400 m. or less; Alta Verapaz (Cerro Chinajá); Izabal. Nicaragua; Panama.

Plants arising from elongate rootstocks, the stems erect, stout but somewhat tortuous, 6–13 cm. long, simple or with 1 or 2 branches, dull red; leaf scales opposite, dull red, numerous and close together, broadly ovate or rounded, rounded at the apex, 4–5 mm. long, united by their bases; flowers 1–2, on stout pedicels 9 mm. long or shorter, lilac or rose-lilac; calyx 7 mm. long, appressed to the base of the corolla, the lobes rounded, minutely ciliate; corolla tube 3–4.5 cm. long, broadest at the base around the ovary, narrowed upward, sometimes minutely pulverulent, the lobes elliptic-ovate, obtuse, 15 mm. long or shorter; style slender, 27 mm. long, the stigma sinuate-peltate; capsule as much as 15 mm. long and 5 mm. broad.

The species may be expected in other countries between Panama and Guatemala.

APOCYNACEAE. Dogbane Family

References: Robert E. Woodson, Apocynaceae, N. Am. Flora 29: 103–192. 1938; The Apocynaceous Flora of the Yucatan Peninsula, Carnegie Inst. Wash. Publ. 522: 61–102. 1940; Studies in the Apocynaceae, II & IV, Ann. Mo. Bot. Gard. 15: 341–378. 1928; 20: 605–790. 1933; 22: 153–306. 1935; 23: 169–438. 1936.

Trees, shrubs or herbs, often herbaceous or woody vines, usually with milky latex. Leaves opposite or verticillate, *rarely* alternate, entire (or panduriform) never serrate or dentate, *estipulate* or with *stipules* or *stipular vestiges*; flowers perfect, actinomorphic or slightly zygomorphic, normally pentamerous, inflorescence of single flowers or usually racemose or cymose; calyx 5- (rarely 4-) lobed, often with glandular appendages (squamellae) within, the lobes imbricate; corolla gamopetalous, funnelform or salverform and often appendaged within, 5-lobed, the lobes sinistrorsely or dextrorsely contorted in the bud; stamens 5 (rarely 4), epipetalous, alternate with corolla lobes, often connivent around the stigma, the anthers bilocular, introrse, filaments free or sometimes united; ovary superior, bicarpellate, the carpels free or united, ovary 2-celled with axil placentae, or 1-celled with parietal placentae, the style simple; the stigma large and various in form; ovules 1–many in each cell, anatropous or orthotropous; fruit of distinct or united carpels, follicular, capsular, baccate or drupaceous; seeds usually with endosperm, naked, comose at the apex, with a papery wing or sometimes arillate, embryo straight.

A large family of some 200 genera and 2,000–3,000 species with the greater part of the species found in tropical regions of the world.

The family is well represented in Guatemala. Few of the plants are of economic importance; some are used as ornamentals; the latex of several is known to be poisonous to man, and a few may be contact poisons to persons with sensitive skin; cordage fibers or even textiles may be produced from a few members of the family, especially from the genus *Apocynum*.

Dr. Robert E. Woodson prepared monographs or revisionary studies of most of the American genera of this family and has brought them into most satisfactory order, the more convenient because of the chaos formerly prevalent in some of the groups. Our account of this family in Guatemala is based largely on Dr. Woodson's studies.

Members of this family usually are said to be without stipules, however stipules or stipular vestiges are often present. Interpetiolar stipules much like those in some Rubiaceae are to be found in some Guatemalan species.

Plants scandent.
- Leaves verticillate; fruit covered with long spines; flowers large, bright yellow. *Allamanda.*
- Leaves opposite.
  - Corolla 12–20 cm. long; cultivated plants ..... *Beaumontia.*
  - Corolla much smaller, often very small; native plants.
    - Connectives of the anthers with thick obtuse basal lobes; stigma pentagonal-umbraculiform; upper surface of the leaves glandular on the costa, at least at its base.
      - Inflorescence simple, not branched ..... *Mandevilla.*
      - Inflorescence branched, or at least obscurely dichotomous.
        - Corolla funnelform, dull red outside; inflorescence repeatedly branched. *Tintinnabularia.*
        - Corolla salverform, greenish white; inflorescence obscurely dichotomous, branched once or twice ..... *Mesechites.*
    - Connectives of the anthers with slender or attenuate basal lobes or, if with obtuse lobes (*Fernaldia*) the sporangia with conspicuous sterile protuberant bases; stigma fusiform or subcapitate; leaves not glandular.
      - Calyx without squamellae inside the lobes.
        - Corolla salverform, the tube usually spirally twisted, the orifice with a callous annulus ..... *Laubertia.*
        - Corolla funnelform, the tube not twisted, the orifice without a callous annulus ..... *Rhabdadenia.*
      - Calyx bearing squamellae inside the lobes.
        - Squamellae as many as the calyx lobes and opposite them, sometimes deeply lacerate.
          - Corolla with ligular appendages within behind the stamens, the orifice callous and annular; corolla funnelform or salverform. *Prestonia.*
        - Corolla not appendaged within, without a callous annular orifice.
          - Corolla funnelform, the lobes arachnoid-villous within. . *Fernaldia.*
          - Corolla salverform, not arachnoid-villous within ..... *Echites.*
        - Squamellae alternate with the calyx lobes or indefinitely distributed.

Corolla salverform, small, white ..... *Forsteronia.*

Corolla funnelform, large, yellow.

Anthers with linear apical appendages; placentae of the ovary becoming chaffy in fruit ..... *Urechites.*

Anthers without linear apical appendaged; placentae not chaffy in fruit ..... *Odontadenia.*

Plants not scandent.

Leaves alternate, or a few of the lower ones sometimes opposite.

Plants low, mostly 50 cm. high or less, herbaceous throughout or merely suffrutescent below; flowers yellow ..... *Haplophyton.*

Plants large shrubs or trees, with woody branches.

Carpels of the ovary many-ovulate.

Calyx lobes 4, the 2 outer ones connate and completely enclosing the smaller ones ..... *Aspidosperma.*

Calyx lobes 5, equal or nearly so.

Follicles of the fruit strongly compressed, ligneous; seeds surrounded by a very broad, papery wing; flowers small ..... *Aspidosperma.*

Follicles not compressed, not ligneous; seeds with a small excentric basal wing; flowers large and showy ..... *Plumeria.*

Carpels of the ovary containing only 1–6 ovules.

Calyx without squamellae; flowers small, white, the tube 7–8 mm. long; fruit small, white, juicy ..... *Vallesia.*

Calyx with squamellae within; flowers large and showy, usually yellow, fruit large, not white ..... *Thevetia.*

Leaves opposite or verticillate.

Leaves all or chiefly verticillate.

Cultivated plants, the flowers large and showy ..... *Nerium.*

Native plants, with small or large flowers.

Fruit of dry follicles; leaves mostly linear-oblanceolate; flowers small, white ..... *Tonduzia.*

Fruit fleshy; leaves mostly elliptic or oval.

Ovary 1-celled; tall trees with rose-purple flowers ..... *Couma.*

Ovary 2-celled; shrubs with white flowers ..... *Rauvolfia.*

Leaves opposite.

Plants herbaceous.

Corolla blue or blue-purple; plants with elongate and often rooting basal shoots ..... *Vinca.*

Corolla white or pink, never bluish; plants annual, without sterile basal shoots ..... *Lochnera.*

Plants shrubs or trees.

Fruit samaroid; leaves very obtuse or rounded at the apex; flowers small, white ..... *Cameraria.*

Fruit fleshy or of dry follicles, never samaroid; leaves mostly acute or acuminate.

Anthers connivent and agglutinated to the stigma; corolla lobes dextrosely convolute in bud ..... *Malouetia.*

Anthers neither connivent nor agglutinated to the stigma; corolla lobes sinistrorsely convolute in bud.

Carpels of the ovary united throughout; fruit fleshy and juicy. *Lacmellea.*

Carpels of the ovary distinct; fruit dry or nearly so.

Calyx lobes large, foliaceous or petaloid; corolla funnelform or salverform ..... *Stemmadenia.*

Calyx lobes small, corolla salverform ..... *Tabernaemontana.*
Calyx lobes linear, pubescent ..... *Haplophyton.*
Calyx lobes broader, scarious, glabrous ..... *Tabernaemontana.*

ALLAMANDA L.

Woody vines with copious milky sap; leaves mostly quaternate, not glandular; inflorescence cymose, few-flowered, lateral or pseudoterminal; calyx 5-parted, the lobes equal or nearly so, foliaceous, without squamellae; corolla large and showy, funnelform, the limb regularly 5-lobate, the lobes sinistrorsely contorted; anthers not connivent, wholly included, the connective not enlarged; ovary 1-celled, the numerous ovules borne upon two linear placentae, surrounded by a low annular nectary; fruit capsular, globose or subglobose, densely echinate; seeds numerous, compressed, winged.

About ten species, in tropical America. Only the following is known from North America.

Allamanda cathartica L. Mant. Pl. 214. 1771. *Amanda; campana.*

Wooded swamps or wet forest, at or little above sea level; Izabal; much planted for ornament in other parts of Guatemala. British Honduras to Panama, along the Atlantic coast; northeastern South America.

A large woody shrub or sometimes an arching vine, glabrous to villous or hirsute, especially on the stems and lower leaf surfaces; leaves subcoriaceous to membranaceous, short-petiolate, obovate to oblong-lanceolate, 6–15 cm. long, 2.5–6 cm. broad, acuminate, often caudate-acuminate, attenuate to the base; inflorescences few-flowered; flowers sweet-scented, golden yellow; calyx lobes ovate to lanceolate, acute, 5–12 mm. long, spreading; corolla 7–10 cm. long, the tube 2–3.5 cm. long, slender, the throat 3–4 cm. long, much ampliate, the lobes obliquely obovate, spreading, broadly rounded at the apex; capsule 4–6 cm. broad, somewhat compressed, covered with numerous green spines 1 cm. long.

Called "San José" in El Salvador. This handsome plant is grown in many tropical and subtropical regions remote from its native habitat, as in Florida. It is very showy when in blossom, in Guatemala most profusely perhaps in January and February. It has every appearance of being native in wet forests along the Atlantic coast of Central America, in Guatemala only along the coast of Izabal. In this country it is planted commonly from the central highlands, at about 1,500 m., down to the Pacific and Atlantic coasts. In the Canal Zone the English speaking people give the flowers the name of "buttercups."

ASPIDOSPERMA Martius & Zuccarini

Reference: Robert E. Woodson, Studies in the Apocynaceae. VIII. Ann. Mo. Bot. Gard. 38: 119–204. 1951.

Large trees of the forest or rarely shrubs, with whitish or reddish latex. Leaves alternate or approximate, rarely decussate or ternate (not ours); inflorescence terminal or axillary, determinate, dichasially cymose or dichasial and thyrsiform; calyx with usually 5 equal or unequal lobes, or sometimes reduced to 4, eglandular within; corolla salverform to tubular-salverform or tubular, constricted or not at the throat, the lobes sinistrorsely contorted in the bud; anther inserted at the middle or higher in the tube, mucronulate; ovary superior, bicarpellate, the carpels essentially free, fruit follicular, usually strongly compressed and more or less woody, usually asymmetrical, from nearly circular to falciform or dolabriform; seeds peltate, greatly compressed and with a flat, papery wing.

This genus supplies important timber trees in Guatemala, and more especially in South America. There are about 60 species,—only two are known in Central America.

Calyx densely pubescent; corolla lobes caudate-acuminate, the tube callose-angulate ..... *A. megalocarpon.*
Calyx nearly glabrous; corolla lobes not abruptly caudate-acuminate, the tube essentially terete ..... *A. stegomeris.*

Aspidosperma megalocarpon Muell.-Arg. Linnaea 30: 40. 1860; Woodson, Ann. Mo. Bot. Gard. 38: 192. 1951. *Macaglia megalocarpa* O. Kuntze, Rev. Gen. Pl. 2: 416. 1891. *Aspidosperma cruentum* Woodson, Am. Jour. Bot. 22: 634. 1935. *A. matudae* Lundell, Phytologia 1: 339. 1939 (as *Matudai*). *A. chiapense* Matuda, Madroño 10: 172. 1950. *A. chiapense* forma *tenax* Matuda, l.c. 174.

In dense, dry forests or in river bottom forests as well; Petén; Alta Verapaz; Suchitepéquez; Escuintla. Southeastern Mexico; British Honduras; Honduras. South to Colombia and British Guiana.

Trees 7–30 m. tall, the trunk 2–8 dm. in diameter and with whitish, rough bark; branches minutely gray-pilosulose when young, soon glabrate and developing a blackish bark without apparent lenticels; leaves alternate, elliptic-obovate to narrowly oblong, apex acute to broadly obtuse, base acutely or obtusely cuneate, 5–25 cm. long, 2–9 cm. broad, firmly membranaceous or subcoriaceous, wholly glabrous, highly lustrous above, somewhat paler beneath, the secondary veins broadly ascending to subhorizontal, very numerous and crowded; petioles 1–3 cm. long; inflorescences terminal and axillary at the uppermost nodes, broadly corymbose-thyrsiform, shortly pedunculate, many-flowered, sordid brown-tomentulous without; corolla yellowish white, glabrous without, the tube callose-angulate, 3–4 mm. long, the lobes linear, caudate-acuminate, strongly spiraled in the bud, about 1.5–2.0 mm. long; anthers inserted about midway within the corolla tube, about 1 mm. long; ovary globose, glabrous, about 0.7 mm. long; follicles broadly oval to nearly circular, 8–15 cm. long and 6–11 cm. broad, woody, brown-tomentulous, with a rather broad stipe 1–3 cm. long.

FIG. 92. *Aspidosperma megalocarpon*, A, habit, × ½; B, flower, × 5; C, corolla dissected to show stamens, × 5; D, pistil, × 10; E, winged seed, × ½.

Aspidosperma stegomeris Woodson, Ann. Mo. Bot. Gard. 38: 178. 1951. *Cufodontia stegomeris* Woodson, Archivo Bot. 10: 39. 1934. *C. lundelliana* Woodson, l.c. 40 (type from Petén, *Lundell 3408*). *Aspidosperma lundellianum* Woodson, Am. Jour. Bot. 22: 684. 1935. *Chichica; sacuallón; bayo blanco; malerio blanco.*

Dry forests at low elevations, Petén; Retalhuleu. Mexico; British Honduras; Costa Rica.

Trees as much as 33 m. in height, the branches rather slender, indefinitely puberulent-papillate when very young, soon becoming glabrate and with a thin, striate, conspicuously lenticellate, yellowish-gray bark. Leaves alternate, rather narrowly elliptic-oblong to broadly oval, apex shortly acuminate to broadly rounded, base broadly obtuse to rounded, 6–16 cm. long and 2.5–7 cm. broad, firmly membranaceous to subcoriaceous, above dark green, glabrous, and somewhat lustrous, beneath paler and indefinitely papillate to essentially glabrous; petioles 0.7–1.5 cm. long; inflorescences lateral and extra-axillary near the tips of the leafy branches, cymose, several-flowered, more or less densely yellow-papillate, the peduncles once-to-thrice dichotomous and about 1–2 cm. long; bracts extremely inconspicuous or absent; pedicels 1–5 mm. long; outer calyx lobes 3–6 mm. long, more or less densely yellow-papillate; corolla yellowish-white, the tube 4–6 mm. long, about 1.5 mm. broad, densely and appressed velutinous-papillate without, the lobes oblong-elliptic, 5–6 mm. long, essentially glabrous without; stamens inserted about midway within the corolla tube, the anthers about 1.2 mm. long; ovary ovoid, glabrous, about 1 mm. long; follicles broadly subreniform to nearly circular, 7–11 cm. long and 6.5–8 cm. broad, sessile, indefinitely papillate to essentially glabrous, covered with small lenticels.

This tree was formerly not uncommon near Retalhuleu where it was an important lumber tree.

Called "white malady" or "cojotón" in British Honduras.

BEAUMONTIA Wallich

Large woody vines; leaves opposite, membranaceous, penninerved, the axils often glanduliferous; flowers very large, white, fragrant, in terminal cymes; bracts mostly foliaceous and caducous; calyx 5-parted, eglandular within at the base or bearing numerous small glands, the segments large, foliaceous; corolla funnelform, the tube short, the throat ampliate, without squamellae, the 5 lobes dextrorsely contorted; stamens inserted at the apex of the tube, included in the throat, the filaments thickened at the apex; anthers sagittate, short-acuminate, connivent about the stigma and adherent to it, the anther cells produced at the base into acuminate appendages; disk 5-lobate; ovary 2-celled, the style filiform, the stigma oblong-fusiform, exannulate; ovules numerous in each cell; fruit elongate, thick, subligneous, finally separating into two follicles; seeds compressed, ovate or oblong, attenuate to the apex and bearing a tuft of hairs; radicle short, superior.

About four species, native in the East Indies and Malaysia.

Beaumontia grandiflora Wall. Tent. Fl. Nep. 15, *t.* 7. 1824. *Campanula; campana blanca.*

Native of eastern India, now grown in many tropical regions of the earth as an ornamental plant; rarely in Guatemala, but cultivated also in other parts of Central America.

A large woody vine, the stout young branches ferruginous-tomentose; leaves short-petiolate, oblong-obovate, 10–17 cm. long or larger, rounded or obtuse at the apex and shortly cuspidate-acuminate, acute or obtuse at the base, when young

somewhat ferruginous-tomentose beneath but in age almost glabrous; cymes terminal, few-flowered, the flowers pedicellate; calyx 3–4 cm. long, ferruginous-tomentose, green, the broad segments cuspidate; corolla white, 12–20 cm. long, somewhat pubescent outside, the lobes short and broad, acutish; follicles horizontally divergent, linear, with incurved obtuse tips, 15–25 cm. long, slender.

Known in El Salvador as "pomoncia," "bomoncia" and "azucena japonesa." The vine is highly recommended for cultivation in tropical and subtropical regions. It often attains a great size, and in its native country is said to cover tall trees. The flowers are almost pure white, exceedingly large, and in appearance almost exactly like those of *Datura arborea*. In Guatemala the plant is somewhat of a rarity, and in the smaller towns usually is closely guarded by its owners. The flowers are sometimes employed in making funeral wreaths.

CAMERARIA L.

Glabrous shrubs or small trees; leaves opposite, eglandular; inflorescence terminal, cymose, few-flowered; calyx without squamellae, 5-cleft almost to the receptacle, the lobes subequal; corolla salverform, white, small, not appendaged within; anthers not connivent, the connective not enlarged; ovary of 2 distinct carpels, without a nectary, 1–4-ovulate; follicles 2, indehiscent, samaroid, with a broad inequilateral wing, usually containing a single naked seed.

Two species, the other in Haiti.

Cameraria latifolia L. Sp. Pl. 210. 1753. *C. retusa* Griseb. Fl. Brit. W. Ind. 410. 1861. *C. belizensis* Standl. Trop. Woods 7: 8. 1926 (type from British Honduras, *S. J. Record*). *Chechém de caballo; savanna white poisonwood; white poisonwood* in British Honduras; *iquiché, chechém* (Petén).

In low mixed forests, little above sea-level, Petén. British Honduras. West Indies.

A shrub or small tree with ashy gray bark; leaves firm-membranaceous to subcoriaceous, on petioles 2–6 cm. long, mostly oblong-ovate or oblong-oval, 1.5–4 cm. long, obtuse or rounded at the apex and emarginate (in British Honduras material), obtuse or rounded at the base, very lustrous above; inflorescence terminal, usually 2–4-flowered, about equalling the subtending leaves, the pedicels 5–8 mm. long; calyx lobes ovate, acute or obtuse, 1–1.5 mm. long, imbricate; corolla white, the tube 5–8 mm. long, somewhat dilated above, the lobes broadly obovate, 6–15 mm. long; stamens included, sessile, anthers short, obtuse, apex of connective produced into a long, free filament; fruit 4–4.5 cm. long, 1.5–2 cm. broad.

The plant is highly poisonous if the latex falls upon the skin, producing serious swelling and inflammation similar to that produced by poison ivy (*Rhus radicans*). The wood is pale olive, hard, heavy, fine-textured, finishes very smoothly, is not durable; no use is made

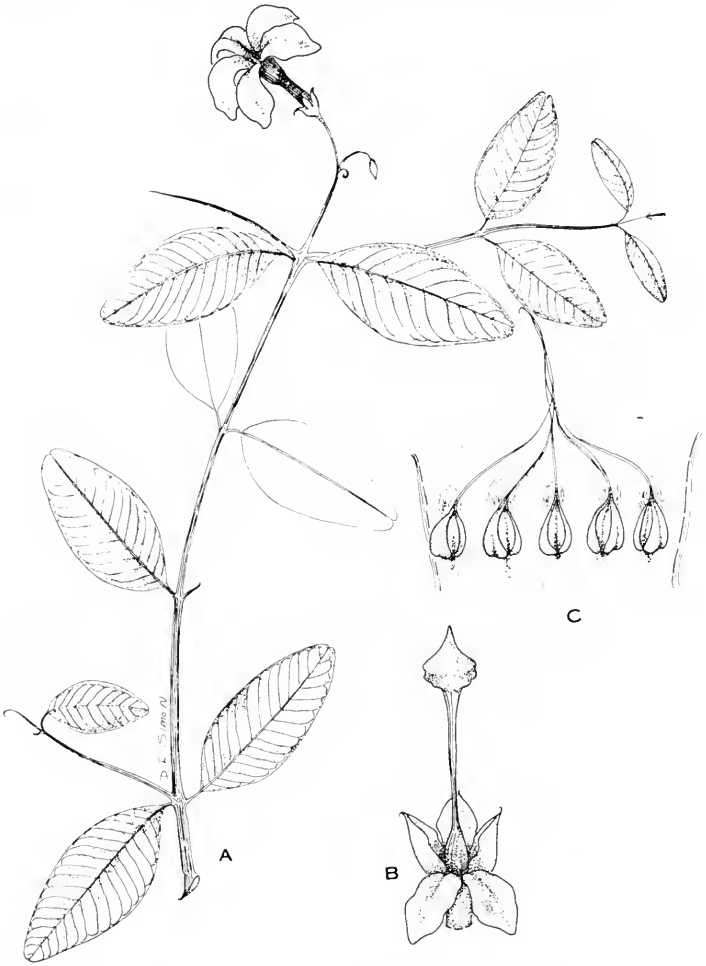

FIG. 93. *Cameraria latifolia*. A, habit, natural size; B, calyx and pistil, × 4; C, portion of the corolla tube to show stamens in natural position, × 5.

of it. Woodson recognizes only two species of *Cameraria*, but other authors commonly have recognized a larger number. The British Honduras plant is like *C. retusa* Griseb., which perhaps will prove to be a perfectly distinct species when more ample material of the genus has been assembled for study.

COUMA Aublet

Reference: Joseph Monachino, A Revision of Couma and Parahancornia (Apocynaceae), Lloydia 6: 229–247. 1943.

Usually large trees; leaves verticillate or sometimes opposite, eglandular; inflorescence cymose, lateral, many-flowered, the flowers small; calyx 5-parted, the lobes equal, imbricate, without squamellae; corolla salverform, the limb 5-parted, the lobes equal, sinistrorsely contorted; anthers not connivent, the connective not enlarged; ovary syncarpous, 1-celled, the ovules numerous, borne upon 2 linear parietal placentae; fruit a large several-seeded berry.

About five or six species, in tropical America, all except the following confined to South America.

Couma macrocarpa Barb.-Rodr. Vellosia ed. 2, 1: 32, *t. 1, fig. b.* 1891. *C. guatemalensis* Standl. Trop. Woods 7: 8. 1926 (type collected near Entre Ríos, Izabal, *S. J. Record 42*). *Palo de vaca; palo de leche.*

Low wet mixed forest, or often seen in cleared pastures, at or little above sea level; Izabal. British Honduras; possibly Panama; Colombia; Peru; and Venezuela to Amazonian Brazil.

A large or medium-sized tree with thick, dark-colored bark, the young branchlets thick, hirtellous with short, slender, stiff, brownish hairs; leaves ternate, on stout petioles 8–17 mm. long, elliptic, 6.5–27 cm. long and 3.5–18 cm. broad, usually abruptly short-acuminate, obtuse and often short-decurrent at the base, chartaceous at maturity, green above and glabrous or nearly so, densely and minutely puberulent beneath; inflorescence about equalling the leaves, the flowers very numerous, rose-purple; calyx lobes oblong-lanceolate, obtuse, 2–2.5 mm. long, minutely puberulent; corolla puberulent, the tube 7–8 mm. long, the lobes oblong, obtuse, 4–6 mm. long; fruit subglobose, very fleshy, about 3 cm. in diameter, yellow at maturity.

Called "barca" in British Honduras. One of the most interesting of Central American trees, and one that has received much attention in periodical literature of the United States, especially in newspapers. The first known North American material was obtained by the senior author in June, 1922, in a swamp at Puerto Barrios, but it was not determined, because of its imperfect condition, until Professor Record obtained flowering specimens at Entre Ríos in March, 1926. When the bark of the cow tree is cut or broken, there issues from it a rich creamy latex that is sweet and palatable. It is not very sticky and may be drunk like cow's milk. The tree is none too abundant in Guatemala and British Honduras, but is plentiful in some localities. There are numerous trees close about Puerto Barrios, in pastures or other clearings. They are 12–18 m. high, with an almost smooth, tall trunk, and a dense rounded crown. The flowers are borne in great abundance when the trees are leafless or nearly so, and they make the trees conspicuous and easily spotted from considerable distance. In British Honduras the cow tree has been collected along

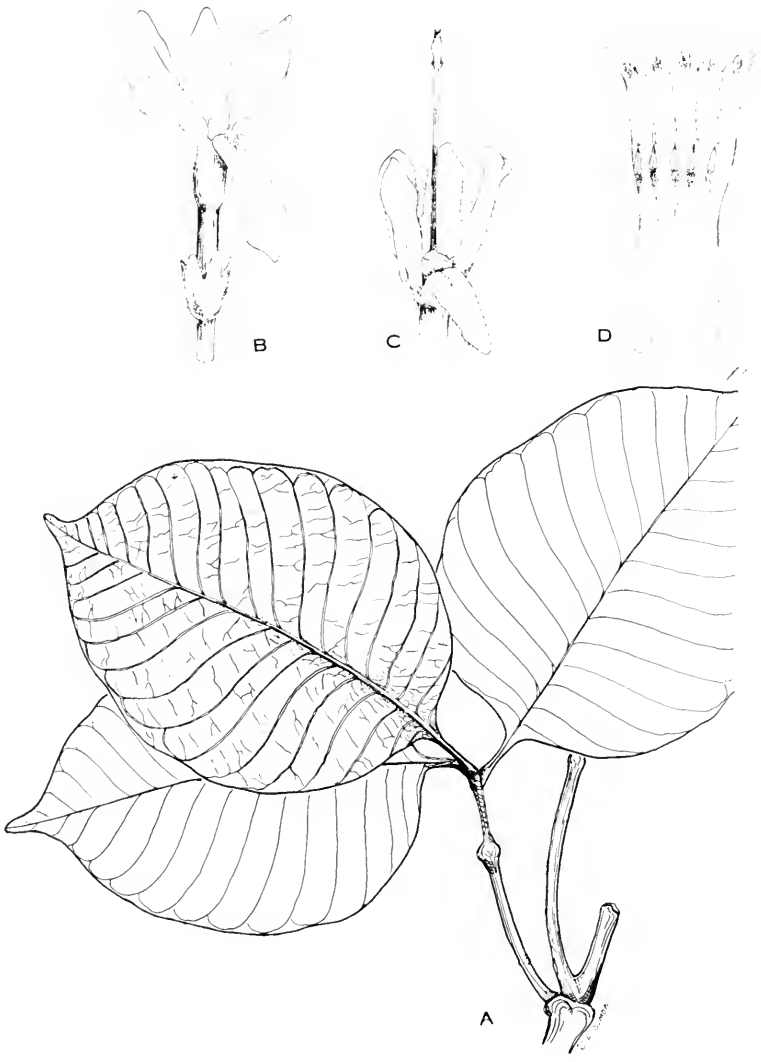

FIG. 94. *Couma macrocarpa*. A, habit, × ½; B, flower, × 2; C, calyx partially dissected to show pistil, × 5; D, portion of corolla tube to show anthers in position and patches of pubescence, × 4.

the Temash River. The best known trees of Guatemala are those at Entre Ríos not far inland from Puerto Barrios. In years past many tourists have been taken to these by the United Fruit Company to see one of the "natural wonders" of Guatemala. The white latex is sometimes used in British Honduras as a chicle substitute. Little or no use is made locally of it as a beverage, although its properties are rather well known, perhaps as the result of long advertising. It is reported from British Honduras that woodsmen sometimes use an infusion of the leaves as a beverage. The wood is dull brown, moderately hard, of medium texture, fairly straight-grained, not difficult to work. In Venezuela this tree is reported to attain a height of 40 m., with a trunk as much as a meter in diameter. In that country it is stated that the latex boiled in water gives a product similar to guttapercha that is used for caulking canoes.

The species is to be expected in other Central American countries in the Atlantic forests.

ECHITES P. Browne

Reference: Robert E. Woodson, Studies in Apocynaceae IV. Ann. Mo. Bot. Gard. 23: 217–252. 1936.

Slender, woody or suffrutescent vines; leaves opposite, eglandular; inflorescence a more or less modified dichasium, alternate-axillary, rarely terminal or subterminal, the flowers several, rarely solitary; calyx 5-parted almost to the receptacle, the lobes subequal, somewhat imbricate, bearing within at the base a solitary, often deeply dissected squamella; corolla salverform, the tube not appendaged or annulate within, the limb regularly 5-parted, dextrorsely contorted; anthers connivent and agglutinated to the stigma, the connective enlarged, narrowly or rarely obtusely bilobate; ovary of 2 distinct carpels, many-ovulate, surrounded at the base by 5 distinct or somewhat concrescent nectaries; stigma fusiform-subcapitate; fruit of 2 distinct follicles; seeds numerous, rostrate, comose at the apex.

Seven species are known, in tropical America. One other from Central America has been described from Costa Rica.

Corolla about 2 cm. long ..... *E. tuxtlensis.*
Corolla 3–8 cm. long.
  Tube of the corolla conspicuously twisted ..... *E. umbellata.*
  Tube of the corolla not twisted.
    Inflorescence dichasial to simple helicoid, not subumbellate; calyx lobes 3–7 mm. long; leaves rather thin, usually abruptly short-acuminate, not lobate ..... *E. turrigera.*
    Inflorescence umbelliform; calyx lobes 2–3 mm. long; leaves thick, long-acuminate, often panduriform ..... *E. yucatanensis.*

Echites turrigera Woodson, Ann. Mo. Bot. Gard. 19: 381. 1932.

In thickets, 600–1,200 m.; Zacapa (type from Gualán, *Deam 6376*); Jutiapa (Lago de Güija). Honduras; Nicaragua.

A somewhat woody vine; leaves long-petiolate, membranaceous, broadly oblong-elliptic to ovate-elliptic, 5–15 cm. long, 3–10 cm. broad, rather abruptly short-acuminate or acute, obtuse to rounded or rarely subcordate at the base, glabrous, green above, paler beneath, reticulate-veined on both surfaces; inflorescence lateral or subterminal, dichasial to simple helicoid, equalling or longer than the leaves, 6–20-flowered, the peduncles minutely pilosulous or glabrate, the pedicels 10–12 mm. long; bracts oblong-lanceolate, acuminate, somewhat foliaceous, 1–3 mm. long; calyx lobes lanceolate, acuminate, 3–7 mm. long, sparsely pilosulous; corolla white or cream-colored, salverform, the tube 28–38 mm. long, 1.5–2 mm. thick at the base, dilated below the middle, constricted toward the orifice, the lobes obliquely obovate, 1.5–2 cm. long, spreading; young follicles slender, pilosulous, 7 cm. long, 4 mm. thick.

Echites tuxtlensis Standl. Contr. U. S. Nat. Herb. 23: 1164. 1924.

In forest or thickets, 800–1,000 m.; Petén; Huehuetenango. British Honduras, in high ridge; Mexico (Chiapas; Yucatan); Honduras; Costa Rica.

A small slender vine, glabrous throughout, essentially herbaceous, arising from a small tuberous root; leaves on petioles 3–8 mm. long, thick-membranaceous, narrowly lanceolate to obovate-elliptic, 6–10 cm. long, 1.5–3.5 cm. broad, acuminate, cuneate to rounded at the base, the nerves and veins obscure; inflorescence a lax, repeatedly compound dichasium bearing several to many, small, yellowish green flowers, much longer than the leaves; pedicels 7–10 mm. long; calyx lobes ovate-triangular, acute or acuminate, 1–1.5 mm. long; corolla tube 8–10 mm. long, the lobes oblong-lanceolate to elliptic-lanceolate, acuminate, somewhat shorter than the tube, reflexed in anthesis; nectaries half as long as the ovary.

The Maya names of Yucatan are reported as "cahuale chac cancel" and "ibincan."

Echites umbellata Jacq. Enum. Pl. Carib. 13. 1760.

British Honduras, at or little above sea level. Southern Florida; Mexico (Yucatan); Honduras; West Indies; coast of Colombia.

A suffrutescent vine, glabrous throughout; leaves chartaceous, on petioles 3–15 mm. long, narrowly oblong-elliptic to suborbicular, 4–12 cm. long, 2–7.5 cm. broad, acute to usually rounded or retuse at the apex, cuneate to rounded at the base; inflorescences lateral or subterminal, somewhat shorter than the leaves, 2–7-flowered, pedunculate; bracts ovate or ovate-lanceolate, 1.5–3 mm. long; calyx lobes ovate to narrowly oblong-triangular, acute or acuminate, 1.5–5 mm. long, scarious or only slightly foliaceous; corolla cream-colored, the tube 2–5.5 cm. long, somewhat dilated below the middle, above spirally contorted and gradually constricted toward the orifice, the lobes obliquely obovate, 1–3 cm. long, spreading; nectaries half as long as the ovary or equalling it; follicles rather stout, rigidly divaricate, 10–25 cm. long, glabrous.

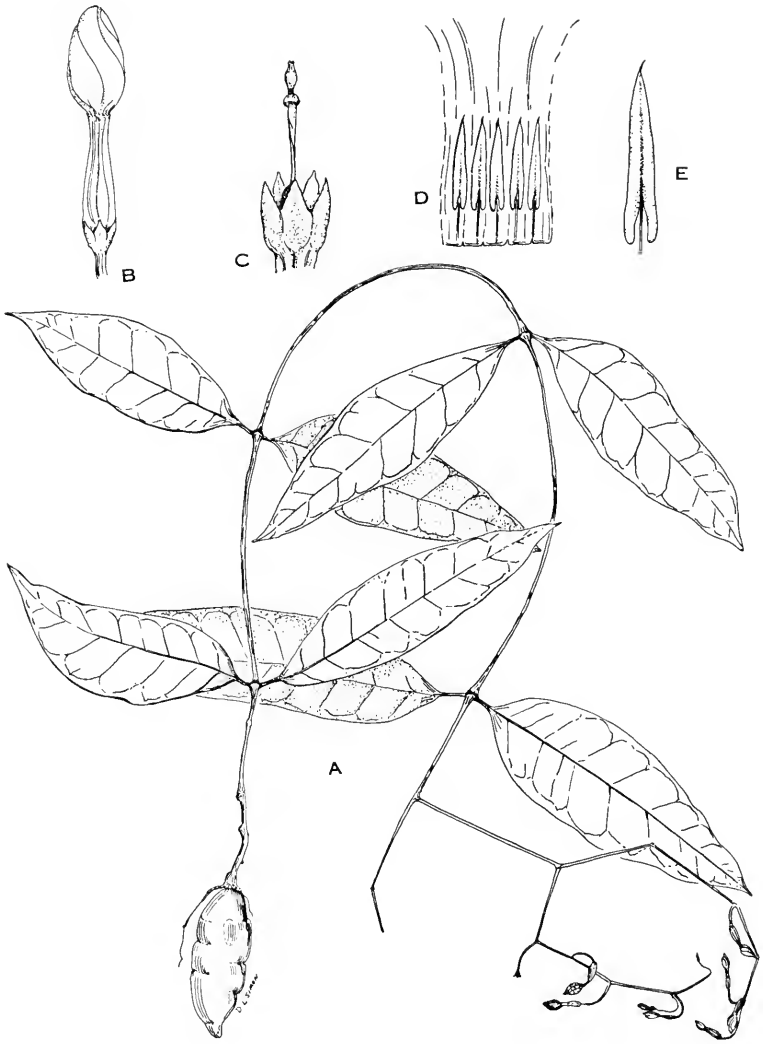

FIG. 95. *Echites tuxtlensis*. A, habit showing tuber, × ½; B, flower just before anthesis, × 2; C, calyx and style, × 5; D, corolla tube dissected to show stamens in natural position, × 2½; E, a single stamen, × 5.

Echites yucatanensis Millsp. ex Standl. Field Mus. Bot. 8: 35. 1930.

British Honduras (Tower Hill, *Karling 28*); Mexico (Yucatan and Campeche).

A suffrutescent vine, glabrous throughout; leaves coriaceous or subcoriaceous, on petioles 1–2 cm. long, ovate to oblong, often irregularly pandurate, 7–12 cm. long, 2.5–7 cm. broad, acuminate, obtuse or rounded at the base, deep green and lustrous above, the veins reticulate and very conspicuous on both surfaces; inflorescences lateral, subumbellate, 3–9-flowered, the pedicels 10–13 mm. long, the bracts minute, scarious, ovate-lanceolate; calyx lobes ovate-lanceolate, 2–3 mm. long, acuminate; corolla pale greenish yellow, the tube 4–4.5 cm. long, abruptly dilated below the middle, gradually constricted above toward the orifice, the lobes obliquely obovate, 2.5–3 cm. long; nectaries less than half as long as the ovary; follicles slender, divaricate, 15–25 cm. long, glabrous.

FERNALDIA Woodson

Slender vines, herbaceous or suffrutescent; leaves opposite, eglandular; inflorescences alternate-axillary, simply scorpioid, with several large showy flowers; calyx 5-parted almost to the receptacle, the lobes equal or subequal, scarious or subfoliaceous, scarcely imbricate, each with a solitary squamella within; corolla funnelform, the tube not appendaged within, the throat usually more or less closed by a dense villous indument, the limb regularly 5-parted, dextrorsely contorted; anthers connivent and agglutinated to the stigma, the connective enlarged, obtusely bilobate; ovary of 2 distinct carpels, many-ovulate, surrounded at the base by 4 rather unequal, more or less concrescent nectaries; stigma fusiform-capitate; fruit of 2 distinct follicles; seeds numerous, truncate and comose at the apex.

This genus was named by Dr. Woodson for his friend and sometimes mentor, Prof. Merritt L. Fernald, who spent a lifetime studying the flora of the northeastern United States and adjacent Canada. While Prof. Fernald was pleased that this genus had been named for him, the junior author once heard Prof. Fernald speculate that Woodson may have been "pulling his leg" in using the first of the specific names below, for it described Prof. Fernald quite well.

Two other species are known, one in western Mexico, the other in Panama.

Corolla short-pilose outside, the throat narrowly conic, 16–18 mm. long. *F. brachypharynx.*

Corolla glabrous outside, the throat broadly campanulate-conic, 9–12 mm. long. *F. pandurata.*

Fernaldia brachypharynx Woodson, Ann. Mo. Bot. Gard. 19: 380. 1932. *Loroco.*

In thickets, endemic; Escuintla (type collected along the road between Escuintla and San José, *Sutton Hayes*); Guatemala; Sacatepéquez (cultivated).

FIG. 96. *Fernaldia pandurata*. A, habit, × ½; B, stamen, × 5; C, calyx dissected to show corona, pistil, × 5.

A small or large, herbaceous vine, velutinous-puberulent throughout; leaves on petioles 1–2 cm. long, membranaceous, broadly ovate or elliptic, 7–10 cm. long, 5–7 cm. broad, abruptly short-acuminate, broadly rounded at the base; inflorescences slightly shorter than the leaves, few-flowered, the pedicels 4–5 mm. long, the bracts ovate, 1–2 mm. long; calyx lobes ovate, acuminate, 2–3 mm. long, minutely pilosulous; corolla greenish white, pilosulous outside, the tube 18–20 mm. long, the throat narrowly conic, 16–18 mm. long, 7 mm. broad, the lobes 12–14 mm. long, arachnoid-villous within at the base.

This and the following species are well known plants of northern Central America, the flowers and flower buds being cooked and eaten commonly, in small meat pies or with rice or other substances. The roots are said to be very poisonous, and in Chiquimula are employed for poisoning noxious animals.

Fernaldia pandurata (A. DC.) Woodson, Ann. Mo. Bot. Gard. 19: 48. 1932. *Echites pandurata* (A. DC.) in DC. Prodr. 8: 458. 1844. *Urechites karwinskii* Muell.-Arg. Linnaea 30: 440. 1860. *E. pinguifolia* Standl. Field Mus. Bot. 8: 35. 1930 (type from Yucatan). *Loroco.*

At 900 m. or lower; Izabal; Zacapa; Chiquimula; Jutiapa. Mexico; El Salvador; Honduras.

A small or large herbaceous vine, densely puberulent or shortly velutinous-pilosulous throughout; leaves membranaceous, on petioles 1–2 cm. long, oblong-elliptic to broadly ovate, 4–13 cm. long, 1.5–8 cm. broad, short-acuminate, the lower ones cordate at the base, the upper obtuse to truncate, usually very densely and softly pilose beneath; inflorescences generally somewhat shorter than the leaves, with 8–18 flowers, the pedicels 4–6 mm. long; bracts ovate, 1–2 mm. long; calyx lobes ovate, acute or obtuse, 2–3 mm. long; corolla white within, greenish outside and glabrous, the tube 20–22 mm. long, the throat broadly campanulate-conic, 9–12 mm. long, 7–9 mm. broad, the lobes ciliate, 10–13 mm. long, densely villous-arachnoid within at the base.

A glabrous variety is found in Honduras, var. *glabra* Molina, where this species is a common one.

FORSTERONIA G. Meyer

Reference: Robert E. Woodson, Ann. Mo. Bot. Gard. 22: 153–224. 1935.

Woody vines; leaves normally opposite, glandular above at the base of the costa or rarely eglandular, usually pitted beneath in the axils of the nerves; inflorescence terminal or terminal and lateral, aggregate-dichasial or thyrsiform, the flowers small, very numerous; calyx 5-parted almost to the receptacle, the lobes subequal, more or less imbricate, scarious, usually with several or numerous squamellae within; corolla rotate or nearly so, the tube short, the orifice not annulate, the limb equally 5-parted, dextrorsely or rarely sinistrorsely contorted; anthers connivent

FIG. 97. *Forsteronia myriantha*. A, habit, × ½; B, flower and buds, × 5; C, corolla dissected to show anthers in natural position, × 5; D, pistil (note alate stigma).

and agglutinated with the stigma, the connective enlarged, rather narrowly bilobate; ovary of 2 distinct carpels or very rarely syncarpous, many-ovulate, surrounded by 5 distinct or more or less concrescent nectaries; stigma fusiform or subcapitate; follicles distinct or very rarely more or less agglutinated; seeds numerous, truncate and comose at the apex.

About 48 species, in tropical America. No others are known from Central America; one is known from Panama.

Anther tips barely exserted from the corolla or wholly included; filaments free from the style ..... *F. viridescens.*

Anthers wholly exserted; filaments agglutinated to the style, at least above.

Leaves not glandular on the upper surface ..... *F. peninsularis.*

Leaves glandular above at the base of the costa.

Squamellae of the calyx numerous, indefinitely distributed ..... *F. myriantha.*

Squamellae alternate with the calyx lobes, solitary or infrequently in groups of 2–3 ..... *F. spicata.*

Forsteronia myriantha Donn.-Sm. Bot. Gaz. 27: 435. 1899.

Moist or wet thickets or forest, 1,800 m. or less; Petén; Santa Rosa; Sacatepéquez (type from Embaulada, *Heyde & Lux 4534*); Suchitepéquez; Quezaltenango. British Honduras; Honduras; Costa Rica; Panama.

A small or large vine, sometimes 12 m. long and climbing over trees; leaves thick-membranaceous, on petioles 2–4.5 mm. long, elliptic to oval or elliptic-oblong, 4.5–10 cm. long, 2–4.5 cm. broad, acute or acuminate, obtuse to broadly acute at the base, glabrous, or sometimes sparsely pilose beneath, inconspicuously glandular above at the base of the costa; inflorescence terminal, thyrsiform, shorter than the leaves, the flowers white or greenish yellow, the pedicels 1–2 mm. long; calyx lobes ovate, subacute or obtuse, 1 mm. long, puberulent or rarely tomentulose, the squamellae numerous, indefinitely distributed; corolla glabrous or minutely papillate outside, the tube 1 mm. long or less, the lobes oblong-obovate, 2.5–3 mm. long; anthers glabrous, widely exserted; immature follicles 10 cm. long or more, very slender, glabrous.

Forsteronia peninsularis Woodson, Ann. Mo. Bot. Gard. 22: 215. 1935.

Moist or wet forest, 1,300–1,500 m.; Quezaltenango (?). British Honduras (type from Maskall, Northern River, *Gentle 1281*).

A large woody vine; leaves firm-membranaceous or subcoriaceous, on petioles 5–8 mm. long, oblong-elliptic to lance-oblong, 4.5–5.5 cm. long, 1.5–2 cm. broad, subacute to acuminate, obtuse at the base, glabrous, eglandular; inflorescence subthyrsiform, broadly pyramidal, somewhat shorter than the leaves, the flowers greenish white, the pedicels 2–2.5 mm. long; calyx lobes ovate, obtuse, 1.5 mm. long, puberulent-papillate; corolla minutely puberulent-papillate outside, the tube 2 mm. long, the lobes oblong-elliptic, 4 mm. long; anthers glabrous, wholly exserted.

Forsteronia spicata (Jacq.) G. Meyer, Fl. Esseq. 135. 1818. *Echites spicata* Jacq. Enum. Pl. Carib. 13. 1760.

In thickets, about 200 m.; Zacapa (Gualán, *Deam 6368*). Southern Mexico; Honduras and El Salvador to Nicaragua; Cuba; Colombia.

A large or small, woody vine; leaves firm-membranaceous, on petioles 4–10 mm. long, broadly oval or obovate-elliptic, 6–16 cm. long, 3.5–9 cm. broad, very shortly and abruptly subcaudate-acuminate, broadly obtuse or rounded at the base, minutely pilosulous above, inconspicuously glandular at the base of the costa, minutely tomentulose beneath; inflorescences thyrsiform and often spike-like, terminal and lateral, shorter than the leaves, very dense, the flowers white, sessile or nearly so; bracts ovate, 1–5 mm. long, subfoliaceous; calyx lobes ovate, acute to acuminate, 2.5–4 mm. long, densely tomentulose outside; corolla glabrous or nearly so, the tube 1.5–2 mm. long, the lobes oblong-ovate, 3.5–4 mm. long; anthers glabrous, wholly exserted; ovary tomentulose; follicles essentially united, relatively stout and rigid, 12–19 cm. long, glabrate in age.

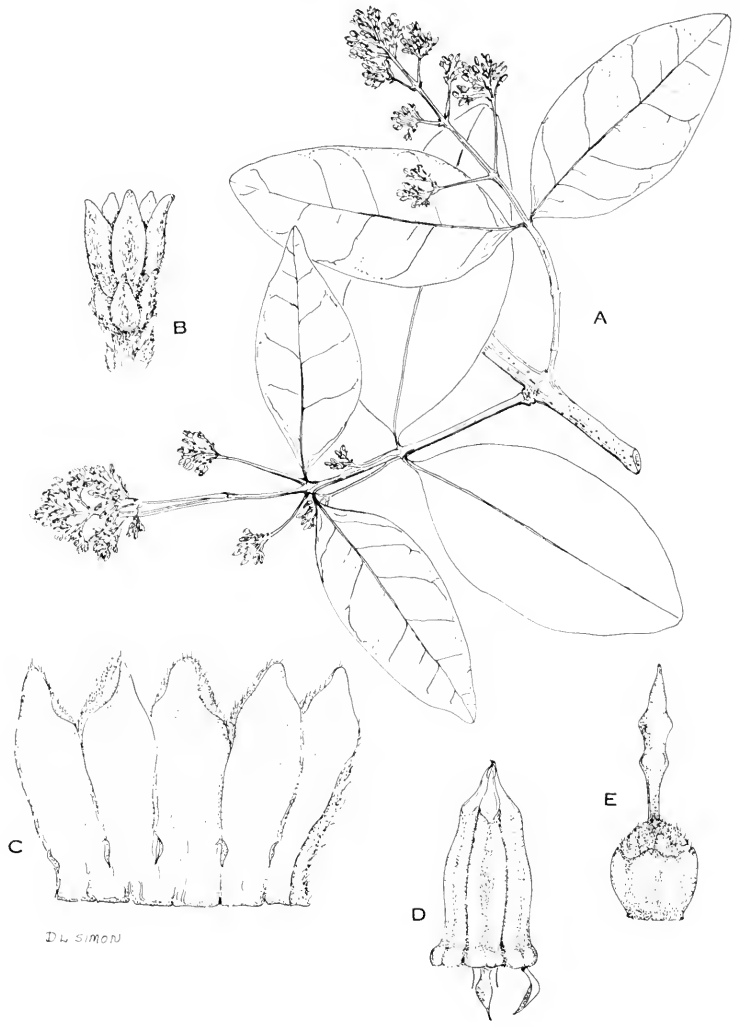

FIG. 98. *Forsteronia viridescens*. A, habit, × ½; B, flower, × 5; C, corolla dissected, × 10; D, stamens in natural position, × 15; E, pistil with surrounding disk, × 15.

Forsteronia viridescens Blake, Contr. Gray Herb. 52: 80. 1917.

Wet thickets or forest, sometimes in *Manicaria* swamps, at or little above sea level; Izabal. British Honduras (type from Manatee Lagoon, *Peck 450*).

A small or large vine; leaves coriaceous or subcoriaceous, on petioles 3–6 mm. long, oblong-elliptic, 9–13 cm. long, 2.5–6 cm. broad, very shortly and abruptly

acuminate, broadly obtuse or rounded at the base, glabrous, glandular above at the base of the costa; inflorescence thyrsiform, terminal and sometimes also lateral, shorter than the leaves, the flowers very numerous, cream-colored or greenish white, the pedicels 1–1.8 mm. long; calyx lobes ovate to ovate-lanceolate, 1 mm. long, minutely puberulent-papillate; corolla densely puberulent-papillate, the tube 1.5 mm. long, the lobes broadly oblong to ovate-oblong, 2 mm. long; anthers slightly exserted at the tips, minutely and sparsely barbellate.

Called "tietie" in British Honduras.

HAPLOPHYTON A. De Candolle

Plants slender, chiefly herbaceous but usually suffrutescent near the base; leaves mostly alternate, eglandular; flowers yellow, rather large, mostly solitary in the upper leaf axils; calyx 5-parted, the lobes subequal, not or scarcely imbricate, without squamellae; corolla salverform, not appendaged within, the limb equally 5-parted, sinistrorsely contorted; anthers not connivent, wholly included, the connective not enlarged; ovary of 2 distinct carpels, without a nectary, many-ovulate; follicles terete, elongate; seeds numerous, comose at the apex.

The genus consists of a single species.

Haplophyton cinereum (A. Rich.) Woodson, Ann. Mo. Bot. Gard. 23: 231. 1936. *Echites cinerea* A. Rich. in Sagra, Hist. Cub. 11: 93. 1850. *Haplophyton cimicidum* A. DC. in DC. Prodr. 8: 412. 1844.

Moist or dry thickets, often in fence rows, 200–1,300 m.; El Progreso; Huehuetenango; Zacapa. Southwestern United States and Mexico. The type is thought to have been from Cuba, doubtless in error.

Plants mostly 50 cm. high or less, often much branched, the stems green; leaves membranaceous, alternate or occasionally opposite, on very short petioles, ovate to narrowly oblong-elliptic, 2–6 cm. long, 1–3.5 cm. broad, long-acuminate, obtuse or rounded at the base, pilose on both surfaces with short, rather rigid, subappressed hairs; flowers pedicellate; calyx lobes linear-lanceolate, acuminate, 5–8 mm. long, thinly pilosulous; corolla minutely puberulent outside, pale yellow, the tube 6–9 mm. long, the lobes broadly obovate, 10–18 mm. long, spreading; anthers inserted near the middle of the corolla tube or somewhat lower; follicles slender, terete, 6–8 cm. long, puberulent or glabrate.

In Mexico this plant has long been known to have insecticide properties, and its Nahuatl name, "actimpatli," signifies "flea-killer." The roots are employed for killing flies, lice, fleas, cockroaches, and other insects. In Guatemala the plant is abundant in many localities about Zacapa, especially where it is protected from grazing. The plants wither, at least in part, during the long dry season of that area, and may be found green only when there is plenty of moisture.

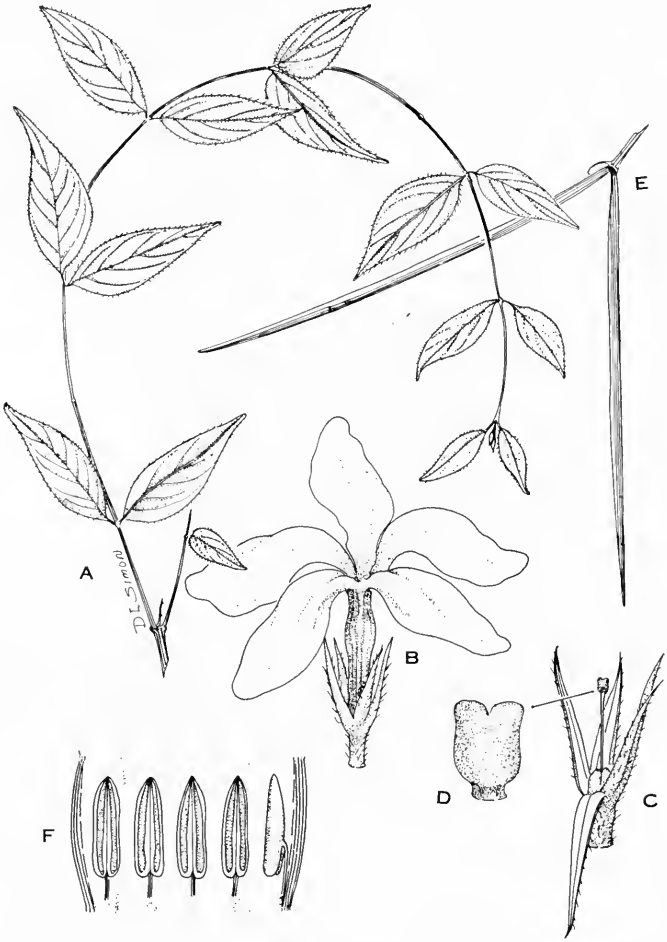

FIG. 99. *Haplophyton cinereum.* A, habit, natural size; B, flower, × 2; C, calyx with pistil, × 6; D, stigma, × 15; E, follicles, natural size; F, stamens in position on dissected corolla, × 10.

LACMELLEA Karsten

Reference: Joseph Monachino, A revision of *Lacmellea* and the transfer of *Zschokkea,* Lloydia 7: 275–302. 1944.

Trees with milky latex; leaves opposite, the petioles usually glandular at the base; inflorescences alternate-axillary or opposite-axillary, cymose, few–many-flowered, the flowers small, white; calyx 5-parted almost to the receptacle, the lobes subequal, imbricate, without squamellae; corolla salverform, the tube usually long and slender, usually slightly gibbous, the limb equally 5-parted, the lobes

short, sinistrorsely contorted; anthers inserted near the orifice of the corolla tube, not connivent, included, the connective not enlarged; ovary of 2 united carpels, surrounded by an almost completely adnate, annular nectary, each carpel with several biseriate ovules on an axile binate placenta; fruit a small juicy berry, containing 1–several seeds.

About 19 species, in tropical America. One other is known from Panama.

Lacmellea standleyi (Woodson) Monachino, Lloydia 7: 285. 1944. *Zschokkea standleyi* Woodson in Standl. Field Mus. Bot. 22: 44. 1940. *L. edulis* Woodson, N. Am. Fl. 29: 141. 1938, not Karst. *Palo de vaca.*

Wet mixed lowland forest, sometimes in open pasture land, 300 m. or lower; Izabal (type from Entre Ríos, *Standley 72587*; also in Montaña del Mico); Alta Verapaz, British Honduras.

A glabrous tree of 5–11 m.; leaves on petioles 6–10 mm. long, chartaceous, oblong or elliptic-oblong, 10–15 cm. long, 3–5 cm. broad, abruptly acuminate, obtuse or rounded at the base; inflorescences axillary, peduculate, 5 cm. long or less, many-flowered, the stout pedicels 3 mm. long or less; calyx lobes ovate-subreniform, rounded at the apex, 2–2.5 mm. long, ciliolate; corolla white or greenish white, the tube 2–2.5 cm. long, glabrous outside, the lobes obliquely ovate-lanceolate, acuminate, 8 mm. long, spreading; anthers narrowly oblong, 6 mm. long; fruit broadly ovoid, yellow, 1.5–2 cm. long, 1-seeded.

The fruit is said to have the odor of mangos. It probably is edible. The wood is soft and light in weight. Known in British Honduras as "vaca" or "palo de vaca," "vaca tree" or "prickly vaca." The last name alludes to the fact that the trunk is covered with woody prickles. The abundant latex obtained from incisions in the trunk is said to be drunk sometimes, although not altogether agreeable in consistency.

LAUBERTIA A. De Candolle

Reference: Robert E. Woodson, Ann. Mo. Bot. Gard. 23: 370–375. 1936.

Slender vines, herbaceous or suffrutescent; leaves opposite or rarely verticillate above, eglandular; inflorescence alternate-axillary, occasionally terminal or subterminal, dichotomously or trichotomously scorpioid, bearing few–many flowers of medium size; calyx 5-parted almost to the receptacle, the lobes equal or subequal, somewhat foliaceous, scarcely imbricate, without squamellae within; corolla salverform, the tube not appendaged within, spirally contorted, the limb regularly 5-parted, dextrorsely contorted; anthers connivent and agglutinated to the stigma; the connective enlarged, narrowly bilobate, usually slightly exserted at the apex; ovary of 2 distinct carpels, many-ovulate, surrounded at the base by 5 separate or

FIG. 100. *Lacmellea standleyi*. A, habit, × ½; B, corolla opened to show stamens, × 1½; C, calyx and style, × 1½; D, stigma, × 5; E, fruit, natural size; F, an anther from the side and another from front, × 5; G, pseudospines from the trunk of the tree, natural size.

somewhat concrescent nectaries; stigma fusiform-capitate; follicles 2, distinct, terete; seeds numerous, truncate and comose at the apex.

Four species, distributed from Mexico to Peru. Only one is known in Central America.

Laubertia peninsularis Woodson, Ann. Mo. Bot. Gard. 23: 374. 1936.

Known only from the type, collected somewhere along the boundary between Petén and British Honduras, *W. A. Schipp.*

Leaves firm-membranaceous, on petioles 2 cm. long, ovate-elliptic, 6–13 cm. long, 4–7 cm. broad, acuminate, rounded or very obscurely cordate at the base, minutely puberulent or glabrate above, minutely ferruginous-puberulent beneath; inflorescences dichotomous or trichotomous, somewhat shorter than the leaves, 10–20-flowered, the pedicels 8–10 mm. long; calyx lobes oblong-elliptic, acute or acuminate, 9–11 mm. long, subfoliaceous, minutely hirtellous; corolla cream-colored, minutely ferruginous-hirtellous outside, the tube 13–14 mm. long, spirally contorted above, the lobes oblique-obovate, 9–11 mm. long, reflexed; stamens inserted about the middle of the corolla tube, the anthers minutely puberulent-papillate dorsally, barely included; nectaries somewhat shorter than the ovary.

LOCHNERA Reichenbach

Erect herbs, annual or sometimes more enduring, somewhat succulent; leaves opposite, eglandular; inflorescences lateral, cymose, 1–4-flowered, sessile, the flowers rather large and showy, white or pink; calyx 5-parted, the lobes almost equal, subfoliaceous, without squamellae; corolla salverform, the limb equally 5-parted; anthers not connivent, barely included, the connective not enlarged; ovary of 2 distinct carpels, accompanied by alternate oblong-ovoid nectaries of almost equal size, many-ovulate; follicles terete, distinct; seeds numerous, naked, subcompressed.

Three species, natives of Madagascar, one of them cultivated and widely naturalized in tropical regions.

Lochnera rosea (L.) Reichb. Consp. 134. 1828. *Vinca rosea* L. Syst. Nat. ed. 10. 944. 1759. *Catharanthus roseus* G. Don, Gen. Hist. 4: 95. 1838. *V. rosea β albiflora* Bertol. Fl. Guat. 411. 1840 (type from Guatemala). *Chatas; chula; chatilla; lila* (Petén).

Planted commonly in gardens for ornament, mostly at low but sometimes at middle elevations; thoroughly naturalized in many localities, especially in sand close to seashores, along roadsides, in abandoned land, or in waste places, chiefly at 1,400 m. or less; Petén; Izabal; Jalapa; Santa Rosa; Retalhuleu; San Marcos; doubtless to be found wild in other departments. Generally naturalized at lower elevations. Mexico; British Honduras to Panama; and in tropical America generally.

Plants stout, erect, usually less than 75 cm. high; leaves on petioles 10 mm. long or usually shorter, broadly oblong-elliptic to ovate-elliptic, 2–7 cm. long, 1.5–3 cm. broad, very obtuse or rounded at the apex, cuneate at the base, rather succulent, densely short-pilose, especially beneath, or sometimes glabrate; inflorescences produced in alternate leaf axils, the pedicels 1.5–3 mm. long; calyx lobes narrowly lanceolate, acuminate, 4–7 mm. long, minutely pilosulous; corolla pink, the tube 2–3 cm. long, the lobes broadly obovate, 1.5–2.5 cm. long, spreading; follicles rather short and stout, terete, 1.5–3.5 cm. long.

Sometimes called "chuladita" in El Salvador, where the plant is a common domestic remedy for inflammation of the throat; "clavellina" (Honduras); "vicaria" (Yucatan); "paragüita" (Oaxaca). The plant is seen in the majority of Guatemalan gardens, and often is planted in the parks. It is popular probably because it thrives with little or no attention, and withstands drought. It is particularly plentiful along the Atlantic coast of Central America, usually growing in the shade of coconut palms. It is one of the most common flowers in cemeteries. The following color forms are frequent: *L. rosea* f. *alba* (Sweet) Woodson, the corolla white throughout; *L. rosea* f. *ocellata* (Sweet) Woodson, the corolla white with a pink or deep red eye. The various color forms often grow together.

MALOUETIA A. De Candolle

Reference: Robert E. Woodson, Ann. Mo. Bot. Gard. 22: 238–270. 1935.

Shrubs or small trees; leaves opposite, eglandular, usually pitted beneath in the axils of the nerves; inflorescence umbellate, terminal or lateral, the flowers small or medium-sized; calyx 5-parted almost to the receptacle, the lobes subequal, bearing within alternate, solitary or binate squamellae; corolla salverform, not appendaged within, often somewhat thickened at the orifice, the limb regularly 5-parted, dextrorsely contorted; anthers connivent and agglutinated to the stigma, usually more or less exserted, the connective narrowly bilobate; ovary of 2 distinct carpels, many-ovulate, surrounded at the base by 5 distinct or more or less concrescent nectaries; stigma fusiform; follicles distinct, narrowly terete to broadly fusiform; seeds numerous, not comose.

About 20 species in tropical America and chiefly in South America. Only one species has been found in continental North America.

Malouetia guatemalensis (Muell.-Arg.) Standl. Journ. Wash. Acad. Sci. 15: 459. 1925. *Stemmadenia guatemalensis* Muell.-Arg. Linnaea 30: 410. 1860. *M. panamensis* Van Heurck & Muell.-Arg. in Van Heurck, Obs. Bot. 185. 1871.

Wet mixed forest or thickets, sometimes in second growth, at or little above sea level; Izabal. British Honduras to Panama.

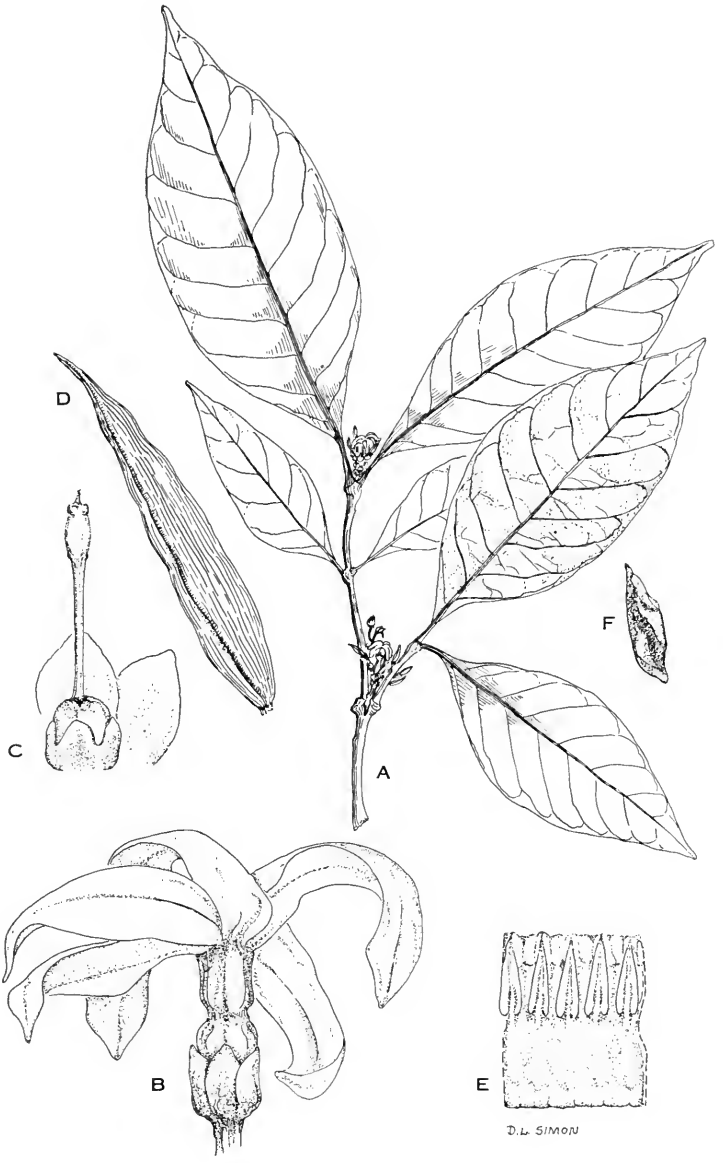

FIG. 101. *Malouetia guatemalensis*. A, habit, × ½; B, flower, × 5; C, calyx (2 lobes), pistil with surrounding corona and pistil, × 10; D, follicle, × ½; E, stamens to show attachment to corolla tube; F, seed, much enlarged.

Often flowering when only a shrub, but sometimes becoming a tree of 12 meters or more with a trunk 35 cm. in diameter; leaves on petioles 5–10 mm. long, firm-membranaceous, oblong-elliptic to ovate-elliptic, 6–25 cm. long, 2–10 cm. broad, long-acuminate, acute at the base, glabrous, very lustrous above, paler beneath; flowers slightly fragrant, white, in small many-flowered, often dense and almost head-like, lateral and terminal umbels; pedicels 3–5 mm. long; calyx lobes ovate, acute or obtuse, subcoriaceous, closely imbricate, 1.5–2.5 mm. long, minutely puberulent-papillate; corolla glabrous or nearly so, the tube 4–5.5 mm. long, the lobes obliquely lanceolate to ovate-oblong, acuminate, 7–12 mm. long; anthers included, minutely puberulent-papillate dorsally; follicles stout, fusiform, divaricate, 10–13 cm. long, 1–2 cm. thick, glabrous.

Although named *guatemalensis*, this species probably was based upon material collected in Nicaragua by Friedrichsthal. The locality is cited as "Mniogalpa," certainly not a Guatemalan locality, but either Honduran or Nicaraguan. All Friedrichsthal's plants have labels with the heading "Guatemala," but the place names prove that they came from various Central American countries.

MANDEVILLA Lindley

Reference: Robert E. Woodson, Ann. Mo. Bot. Gard. 20: 645–777. 1933.

Slender vines, herbaceous or suffrutescent; leaves normally opposite, bearing on the upper surface several glands clustered at the base or sparsely distributed along the costa, rarely eglandular; inflorescences usually alternate-axillary, sometimes terminal or subterminal, racemose or rarely obscurely compound; calyx 5-parted almost to the receptacle, the lobes subequal, usually little imbricate, bearing squamellae within; corolla salverform, funnelform, or tubular, the limb equally 5-parted, the lobes dextrorsely contorted; anthers connivent and agglutinated to the stigma, the connective enlarged, obtusely bilobate or truncate; ovary of 2 distinct carpels, each carpel many-ovulate, surrounded by 5 or rarely 2, separate or variously concrescent nectaries; stigma umbraculiform; follicles terete, acuminate, distinct, continuous or moniliform; seeds numerous, truncate, comose.

About 100 species, in tropical America. One other Central American species is found in Costa Rica and in Panama.

Corolla tube more or less gibbous or arcuate; squamellae as many as the calyx lobes and opposite them, sometimes deeply lacerate; upper surface of the leaves sparsely glandular along the costa.

Corolla funnelform; bracts of the inflorescence foliaceous or petaloid. . *M. hirsuta*.

Corolla salverform.

Bracts scarious, 1–5 mm. long . . . . . *M. subsagittata*.

Bracts foliaceous or petaloid, 10–35 mm. long . . . . . *M. villosa*.

Corolla tube straight, not gibbous or arcuate; squamellae of the calyx usually more numerous than the calyx lobes, or alternate with them when of the same number; upper surface of the leaves glandular at the base of the costa, or very rarely eglandular; corolla salverform.

Stamens inserted near the orifice of the corolla tube; anthers with truncate auricles.

Inflorescence secund; leaves broadly ovate to ovate-oblong. *M. donnell-smithii.*

Inflorescence not secund; leaves lanceolate to oblong-lanceolate. . *M. tubiflora.*

Stamens inserted about the middle of the corolla tube; anthers with rounded auricles.

Inflorescence secund and subscorpioid; leaves obovate to ovate-lanceolate, densely tomentulose beneath . . . . . *M. scorpioidea.*

Inflorescence neither secund nor subscorpioid; leaves lanceolate, glabrous. *M. rosana.*

Mandevilla donnell-smithii Woodson, Ann. Mo. Bot. Gard. 19: 54. 1932. *Reguilete* (fide Aguilar).

Moist or dry, brushy, often rocky slopes, 1,100–2,000 m.; Baja Verapaz; Zacapa; Chiquimula; Quiché; Jalapa; Santa Rosa; Guatemala; Sacatepéquez; Huehuetenango. Mexico; Honduras; Nicaragua.

A slender woody vine; leaves on petioles 7–25 mm. long, membranaceous, broadly ovate to ovate-oblong, 4–10 cm. long, 2–8 cm. broad, acute or acuminate, rounded and shallowly cordate at the base, hirtellous above, pale or whitish beneath and densely tomentose; racemes alternate-axillary, equalling or somewhat longer than the leaves, 10–25-flowered, the pedicels 5–7.5 mm. long; calyx lobes ovate or ovate-lanceolate, acute or acuminate, 3–4 mm. long, minutely puberulent, the squamellae very numerous; corolla salverform, yellow, glabrous outside, the tube 12–15 mm. long, the lobes obliquely obovate, 2.5–4 mm. long; follicles very slender, 8 cm. long or more, glabrous or nearly so, striate, obscurely torulose.

This has been reported from Guatemala as *Echites tubiflora* Mart. & Gal. and *E. triflora* Mart. & Gal.

Mandevilla hirsuta (A. Rich.) Schum. in Engler & Prantl Nat. Pflanzenfam. IV. 2: 171. 1895. *Echites hirsuta* A. Rich. Act. Soc. Hist. Nat. Paris 1: 107. 1792. *E. tomentosa* Vahl, Symb. Bot. 3: 44. 1794. *E. fluminensis* A. DC. Prodr. 8: 452. 1844. *M. tomentosa* Kuntze, Rev. Gen. 2: 416. 1891. *M. fluminensis* Donn.-Sm. Enum. Pl. Guat. 2: 47. 1891. *M. denticulata* Blake, Contr. Gray Herb. 52: 81. 1917 (type from British Honduras, *Peck 696*). *Bejuco de culebra.*

Moist or wet, mixed forest or in thickets, sometimes in lowland pine forest, 1,100 m. or less; Alta Verapaz; Izabal. British Honduras to Panama; southward to Bolivia and Brazil.

A small or large vine, usually suffrutescent; leaves membranaceous, on petioles 2.5 cm. long or less, obovate-elliptic to oblong-elliptic, 5–20 cm. long, 2–8 cm. broad, abruptly short-acuminate, obscurely auriculate at the base, strigillose above, glandular along the costa, densely tomentulose or whitish-hirtellous beneath; racemes alternate-axillary, simple, about equalling the leaves, 5–25-flowered, the pedicels 2–5 mm. long; bracts petaloid or foliaceous, ovate or ovate-lanceolate,

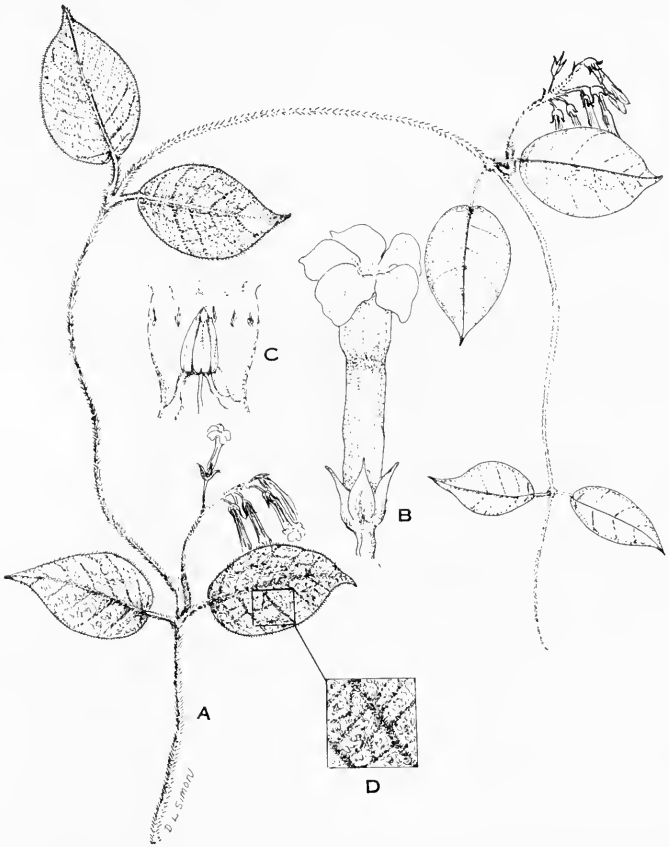

FIG. 102. *Mandevilla donnell-smithii*. A, habit, × ½; B, flower, × 2; C, corolla dissected to show stamens in natural position, their attachment and patches of pubescence on inner face of corolla tube, × 3; D, much enlarged under surface of leaf to show pubescence.

caducous, 5–20 mm. long; calyx lobes lanceolate or ovate-lanceolate, acuminate, 5–10 mm. long, scarious or somewhat petaloid, each bearing a single opposite squamella within; corolla funnelform, pilose outside, greenish yellow or yellowish white, the throat red-purple, the tube somewhat gibbous, 2–3.5 cm. long, the throat conic or conic-campanulate, 1.5–2 cm. long, the lobes obliquely obovate, 1.5–2 cm. long; nectaries half as long as the ovary; follicles rather stout, 6–15 cm. long, conspicuously articulate, hispidulous or glabrate.

Mandevilla rosana (Donn.-Sm.) Woodson, Ann. Mo. Bot. Gard. 19: 56. 1932. *Echites rosana* Donn.-Sm. Bot. Gaz. 40: 6. 1905.

Type from Buena Vista, Santa Rosa, 1,000 m., *Heyde & Lux 4540*.

A suffrutescent vine, glabrous or nearly so; leaves on petioles 3–5 mm. long, firm-membranaceous, lanceolate or narrowly ovate-lanceolate, 6–12 cm. long, 1.5–3 cm. broad, acuminate, obscurely cordate at the base; racemes alternate-axillary or subterminal, simple, equalling or sometimes surpassing the leaves, 6–15-flowered, the pedicels 7–10 mm. long; calyx lobes ovate-lanceolate, 3–4 mm. long, the squamellae in alternate groups of 5–6; corolla salverform, glabrous outside, the tube 14–16 mm. long, the lobes obliquely obovate-oblong, 6–7 mm. long; stamens inserted about the middle of the corolla tube, the anthers with rounded auricles.

A specimen of this species, without locality, is in the Sessé and Mociño Herbarium (1787–1804). It may be a part of the collection said to have been made in Guatemala by those collectors or it may have been gathered in Mexico.

Mandevilla scorpioidea Woodson, Ann. Mo. Bot. Gard. 19: 56. 1932. *M. subscorpoidea* Woodson, Ann. Mo. Bot. Gard. 20: 653. 1933, *lapsus*.

In thickets, about 1,350 m.; Alta Verapaz; Quezaltenango; El Progreso (?); Zacapa (?). Mexico (type from Cerro del Boquerón, Chiapas); Honduras.

Leaves membranaceous, on petioles 4–10 mm. long, ovate to ovate-lanceolate, 4–14 cm. long, 1.5–7 cm. broad, acuminate, narrowly cordate at the base, hirtellous or hispidulous to glabrate above, densely and softly pilosulous beneath; inflorescence racemose secund, simple, alternate-axillary, about equalling the leaves, 15–40-flowered, the pedicels 7–10 mm. long; calyx lobes lanceolate, acuminate, 4 mm. long, sparsely hirtellous or glabrate, the squamellae numerous, indefinitely distributed; corolla salverform, glabrous outside, the tube 15–20 mm. long, the lobes obliquely obovate, 4–5 mm. long; stamens inserted about the middle of the corolla tube, the anthers 4 mm. long, with rounded auricles.

This species is perhaps not distinct from *M. tubiflora* (Mart. & Gal.) Woodson.

Mandevilla subsagittata (Ruiz & Pavón) Woodson, Ann. Mo. Bot. Gard. 19: 69. 1932. *Echites subsagittata* Ruiz & Pavón, Fl. Peruv. 2: 19. 1799. *E. microcalyx* A. DC. in DC. Prodr. 8: 456. 1844. *E. cuspidifera* Blake, Contr. Gray Herb. 52: 79. 1917 (type from Manatee Lagoon, British Honduras, *Peck 35*). *Bejuco pie de rana* (fide Aguilar).

Wet to dry thickets, often in second growth, 1,800 m. or lower; Petén; Alta Verapaz; Baja Verapaz; Izabal; Zacapa; Chiquimula; Jalapa; Jutiapa; Santa Rosa; Escuintla; Guatemala; Sacatepéquez; Quiché; Huehuetenango. Southern Mexico; British Honduras to Panama; northern South America.

A large or small, slender suffrutescent vine, glabrous or variously pubescent; leaves membranaceous, on petioles 5–10 mm. long, oblong-elliptic to rarely narrowly lanceolate, 2–10 cm. long, 0.5–3 cm. broad, abruptly or gradually acuminate, rarely obtuse or rounded at the apex, auriculate at the base, glandular above along the costa, usually (in Central American material) densely and softly pilosulous beneath; racemes alternate-axillary, simple, more or less secund, about equalling the leaves, 8–20-flowered, the pedicels 4–6 mm. long; bracts scarious, lanceolate, 1–5 mm. long; calyx lobes narrowly triangular, 1–1.5 mm. long, each bearing a single squamella within; corolla salverform, bright yellow, the tube more or less gibbous or ventricose, 2–2.5 cm. long, the lobes obliquely obovate, 1–1.5 cm. long; nectaries 5, half as long as the ovary; follicles slender, conspicuously moniliform, 10–20 cm. long.

Mandevilla tubiflora (Mart. & Gal.) Woodson, Ann. Mo. Bot. Gard. 19: 52. 1932. *Echites tubiflora* Mart. & Gal. Bull. Acad. Brux. 11, pt. 1: 358. 1844. *E. cobanensis* Donn.-Sm. Bot. Gaz. 40: 6. 1905 (type from Cobán, Alta Verapaz, *Tuerckheim 8709*).

Wet to dry thickets or open forest, 500–2,000 m.; Alta Verapaz; Chiquimula; Jalapa; Sololá; Huehuetenango; Quezaltenango. Southern Mexico; Honduras.

Plants perennial from a thick woody root, scandent, herbaceous or suffrutescent; leaves on petioles 4–10 mm. long, membranaceous, lanceolate or oblong-lanceolate, 4–10 cm. long, 1–4 cm. broad, acuminate, obscurely cordate at the base, minutely puberulent or glabrate above, pale and densely tomentose beneath; racemes alternate-axillary, about equalling the leaves, 8–20-flowered, the pedicels 7–10 mm. long; calyx lobes ovate or ovate-lanceolate, acute or acuminate, 1–2 mm. long, minutely puberulent or glabrate, the squamellae in alternate groups of 5–6; corolla salverform, lemon-yellow or greenish yellow, glabrous outside, the tube 1–1.5 cm. long, the lobes obliquely obovate, 2.5–3.5 mm. long.

Mandevilla villosa (Miers) Woodson, Ann. Mo. Bot. Gard. 19: 70. 1932. *Laseguea villosa* Miers, Apocyn. S. Amer. 250. 1878. *Echites comosa* Kuntze, Rev. Gen. 2: 414. 1891.

In thickets, 450 m. or less; Sololá; Retalhuleu. Mexico (Chiapas); El Salvador to Panama. Venezuela.

A slender suffrutescent vine; leaves membranaceous, on petioles 4–25 mm. long, elliptic or obovate-elliptic, 3–9 cm. long, 1.5–4 cm. broad, rather abruptly acuminate, obscurely auriculate or almost subhastate at the base, finely and sparsely pilose above or glabrate, glandular along the costa, finely and densely pilose beneath or glabrate; racemes simple, alternate-axillary, secund, about equalling the leaves, 8–20-flowered, the pedicels 2–4 mm. long; bracts petaloid or foliaceous, deciduous, lanceolate to ovate-lanceolate, 1–3.5 cm. long; calyx lobes triangular, acute or acuminate, 1–1.5 mm. long, each bearing an opposite squamella within; corolla salverform, finely pilosulous or glabrate, the tube somewhat gibbous or ventricose, 1.5–2 cm. long, the lobes obliquely obovate-oblong, 1–1.5 cm. long;

nectaries 5, half as long as the ovary; follicles slender, conspicuously moniliform, 10–15 cm. long, glabrous.

This has been reported from Guatemala as *M. moritziana* (Muell.-Arg.) Donn.-Sm.

Many new collections of the complex to which this species belongs seem to indicate that this species is hardly distinct from *M. subsagittata* (Ruiz & Pavón) Woodson.

MESECHITES Mueller von Argau

Reference: Robert E. Woodson, Ann. Mo. Bot. Gard. 20: 629–645. 1933.

Slender vines, herbaceous or suffrutescent; leaves opposite, bearing 1–4 glandular emergencies above at the base of the costa; inflorescences alternate-axillary, the axis dichotomously or rarely trichotomously divided, bearing several or few, congested, medium-sized flowers; calyx 5-parted almost to the receptacle, the lobes subequal, imbricate, bearing several alternate or indefinitely distributed squamellae within; corolla salverform, the limb regularly 5-parted, the lobes dextrorsely contorted, reflexed; anthers connivent and agglutinated to the stigma, without apical appendages, the connective enlarged, obtusely bilobate; ovary of 2 distinct carpels, each carpel many-ovulate, surrounded by 5 distinct or somewhat concrescent nectaries; stigma fusiform-umbraculiform; fruit apocarpous, follicular; seeds numerous, truncate and comose at the apex.

Ten species, all in tropical America. Only the following is found in continental North America.

Mesechites trifida (Jacq.) Muell.-Arg. in Mart. Fl. Bras. 6[1]: 151. 1860; *Echites trifida* Jacq. Enum. Pl. Carib. 13. 1760. *Reguilete* (fide Aguilar).

Wet to dry thickets, 1,500 m. or less; Petén; Alta Verapaz; Zacapa; Chiquimula; Jutiapa; Santa Rosa; Guatemala; Huehuetenango. Southern Mexico; British Honduras to Panama; South America.

A small or large, glabrous, suffrutescent vine; leaves on petioles 5–30 mm. long, firm-membranaceous, ovate to oblong or oblong-lanceolate, 5–12 cm. long, 2–8 cm. broad, acuminate to obtuse, usually mucronulate, obtuse to rounded or subcordate at the base; inflorescences axillary or rarely subterminal, half as long as the leaves, few–many-flowered, the pedicels 5–10 mm. long; calyx lobes broadly oblong, obtuse or rounded at the apex, 3–5 mm. long; corolla greenish white, the tube 1.5–2.5 cm. long, the lobes obliquely oblong-obovate, 7–15 mm. long; follicles very slender, continuous or nearly so, terete, 15–30 cm. long.

NERIUM L. Oleander

Shrubs or small trees; leaves usually ternate, coriaceous, eglandular; inflorescence thyrsiform, the flowers numerous, large and showy; calyx 5-parted almost to

FIG. 103. *Mesechites trifida*. A, habit, × ½; B, corolla in natural position, natural size; C, calyx and style, × 2; D, stamens in position on portion of corolla tube, × 3; E, seed, × ½; F, node showing interpetiolar stipule, × 2.

the receptacle, the lobes equal, more or less imbricate, bearing numerous squamellae within at the base; corolla funnelform, the throat with rather conspicuous, mostly 5-cleft, petaloid appendages, the limb regularly 5-parted, dextrorsely contorted; anthers connivent and agglutinated to the stigma, the tips exserted, the connective enlarged, bilobate at the base; ovary of 2 distinct cells, many-ovulate, without a nectary, the stigma fusiform; follicles 2, distinct, rather stout; seeds numerous, compressed, densely puberulent, comose at the apex.

Three species, natives of the Mediterranean region and of Asia.

Nerium oleander L. Sp. Pl. 209. 1753. *Adelfa; narciso; oleander.*

Planted commonly for ornament and sometimes naturalized, in Guatemala except at high elevations, common at low altitudes; native of the Mediterranean region.

A shrub or small tree, usually 6 m. high or less, glabrous or nearly so; leaves opposite or in whorls of 3–4, short-petiolate, coriaceous, oblong-lanceolate or linear-lanceolate, 6–25 cm. long, acuminate, attenuate to the base; inflorescence much longer than the leaves, with few or numerous flowers, these often double, white to pink or red; calyx lobes lanceolate or ovate-lanceolate, acuminate, 4–6 mm. long, somewhat foliaceous; corolla glabrous outside, the tube 8–12 mm. long, the throat conic-campanulate, 10 mm. long, the lobes obliquely obovate or obovate-oblong, 20–25 mm. long; follicles stout and thick, 8–15 cm. long.

The oleander is a popular ornamental shrub in Guatemala because of its attractive sweet-scented flowers, produced at all seasons of the year. The plant contains alkaloids that act as a powerful cardiac stimulant, and it has been employed in medicine as a heart stimulant and tonic. It has long been used in southern Europe for poisoning rats, and sometimes for killing people. An infusion of the leaves in oil has been employed as a remedy for cutaneous diseases and to destroy insect parasites. The sap is caustic to some persons. The wood if used as a spit to roast meat may cause the meat to become toxic. The plant is reported toxic to all classes of livestock and 15–20 grams are said to be sufficient to cause death in mature cattle or horses.

ODONTADENIA Bentham

Reference: Robert E. Woodson, Ann. Mo. Bot. Gard. 22: 270–306. 1935.

Usually large woody vines; leaves opposite, eglandular, stipulate or exstipulate; inflorescence opposite-axillary, sometimes also terminal, thyrsiform to simply scorpioid, with few to numerous, usually large and showy flowers; calyx 5-parted almost to the receptacle, the lobes subequal or conspicuously unequal, closely imbricate, bearing within 5–many alternate or indefinitely distributed squamellae; corolla funnelform or rarely almost salverform, the tube not appendaged within, the limb regularly 5-parted, dextrorsely contorted; anthers connivent and agglutinated to the stigma, the connective enlarged, narrowly bilobate; ovary of 2 distinct carpels, many-ovulate, surrounded at the base by 5 nectaries, these usually concrescent and irregularly lobate or lacerate; stigma fusiform to subcapitate; follicles 2, distinct, terete or dorsally compressed; seeds numerous, truncate and comose at the apex.

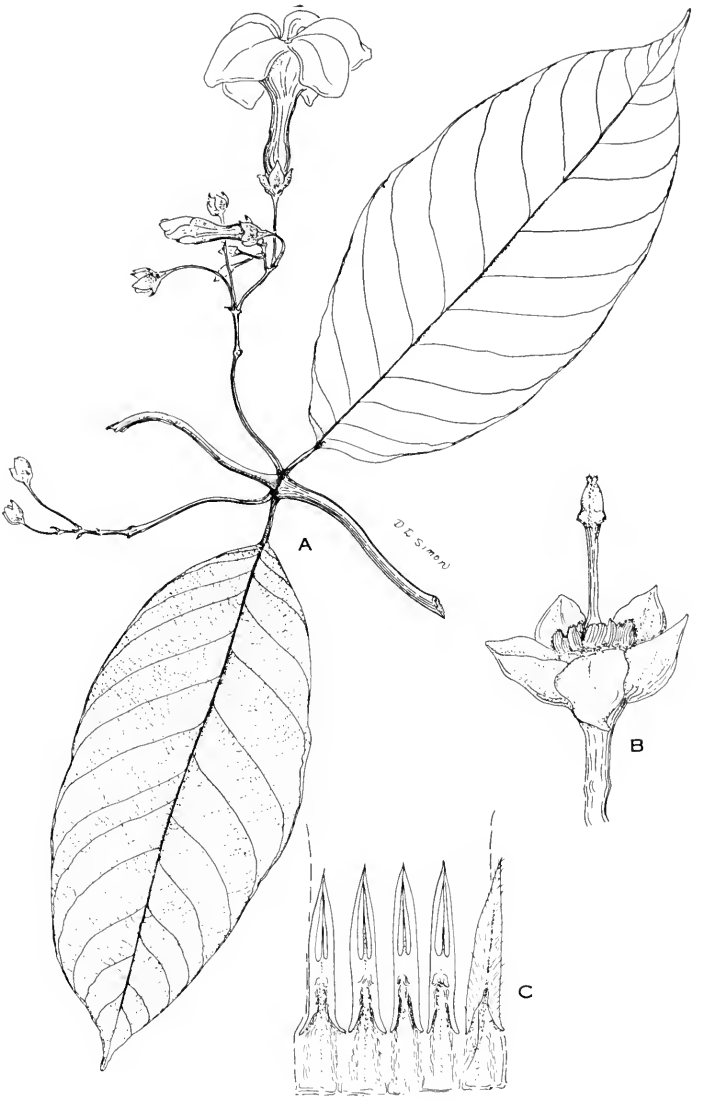

FIG. 104. *Odontadenia caudigera*. A, habit, × ½; B, calyx and pistil show digitiform squamellae, × 2; C, portion of corolla tube to show stamens, one reversed, × 2.

About 25 species, in tropical America. Two other species are known from southern Central America. The genus is perhaps too closely related to Mandevilla.

Inflorescence not thrysiform; calyx lobes equal or nearly so; stipules absent or minute ..... *O. caudigera.*

Inflorescence thyrsiform; calyx lobes very unequal, the outer ones shorter; stipules present but caducous ..... *O. schippii.*

Odontadenia caudigera Woodson, Ann. Mo. Bot. Gard. 23: 384. 1936.

Wet thickets or forest, at or little above sea level; Izabal; Alta Verapaz. British Honduras (type collected by W. A. Schipp, the exact locality unknown); Costa Rica.

A large woody vine, glabrous throughout, sometimes 10 m. long or more; leaves opposite, membranaceous, on petioles 1.5–2.5 cm. long, elliptic or oblong-elliptic, 10–20 cm. long, 6–11 cm. broad, subcaudate-acuminate, obtuse or almost rounded at the base, the lateral nerves prominent and very conspicuous beneath; inflorescences terminal and opposite-axillary, obscurely compound, mostly 3–6-flowered, the pedicels about 2 cm. long; bracts ovate, 2–3 mm. long; calyx lobes broadly ovate, obtuse, 6–7 mm. long; corolla funnelform, greenish yellow, glabrous outside, the tube 8–9 mm. long, the throat 16 mm. long, the lobes obovate-dolabriform, 20 mm. long; anthers densely hirtellous dorsally; nectaries concrescent, deeply multifid, slightly longer than the ovary.

This has been reported from British Honduras as *O. hoffmannseggiana* (Steud.) Woodson.

Odontadenia schippii Woodson, Ann. Mo. Bot. Gard. 22: 292. 1935.

Known only from the type, collected on the boundary between Petén and British Honduras, about 820 m., *Schipp S709*, growing in forest.

A large vine as much as 25 m. long, with a trunk 10 cm. in diameter; leaves glabrous, on petioles 1–1.5 cm. long, firm-membranaceous, elliptic to oval, 7–12 cm. long, 3–5.5 cm. broad, obtusely short-acuminate, obtuse at the base, glabrous, somewhat lustrous above; inflorescences terminal and opposite-axillary, thyrsiform, equalling or somewhat longer than the leaves, several-flowered, the pedicels 2–2.5 cm. long; calyx lobes evidently unequal, the outer ones broadly ovate, obtuse or rounded at the apex, 5–6 mm. long, coriaceous, densely and minutely puberulent-papillate, the inner ones broadly oblong, 9–10 mm. long; corolla funnelform, glabrous outside, creamy white, the tube 15–17 mm. long, the throat 2.5 cm. long, the lobes obliquely dolabriform, 1.5 cm. long; anthers minutely hirtellous dorsally; nectaries three times as long as the ovary, concrescent throughout.

PLUMERIA L.

Reference: Robert E. Woodson, Ann. Mo. Bot. Gard. 25: 202–224. 1938.

Large shrubs or medium-sized trees, the branches usually very thick and exuding abundant latex when broken; leaves alternate; inflorescence terminal or pseudolateral, fastigiate-thyrsiform, often very dense and many-flowered, the flowers large and showy, waxy; calyx 5-parted almost to the receptacle, the lobes subequal, without squamellae but tipped with a glandular epithelium; corolla salverform, not appendaged within, the limb equally 5-parted; stamens wholly included, the anthers not connivent, the connective not enlarged; ovary of 2 distinct carpels, many-ovulate, not accompanied by a nectary; follicles 2, distinct, thick, the seeds numerous, winged basally.

About 40 species have been described, all from tropical America. Only the following are known from continental North America. The generic name has been written *Plumiera* and *Plumieria.* It is dedicated to Charles Plumier (1646–1704), a brother in the Franciscan order, one of the first botanists to explore the flora of the New World, particularly that of the Antilles.

Leaves acute or acuminate; inflorescence corymbose ..... *P. rubra.*
Leaves rounded or emarginate at the apex; inflorescence congested and subumbellate ..... *P. obtusa.*

Plumeria obtusa L. Sp. Pl. 210. 1753. Native of Bahamas and the Greater Antilles, also on Swan Island, Honduras; represented in Central America by the following variety:

Plumeria obtusa var. **sericifolia** (C. Wright) Woodson, Ann. Mo. Bot. Gard. 25: 214. 1938. *P. sericifolia* C. Wright ex Griseb. Cat. Pl. Cub. 171. 1866. *P. multiflora* Standl. Field Mus. Bot. 8: 33. 1930 (type from Yucatan). *Flor de Mayo; flor de chombo.*

In dry, open forests at or little above sea level; Petén. British Honduras; Mexico (Yucatan); Bahamas; Cuba; Hispaniola.

A shrub or small tree, 6 m. high or less; leaves short-petiolate, coriaceous, obovate to obovate-oblong, 5–18 cm. long, 2–8 cm. broad, rounded or emarginate at the apex, cuneate-attenuate to the base, glabrous and lustrous above, minutely and densely pubescent beneath; inflorescence congested and subumbellate, the flowers few or numerous, white with a yellow center, the pedicels 7–10 mm. long; calyx lobes ovate-triangular, 1–1.5 mm. long, rounded to truncate at the apex, glabrous or pilosulose; corolla tube 1–2 cm. long, the lobes ovate-oblong or obovate, obtuse or rounded at the apex, 1.5–4.5 cm. long; follicles stout, 7–24 cm. long, 1–2 cm. in diameter.

Called "zopilote" in British Honduras. This species is probably not in cultivation in Central America. The Maya name of Yucatan is "nichte chom," and the plant is employed there in domestic medicine.

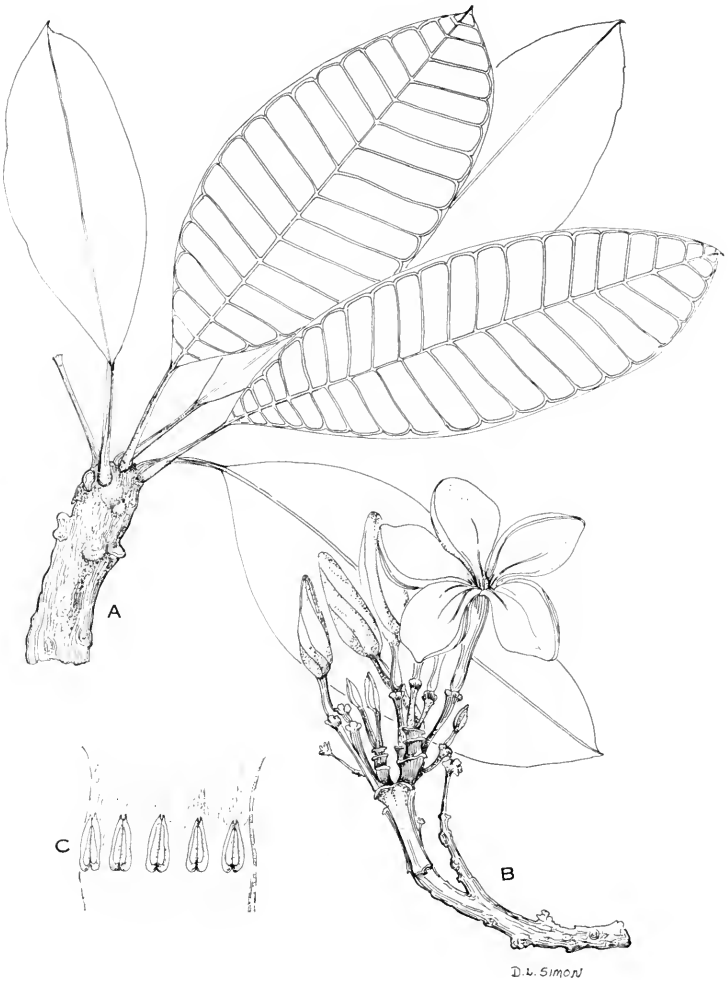

FIG. 105. *Plumeria rubra*. A, habit, × ½; B, inflorescence, × ½; C, stamens in place on dissected portion of corolla tube, × 3.

Plumeria rubra L. Sp. Pl. 209. 1753.

Widely cultivated in several color forms; native in rather dry often rocky forest and mountain slopes, occasionally on plains or in brushy savannas, usually at 1,500 m. or less, more commonly at 500–1,000 m.

A large shrub or small tree, seldom more than 6 meters high, except wild trees 10–12 m.; leaves firm membranaceous, somewhat succulent when fresh, obovate to

elliptic-oblong or oblong-lanceolate, 12–50 cm. long, 3.5–15 cm. broad, acute or acuminate, cuneate at the base, glabrous or nearly so, sometimes pubescent beneath, the petioles 1.5–10 cm. long; inflorescence corymbose, usually rather lax, many-flowered, the flowers very fragrant, the pedicels 1–2 cm. long; calyx lobes ovate-quadrate to ovate-deltoid, obtuse or truncate, 1–2 mm. long; corolla tube 1–2.5 cm. long, the lobes broadly obovate, rounded or obtuse at the apex, 2.5–6 cm. long; follicles 9–30 cm. long, 1.5–4 cm. thick.

The following forms may be distinguished by those who wish to do so:

f. **acutifolia** (Poir.) Woodson, Ann. Mo. Bot. Gard. 25: 211. 1938, as f. *acutifolia* (Ait.) Woodson. *P. acutifolia* Poir. Encycl. Suppl. 2: 667. 1812. *P. mexicana* Lodd. Bot. Cab. *t. 1024*. 1825. *P. megaphylla* A. DC. in DC. Prodr. 8: 391. 1844. *Flor de la cruz; flor de Mayo; palo de cruz; cumpap* (Jacaltenango); *nicte de monte; matuhua* (Petén).

Usually in rather dry, open rocky forest, brushy savannas or plains, 1,500 m. or less, most common at 500–1,000 m.; Petén; Baja Verapaz; Zacapa; Chiquimula; El Progreso; Jutiapa; Santa Rosa; Guatemala; Sacatepéquez; Retalhuleu; San Marcos; Huehuetenango. Mexico to Panama.

This is the white-flowered form, the center sometimes yellow, usually a native tree but sometimes brought into cultivation.

In El Salvador sometimes called "flor blanca" and "flor de ensarta"; "zacnicte" (Yucatan, Maya). This wild form is abundant in some places in Guatemala, especially along the drier Pacific foothills, and in the lower Motagua Valley and in the "Oriente." Through most of the dry season it is leafless, and flowers before the new leaves appear. The trunk is almost white, and the whole tree more or less distinctive in form, so that it can be recognized at a distance. When covered with its large clusters of white flowers it is showy and very attractive. It is not cultivated commonly in Central America, and it is the only form found wild. The wild trees are often 10 m. tall, with a trunk 25 cm. in diameter or sometimes more, the branches strongly ascending. The wood is hard, compact, very fine textured, yellowish brown with faint purplish streaks, giving it a pleasing appearance. The wood takes a high polish and is employed in some regions for articles of turnery. In Guatemala the Indian people sometimes employ an infusion of the flowers as a supposed remedy for diseases of the chest. In British Honduras the tree is sometimes called "Spanish jasmine" and "fringipanzi."

f. **lutea** (Ruiz & Pavón) Woodson, l.c. *P. lutea* Ruiz & Pavón, Fl. Peruv. 2: 21, *t. 142*. 1799.

This is the yellow-flowered form. It is uncommon and is known only from cultivation in Guatemala.

f. **rubra.** *P. rubra* L. Sp. Pl. 209. 1753.

Cultivated as an ornamental at low and middle elevations around the tropical world. Native of America and Phil Clark has seen it in Mexico where he believed it to be native, otherwise the native habitat not known and not recorded in the wild state by others. The flowers are red or pinkish and from this fact comes the specific name of the species. It may be a derivative of the forma *acutifolia*.

In Guatemala the plant is known as *flor de cruz; flor de mayo; nicte* and *nicte chachac* (Petén, Maya); "zabacnicte," "chacnicte," and "cumpap" (Yucatan, Maya). The flowers of this and other forms of the species are fragrant and attractive. A perfume, called frangipanni, has been made from the flowers and the same name has often been applied to the plant itself. The common name, *flor de mayo*, alludes to the fact that the tree often flowers in May but they are in flower commonly during other months. The corollas are rather stiff and keep their form and color long after being removed from the plants. On this account they are made into garlands, especially for decoration of the crosses that are put up in many places in Central America on *Día de la Cruz* (Invention of the Cross) and from this comes the common name *flor de la cruz*. The names *fringipanni* or *frangipanni* is derived from the French *frangipanier*, coagulated milk, in reference to the abundance of latex that pours from a broken branch.

f. **tricolor** (Ruiz & Pavón) Woodson, l.c. *P. tricolor* Ruiz & Pavón, Fl. Peruv. 2: 20, *t. 39*. 1799.

An infrequent color form in Guatemala which is known only from cultivation. The corollas are white or pale yellow, with rose-margined lobes and a yellow center.

PRESTONIA R. Brown

Reference: Robert E. Woodson, Ann. Mo. Bot. Gard. 23: 276–367. 1936.

Woody or suffrutescent vines; leaves eglandular; inflorescences alternate-axillary, rarely subterminal, racemose, simple or dichotomously or trichotomously divided, often corymbose or subumbellate, bracteate, the flowers few or numer-

ous, medium-sized or large; calyx 5-parted almost to the receptacle, the lobes subequal, somewhat foliaceous, bearing an opposite solitary squamella within; corolla salverform or rarely funnelform, the tube usually bearing 5 epistaminal appendages within, the orifice bearing a more or less conspicuous callose annulus, the limb regularly 5-parted, dextrorsely contorted; anthers connivent and agglutinated to the stigma, the tips somewhat exserted, the connective enlarged, narrowly bilobate; ovary of 2 distinct carpels, many-ovulate, surrounded at the base by 5 separate, more or less concrescent nectaries; stigma fusiform to subcapitate; follicles 2, distinct or more or less agglutinated, narrowly terete to subfusiform; seeds numerous, comose.

About 60 species, in tropical America. Nine or ten other species are found in southern Central America and in adjacent Mexico.

There are eight species of this small genus in Guatemala, easily divided into two groups by flowers, fruits and indument. The first three in the following key are much alike and difficult to separate, the remaining five are closely related also and it is doubtful if all are distinct.

Another species to be expected in Guatemala and included here is *P. grandiflora* L. Wms. described from Chiapas. It belongs in the first section mentioned above but has flowers twice as large as any of those species.

Corolla densely pubescent outside; leaves densely pubescent beneath.
- Corolla funnelform, the tube dilated above.
  - Corolla 5–6 cm. long ..... *P. grandiflora.*
  - Corolla 3–3.5 cm. long ..... *P. speciosa.*
- Corolla salverform, the tube cylindric.
  - Corolla 3.5–4.5 cm. long ..... *P. mexicana.*
  - Corolla 2.8–3 cm. long ..... *P. amanuensis.*

Corolla glabrous or merely papillate externally.
- Calyx lobes small and inconspicuous, 1.5–2 mm. long, only slightly foliaceous, usually more or less reflexed ..... *P. acutifolia.*
- Calyx lobes large and conspicuous, 4–20 mm. long, foliaceous or coriaceous to petaloid, not reflexed.
  - Nectaries thick and fleshy throughout; calyx lobes 4–5 mm. long.. *P. concolor.*
  - Nectaries thin and more or less diaphanous, at least on the margins; calyx lobes 8–17 mm. long.
    - Epistaminal appendages deeply included in the corolla tube.... *P. schippii.*
    - Epistaminal appendages exserted, or at least reaching the orifice of the corolla.
      - Calyx lobes 7–9 mm. long, scarcely or not at all suffused with purple; inflorescence 2–3 dichotomous ..... *P. guatemalensis.*
      - Calyx lobes 11–17 mm. long, usually deeply suffused with purple; inflorescence once divided or simple ..... *P. portobellensis.*

Prestonia acutifolia (Benth.) Schum. in Engler & Prantl, Pflanzenfam. 4, pt. 2: 188. 1895. *Haemadictyon acutifolium* Benth. ex Muell.-Arg. in Mart. Fl. Bras. 6[1]: 167. 1860.

Dry thickets, about 120 m.; Retalhuleu (near Nueva Linda, *Standley 66548*). Panama; southward to Argentina.

A woody vine, appearing glabrous; leaves on petioles 6–20 mm. long, thick-membranaceous, elliptic to oblong-elliptic or ovate-elliptic, 6–16 cm. long, 2–8 cm. broad, abruptly acute or acuminate, obtuse or rounded at the base, often veined with red or purple when young, glabous above, minutely papillose-puberulent beneath; inflorescence racemose, simple, about equalling the leaves, 6–40-flowered, the pedicels 5–12 mm. long, glabrous or minutely papillate; bracts ovate-lanceolate, 1–2 mm. long, subfoliaceous; calyx lobes narrowly ovate-lanceolate, acuminate, 1.5–2 mm. long, subfoliaceous, reflexed; corolla glabrous or minutely papillate, greenish yellow, the tube 15–20 mm. long, the epistaminal appendages 0.5–2 mm. long, wholly included, the lobes obliquely obovate, 7–10 mm. long; anthers minutely pubescent dorsally, the tips somewhat exserted; nectaries about equalling the ovary; follicles slender, obscurely moniliform, agglutinated and united at the apex, 20–40 cm. long, glabrous or nearly so.

Prestonia amanuensis Woodson, Ann. Mo. Bot. Gard. 23: 359. 1936.

Type from Stann Creek Railway, British Honduras, near sea level, growing in open places, *Schipp S7*.

A woody vine 3 m. long, densely fulvous-hirtellous or somewhat tomentose throughout, the pubescence rather harsh; leaves thick-membranaceous, almost sessile, broadly ovate, 6–9 cm. long, 4–7 cm. broad, abruptly and shortly cuspidate-acuminate from an often rounded apex, broadly and shallowly cordate at the base; inflorescence dense, subumbellate, 6–12-flowered, much shorter than the leaves, the pedicels 3–5 mm. long; bracts ovate-lanceolate, 3–7 mm. long; calyx lobes ovate-lanceolate, acuminate, 11–17 mm. long, foliaceous, appressed-hirtellous; corolla cream-colored, ferruginous-villous, the tube 20–22 mm. long, the epistaminal appendages replaced by subquadrate protuberances, the lobes obliquely obovate, 8–9 mm. long; anthers glabrous, partly exserted; nectaries concrescent, annular, essentially entire, about as long as the ovary.

This has been reported from British Honduras as *P. mexicana*, from which it is not very distinct.

Prestonia concolor (Blake) Woodson ex Standl. & Record, Field Mus. Bot. 12: 327. 1936. *Belandra concolor* Blake, Contr. Gray Herb. 52: 78. 1917.

Wet mixed forest, at or near sea level; Izabal (Río Dulce, above Livingston, *Steyermark 39434*). British Honduras (type from Río Grande, *Peck 953*).

A somewhat woody vine, almost glabrous throughout; leaves subcoriaceous, on petioles 6–9 mm. long, elliptic-oblong or oblong, 9–13 cm. long, 3–5 cm. broad, short-acuminate, obtuse or rounded at the base, somewhat lustrous above, conspicuously reticulate-veined; inflorescences racemose, simple, 30–40-flowered, the

FIG. 106. *Prestonia concolor*. A, habit, × ½; B, calyx and pistil, × 2; C, stigma, × 5; D, stamens in place on corolla tube, one reversed to show back, × 5.

peduncles equalling or often much exceeding the leaves, the pedicels 7–10 mm. long; bracts linear-lanceolate, minute; calyx lobes ovate-elliptic, acute or acuminate, 4–5 mm. long, membranaceous or subcoriaceous, deeply suffused with purple, minutely papillate outside; corolla greenish yellow, glabrous or very minutely papillate, the tube 15–18 mm. long, the epistaminal appendages wholly included, the lobes obliquely obovate, 8–10 mm. long; anthers glabrous or very minutely puberulent dorsally, slightly exserted; nectaries concrescent, thick and carnose, entire or slightly undulate, somewhat surpassing the ovary.

This species was collected 170 years ago by Sessé and Mociño, possibly in Guatemala but more probably somewhere in southern Mexico.

Prestonia grandiflora L. Wms. Field Mus. Bot. 31: 402. 1968.

Probably in moist thickets, type from about 2,000 m., La Grandoza, Chiapas, Mexico, *Matuda 15570*, to be expected in Guatemala.

Rampant woody vines. Branches terete, fulvous pubescent, glabrous with age, 7–8 mm. or possibly more in diameter. Leaves ovate to broadly ovate or broadly obovate, abruptly acuminate, rounded to the base, petiole short, 1 cm. or less, with 8–10 lateral nerves, sparsely pubescent above except densely so along the nerves, prominently fulvous-pubescent below, the blades 9–17 cm. long and 3.5–11 cm. broad; stipules corneous, 4–6 along the base of the petiole and also interpetiolar, 2–3 mm. long; inflorescence axillary, corymbose and several times branched, bearing few to several large yellow flowers, shorter than the subtending leaf, minutely ferruginous pubescent, bracts lanceolate, to 10 mm. long; calyx divided to the base, the lobes elliptic-lanceolate, ovate-lanceolate or lanceolate, acute or acuminate, minutely fulvous pubescent, 12–14 mm. long and 3.5–5 mm. broad; corolla largest of the genus, fulvous pubescent outside except on plicae, about 6 cm. long at maturity, tubular-campanulate, the basal tube about 3.5–4 cm. long to the throat, the apical portion somewhat expanded and containing the stamens, with an inconspicuous internal lamellate corona at the throat, the limb plicate, contorted in the bud, when mature the lobes about 3 cm. long and up to 2 cm. broad, divided to the throat, somewhat oblique and broadly obovate; stamens inserted below the throat, anthers linear-lanceolate, sagittate, 8–9 mm. long and about 2 mm. broad at the base, filaments about 2 mm. long, arched inward, attached peltately to the base of the stamen; carpels 2, with a maniculate stigma reaching to the enclosing anthers, subtended by 5 nearly separate nectaries; immature fruit densely fulvous pubescent.

Prestonia guatemalensis Woodson, Ann. Mo. Bot. Gard. 23: 339. 1936.

Moist or wet thickets, 500–2,000 m.; Alta Verapaz (type from Sepacuité, *Owen 1*); Santa Rosa (Volcán de Tecuamburro); Chimaltenango; Quezaltenango; San Marcos. Southern Mexico.

A suffrutescent vine, glabrous almost throughout; leaves firm-membranaceous, on petioles 1–1.5 cm. long, broadly obovate-elliptic to oblong, 15–25 cm. long,

7–10 cm. broad, abruptly short-acuminate, obtuse or rounded at the base; inflorescences lateral, 2–3-dichotomous, several-flowered, the peduncles 5–6 cm. long, the pedicels 9–12 mm. long, glabrous or minutely papillate; calyx lobes elliptic, obtuse or acute, 7–9 mm. long, subcoriaceous, pale green, minutely papillate outside; corolla greenish yellow, glabrous outside, the tube 18–20 mm. long, the epistaminal appendages somewhat exserted, the lobes obliquely obovate, 12–13 mm. long, often purplish outside; anthers glabrous, their tips exserted; nectaries concrescent, membranaceous, completely concealing the ovary; follicles slender, 30–50 cm. long, glabrous.

This has been reported from Guatemala as *P. macrocarpa* Hemsl.

Prestonia mexicana A. DC. in DC. Prodr. 8: 429. 1844.

Moist or dry thickets or forest, 200–1,400 m.; Petén; Jutiapa; Santa Rosa; Huehuetenango; Quezaltenango (?). Southern Mexico; British Honduras; El Salvador.

A woody vine, the older stems covered with corky, deeply sulcate or ridged, pale bark, the plants densely fulvous-pubescent or tomentose throughout; leaves firm-membranaceous, on petioles 3–9 mm. long, broadly ovate to oval or obovate-elliptic, 7–23 cm. long, 4–15 cm. broad, acute or more often rounded and abruptly short-acuminate, rounded or subcordate at the base, densely tomentose beneath; inflorescence densely umbellate, simple, 8–20-flowered, the peduncles much shorter than the leaves, the pedicels 5–10 mm. long; bracts ovate-lanceolate, 6–17 mm. long, foliaceous; calyx lobes ovate-lanceolate to oblong-lanceolate, acute or acuminate, 12–13 mm. long, foliaceous, appressed-tomentulose; corolla greenish yellow, fulvous-villous, the tube 22–30 mm. long, the epistaminal appendages replaced by linear callose ridges, the lobes obliquely obovate, 13–15 mm. long; anthers glabrous, partly exserted; nectaries concrescent, annular, broadly 5-lobate to essentially entire, equalling or slightly surpassing the ovary; follicles thick and rigid, divergent, 6–12 cm. long, densely fulvous-hispid.

Called "cacho de chivo" in El Salvador.

Prestonia portobellensis (Beurl.) Woodson, Ann. Mo. Bot. Gard. 18: 553. 1931. *Echites portobellensis* Beurl. Svensk. Vet. Akad. Handl. 1854: 137. 1856. *P. macrocarpa* Hemsl. Biol. Cent. Am. Bot. 2: 311. 1881.

Moist forest, 500–700 m.; Escuintla. Southern Mexico; Honduras and El Salvador to Panama.

A suffrutescent vine, glabrous throughout or nearly so; leaves firm-membranaceous to subcoriaceous, on petioles 6–30 mm. long, oblong-elliptic, 10–30 cm. long, 3–18 cm. broad, obtuse or usually abruptly short-acuminate, obtuse or rounded at the base; inflorescence subcorymbose, 2–3 times divided, rarely simple, 8–30-flowered, the peduncles much shorter than the leaves, the pedicels 6–18 mm. long; bracts ovate-lanceolate, 4 mm. long or less, scarious or slightly foliaceous; calyx lobes oblong-elliptic, acuminate, 11–17 mm. long, coriaceous or subcoriaceous, more or less tinged with purple, glabrous or obscurely papillate; corolla greenish yellow,

sometimes tinged with purple outside, glabrous or obscurely papillate, the tube 11–17 mm. long, the epistaminal appendages slightly exserted or at least reaching the orifice, the lobes obliquely obovate, 10–15 mm. long; anthers puberulent-papillate dorsally, the tips exserted; nectaries concrescent, membranaceous, conspicuously surpassing the ovary; follicles rather slender, 33–35 cm. long, glabrous.

Prestonia schippii Woodson, Ann. Mo. Bot. Gard. 23: 337. 1936.

Vine in mixed forest; Alta Verapaz (*Contreras 4527*). British Honduras (type from Eldorado, *Schipp S388*).

A somewhat woody vine 6–7 m. long, the stems as much as 2.5 cm. in diameter, glabrous throughout or nearly so; leaves firm-membranaceous, on petioles 12–16 mm. long, elliptic-oblong, 10–17 cm. long, 4–7 cm. broad, abruptly short-acuminate, obtuse or rounded at the base, conspicuously reticulate-veined; inflorescence subcorymbose, simple, 10–12-flowered, the peduncles much shorter than the leaves, the pedicels 12–15 mm. long; bracts ovate-lanceolate, 1–2 mm. long, scarious; calyx lobes narrowly ovate-elliptic, acute, 10–12 mm. long, subcoriaceous, glabrous, slightly tinged with purple; corolla cream-colored, minutely papillate outside, the tube 13–14 mm. long, the epistaminal appendages wholly included, the lobes obliquely obovate, 9–10 mm. long; anthers minutely hirtellous dorsally, partly exserted; nectaries concrescent, thin and somewhat diaphanous, conspicuously surpassing the ovary.

Closely related to the preceding species, and perhaps not distinct.

Prestonia speciosa Donn.-Sm. Bot. Gaz. 27: 435. 1899.

Known in Guatemala only from the type, Buena Vista, Santa Rosa, 1,700 m., *Heyde & Lux 4497*. Mexico (Chiapas); Honduras.

A woody vine, densely fulvous-pubescent throughout; leaves firm-membranaceous, on petioles 5–12 mm. long, ovate to broadly ovate-elliptic, 10–17 cm. long, 7–11 cm. broad, abruptly short-acuminate, broadly obtuse or rounded at the base, sparsely and minutely hispidulous-strigillose above, tomentulose beneath along the nerves; inflorescence subumbellate, 4–8-flowered, the peduncles scarcely longer than the petioles, the pedicels 1–1.5 cm. long; bracts narrowly lanceolate, 2–5 mm. long, subfoliaceous; calyx lobes ovate to ovate-oblong, acute, 12–15 mm. long, foliaceous, minutely hirtellous, corolla yellow, appressed-villosulous, the tube 15–17 mm. long, the throat conic-campanulate, 15 mm. long, 8–9 mm. broad, the epistaminal appendages replaced by inconspicuous obtriangular-foveolate protuberances, the lobes obliquely obovate, 20–25 mm. long, spreading; anthers glabrous, included; nectaries concrescent, rather obscurely and irregularly lobate, somewhat longer than the ovary.

RAUVOLFIA [Plumier] Linnaeus

Reference: Aragula Sathyanarayana Rao, Ann. Mo. Bot. Gard. 43: 253–354, *illus.* 1956.

Shrubs or small trees; leaves verticillate, the petioles glandular on the upper surface, at least at the very base, interpetiolar stipules deciduous; inflorescence cymose, terminal or lateral, the flowers small, white or greenish; calyx 5-parted, the lobes equal, without squamellae; corolla salverform or tubular-salverform, the limb equally 5-lobate, sinistrorsely contorted; anthers not connivent, the connective not enlarged; ovary of 2 distinct carpels, each carpal 1–2-ovulate, surrounded by a low annular nectary; fruit syncarpous, drupaceous; seeds 1–2, naked.

About 100 species, in the tropics of both hemispheres, 35 in America. Two other species are known from Panama.

Inflorescence about as long as the largest associated leaf; leaves 3 at each node, rarely 4 ..... *R. ligustrina.*

Inflorescence 2–4 times shorter than the largest associated leaf; leaves 4 at each node, rarely 3 or 5 ..... *R. tetraphylla.*

Rauvolfia ligustrina Roem. & Schult. Syst. Veg. 4: 805. 1819.

Dry scrub or savannas along the Pacific coastal area, mostly near sea level to 1,000 m.; Escuintla; Suchitepéquez. West Indies; Mexico through Central America to northern South America.

Shrubs 1–3 m. tall, the branches glabrous, with glands ascending the petioles; leaves ternate, slightly unequal, short petiolate, ovate to ovate-elliptic, acute to acuminate, glabrous or pubescent along the midrib below, 1–5 cm. long and 0.5–3 cm. broad, the largest ones at the nodes; inflorescences terminal or lateral, few to many-flowered; peduncles slender, 1–3 cm. long and 2–3-branched, secondary peduncles congested, glabrous or puberulent; flowers small; calyx 5-lobed, the lobes lanceolate, acuminate, 1.5–2 mm. long, glabrous; corolla urceolate, 2–3.5 mm. long, pilose near the throat within, otherwise glabrous, the lobes ovate to subrotate, 1–1.5 mm. long; stamens included, inserted near the throat; ovary bicarpellate, subglobose, 1.5–2 mm. in diameter; fruits round, 5–7 mm. in diameter, 2-seeded, glabrous.

Rauvolfia tetraphylla L. Sp. Pl. 208. 1753. *R. hirsuta* Jacq. Enum. Pl. Carib. 14. 1760. *R. tomentosa* Jacq. l.c. *R. canescens* L. l.c. ed. 2, 303. 1762. *R. heterophylla* Roem. & Schult. Syst. Veg. 4: 805. 1819, possibly. *R. canescens* var. *glabra* Muell.–Arg. Linnaea 30: 395. 1860. *R. hirsuta* var. *glabra* (Muell.–Arg.) Woodson, Ann. Mo. Bot. Gard. 26: 299. 1939. *Chalchupa; curarina* (Suchitepéquez).

Wet to dry thickets, often in second growth or in waste ground or old fields, 2,000 m. or less, most common at 500 m. or lower; Petén; Izabal; Baja Verapaz; El Progreso; Zacapa; Jutiapa; Santa Rosa; Escuintla; Suchitepéquez; Chimaltenango (probably planted); Retalhuleu; San Marcos; Huehuetenango. West Indies; Mexico; British Honduras to El Salvador and Panama; northern South America. Introduced into India.

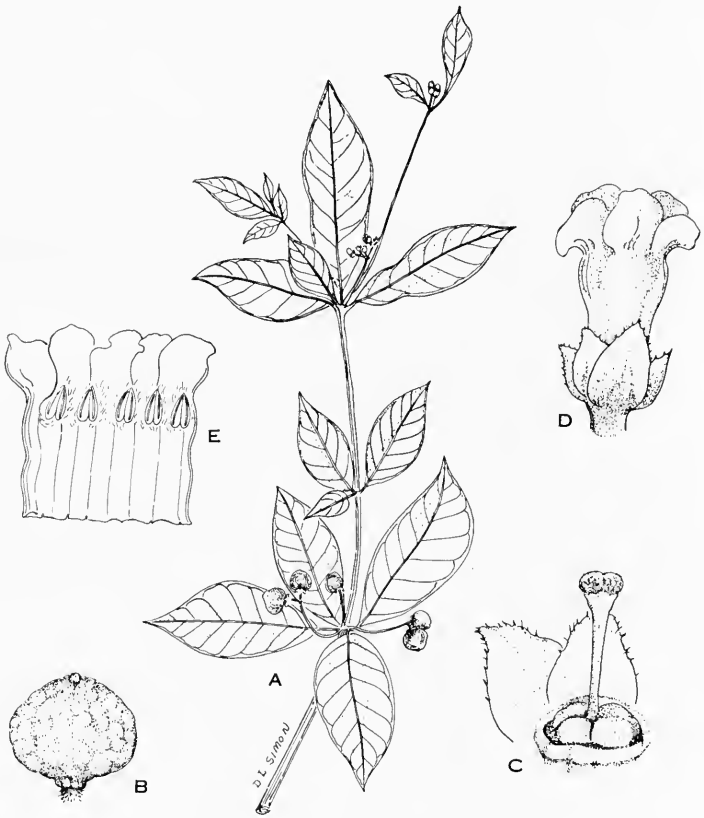

FIG. 107. *Rauvolfia tetraphylla*. A, habit, × ½; B, fruit, × 2; C, pistil with disk at base, × 10; D, flower, × 5; E, corolla opened out with stamens in place, × 5.

Usually a shrub a meter high or less but sometimes becoming a small tree of 4 m., with copious white latex, usually much branched, finely pubescent throughout or often almost wholly glabrous; leaves mostly in whorls of 4, sometimes of 3 or 5, very unequal, firm-membranaceous or when fresh somewhat fleshy, narrowly oblong-elliptic to broadly ovate-elliptic or obovate-elliptic, 2–13 cm. long, 1–5 cm. broad, acute or obtuse, broadly acute or obtuse at the base, the petioles 1–7 mm. long, glandular; inflorescences condensed, much shorter than the subtending leaves, few–many-flowered, the pedicels 2–3 mm. long; calyx lobes ovate or ovate-lanceolate, acute or subobtuse, 1.5–3 mm. long, glabrous or puberulent; corolla minutely puberulent-papillate or glabrous, the tube 2.5–4 mm. long, somewhat constricted at the insertion of the stamens, the lobes obliquely obovate-rounded, 1–1.5 mm. long; stamens inserted about the middle of the corolla tube; drupes subglobose, 5–8 mm. in diameter, becoming red and at maturity almost black.

Known in El Salvador as "amatillo," "hierba de San José," "matacoyote," and "señorita"; "cabamuc," "chacmuc," "chacmuc-ac," "cabalmuc" (Yucatan, Maya).

This is a well-known plant in Guatemala, where it is employed commonly by the country people in treating malaria, and it is also one of the reputed remedies for snake bites. See "Estudio de la planta llamada "chalchuapa," *Revista Agric.* (Guatemala) 14: 205–215, *illus.* 1936. It has been found by Guatemalan investigators to contain two alkaloids, to which the names Chalcupine A and B have been given. The fruit is generally considered to be poisonous. The shrub is abundant on the Pacific plains, and seldom or rarely ascends into the foothills. The typical and original form of the species is densely and finely pubescent throughout. It is infrequent in Guatemala and other parts of Central America. The common form is the glabrous one in which the leaves are sparsely pilose along the nerves, or almost glabrous. There are intergrading forms.

RHABDADENIA Mueller von Argau

Reference: Robert E. Woodson, Ann. Mo. Bot. Gard. 23: 205–211. 1936.

Slender woody vines, glabrous; leaves opposite, not glandular; inflorescence a greatly reduced, dichasial cyme, alternate-axillary or subterminal, sometimes 1-flowered; calyx 5-parted almost to the receptacle, the lobes subequal, somewhat foliaceous, scarcely imbricate, without squamellae within; corolla funnelform, the tube not appendaged within, straight, the limb regularly 5-parted, dextrorsely contorted; anthers connivent and agglutinated to the stigma, the connective enlarged, narrowly bilobate; ovary of distinct carpels, many-ovulate, surrounded by 5 distinct or somewhat concrescent nectaries; stigma fusiform; follicles 2, distinct, slender, terete; seeds numerous, rostrate, comose at the apex.

Three species, the others South American.

Rhabdadenia biflora (Jacq.) Muell.-Arg. in Mart. Fl. Bras. 6[1]: 175. 1860. *Echites biflora* Jacq. Enum. Pl. Carib. 13. 1760. *E. paludosa* Vahl, Eclog. 2: 19. 1798. *R. paludosa* Miers, Apocyn. S. Amer. 119. 1878. *R. macrantha* Donn.-Sm. Bot. Gaz. 40: 7. 1905 (type from Tela, Honduras).

In or near mangrove swamps; Izabal. Southern Florida; Yucatan Peninsula of Mexico; British Honduras; Honduras; Nicaragua; Panama; in Central America apparently confined to the Atlantic coast; Greater Antilles; northern South America.

A small or large, woody vine, glabrous; leaves coriaceous or firm-membranaceous, on petioles 1–2 cm. long, broadly obovate-oblong to oblong or lanceolate,

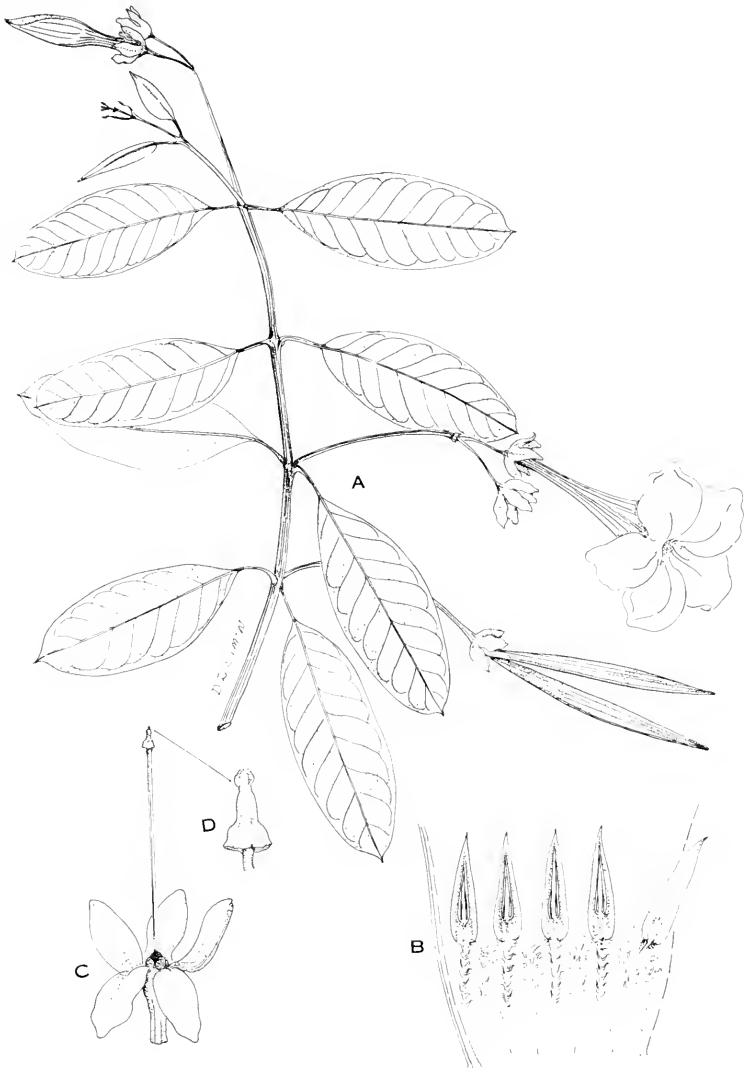

FIG. 108. *Rhabdadenia biflora*. A, habit, × ½; B, stamens in natural position on portion of dissected corolla tube, × 3; C, calyx and pistil, natural size; D, stigma, × 5.

5–12 cm. long, 1.5–5 cm. broad, very obtuse or rounded and mucronate at the apex, obtuse or subacute at the base, paler beneath, the nerves very slender and inconspicuous; inflorescences lateral or rarely subterminal, 1–5-flowered, the peduncles equalling or longer than the leaves, the pedicels 10–13 mm. long; bracts minute, scarious; calyx lobes broadly ovate-oblong, mucronulate, 1–9 mm. long, subfoliaceous; corolla white, often tinged with pink, the tube 1.5–2 cm. long, the throat conic, 2–3 cm. long, 1–1.5 cm. broad at the orifice, the lobes broadly oblique-obovate, 2–2.5 cm. long, spreading; anthers densely pilosulous dorsally, included; nectaries half as long as the ovary; follicles about 8 cm. long or perhaps even longer, straight, terete, striate, glabrous, continuous.

The flowers are showy and handsome. The plant is a characteristic member of the mangrove association.

STEMMADENIA Bentham

Reference: Robert E. Woodson, A revision of the genus *Stemmadenia*, Ann. Mo. Bot. Gard. 15: 341–378, *illus.* 1928.

Shrubs or trees, glabrous or pubescent; leaves opposite, eglandular, membranaceous; inflorescence cymose, few-flowered, the flowers large and showy, yellow or white; calyx 5-parted, the lobes very unequal, closely imbricate, usually conspicuously foliaceous, bearing numerous squamellae within; corolla salverform or funnelform, the limb 5-parted, sinistrorsely convolute; anthers not connivent, the connective not enlarged; ovary of 2 distinct carpels, many-ovulate, surrounded by a fleshy annular nectary; fruit follicular, coriaceous or fleshy, the follicles usually very large and thick; seeds numerous, naked, embedded among fleshy arils.

Fifteen species, in tropical America, mostly in Mexico and Central America. Three others are known from Central America.

Corolla salverform; bracts inserted about the middle of the pedicel, not immediately subtending the calyx.
  Calyx equaling the corolla tube or only slightly shorter ..... *S. donnell-smithii.*
  Calyx half as long as the corolla tube or shorter.
    Bracts scarious or only slightly foliaceous; calyx lobes strongly imbricate. *S. decipiens.*
    Bracts foliaceous; calyx lobes spreading ..... *S. eubracteata.*
Corolla funnelform; bracts inserted at the summit of the pedicel directly below the calyx.
  Corolla throat broadly conic, at least half as broad as long; leaves usually pubescent beneath, often very densely so ..... *S. obovata.*
  Corolla throat tubular or narrowly conic, much longer than broad; leaves glabrous beneath or nearly so.
    Calyx lobes 10–15 mm. long, strongly imbricate ..... *S. galeottiana.*
    Calyx lobes 3–6 mm. long, scarcely imbricate ..... *S. macrophylla.*

Stemmadenia decipiens Woodson, Ann. Mo. Bot. Gard. 15: 363. 1928. *Coyoles de coche.*

Mixed forest, 100–1,100 m.; Retalhuleu (between Retalhuleu and Nueva Linda); Huehuetenango (near Democracia). Western Mexico; Nicaragua.

A shrub or small tree, 10 m. high or less, glabrous throughout or nearly so; leaves on petioles 5–7 mm. long, elliptic to obovate-oblong, 7–10 cm. long, 2.5–6 cm. broad, acute or acuminate, obtuse or acute at the base; inflorescence 3–9-flowered, the pedicels 3–5 mm. long; calyx lobes imbricate, scarious or subcoriaceous, ovate, acute or obtuse, 4–6 mm. long; corolla yellow, salverform, the tube 2–3 cm. long, 2.5 mm. broad, the lobes obliquely obovate, somewhat reflexed.

Stemmadenia donnell-smithii (Rose) Woodson, Ann. Mo. Bot. Gard. 15: 369. 1928. *Tabernaemontana donnell-smithii* Rose ex Donn.-Sm. Bot. Gaz. 18: 206. 1893. *Cojón; copal; cojón de caballo; cojón de puerco; tonché; gutigamba* (fide Aguilar).

Dry to wet thickets or open forest, often in second growth or in roadside hedges, frequent in pastures, 1,500 m. or less, most common at 700 m. or lower; Petén; Alta Verapaz; Izabal; Santa Rosa; Escuintla; Guatemala; Sololá; Suchitepéquez; Retalhuleu; Quezaltenango; San Marcos. Southern Mexico; British Honduras to El Salvador and Panama.

A shrub or small tree, sometimes 15 m. high with a trunk 30 cm. or more in diameter, usually not more than half as high, the bark almost smooth, pale; leaves subsessile, elliptic or obovate-elliptic, 6–14 cm. long, 3–5.5 cm. broad, caudate-acuminate, obtuse or acute at the base, glabrous above or nearly so, barbellate beneath in the axils of the nerves; inflorescence 1–5-flowered, the pedicels 10–13 mm. long; calyx lobes ovate to ovate-oblong, obtuse or subobtuse, 2–2.5 cm. long, scarious; corolla salverform, buff or pale yellow, the tube 2.5–3 cm. long, 3.5 mm. broad at the base, the lobes obliquely obovate, 15–18 mm. long, somewhat reflexed; follicles very large, hard, and heavy, 5–7 cm. long, 3–5 cm. broad, or in the fresh state even larger, very thick, ferruginous, somewhat verrucose.

In Honduras sometimes called "cojón de mico" and "cojón de burro"; "cojotón" (British Honduras). The name "cojón," strangely enough, has been given to a *caserío* in the Department of Jutiapa. The wood is light brown, rather light in weight but firm and strong, fine-textured, easy to work, not durable; not utilized. The large and very conspicuous fruits are so heavy and produced in such abundance that they bend the branches sharply downward. When they or the branches are cut, they exude a large amount of very sticky, white latex that contains a substance having the properties of guttapercha (see Standl. & Calderón, Lista Pl. Salvador 175. 1925). The tree is abundant along much of the Pacific coast of Central America, and it has been suggested that it might be exploited as a source of this substance, which could be obtained in substantial and probably large amounts. The latex is employed in El Salvador for fastening the wrappers of cigarettes, also by boys in making kites, and for other purposes when an adhesive is needed. In Guatemala it sometimes

is chewed like chicle. The latex is said to be employed there also in treating the bites of the spider called *araña de caballo,* whose poison causes the hoofs of horses and mules to fall off.

Stemmadenia eubracteata Woodson, Ann. Mo. Bot. Gard. 15: 368, *t. 49, f. 2.* 1928.

Known only from the type, Volcán de Tecuamburro, Santa Rosa, 2,000 m., *Heyde & Lux 4538.*

A shrub or small tree, glabrous throughout or nearly so; leaves on petioles 4–5 mm. long, oblong-elliptic or oblanceolate-oblong, 6–8 cm. long, 2–3 cm. broad, caudate-acuminate to subobtuse, acute at the base; inflorescence 2–5-flowered, the pedicels 7–9 mm. long; bracts conspicuously foliaceous; calyx lobes foliaceous, obovate-elliptic, abruptly acuminate, 8–10 mm. long, spreading; corolla yellow, salverform, the tube 22–25 mm. long, 3 mm. broad at the base, the lobes obliquely obovate, 14–16 mm. long, somewhat reflexed.

This has been reported from Guatemala as *S. bella* Miers.

Stemmadenia galeottiana (A. Rich.) Miers, Apocyn. S. Amer. 76. 1878. *Odontostigma galeottiana* A. Rich. in Sagra, Hist. Cub. 11: 87. 1850. *Echites bignoniaeflora* Schlecht. Linnaea 26: 372. 1854. *S. bignoniaeflora* Miers, Apocyn. S. Amer. 76. 1878. *S. insignis* Miers, l.c. *S. bella* Miers, l.c. 77. 1878. *Cajón*; *Ixlao*; *ixdislan* (Petén, Maya, fide Lundell); *cojón; cojón de caballo.*

Moist or wet forest, 700 m. or less; Petén; Alta Verapaz. Southern Mexico.

A shrub or small tree, 1–5 m. high, glabrous throughout or nearly so; leaves on petioles 8–11 mm. long, oval to obovate-elliptic, 9–14 cm. long, 4–6 cm. broad, caudate-acuminate, obtuse at the base; inflorescence 1–4-flowered, the pedicels 8–13 mm. long; calyx lobes imbricate, ovate to obovate-oblong, obtuse or rounded at the apex, 1–1.5 cm. long; corolla pure white, funnelform, the tube 8–10 mm. long, the throat subtubular, 4–5.5 cm. long, 7–10 mm. broad at the orifice, the lobes broadly obovate, 2–2.5 cm. long, spreading; follicles ovoid-subreniform, 2–2.5 cm. long, 1.5 cm. broad, irregularly verrucose.

Called "xlaul" (Maya) and "laurel" in Yucatan. A small tree of this species once grew in the park at Cobán, where it attracted attention because of its abundance of handsome, large, pure white flowers.

Stemmadenia macrophylla Greenm. Proc. Am. Acad. Sci. 35: 310. 1900.

Moist or wet thickets or forest, 1,300–1,400 m.; Alta Verapaz (type from Pansamalá, *Tuerckheim 981*); Quezaltenango; so far as known, endemic, but to be expected in Chiapas.

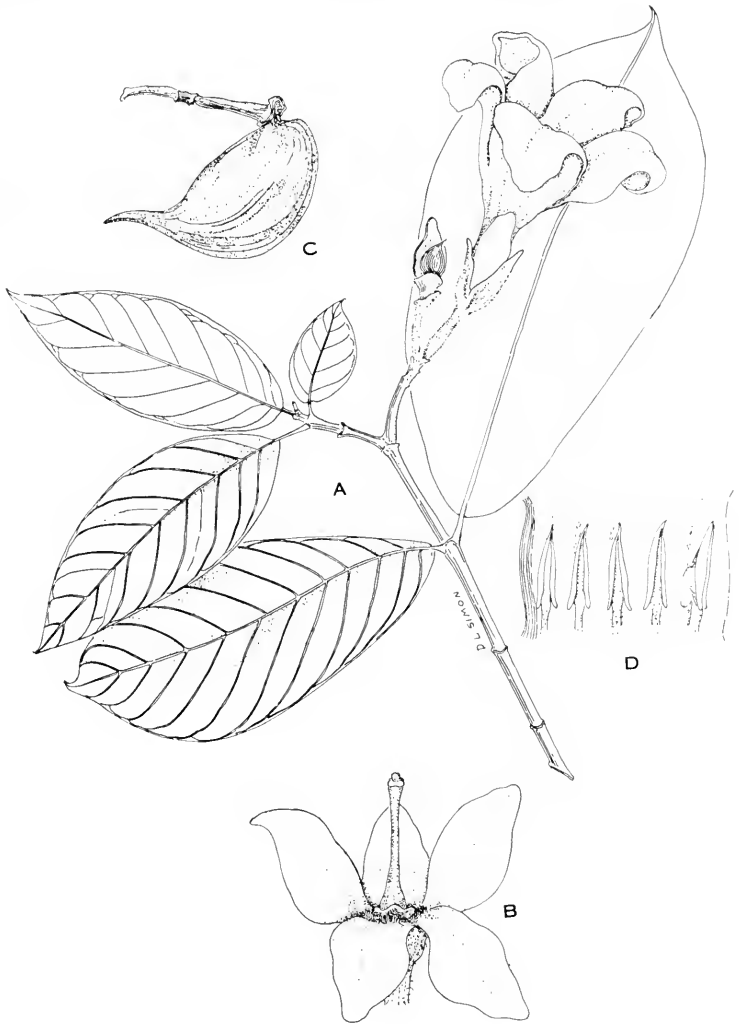

FIG. 109. *Stemmadenia obovata*. A, habit, × ½; B, calyx and pistil partially dissected to show ovary and disk, natural size; C, one follicle of fruit, × ½; D, stamens in position on dissected corolla tube, × 2.

A shrub or tree, sometimes 10 m. high, glabrous throughout or nearly so; leaves on petioles 1.5–2 cm. long, oblong-elliptic or obovate-elliptic, 15–20 cm. long, 5.8 cm. broad, subobtuse or caudate-acuminate, obtusely cuneate at the base; inflorescence 1–8-flowered, the pedicels 2–4 mm. long; calyx lobes scarcely imbricate, ovate or oblong-obovate, acute or obtuse, 3–6 mm. long; corolla funnelform, yellowish, the tube 1.5–2 cm. long, the throat subtubular, 2.5–3 cm. long, 7–9 mm. broad at the orifice, the lobes obliquely ovate-oblong, 2.2–2.8 cm. long, spreading.

This has been reported from Guatemala as *S. bignoniaeflora* Miers.

Stemmadenia obovata (Hook. & Arn.) Schum. in Engler & Prantl, Pflanzenfam. 4^2: 149. 1895. *Bignonia obovata* Hook. & Arn. Bot. Beechey Voy. 439. 1841. *S. pubescens* Benth. Bot. Voy. Sulph. 125. 1845. *S. mollis* Benth. l.c. *S. obovata* var. *mollis* Woodson, Ann. Mo. Bot. Gard. 15: 358. 1928. *Chapopo* (Zacapa); *cojón; cojón de puerco; cojón de coche.*

Moist or dry thickets, often on rocky brushy slopes, sometimes on plains or in thin forest, 1,350 m. or less; Zacapa; Chiquimula; El Progreso; Jutiapa; Santa Rosa; Guatemala; Retalhuleu; Quiché; Huehuetenango. Southern Mexico; El Salvador and Honduras to Panama; southward to Bolivia.

A shrub or small tree, sometimes 10 m. high but usually 5 m. or less; leaves on petioles 5–8 mm. long, obovate or obovate-elliptic, 10–20 cm. long, 7–10 cm. broad, obtuse to acuminate, obtusely cuneate at the base, varying from almost glabrous to densely and softly pubescent beneath, the upper surface glabrous or pubescent; inflorescence pubescent, 1–6-flowered, the pedicels 9–14 mm. long; calyx lobes ovate or oblong-ovate, obtuse, 1.5–2 cm. long; corolla bright yellow, funnelform, the tube 1.5–2.5 cm. long, the throat broadly conic, 1.5–3 cm. long, 1.5–2.5 cm. broad at the orifice, the lobes broadly obovate, 1.5–2.5 cm. long, spreading; follicles obovoid-subreniform, 4–4.5 cm. long and 3–3.5 cm. broad, or probably larger when fresh, minutely verrucose.

Sometimes called "flor del día" in El Salvador. When in flower the shrub is a showy and handsome one, because of the large size and brilliant coloring of the corollas, but the flowers are found for only a short season, toward the end of the rainy season. Pubescence on the leaves of this species is exceedingly variable, from sparse or none to dense on both sides of the leaf, the lower surface usually being more pubescent than the upper surface.

STEPHANOTIS FLORIBUNDA Brongn., native of Madagascar, is planted rather frequently for ornament in Guatemalan gardens. It is a slender glabrous vine with elliptic leaves and small, waxy, white or cream-colored, very fragrant flowers.

TABERNAEMONTANA L.

Shrubs or trees, usually glabrous or nearly so; leaves opposite; inflorescence compound-cymose, usually many-flowered; calyx 5-parted almost to the receptacle, the lobes equal, small, scarious or only slightly foliaceous, bearing numerous squamellae within; corolla salverform, generally small, usually white; anthers not

connivent, free from the stigma, usually tinged with bluish green, the connective not enlarged; ovary of 2 distinct carpels, many-ovulate, with or without a basal annular nectary; fruit follicular, the follicles often large and thick; seeds numerous, embedded among the fleshy arils.

About 50 species, in tropical America. One other Central American species is found in Costa Rica.

Flowers large, commonly 6–7 cm. long, sometimes double; cultivated plants. *T. coronaria.*

Flowers much smaller, usually less than 2 cm. long; native plants.

Anthers yellow throughout, not tinged with bluish green, inserted near or below the middle of the corolla tube, wholly included ..... *T. arborea.*

Anthers margined or tipped with bluish green, inserted near or above the middle of the corolla tube, often somewhat exserted.

Anthers about half exserted ..... *T. amygdalifolia.*

Anthers included or the tips barely exserted.

Corolla tube 15–16 mm. long ..... *T. laurifolia.*

Corolla tube 6–9 mm. long.

Inflorescence dense and congested, much shorter than the subtending leaves ..... *T. alba.*

Inflorescence lax and open, almost equaling the subtending leaves. *T. chrysocarpa.*

Tabernaemontana alba Mill. Gard. Dict. ed. 8. no. 2. 1768.

Reported from Petén. Southern Mexico.

A large shrub or a small or medium-sized tree, glabrous throughout, the trunk as much as 20 cm. in diameter, the crown rather dense, spreading, the bark greenish or light brown; leaves membranaceous or subcoriaceous, on petioles 5–20 mm. long, obovate-elliptic or oblanceolate-elliptic, 5–16 cm. long, 2–7 cm. broad, obtuse or abruptly and shortly obtuse-acuminate, cuneate at the base; inflorescence broadly corymbose, sessile or nearly so, much shorter than the subtending leaves, many-flowered, the pedicels 2–10 mm. long; calyx lobes ovate, subobtuse, closely imbricate, 1.5–1.8 mm. long; corolla white, the tube 6–8 mm. long, slightly constricted at the insertion of the stamens, the lobes 8–10 mm. long, oblong-dolabriform, with an inconspicuous lateral acumen, obtuse, spreading; stamens inserted in the upper third of the corolla tube, the anthers marginate with bluish green, the tips barely exserted; ovary surrounded by a low annular nectary; follicles broadly subreniform, broadly acuminate, 2–2.5 cm. long, 1–1.5 cm. broad, smooth or nearly so.

Called "lecherillo" in Veracruz. The bark exudes a tasteless latex when cut. The wood is whitish throughout.

Tabernaemontana amygdalifolia Jacq. Enum. Pl. Carib. 14. 1760. *T. deamii* Donn.-Sm. Bot. Gaz. 52: 50. 1911 (type collected along the Río Motagua near Gualán, Zacapa, *Deam 6282*). *Cojón de puerco; cojón de mico; cocoguaca* (Alta Verapaz); *palo de mico* (Izabal).

FIG. 110. *Tabernaemontana amygdalifolia*. A, habit, × ½; B, corolla dissected to show anthers in place, × 1½; C, calyx partially dissected to show ovary and glands, × 2; D, fruit, one follicle only, × ½.

Moist or dry thickets, often in sandy places, frequently in second growth, 700 m. or less; Alta Verapaz; Izabal; Zacapa; El Progreso; Chiquimula; Santa Rosa; San Marcos. Southern Mexico; British Honduras to El Salvador and Panama; Colombia and Venezuela.

Usually a shrub of 1–5 m., glabrous throughout; leaves membranaceous, on petioles 5–13 mm. long, oblong-elliptic or obovate-elliptic, 5–15 cm. long, 2–5 cm. broad, obtuse to abruptly acuminate, cuneate at the base; inflorescence corymbose, much branched, slightly shorter than the subtending leaves, few–many-flowered, the pedicels 1–2 cm. long; calyx lobes ovate, acute or subobtuse, somewhat imbricate; corolla white, the tube 14–16 mm. long, somewhat narrowed toward the orifice, the lobes narrowly obovate, 16–22 mm. long, somewhat reflexed, inconspicuously acuminate laterally; stamens inserted near the orifice of the corolla tube, the anthers with bluish green margins, half exserted; ovary surrounded at the base by an annular nectary; follicles narrowly ovoid-ellipsoid, 3–6 cm. long, 1.2–1.8 cm. thick, narrowly acuminate, longitudinally striate.

Known in Yucatan as "utsubpec" (Maya), "jazmín de perro," "olfato de perro," "chilindrón," "cojón macho," "cojón de puerco," "leche de perra," "jazmín del monte," and "amatillo." It is reported that in Yucatan an infusion of the leaves sometimes is administered as a laxative. The latex is said to be used for adulterating chicle.

Tabernaemontana arborea Rose ex Donn.-Sm. Bot. Gaz. 18: 206. 1893. *T. schippii* Standl. Field Mus. Bot. 8: 34. 1930 (type from Big Creek, British Honduras, *Schipp 168*). *Peschiera arborea* Markgraf, Notizbl. Bot. Gart. Berlin 14: 173. 1938. *Cojón.*

Moist or wet thickets or mixed forest, often in second growth, 600 m. or less; Petén; Alta Verapaz; Izabal; Quezaltenango (type from Río Ocosito, *Smith 2766*); San Marcos. Southern Mexico; British Honduras; Honduras; Panama.

A tree, commonly 6–15 m. high, glabrous throughout or nearly so, the trunk often 30–50 cm. in diameter, often with small buttresses, the bark light brown, somewhat scaly, the crown spreading or rounded; leaves membranaceous, on petioles 5–25 mm. long, ovate-elliptic to narrowly oblong-elliptic, 7–18 cm. long, 2–7 cm. broad, shortly obtuse-acuminate, obtuse or acute at the base; inflorescence broadly corymbose, much branched, usually shorter than the subtending leaves, the flowers numerous, white, fragrant, the pedicels 5–8 mm. long; calyx lobes ovate-lanceolate, acute or acuminate, 2–3 mm. long, scarcely imbricate at the base; corolla tube 7–9 mm. long, conspicuously narrowed toward the orifice, the lobes obliquely ovate-oblong, obtuse, 12–15 mm. long, spreading; stamens inserted near the base of the corolla tube, the anthers uniformly yellow, 3–3.5 mm. long, deeply included; ovary without a nectary; follicles broadly reniform, obtuse, 6–8 cm. long, 3–4.5 cm. broad, conspicuously verrucose.

Called "cojotón" and "cojón de caballo" in British Honduras. A fair amount of latex exudes when the trunk is cut. The wood is yellowish or light reddish brown, hard and heavy, fine-textured.

Tabernaemontana chrysocarpa Blake, Contr. Gray Herb. 52: 81. 1917. *T. amblyblasta* Blake, Contr. U. S. Nat. Herb. 24: 18, *t. 6.* 1922 (type from Los Amates, Izabal, *Blake 7636*). *Chapupo, cojón, cojón de gato, cojón de mico, cojón de caballo, lechoso* (Petén), *palo de mico, huevos de mico* (Izabal).

Wet or moist thickets or mixed forest, sometimes in open pine forest, 600 m. or less, most plentiful at or near sea level; Petén; Alta Verapaz; Izabal. Southern Mexico; British Honduras; Honduras to Panama.

A large shrub or a tree, sometimes 15 m. high with a trunk as much as 45 cm. in diameter, usually smaller, the crown dense, spreading, the trunk round or somewhat fluted, the bark dark grayish to light brown, with small scales, glabrous throughout; leaves firm-membranaceous to subcoriaceous, on petioles 6–25 mm. long, obovate to oblanceolate-elliptic, 5–25 cm. long, 2–9 cm. broad, obtuse or shortly and abruptly acuminate, cuneate-acute at the base; inflorescence subcorymbose, usually lax and equalling or surpassing the leaves, many-flowered, the pedicels 7–15 mm. long; calyx lobes broadly ovate, obtuse, about 2 mm. long, closely imbricate; corolla white or yellowish white, the tube 6–9 mm. long, slightly con-

stricted at the insertion of the stamens, the lobes oblong-dolabriform, obtuse, 10–12 mm. long, spreading; stamens inserted in the upper third of the corolla tube, the anthers with bluish green margins, barely included or a small part of the tips exserted; ovary surrounded at the base by a low annular nectary; follicles subreniform, 2–2.5 cm. long, 1.5–2 cm. broad, obtuse or with a very inconspicuous acumen, smooth or nearly so.

Called "cojotón" and "cojón de perro" in British Honduras, "chanchito" (Honduras), "totoyoyote" (Veracruz, the fruit), "lecherillo" (Oaxaca, Veracruz). The fruit yields a large amount of white latex that coagulates readily when rubbed between the hands. It is reported to be used sometime for adulterating chicle, and is chewed locally like that substance. The yellowish white wood is sometimes utilized in construction of the poorer types of lowland dwellings. This species has been reported from Guatemala and other parts of Central America as *T. citrifolia* L., a West Indian species.

Tabernaemontana coronaria (Jacq.) Willd. Enum. Hort. Berol. 275. 1809. *Nerium coronarium* Jacq. Coll. Bot. 1: 138, *t. 52*. 1786. *T. divaricata* of authors, not *Nerium divaricatum* L. *Flor de poeta.*

An ornamental plant, widely distributed in cultivation in tropical regions, perhaps native in the East Indies; cultivated rather frequently in Guatemala, chiefly in the tierra caliente.

A shrub, commonly 1–2 m. high, glabrous; leaves short-petiolate, membranaceous, narrowly elliptic or elliptic-oblong, 8–12 cm. long, caudate-acuminate with usually a long and very narrow acumination, acute at the base, paler beneath; inflorescences 1–8-flowered, mostly in the forks of the branches; flowers fragrant, white, often double, mostly 6–7 cm. long, the corolla limb 3–5 cm. broad, the tube about 2 cm. long.

Known in El Salvador by the names "jazmín de Arabia" and "jazmín de Jamaica." The most common English name is "crape jasmine." A not very showy or attractive shrub, and scarcely worth cultivation when so many better plants are available for tropical regions. It seems not to be very highly esteemed in Central America.

Tabernaemontana laurifolia L. Sp. Pl. 210. 1753. *Cojón.*

Brushy mountain slopes, or wet mixed-forest, 1,200–1,600 m.; Chimaltenango (Volcán de Fuego); San Marcos (above Finca El Porvenir, Volcán de Tajumulco). Jamaica.

A shrub 1.5–2.5 m. high, glabrous throughout; leaves membranaceous, oval to oblong-elliptic, 5–17 cm. long, 3.5–10 cm. broad, abruptly acuminate, obtuse or acute at the base, the petioles 1–2.5 cm. long; inflorescence congested, much shorter than the subtending leaves, subumbellate, the pedicels 2–8 mm. long; calyx lobes

broadly ovate, obtuse, 3 mm. long, imbricate; corolla greenish white, the tube 15 mm. long, slightly constricted at the insertion of the stamens, the lobes oblong-dolabriform, subobtuse, 10 mm. long, spreading; stamens inserted in the upper fourth of the corolla tube, the anthers with bluish green margins, barely included; ovary surrounded at the base by a low annular nectary; follicles narrowly gibbous-ellipsoid, 3–4.5 cm. long, 1–1.2 cm. thick, narrowly acuminate, smooth or nearly so.

The single collection was determined by Woodson. The range of the species, as here treated, is a most unusual one, and on general principles it is rather to be expected that more ample material will prove the Central American plant to be a species distinct from the Jamaican one.

THEVETIA Adanson

Shrubs or small trees; leaves alternate, not glandular; inflorescence cymose, few–several-flowered, the flowers large and showy, usually yellow; calyx 5-parted almost to the receptacle, the lobes equal or nearly so, somewhat foliaceous, bearing numerous squamellae within; corolla salverform, the tube much shorter than the lobes, closed at the orifice by 5 small villous scales inserted above the stamens, the lobes broadly obovate-dolabriform, spreading; anthers not connivent, the connective not enlarged; ovary of 2 distinct carpels, 2–4-ovulate, surrounded by a carnose annular nectary; fruit syncarpous, drupaceous, containing 2 or sometimes 4 large naked seeds.

Species 6–7, in tropical America. The following are found in Central America.

Lateral nerves of the leaves obscure or obsolete beneath in dry state.
- Leaves abruptly acuminate, 4–6 cm. broad ..... *T. ahouai.*
- Leaves acute or short acuminate, 0.6–3 cm. broad.
  - Leaves acute or short-acuminate, 1.5–3 cm. broad; fruits 2–3 cm. broad. *T. gaumeri.*
  - Leaves acutish or obtuse, long attenuate, 13 mm. broad or less; fruits 4–4.5 cm. broad ..... *T. peruviana.*

Lateral nerves of the leaves elevated and very conspicuous beneath.
- Leaves glabrous beneath ..... *T. plumeriaefolia.*
- Leaves densely short pubescent beneath ..... *T. ovata.*

Thevetia ahouai (L.) A. DC. in DC. Prodr. 8: 344. 1844; L. Wms. Fieldiana, Bot. 31: 403. 1968. *Cerbera ahouai* L. Sp. Pl. ed. 2. 303. 1762. *C. nitida* HBK. Nov. Gen. & Sp. 3: 225. 1819. *T. nitida* A. DC. l.c. 345. *Plumeriopsis ahouai* Rusby & Woodson, Ann. Mo. Bot. Gard. 24: 11. 1937. *Chilindrón; cojón de perro.*

Wet to dry thickets, sometimes in second growth or in open pine forest, 600 m. or less; Petén; Alta Verapaz; Izabal; Retalhuleu; San Marcos; Huehuetenango. Southern Mexico; British Honduras to Panama; northern South America.

FIG. 111. *Thevetia ahouai*. A, habit, × ½; B, calyx and pistil, × 2; C, oblique basal view of fruit, natural size; D, corolla partly dissected, × ½; E, stamens in position on corolla tube, one reversed, × 2.

Usually a shrub of 1–3 m., sometimes a small tree, glabrous throughout or nearly so; leaves thick-membranaceous to subcoriaceous, short-petiolate, obovate to oblanceolate, 8–20 cm. long, 3–7 cm. broad, acute to abruptly acuminate, attenuate to the base, deep green and very lustrous above, sometimes sparsely puberulent beneath; inflorescences shorter than the leaves, the flowers few, greenish yellow or lemon-yellow; calyx lobes ovate or ovate-lanceolate, acute or acuminate, 5–7 mm. long, reflexed, glabrous; corolla glabrous outside, the tube 2.5–3.5 cm. long, somewhat dilated at the insertion of the stamens, the lobes obovate, 1.5–2.5 cm. long, reflexed; fruit baccate, pyriform or subglobose, 3.5–4.5 cm. broad, scarlet, the seeds large, black.

Known in British Honduras by the names "cogotone," "cojotón" and "cojón de mico," "yambigo" (Oaxaca). The fruits are showy and rather handsome.

Thevetia gaumeri Hemsl. in Hook. Icon. *t. 1517.* 1886 (type from Cozumel Island, Yucatan). *T. spathulata* Millsp. Field Mus. Bot. 1: 383. 1898. *T. steerei* Woodson, Am. Journ. Bot. 22: 685. 1935 (type from Yucatan).

British Honduras, at or little above sea level. Mexico (Yucatan).

A shrub or small tree, reported to attain rarely a height of 10 m., glabrous throughout, the branches thick, pale; leaves thick-membranaceous, on petioles 1–2 cm. long, linear-oblanceolate, 7–18 cm. long, 1.5–3.5 cm. broad, acute or short-acuminate, long-attenuate to the base, green and lustrous above, paler beneath, the lateral nerves obscure; inflorescences terminal and lateral, several-flowered; calyx lobes ovate or ovate-lanceolate, 8–10 mm. long; corolla yellow, orange or pinkish yellow, the tube 10–13 mm. long, the lobes broadly obovate, 2.5–4 cm. long, spreading; fruit bright red, 2–3 cm. broad.

Known in British Honduras as "willow" and "good-luck seed"; "acitz" (Yucatan, Maya). The fruit is reputed to be poisonous. Closely related to *T. ahouai.*

Thevetia ovata (Cav.) A. DC. in DC. Prodr. 8: 344. 1844. *Cerbera ovata* Cav. Icon. 3: 35, *t. 270.* 1796. *C. cuneifolia* HBK. Nov. Gen. & Sp. 3: 224. 1819. *T. cuneifolia* A. DC. l.c. *Cascabel; cascabel de Lacandón; chilindrón; manzana de Judas* (Huehuetenango).

Generally on dry brushy slopes or in thin rocky forest, 1,250 m. or less; El Progreso; Zacapa; Chiquimula; Jutiapa; Santa Rosa; Retalhuleu; Quiché; Huehuetenango. Western and southern Mexico; Costa Rica.

Usually a shrub of 2–3 m., sometimes a tree of 6 m., with thick branches; leaves subcoriaceous, on petioles 5–10 mm. long, oblanceolate-oblong or cuneate-oblong, 6–17 cm. long, 1–4 cm. broad, usually rounded at the apex, cuneate-attenuate to the base, glabrous above or nearly so, paler beneath, puberulent, the

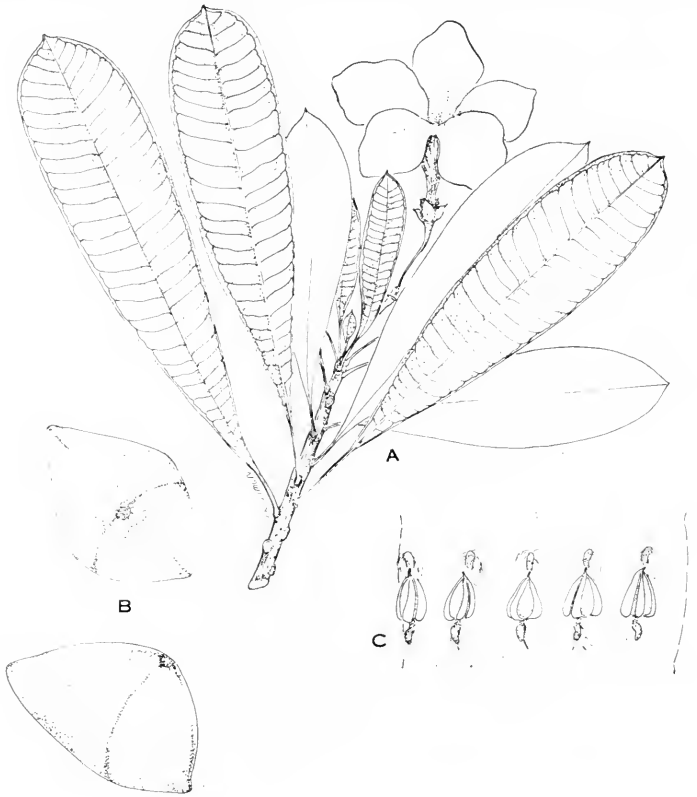

FIG. 112. *Thevetia ovata*. A, habit, × ½; B, fruits, apical and lateral views, natural size; C, anthers in position on portion of corolla tube, × 3.

lateral nerves very numerous and prominent beneath, united to form a collective nerve near the margin; inflorescence few-flowered; calyx lobes ovate, acuminate, 8–12 mm. long, reflexed, minutely puberulent; corolla bright yellow, glabrous or somewhat papillate outside, the tube 1.5–2 cm. long, the throat campanulate, 12–15 mm. long, 1–1.5 cm. broad at the orifice, the lobes obovate-dolabriform, 2.5–3.5 cm. long, spreading; fruit 4.5–5 cm. broad, rose-colored mottled with purple.

The large seeds are light-colored, hard and bony. The name "cascabel de Lacandón" reported from Huehuetenango by Seler leads one to suspect that the seeds probably are used by the Lacandón Indians as ornaments or rattles.

Thevetia peruviana (Pers.) Schum. in Engler & Prantl, Pflanzenfam. 4[2]: 159. 1895. *Cerbera thevetia* L. Sp. Pl. ed. 2. 304. 1762. *C. peruviana* Pers. Syn. Pl. 1: 267. 1805. *T. neriifolia* Juss. ex Steud.

Nom. Bot. 180. 1821. *T. thevetia* Millsp. Field Mus. Bot. 2: 83. 1900. *Chilindrón, chilco, chilca, acitz* (Petén, Maya), *chirca, canjura* (fide Tejada).

Planted commonly for ornament, chiefly at low elevations, but sometimes also at middle altitudes; sometimes more or less naturalized along roadsides and in pastures; not native in Guatemala. Native of tropical America, perhaps of Mexico; now widely cultivated in the tropics of both hemispheres.

A shrub or small tree, glabrous throughout, commonly 3–5 m. high, the trunk short, with light gray bark, the branches often irregular; leaves thick-membranaceous, short-petiolate, linear or nearly so, 7–15 cm. long, 6–13 mm. broad, long-attenuate to each end, the lateral nerves obscure or obsolete; inflorescences lateral or terminal, several-flowered; calyx lobes ovate or ovate-lanceolate, 4–6 mm. long; corolla bright yellow or sometimes buff or reddish buff, the tube 1–1.5 cm. long, the lobes broadly obovate, 3.5–4.5 cm. long, spreading; fruit becoming red at maturity, fleshy, 4–4.5 cm. broad.

Sometimes called "campanilla" in Yucatan and "campanilla amarilla" in El Salvador; "Yambigo" (Oaxaca). The wood is white, the flowers fragrant. In Yucatan the latex is applied to decayed teeth to relieve toothache, and also is used to treat chronic sores and ulcers. This tree varies greatly in flower color, and the color variations deserve investigation. Unfortunately, many of the collections are either without corollas or else their color is not described by the collector. Most of many of the plants seem to have bright yellow flowers, but some of those planted in Florida, as well as those of Central America, have buff or reddish-buff corollas, giving the plants a quite different appearance. In Florida this species usually is called "yellow oleander"; in the West Indies the seeds are called "lucky nuts" and "luck-seeds," and are sometimes carried in the pocket to bring good luck, doubtless because of their curious form. The milky sap and the seeds are reputed poisonous. A tincture of the bark has been employed in some regions as a febrifuge, and in large doses it is said to be a violent purgative and emetic.

Thevetia plumeriaefolia Benth. Bot. Voy. Sulph. 124, *t. 43.* 1845. *Chilindrón.*

Dry brushy rocky hillsides, about 850 m.; Jutiapa (near Jutiapa, *Standley 75314*); reported, perhaps in error, from Escuintla. Western and southern Mexico; El Salvador; Honduras.

A shrub or small tree, glabrous throughout; leaves thick-memebranaceous or subcoriaceous, oblanceolate-oblong or obovate-oblong, 5–12 cm. long, 1.3–3.5 cm.

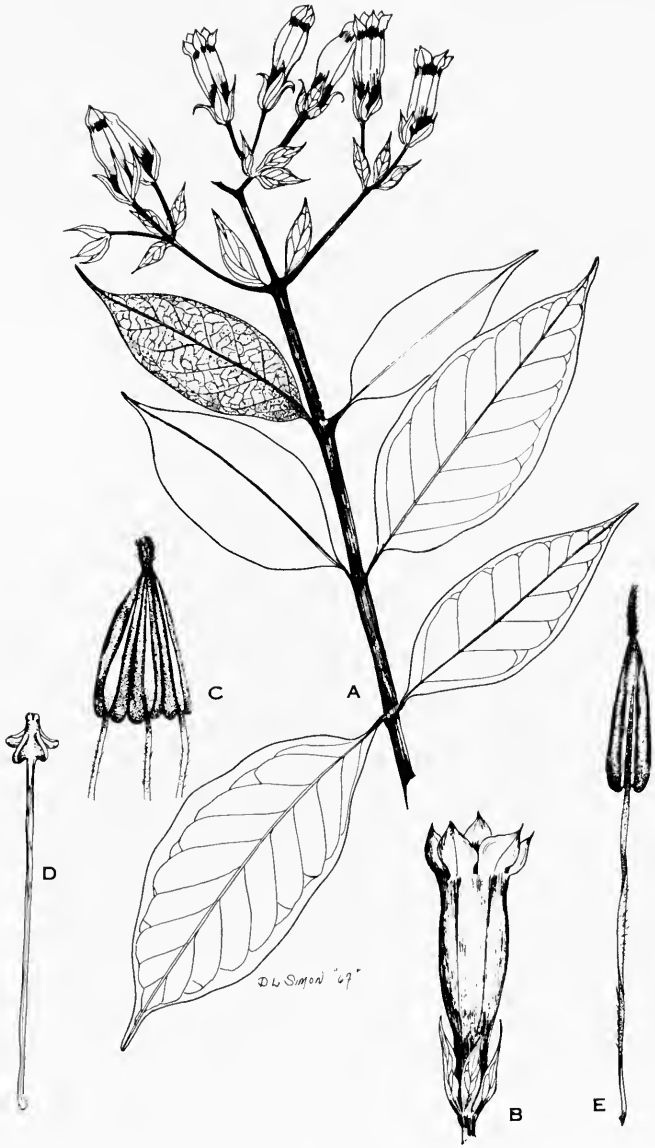

FIG. 113. *Tintinnabularia mortonii*. A, habit, × ½; B, flower, natural size; C, stamens, × 2; D, style and stigma, × 2; E, inner face of anther, × 2. C, D, and E after Woodson.

broad, rounded or very obtuse at the apex, cuneate-attenuate to the base, deep green and lustrous above, paler beneath, the lateral nerves numerous and prominent, the petioles 5–12 mm. long; inflorescence few-flowered, the flowers buff or pinkish yellow; calyx lobes ovate, acute or acuminate, 4–6 mm. long, more or less reflexed; corolla tube 15–22 mm. long, the throat conic-campanulate, 15–18 mm. long, about 1 cm. broad at the orifice, the lobes obovate-dolabriform, 4.5–6 cm. long, spreading; fruit broader than long, 3–3.5 cm. broad, dark purple at maturity, the flesh white.

This is very closely related to *T. ovata* and rather doubtfully distinct from it. Called "chilindrón" in El Salvador.

TINTINNABULARIA Woodson

Woody vines, glabrous throughout or nearly so; leaves opposite, glandular on the upper surface at the base of the costa, usually pitted beneath in the axils of the nerves; inflorescences alternate-axillary, corymbose-cymose, several-flowered, the flowers large and showy; calyx 5-parted, the lobes subequal, foliaceous, bearing groups of squamellae within; corolla funnelform, the tube straight, the throat broadly tubular, the 5 lobes equal, dextrorsely contorted; anthers connivent and agglutinated to the stigma, the connective enlarged, produced into 2 obtuse basal lobes; ovary of 2 distinct carpels, each carpel many-ovulate, surrounded by 5 ovoid nectaries; stigma fusiform-capitate; fruit unknown but doubtless follicular.

The genus is known at present only from Guatemala, and consists of a single species.

Tintinnabularia mortonii Woodson, Ann. Mo. Bot. Gard. 23: 389, *t. 7.* 1936.

Wet thickets or in brushy swamps, 600–2,200 m.; Alta Verapaz, the type from Quebradas Secas, *Johnson 200;* Zacapa (Sierra de las Minas).

A large woody vine; leaves thick-membranaceous, on petioles 7–10 mm. long, oblong-elliptic, 9–10 cm. long, 3–3.5 cm. broad, caudate-acuminate with a long obtuse acumination, obtuse at the base, anisophyllous; inflorescences pendent, the pedicels about 2 cm. long; calyx lobes oblong-elliptic, acuminate, 12–13 mm. long, somewhat foliaceous, spreading; corolla pale reddish outside, cream-colored within, puberulent-papillate, the tube 8–9 mm. long, the throat broadly tubular, 3–3.5 cm. long, 8 mm. broad at the orifice, the lobes obliquely obovate, subobtuse, 1 cm. long, slightly spreading; anthers wholly included, bearing a linear pilosulous apical appendage.

The plant appears to be very rare in Alta Verapaz, and in the large swamp east of Tactic only a single individual was discovered. The large pendent flowers are exceptionally handsome. It has not been re-collected in the more than 30 years since it was described.

TONDUZIA Pittier

Shrubs or trees; leaves in whorls of 3–4, rarely opposite, eglandular; inflorescences lateral or subterminal, thyrsiform, the flowers numerous, small, white or cream-colored; calyx 5-parted almost to the receptacle, the lobes subequal, slightly imbricate, without squamellae; corolla salverform, not appendaged within, the limb equally 5-parted, sinistrorsely convolute; anthers not connivent, wholly included, the connective not enlarged; ovary of 2 distinct carpels, containing several biseriate ovules, surrounded at the base by a low annular nectary, or the nectary absent; fruit of 2 follicles, these dehiscent, terete; seeds numerous, compressed, dry, densely ciliate on the margins.

The genus consists of only the following species. It was named for Adolfo Tonduz, born September 18, 1862, at Pully, near Lausanne, Switzerland; died in Guatemala City in 1921. He went to Costa Rica in 1888 and was engaged in botanical exploration there for many years, assembling a large herbarium of Costa Rican plants. Toward the end of his life he went to Guatemala, and was employed as a botanical collector in the Dirección General de Agricultura until his death. He collected the types of many hundreds of Central America plants, and was a most capable and assiduous collector.

Corolla 15–18 mm. long ..... *T. macrantha.*
Corolla 8–10 mm. long.
Leaves 6–7 times as long as broad; stamens inserted at about the lower third of the corolla tube ..... *T. longifolia.*
Leaves 2–4 times as long as broad; stamens inserted near or but slightly below the middle of the corolla tube ..... *T. pittieri.*

Tonduzia longifolia (A. DC.) Woodson, No. Am. Fl. 29: 122. 1938. *Rauwolfia longifolia* A. DC. in DC. Prodr. 8: 338. 1844. *R. stenophylla* Donn.-Sm. Bot. Gaz. 44: 115. 1907. *T. parvifolia* Pittier, Contr. U. S. Nat. Herb. 12: 103. 1908 (type from San Salvador, El Salvador). *T. stenophylla* Pittier, l.c. 104. *Chilindrillo.*

Dry or wet, mixed forest or thickets, often in rocky places, 1,650 m. or less; Izabal; El Progreso; Escuintla; Guatemala; Huehuetenango; Quezaltenango. Southern Mexico; Honduras; El Salvador; Costa Rica.

A shrub or tree, sometimes 15 m. tall, often a shrub of only 2–3 m., glabrous throughout or nearly so; leaves 3–4-nate, or rarely opposite above, firm-membranaceous, on petioles 4–15 mm. long, narrowly oblong-lanceolate or linear-lanceolate, 5–20 cm. long, 1–4 cm. broad, very narrowly long-attenuate, attenuate to the base, green above, pale beneath, the nerves obscure; inflorescence corymbose, congested, many-flowered, much shorter than the leaves, the pedicels 3–4 mm. long; calyx lobes ovate-triangular, acute, 0.5–0.7 mm. long; corolla white, the tube 4 mm. long, the lobes broadly oblong-dolabriform, rounded at the apex, 4–5 mm. long,

spreading; stamens inserted near or slightly below the middle of the tube; follicles 7–11 cm. long, terete, longitudinally striate, attenuate at each end, 5 mm. thick.

Known in El Salvador as "amatillo" and "chilindrón de montaña."

Tonduzia macrantha Woodson, Ann. Mo. Bot. Gard. 24: 12. 1937 (type from Volcán de Zunil, *Skutch 871*). *T. longipedunculata* Woodson, in Standl. & Steyerm. Field Mus. Bot. 23: 78. 1944 (type from Sololá, *Steyermark 47313*).

Dry thickets and forest edges or in second growth, 1,500–2,300 m. or perhaps higher, endemic but to be expected in adjacent Mexico; Quezaltenango; San Marcos; Sololá.

A glabrous tree or shrub of 6–9 m.; leaves ternate or the upper ones opposite, firm-membranaceous, very narrowly oblong-lanceolate, 10–20 cm. long, 2–4 cm. broad, very narrowly long-attenuate, attenuate to the base, paler beneath, the nerves inconspicuous, the petioles 1–2 cm. long; inflorescence terminal or subterminal, irregularly cymose, much shorter than the leaves, few–many-flowered, the pedicels 5–7 mm. long; calyx lobes ovate-deltoid, rounded at the apex, 1–1.2 mm. long; corolla white or cream-colored, the tube 7 mm. long, the lobes oblong-dolabriform, rounded at the apex, 9–10 mm. long, spreading; follicles stout, 10–12 cm. long, 8 mm. thick, acuminate, longitudinally striate.

Tonduzia pittieri Donn.-Sm. Bot. Gaz. 49: 456. 1910.

Moist or dry forest or thickets, often in dry rocky places, 400–1,100 m.; endemic; Zacapa; El Progreso; Baja Verapaz; Guatemala (type from Fiscal, *Deam 6098*).

A shrub or small tree, 3–4 m. high, with slender branches, glabrous throughout; leaves 3–4-nate, or the upper rarely opposite, firm-membranaceous, narrowly elliptic to oblong-lanceolate, 5–12 cm. long, 1–3 cm. broad, long-acuminate, attenuate to the base, the petioles 4–5 mm. long; inflorescence corymbose, congested, much shorter than the leaves, many-flowered, the pedicels 3–4 mm. long; calyx lobes ovate-triangular, acute, 0.5–0.7 mm. long; corolla tube 4 mm. long, the lobes rather broadly oblong-dolabriform, rounded at the apex, 4–5 mm. long, spreading; stamens inserted near or slightly below the middle of the corolla tube.

This is very close to *T. longifolia* and questionably distinct, especially since the two do not have distinct ranges.

URECHITES Mueller von Argau

Reference: Robert E. Woodson, Ann. Mo. Bot. Gard. 23: 198–205. 1936.

Woody or suffrutescent vines; leaves opposite or rarely subverticillate, eglandular; inflorescences alternate-axillary to terminal or subterminal, scorpioid, simple, few–many-flowered, the flowers large, yellow; calyx 5-parted almost to the receptacle, the lobes subequal, imbricate, bearing within at the base binate and alternate

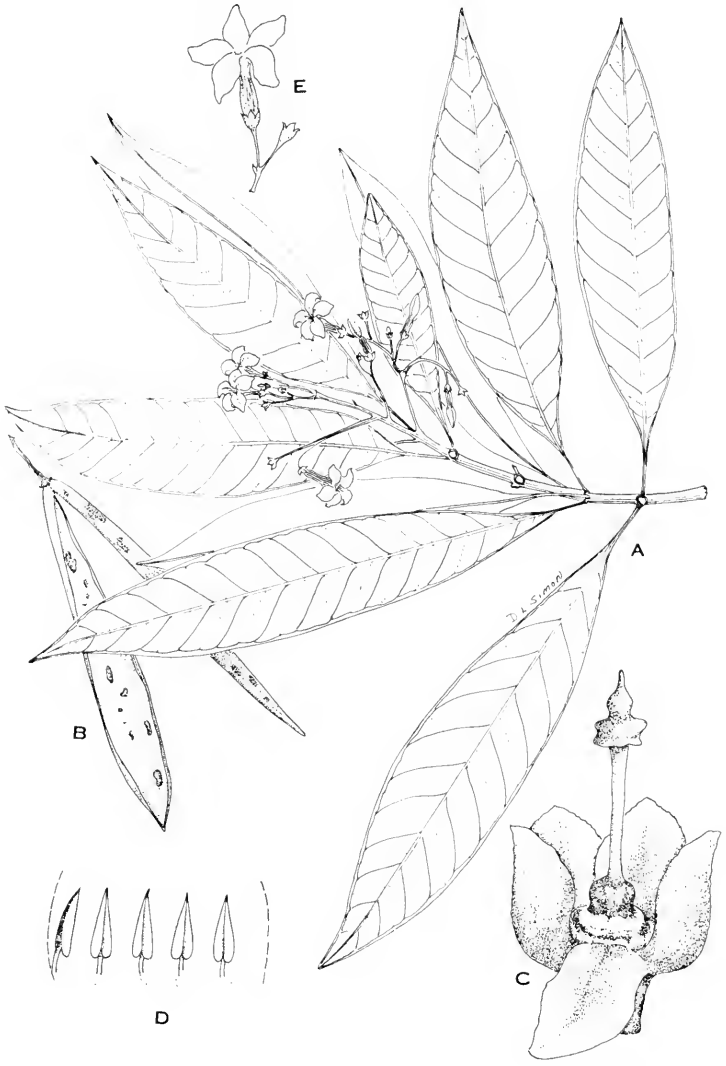

FIG. 114. *Tonduzia macrantha*. A, habit, × ½; B, fruit, with one follicle dehisced; C, calyx partially dissected with pistil, × 10; D, stamens in natural position on part of dissected corolla tube, × 5; E, flower, natural size.

or numerous and indefinitely distributed squamellae; corolla funnelform, the tube not appendaged within, the limb regularly 5-parted, dextrorsely contorted; anthers connivent and agglutinated to the stigma, the connective enlarged, narrowly bilobate, appendaged at the apex; ovary of 2 distinct carpels, many-ovulate, surrounded at the base by 5 distinct or concrescent nectaries; stigma fusiform-capitate; follicles 2, distinct; seeds numerous, dry, narrowly rostrate, comose at the apex.

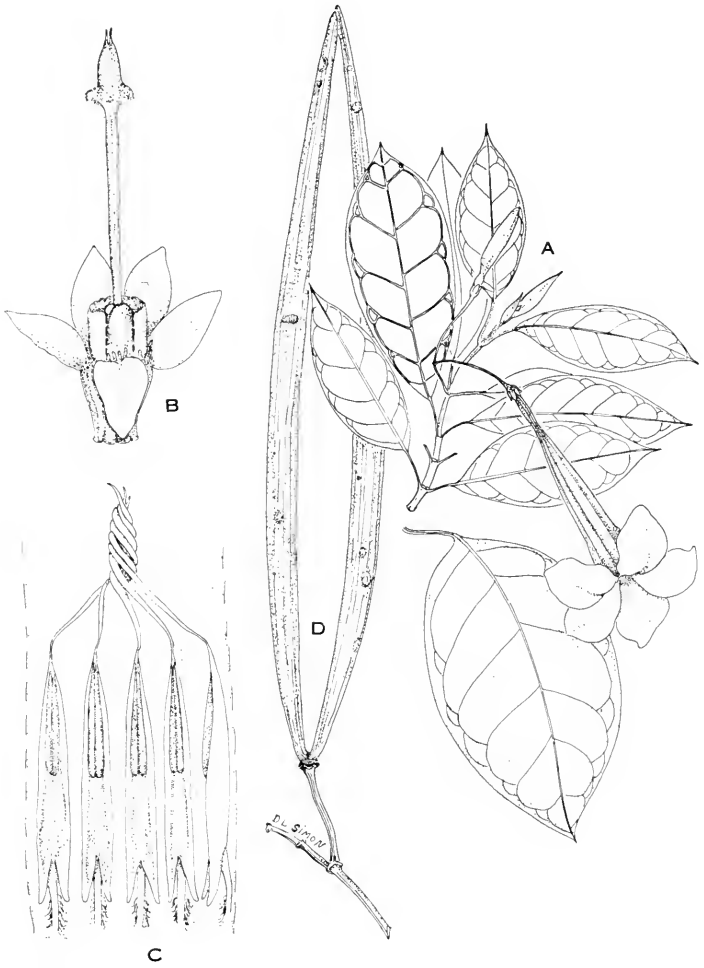

FIG. 115. *Urechites andrieuxii*. A, habit, × ½; B, calyx and pistil with part of the callus-like corona dissected away to show ovary, × 4; C, anthers in place on dissected portion of corolla tube, × 5; D, follicles, × ½.

Two species, the other in Florida and the West Indies.

Urechites andrieuxii Muell.-Arg. Linnaea 30: 442. 1860.

Wet or dry thickets or mixed forest, often in mangrove swamps, 600 m. or less; Petén; Izabal; Zacapa; Chiquimula; Santa Rosa; Retalhuleu. Southern Mexico; British Honduras. *Contrayerba.*

A small or large vine, usually woody, sometimes 6 m. long; leaves opposite, membranaceous or subcoriaceous, on petioles 8–20 mm. long, oblong-elliptic to

ovate-elliptic or obovate-elliptic, 5–12 cm. long, 2.5–7 cm. broad, short-acuminate, obtuse or rounded at the base, glabrous above, paler beneath, glabrous or finely puberulent; inflorescences usually somewhat longer than the leaves, few–several-flowered, the pedicels 15–22 mm. long, glabrous or inconspicuously puberulent, the bracts minute, scarious; calyx lobes ovate, obtuse, 3–5 mm. long, the squamellae binate, alternate with the lobes; corolla yellow, glabrous, the tube 1–1.5 cm. long, the throat broadly tubular, 2.5–3 cm. long, 5–8 mm. broad at the orifice, the lobes oblique-obovate, 1.5–2.3 cm. long, spreading; nectaries completely concrescent, twice as long as the ovary; follicles rather stout, continuous, glabrous, about 25 cm. long.

The Maya name of Yucatan is "cantibteac." The nerves and veins, although not elevated, form a conspicuous close network on the lower leaf surface. The species is reported by Lundell to be used in Petén to treat headaches.

VALLESIA Ruiz & Pavón

Shrubs or small trees; leaves alternate, subtended by small dentate axillary stipular glands; inflorescence lateral, umbellate or umbellate-cymose, simple or dichotomous, several–many-flowered, the flowers small, white or yellowish; calyx 5-parted almost to the receptacle, the lobes equal, without squamellae; corolla salverform, the limb regularly 5-parted, sinistrorsely contorted; anthers not connivent, the connective not enlarged; ovary of 2 distinct carpels, without a nectary, the carpels 1–2-ovulate; fruit drupaceous, usually a single carpel developing, juicy.

About eight species, in tropical America. One other is found in Central America (Costa Rica).

Vallesia mexicana Muell.-Arg. Linnaea 30: 393. 1860.

Usually in dense, wet or moist, mixed forest, 1,500–2,600 m.; Guatemala; Sacatepéquez; Chimaltenango; Quiché; Huehuetenango; San Marcos. Mexico.

A glabrous shrub or tree, 3–12 m. high; leaves firm-membranaceous or subcoriaceous, on petioles 5–8 mm. long, narrowly oblong to oblong or lance-oblong, 6–17 cm. long, 2–5 cm. broad, acuminate or acute, obtuse or rounded at the base; inflorescence umbelliform, simple or dichotomous, much shorter than the leaves, many-flowered, the pedicels 2–4 mm. long, minutely puberulent-papillate; calyx lobes ovate, acuminate, 1.5–2 mm. long; corolla white, glabrous, the tube 10–13 mm. long, somewhat dilated at the insertion of the stamens, constricted at the orifice, the lobes oblique-oblong, spreading; drupes white, juicy, oblong-ovoid, the seed 17–20 mm. long.

VINCA L.

Perennial herbs, erect or trailing; leaves opposite, eglandular; flowers solitary in the leaf axils, pedicellate, usually blue or violet; calyx 5-parted, the lobes sub-

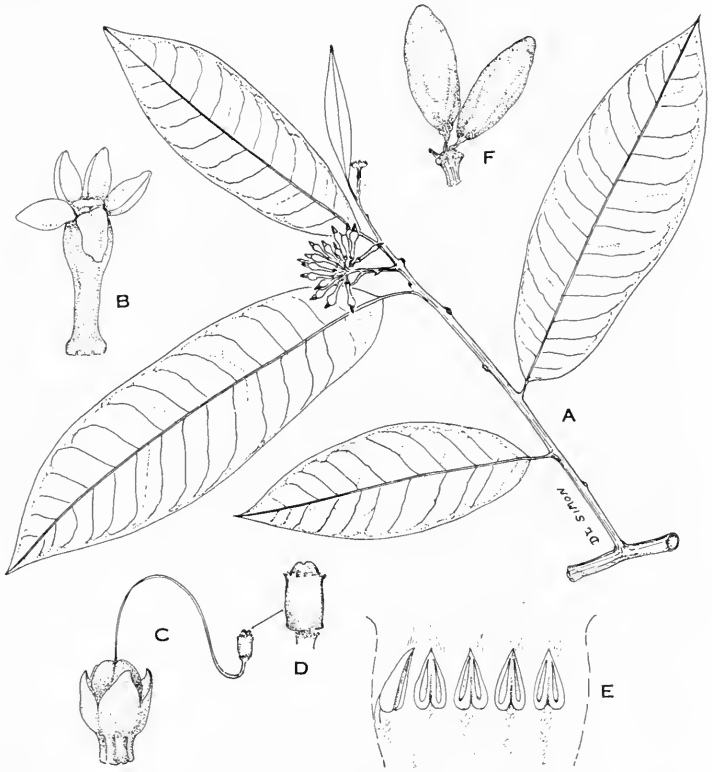

FIG. 116. *Vallesia mexicana*. A, habit, × ½; B, corolla, × 2; C, calyx and pistil, × 5; D, stigma, × 10; E, stamens, × 5; F, fruits, natural size.

equal, without squamellae; corolla funnelform, equally 5-lobate, not appendaged within; anthers not connivent, the connective produced into a rather large, apical appendage, not appendaged at the base; ovary of 2 distinct carpels, accompanied by 2 alternate nectaries of almost equal size, many-ovulate; follicles 2, terete, slender, seeds numerous, naked, subcompressed.

Species 5, in Europe, Asia, and northern Africa. Two often are grown for ornament in temperate and subtropical regions.

Vinca major L. Sp. Pl. 209. 1753. *Sereno, Vinca, pervinca* (Cobán).

Native of southern Europe and northern Africa, often planted for ornament in other regions; frequent in Guatemala gardens, chiefly in the higher mountains; thoroughly naturalized in thickets or open places in Quezaltenango and probably also San Marcos, mostly at 2,000–3,000 m.

Plants stout, perennial, erect, ascending, or sometimes scandent, the sterile shoots often elongate and rooting, almost wholly glabrous; leaves persistent, thick, deep green, often ciliate, broadly deltoid-ovate, mostly 4–5.5 cm. long, obtuse, rounded or subcordate at the base; pedicels shorter than the subtending leaves; calyx lobes linear, green, ciliate; corolla blue or violet, glabrous, the tube 1.5 cm. long, the lobes cuneate-obovate, equalling or slightly longer than the tube.

Probably introduced into Guatemala directly from Europe long ago, and now thoroughly naturalized at many places about Quezaltenango, and at various localities in the department of that name. The plant is often cultivated in patios, sometimes in pots, and at Quezaltenango there was observed a form with white-edged leaves. The plant is noteworthy in the western highlands because it blooms freely during the cold dry season when flowers are very scarce.

ASCLEPIADACEAE Milkweed Family

Reference: Robert E. Woodson, Jr., The North American Asclepiadaceae. I. Perspective of the genera, Ann. Mo. Bot. Gard. 28: 193–244. 1941.

Mostly perennial herbs, erect or scandent and twining, sometimes prostrate, frequently more or less woody, generally pubescent, sometimes glabrous, the sap usually milky; leaves commonly opposite, rarely verticillate; stipules none; inflorescence normally cymose, but the cymes usually umbelliform or racemiform, rarely 2–3 times branched, the inflorescences commonly axillary and pedunculate or sessile; flowers small or medium-sized, white, pink, green or brown-purple, of very complicated structure, perfect, regular; calyx tube very short or none, the 5 lobes imbricate or open in bud; corolla sympetalous, rotate to campanulate or urceolate, shallowly or deeply 5-lobate, the lobes valvate or more commonly contorted; a corona often or usually present, simple or of 5 or more scales or lobes, adnate to the tube of the corolla or to the staminal column, highly varied as to structure; stamens 5, inserted at or near the base of the corolla, the filaments flat, short, usually connate to form a tube, the stamens and stigma united to form the gynostegium[1]; anthers introrsely 2-celled, often produced at the base, the connective often produced at the apex into a membranaceous appendage; pollen collected in masses called pollinia, these usually solitary in each anther cell; corpuscles 5, small, usually colored, agglutinate between the anthers to the margin of the stigma disk, after dehiscence of the anthers extruding the pollinia; disk none; carpels of the ovary 2, distinct, superior, included in the stamen tube; styles 2, short, distinct to the stigma; stigma 1, peltately dilated and forming a usually pentagonal disk, flat at the apex or depressed, convex, umbonate, or rostrate; ovules numerous in each cell, pendulous, imbricate upon the placentae; fruit of 2 parallel or divaricate follicles, or the follicles by abortion only 1, sessile, generally ovoid or lanceolate and acuminate, smooth or muricate, sometimes longitudinally winged, ventrally dehiscent; seeds rather large, compressed and often marginate, the testa thick or membranaceous, narrowed at the apex and generally bearing a tuft of long soft

[1] Somewhat similar to the column in Orchidaceae.

white silk-like hairs; endosperm cartilaginous, thin; embryo large, the cotyledons flat, the radicle short, superior.

A group of wide distribution in most temperate and tropical regions of the earth. Authors have recognized as many as 250 genera, but if the family is aligned in accordance with the treatment used here, the number would be probably not more than a fifth as many. The Asclepiadaceae of North America are referred by Woodson to nine genera, about a third as many as have been recognized by most authors. All of these genera are represented in the following treatment.

The realignment of the genera by Woodson, while revolutionary, has done much to bring order out of the chaos previously prevailing so far as North American genera are concerned, and while to some it may appear too radical, it must be recognized that if deviations from it are made, a host of others must accompany them. The complexity of the flowers, or of the androecium, more varied and highly specialized probably than in any other group of plants, has offered unlimited possibilities for proposal of new genera, and if this is once begun, there are no limits to which an enthusiastic amateur may extend his work. It must be confessed that this recent disposition of genera does not make it much easier to place a plant in its genus, but the Asclepiadaceae seldom offer vegetative characters that are useful for distinguishing the generic groups. The Central American plants of the family fall naturally into two groups, those with erect stems and those with twining ones. Unfortunately, because of flower structure, it is necessary in case of the Guatemalan species to place two plants with erect stems in groups whose other representatives have scandent stems.

Plants of this family are of little economic importance. The silky fiber of the seeds looks much like silk, but it is brittle and unsuited for textile purposes. In Central America the young and tender seed pods of some of the scandent Asclepiadaceae are used as a vegetable, cooked in various ways or sometimes, it is said, eaten raw.

Pollinia pendulous, their faces uniformly flattened or rounded, uniformly fertile up to the point of attachment of the translators; plants erect or scandent [Asclepiadeae].

Plants erect or nearly so, herbaceous, never scandent ..... *Asclepias.*

Plants scandent, herbaceous or somewhat woody.

Flowers very small, mostly 2–3 mm. long, rarely slightly larger; inflorescence umbellate or racemose ..... *Cynanchum.*

Flowers larger, usually much larger, 5 mm. long or more; inflorescence umbellate.

Lobes of the corolla linear, 15–20 mm. long; leaves ovate-cordate. *Oxypetalum.*

Lobes of the corolla not linear, or if so, much less than 10 mm. long.

Corona of 5 subvescicular sacs attached separately to the backs of the anthers; plants glabrous; leaf blades rounded at the base. *Blepharodon.*

Corona of 5 closed vesicles joined at their bases by a fleshy ring adnate to the corolla throat; plants glabrous or usually pubescent; leaf blades acute to cordate at the base. . . . . *Sarcostemma.*

Pollinia horizontal or erect.

Pollinia strictly erect, their faces uniformly rounded, uniformly fertile to the point of attachment of the translators; inflorescences usually 2–3 times branched; plants scandent or in one species erect [Tylophoreae]. . *Marsdenia.*

Pollinia usually horizontal or nearly so, occasionally ascending or descending, but one or both faces more or less excavated, and with a sterile hyaline margin or indentation near the point of attachment of the translators; plants usually scandent, erect in only one species [Gonolobeae].

Corolla lobes conspicuously crispate; anthers very conspicuously hypertrophied and vesicular throughout; plants scandent. . . . . *Fischeria.*

Corolla lobes not crispate; anthers not conspicuously hypertrophied and vesicular.

Anthers relatively simple, not with dorsal appendages; plants scandent, except for one species, this an erect herb. . . . . *Matelea.*

Anthers with spreading, more or less laminate, fleshy, dorsal appendages; plants scandent. . . . . *Gonolobus.*

ASCLEPIAS L. Milkweed

Reference: Robert E. Woodson, Jr., North American Species of Asclepias, in Ann. Mo. Bot. Gard. 41: 1–211. 1954.

Perennial herbs, usually erect, glabrous or pubescent, sometimes tomentose; leaves opposite or verticillate; flowers variously colored, usually white or purplish, sometimes bright red or orange, small or medium-sized, umbellate, the umbels usually many-flowered, terminal or in the upper leaf axils; calyx 5-parted, 5–10-glandular within at the base, the lobes usually acute; corolla rotate or finally reflexed, deeply 5-lobate, the lobes usually valvate, not barbate within; scales of the corona 5, affixed to the stamen tube, erect, concave-cucullate, ligulate within; stamens affixed to the base of the corolla, the filaments connate into a tube; anthers tipped with an inflexed membrane; pollinia solitary in each cell, oblong, pendulous from the apex of the cell; stigma flat at the apex, pentagonal or obtusely 5-lobate; follicles usually thick, acuminate, smooth or rarely spinose-tuberculate; seeds comose.

The genus *Asclepias* with more than 100 species in temperate North America and Mexico has relatively few species in Central America. There are ten species in Guatemala, none of which is endemic, and all of them extend southward from Mexico. No additional species are known in Central America. Only the ubiquitous and often weedy *A. curassavica* and the rare *A. woodsoniana* extend as far south as Panama. There is an additional American center of dispersal of *Asclepias* in subtropical South America.

Leaves sessile or essentially so, often cordate or subcordate at the base.
Leaves linear; usually not more than 3 mm. broad; stems and lower surface of the leaves more or less tomentose ..... *A. rosea.*
Leaves much broader than linear, mostly 2 cm. broad or usually broader; plants not at all tomentose.
Stems and leaves hirsute or villous ..... *A. contrayerba.*
Stems and leaves glabrous or the stems sometimes pubescent at the apex.
Column or gynostemium sessile or nearly so, the horns poorly developed. *A. elata.*
Column or gynostemium stipitate (sometimes subsessile), the horns well developed and exserted ..... *A. glaucescens.*
Leaves usually conspicuously petiolate, the blades obtuse to attenuate at the base.
Leaves linear or nearly so, less than 1 cm. broad; flowers white and pale green or greenish white ..... *A. woodsoniana.*
Leaves lanceolate or broader, usually much more than 1 cm. broad, if narrow the flowers scarlet and yellow.
Scales of the corona more than twice as long as the stamens.
Scales of the corona 6–7 mm. long; leaves usually obtuse, rough-villosulous on the upper surface ..... *A. oenotherioides.*
Scales of the corona about 9 mm. long; leaves acuminate, glabrous on the upper surface ..... *A. auriculata.*
Scales of the corona not or scarcely exceeding the stamens.
Follicles glabrous.
Corolla bright red; hoods of corona yellow or orange; leaves not prominently bicolored on the surfaces ..... *A. curassavica.*
Corolla dull rose; hoods of corona white to rose-colored; leaves obviously lighter in color below than above ..... *A. pellucida.*
Follicles pubescent; hoods of the corona white or greenish-white; corolla greenish-white or purple ..... *A. similis.*

Asclepias auriculata HBK. Nov. Gen. & Sp. Pl. 3: 191, *t. 228.* 1819. *Otaria fragrans* Benth. Pl. Hartweg. 89. 1841 (type from Guatemala, *Hartweg,* without number, the locality not indicated). *A. fragrans* Dcne. in DC. Prodr. 8: 571. 1844. *A. purpusii* Brandegee, Zoe 5: 251. 1908. *Hierba de cantil, viborana blanca* (fide Aguilar).

Usually in open pine-oak forest, 1,200–1,900 m.; Zacapa; Santa Rosa; Guatemala; Chimaltenango; Huehuetenango. Southern Mexico.

A stout erect herb, sometimes a meter high, usually simple, the stems terete, more or less pubescent or glabrate; leaves opposite, on short stout petioles, lance-oblong or lanceolate, mostly 9–12 cm. long and 2.5–3.5 cm. broad, acuminate, acute at the base or rarely obtuse, green above, pale beneath, glabrous or nearly so; umbels few, terminal and in the upper leaf axils, long-pedunculate, lax, many-flowered, the slender pedicels about 2.5 cm. long, pubescent; calyx lobes puberulent, narrowly lanceolate, short; corolla pale green or whitish, glabrous, the lobes oblong-ovate, subacute, reflexed; corolla white, the lobes about 9 mm. long, about twice as long as the stamens, white, ovate-oblong, broadest at the base.

It is probable that *Asclepias plumerifolia* Ramirez-Goyena, Fl. Nic. 2: 658. 1911, from Nicaragua, belongs here as a synonym.

Asclepias contrayerba Sessé & Mociño, Fl. Mex. ed. 1, 2: 79. 1887. *Sicaquina; jicaca. A. setosa* Benth. Pl. Hartw. 24. 1839, non Forsk.

Moist or dry, open fields, or most often in grassy pine-oak forest, 1,950 m. or lower; Petén; Jalapa; Guatemala; Sololá; Huehuetenango. Mexico; El Salvador.

Plants herbaceous, erect, 40 cm. high or less, the stems stout, simple or branched, villous-hispid, usually bearing numerous leaves; leaves opposite, sessile or nearly so, thick, oblong-lanceolate or narrowly oblong, mostly 4–6 cm. long, acute or obtuse at the apex, rounded or subcordate at the base, rather densely villous on both surfaces with several-celled pale hairs; umbels usually 1–2 at the apex of the stem, on rather short, slender peduncles, the slender pedicels mostly 1.5–2 cm. long, short-villous; calyx lobes lanceolate, short, short-villous, 5–6 mm. long; corolla pale green, glabrous, 5–10 mm. long, the lobes reflexed; gynostegium borne on a distinct thick column, the corona hoods whitish, 4 mm. long, broad, cucullate, the horns short-exserted; pedicels reflexed in fruit; follicles 6–11 cm. long and 1.2–2.5 cm. broad, densely hispid.

Called "ishcaco" in El Salvador.

Asclepias curassavica L. Sp. Pl. 215. 1753. *Viborana, viborrana* (sometimes corrupted to *vibarona); mariguana amarilla* (Chimaltenango); *hierba de leche; olh'én* (Cobán, Quecchí); *seda* (Cobán); *hierba de cantil, hierba de culebra* (fide Tejado); *cantil.*

Moist or wet thickets or fields, often along roadsides or in waste ground about dwellings, 1,900 m. or lower; Petén; Alta Verapaz; El Progreso; Izabal; Chiquimula; Jalapa; Santa Rosa; Escuintla; Guatemala; Sacatepéquez; Chimaltenango; Suchitepéquez; Retalhuleu; Quezaltenango; San Marcos; Huehuetenango; doubtless in most other departments. Florida; Mexico; British Honduras to El Salvador and Panama; West Indies; South America.

An erect herb, usually 60–75 cm. high, the stems often several, mostly simple, green, glabrous or somewhat pubescent above; leaves opposite or sometimes partly ternate, lanceolate or linear-lanceolate, 5–16 cm. long, attenuate-acuminate, acute or attenuate at the base, short-petiolate, glabrous or sparsely and inconspicuously pubescent, slightly paler beneath; umbels usually several, rather few-flowered, the pedicels 1–2 cm. long, pubescent; corolla bright red or orange-red, 6–8 mm. long, the lobes ovate to oblong; hoods of the corona erect, broadly ovate, 4–5 mm. long, rounded or very obtuse at the apex, bright yellow, shorter than the conspicuous horns of the corona; fruiting pedicels erect; follicles narrowly fusiform, 4–10 cm. long, glabrous; seeds about 6 mm. long.

Called "Polly redhead" in British Honduras; "señorita," "flor de agua" (El Salvador); "flor de culebra" (Veracruz); variously known in Yucatan as "chacnich," "chililoo-xiu," "analcac," "chontalpa,"

"cabal-cumche," "cochinita" (Tabasco), "quema-casas" (seeds; Tabasco). About Cobán the milk of the stems is collected on cotton and when dry is placed in the nostrils. It produces sneezing, and is believed to have a beneficial effect on head colds. The latex often is placed in cavities in the teeth to relieve toothache, and sometimes it is used internally as an emetic and purgative. In Guatemala it is popularly believed to be useful in treating bites of poisonous animals. The plant is one of the most common weeds of the lowlands of Central America, rather showy because of its bright red and yellow flowers. There is sometimes found in Central America (we have not observed it in Guatemala) a form in which the flowers are bright yellow throughout, without any red coloring, *A. curassavica* var. *flava* Kuntze.

Asclepias elata Benth. Pl. Hartw. 290. 1848; Woodson, Ann. Mo. Bot. Gard. 41: 186, *fig.* 1954. *A. glaucescens* var. *elata* Fourn. Ann. Sci. Nat. Bot. ser. VI, 14: 382. 1882.

Open slopes in oak or pine woods, spreading to cultivated ground. Huehuetenango; Chimaltenango. Southwestern United States; Mexico.

Perennial herbs with a stout simple stem up to 70 cm. tall. Leaves sessile, broadly oval to oblong, obtuse or rounded, the base subcordate and the lobes often clasping the stem, 7–14 cm. long and 2.5–7 cm. broad, glabrous and glaucous; inflorescence usually lateral from upper leaves or terminal, exceeding the leaves, subumbellate, the pedicels 1.5–3 cm. long, tomentulose; calyx lobes ovate, 3–4 mm. long; corolla pale green, the lobes 8–12 mm. long; gynostemium sessile, the hoods saccate at the base, truncate, 4–6 mm. long, the crest adnate and about as long as the hood; follicles fusiform, 8–12 cm. long, pilosulose to glabrous; seeds oval, about 7 mm. long, the coma 2.5–4.5 cm. long.

The species is known from a single collection in Guatemala. The species has been confused with *A. glaucescens* from which it may be distinguished easily by its sessile gynostemium.

Asclepias glaucescens HBK. Nov. Gen. & Sp. Pl. 3: 190, *t. 227.* 1819; Woodson, Ann. Mo. Bot. Gard. 41: 97. 1954. *Polín* (Huehuetenango).

Native in open pine or oak woods but found in disturbed ground and old fields. Petén; Alta Verapaz; Guatemala; Jalapa; Chimaltenango; Sololá; Huehuetenango; Chiquimula; perhaps to be found in most departments. Mexico; El Salvador; Costa Rica.

Herbaceous perennials, stout and erect, to 1 m. tall but usually less, glabrous and glaucous. Leaves sessile or nearly so, ovate to oval or oblong, often narrowly

so, obtuse or broadly acute, the base cordate or amplexicaul, 5–18 cm. long and 2–7 cm. broad; inflorescences one or few from axils of upper leaves or occasionally terminal, flowers borne in often long pedunculate subumbellate heads, the pedicels about 1 cm. long, glabrous; calyx lobes ovate-lanceolate, 4–5 mm. long; corolla lobes reflexed, about 9 mm. long; gynostemium short stipitate to subsessile, the column about 1 mm. long, hoods obovate, conduplicate, rounded and frequently emarginate, 5–7 mm. long; follicles narrowly fusiform, erect, 8–10 cm. long and 1 cm. in diameter, smooth and glabrous; seeds oval, 6–8 mm. long, the coma 2.5–3.5 cm. long.

Asclepias glaucescens and *A. elata* are difficult to separate. Woodson gives characters for their separation and placed them in different subgenera but was dubious as to the systematic value of these subgenera.

The species is known in El Salvador by the expressive names "matacoyote," "jicaca" and "oreja de burro."

Asclepias oenotherioides Cham. & Schlecht. Linnaea 5: 123. 1830. *A. longicornu* Benth. Pl. Hartw. 24. 1839.

Moist or dry open fields or hillsides, sometimes on disturbed soils at 1,400 m. or less; Petén; Izabal; Guatemala; Zacapa; Jutiapa; El Progreso; Retalhuleu; San Marcos; and probably in other departments. Mexico; El Salvador; Honduras; Nicaragua and Costa Rica.

Plants herbaceous, erect, stout, mostly 50 cm. high or less, the stems mostly simple, often densely leafy, rough-villosulous; leaves short-petiolate, lance-oblong or ovate-oblong, 5–12 cm. long, rather thick, narrowed to an obtuse or rounded apex, sometimes subacute, acute or cuneate at the base, sparsely short-villosulous with harsh hairs and somewhat rough to the touch, the margins generally undulate; umbels usually several, in the upper leaf axils, short-pedunculate or almost sessile, the flowers pale green, few or numerous, on long slender pedicels; corolla pale green, hispidulous outside, the lobes lanceolate, reflexed, 9 mm. long; hoods of the corona very narrow below, dilated above, 7 mm. long, fully twice as long as the gynostegium, the horns short-exserted; corona sessile or nearly so; pedicels reflexed in fruit; follicles thick, 8 cm. long, tomentose or glabrate.

Known in El Salvador by the names "matacoyote," "angelito," and "cuchamper de zope," "cabalcunché" (Yucatan, Maya). The latex of this and probably all the other species is used commonly for alleviating toothache, and it often is employed in Central America for removing warts, a use made of milkweed sap in many parts of the United States.

Asclepias pellucida Fourn. Ann. Sci. Nat. ser. VI, 14: 381. 1882.

Known from a single collection in Guatemala, Santa Eulalia, Huehuetenango. Mexico.

Simple, erect perennial herbs, glabrous or somewhat pilose at the nodes, to 1 m. tall but usually much less. Leaves ovate to oblong-elliptic, acuminate, the base rounded or obtuse, glabrous or pilosulose on the mid-vein below, 7–30 cm. long and 2.5–9 cm. broad, petioles 2–3 cm. long; inflorescences one–few at the upper internodes, the flowers few to many disposed in a subumbel with pedicels 2–4 cm. long; calyx lobes oblong-lanceolate, 3–4 mm. long; corolla lobes elliptic-ovate, 6–8 mm. long; gynostemium short stipitate, column obconic, the hood cucullate, obovate, 2.5–3.5 mm. long, with a short falciforme horn; follicles glabrous, broadly ovoid, 7–8 cm. long; seeds oval, naked, about 1.5 cm. long.

This and *A. similis* are separated easily in the key which we present but it may be difficult to separate the species if specimens are not good or complete.

Asclepias rosea HBK. Nov. Gen. & Sp. Pl. 3: 189. 1819. *Viborana, platail, cicuta* (fide Aguilar).

Open slopes or grassy fields, 800–2,000 m.; Santa Rosa; Guatemala; Chimaltenango; Sololá; Quiché; Huehuetenango(?). Central and southern Mexico; El Salvador; Honduras; Nicaragua.

Plants low, mostly 50 cm. high or less, the roots often greatly tuberous-thickened or hard and woody, the stems usually several, erect or ascending, sometimes sparsely branched, glabrous or when young somewhat whitish-tomentose; leaves opposite, rather thick, linear, 2–18 cm. long, ascending, 2–6 mm. broad, often with revolute margins, narrowed at each end, glabrous above or nearly so, whitish-tomentose beneath when young; inflorescences few, on long slender, terminal or lateral peduncles, these usually longer than the leaves, few-flowered or many-flowered, the pedicels pubescent or tomentose, mostly 7–20 mm. long; corolla greenish white or tinged with pink, glabrous, the lobes broad, 4–7 mm. long; gynostegium borne on a very short column; hoods of the corona white, scarcely more than 3 mm. long, little exceeding the anthers, the horns not or scarcely exserted; fruiting pedicels reflexed; follicles slender, 6–15 cm. long, about 7 mm. broad, tomentulose.

This is doubtless the species reported by Loesener from Huehuetenango as *A. michauxii* Dcne.

Asclepias similis Hemsl. Biol. Cent. Am. Bot. 2: 326. 1881. *A. guatemalensis* Donn.-Sm. Bot. Gaz. 18: 207. 1893 (type from Santiago, Sacatepéquez, Guatemala, *Rosalio Gómez 809*). *Mishito* (Chimaltenango); *chumimí* (Huehuetenango).

Moist thickets or open forest, most often in pine-oak forest, 1,400–2,600 m.; Alta Verapaz; Zacapa; Jalapa; Guatemala; Sacatepéquez; Chimaltenango; Quiché; Sololá; Huehuetenango. Mexico; Honduras.

FIG. 117. *Asclepias woodsoniana*. A, habit, × ¾; B, flower, in natural position, × 4; C, calyx and pistil, × 8; D, pollinia, × 10.


A
B
C
D

An erect, rather stout herb a meter high or less, the stems usually simple, pubescent at first, glabrate in age; leaves opposite, short-petiolate, oblong-ovate to oblong-lanceolate, mostly 7–13 cm. long, acute or acuminate, rounded to acute at the base, green above, sparsely pubescent or glabrate, pale beneath, puberulent beneath on the veins, or sometimes more densely pubescent or glabrate; umbels few at the ends of the stems and in the uppermost leaf axils, long-pedunculate, many-flowered, the slender pedicels 12–25 mm. long, puberulent; calyx lobes oblong-lanceolate, subacute, glabrous; corolla purplish or usually greenish white or pale green, 7–8 mm. long; gynostegium borne on a distinct thick column; hoods of the corona white, sessile, about 4 mm. long, the horns usually exserted and conspicuous; pedicels reflexed in fruit; follicles about 13 cm. long and 1.5 cm. thick, variously pubescent or in age glabrate.

It is presumably this species that was reported from Huehuetenango by Loesener as *A. ovata* Mart. & Gal.

Asclepias woodsoniana Standl. & Steyerm. Field Mus. Bot. 23: 224. 1947; Dugand, Caldesia 9, No. 45: 403. 1966.

Known in Guatemala only from the type, Jutiapa, salt flats, fields between Trapiche Vargas and Asunción Mita, 500 m., *Steyermark 31781*. Mexico; El Salvador; Honduras; Nicaragua; Costa Rica; Colombia.

An erect perennial herb, 40 cm. high or possibly taller, the stems slender, rather sparsely leafy, whitish-pubescent in 2 lines; leaves rather thick, on a stout petiole 3–5 mm. long, almost linear, gradually long-attenuate from a truncate or subhastate base 4–12 mm. broad, 5–17 cm. long, glabrous or very sparsely puberulent, 1-nerved, glaucescent; inflorescences 2–4 at the apex of the stem or from the uppermost leaf axils, on slender peduncles 1.5–3.5 cm. long, about 12-flowered, the pedicels slender, 10–14 mm. long, grayish-puberulent; calyx lobes oblong, acute, 2 mm. long or shorter; puberulent; corolla apparently pale green or whitish, 4.5 mm. long, glabrous, the lobes broad, obtuse, reflexed; stamen column thick, 1 mm. high; hoods of the corona ovate, obtuse, contracted and short-unguiculate at the base, the horns exserted; anthers 2.3 mm. long, the apex white and scarious.

The species is apparently not an uncommon one, usually in savannas, from Mexico to Colombia but is often difficult to find.

BLEPHARODON Decaisne

Scandent perennial plants, herbaceous or suffrutescent; leaves opposite, often subcoriaceous; inflorescence cymose or subumbellate, few–many-flowered, borne on a peduncle from the axils of leaves; flowers medium-sized to small; calyx 5-lobed and with 5 glands within at the base; corolla valvate, 5-lobate nearly to the base, the lobes ciliate; corona with 5 scales affixed to the stamen tube, free at the apex, erect, concave, cymbiform or cucullate; stamens affixed to the base of the corolla, the filaments connate into a short tube; anthers terminated by an inflexed membrane, the basal auricles elongated; pollinia solitary in each cell, ovoid, pendulous; stigma depressed or umbonate at the apex; follicles smooth.

FIG. 118. *Blepharodon mucronatum.* A, habit, natural size; B, corolla and corona, × 3; C, calyx showing dactyliform squamellae and pistils, × 10; D, opened capsule, natural size.

Apparently a single species in North America which may be considered typical of the genus. There are some 20 more described from South America. Decaisne's generic description seems to be based on a mixture of two genera. We accept the name based upon *B. mucronatum*.

Blepharodon mucronatum (Schlecht.) Dcne. in DC. Prodr. 8: 603. 1844. *Astephanus mucronatus* Schlecht. Linnaea 8: 518. 1833. *Bejuco de pescado.*

Moist to wet or dry thickets, or in mixed or pine-oak forest, often in second growth, 1,450 m. or lower; Alta Verapaz; Izabal; Chiquimula; Santa Rosa; Guatemala; Suchitepéquez; Quezaltenango; Huehuetenango; probably to be expected in most departments. Mexico; British Honduras to El Salvador and Panama; South America.

A large or small, slender, branched vine, glabrous throughout; leaves subcoriaceous, on short or rather long, slender petioles, lance-oblong to elliptic, 3–7 cm. long, cuspidate-acuminate, rounded or obtuse at the base, pale beneath and with rather conspicuous but very slender nerves; umbels axillary, on long slender peduncles, shorter than the leaves, few-flowered, the pedicels filiform, 1–2.5 cm. long; calyx lobes oblong-ovate, obtuse, about 1.5 mm. long, pale-marginate; corolla greenish white, 1 cm. broad, the lobes lance-oblong, obtuse, densely short-villous within, along and on the margins; lobes of the corona oval, obtuse, shorter than the gynostegium; follicles glabrous, about 9 cm. long and 2 cm. broad, smooth.

Sometimes called "tietie" in British Honduras; "cancelxiu," "hulkin-xiu" (Yucatan, Maya). The flowers have an odor suggestive of lemon.

Cryptostegia grandiflora (Roxb.) R. Br., a rubber vine, native of India, is planted rarely in Guatemala for ornament. It is a large woody vine, glabrous or nearly so, with petiolate, oval to elliptic-ovate, somewhat coriaceous leaves 5–10 cm. long, and cymose, pink or purplish flowers 5–7 cm. long. The latex yields a considerable amount of rubber, and the vine has been exploited in the past for this product. The plant is at home in the wet-dry regions of Central America and produces follicles and viable seeds in abundance. It should perhaps not be used as an ornamental, or otherwise, because of its potential as a weed. Although we have not yet seen it naturalized in Central America, Drouet and Richards, in 1939, report their number 3838 as being established on lower slopes of mountains just east of Guaymas, Sonora, Mexico. L. H. MacDaniels number 8 from Mazatlán, Sinaloa, was taken by the collector as a native plant.

The plant is reported poisonous to livestock.

CYNANCHUM L.

Plants slender, usually scandent and herbaceous, sometimes suffrutescent, glabrous or pubescent; leaves opposite, coriaceous to membranaceous, often very small and narrow, acute to cordate at the base; flowers whitish or yellowish, usually very small, the inflorescences umbelliform or racemiform, sessile or pedunculate; calyx small, deeply 5-lobate, 5-glandular within at the base or eglandular, the lobes most often obtuse; corolla campanulate to urceolate or subrotate, 5-lobate, the lobes valvate, often villous within; corona of 5 scales, these distinct or connate, laminate to filiform, sometimes variously compound or with internal processes, rarely wholly lacking; stamens inserted near the base or middle of the corolla tube, the filaments connate into a short or elongate tube; anthers terminated by an inflexed membrane; pollinia solitary in each cell, ovoid or oblong, often compressed, pendulous; stigma flat at the apex or apiculate; follicles terete, acuminate, usually slender, smooth; seeds bearing a coma of silky white hairs.

A very large genus, with perhaps 200 species, widely distributed in both hemispheres, chiefly in tropical or warm regions. There are four or five species besides those listed here that occur in southern Central America. As here treated, the group includes plants that have been cited previously under the names *Metastelma, Roulinia, Rouliniella, Enslenia, Vincetoxicum, Ditassa* and various others.

The species referred here to the genus *Cynanchum* certainly are all closely related, with the exception of *C. rensonii*. The flowers are small and quite as complex as those of the larger flowered Asclepiads. To this is due the confusion which has existed in the genus. The genus, however, is not impossible as Woodson once hinted that it might be for there are good characters that may be seen with a microscope. The genus in North America offers a very nice doctorate problem.

Inflorescences subracemose, with evidently elongated nodes; leaves broadly ovate, cordate at the base, mostly 2–5 cm. broad (*Cynanchum* subg. *Mellichampia*). *C. rensonii.*

Inflorescence subumbellate, the internodes suppressed or very short; leaves linear to oval, acute to rounded to the base, usually less than 2 cm. broad (*Cynanchum* subg. *Metastelma*).

Leaves densely pubescent on both surfaces ..... *C. trichophyllum.*

Leaves glabrous on both surfaces.

Lobes of the corona as broad or broader than long; flowers red ..... *C. rubens.*

Lobes of the corona longer than broad; flowers not red.

Inflorescences sessile, not pedunculate ..... *C. miserum.*

Inflorescence not sessile, pedunculate.

Lowest veins of the leaves subparallel to the margin of the leaves. *C. sepium.*

Lowest veins of the leaves not parallel to the margins or the veins obsolete.

Lateral veins of the leaves obsolete; leaves mostly linear.

Lobes of the corona oblong and retuse..... *C. palustre.*

Lobes of the corona linear, not retuse..... *C. chiapense.*

Lateral veins of the leaves evident; leaves mostly broader than linear.

Inner surface of the corolla lobes nearly glabrous or obscurely puberulent; peduncles of inflorescences 1.5–2 cm. long; inflorescence few-flowered..... *C. woodsonianum.*

Inner surface of the corolla lobes densely and obviously pubescent.

Lobes of the corona as long as the corolla or nearly so; inner face of corolla evenly pubescent; leaf blades usually sharply reflexed from apex of petiole; British Honduras endemic. *C. stenomeres.*

Lobes of the corona much shorter than the corolla; inner face of the corolla lobes densely and often retorsely white barbellate; leaf blades usually not sharply reflexed from apex of petiole; common species in Mexico, Guatemala and British Honduras. *C. schlechtendalii.*

Cynanchum chiapense (Gray) Standl. & Steyerm. Field Mus. Bot. 23: 226. 1947. *Metastelma chiapense* Gray, Proc. Am. Acad. 21: 397. 1886. *Metastelma collinum* Blake, Contr. U. S. Nat. Herb. 24: 19. 1922 (type from Izabal, *Blake 7793*). *Cynanchum collinum* Standl. & Steyerm. l.c.

Twining on shrubs or grasses or rocky and brushy hillsides, 600–1,400 m. or higher; Izabal; Petén; Alta Verapaz; Quezaltenango; Huehuetenango; Jutiapa; Chiquimula; Jalapa. Mexico, the type from Chiapas; El Salvador; Honduras.

Plants slender, often forming dense tangles of stems, sometimes low and suberect, herbaceous or often woody below, the stems bifariously puberulent or almost glabrous, subterete, often with greatly elongate internodes; leaves short-petiolate, linear or nearly so, 1–5 cm. long, usually about 2 mm. broad, thick and firm, often revolute-margined, 1-nerved, acute, glabrous or ciliate; umbels sessile or on very short peduncles, mostly 3–6-flowered, the pedicels short, puberulent or glabrous; flowers white or greenish white, 2.5 mm. long, glabrous outside; calyx lobes ovate, obtuse; corolla in bud broadly ovoid or ovoid-globose, the lobes ovate, subacute, puberulent and retrorse-barbellate within, erect or ascending; gynostegium subsessile; scales of the corona narrowly linear, less than one-third as long as the corolla lobes, equalling the pyramidal apex of the stigma.

This species has consistently linear leaves without visible lateral nerves. The stems may be quite pubescent (rarely) or more often pubescent in lines, the leaves are often obscurely ciliolate.

Cynanchum miserum L. Wms. Fieldiana, Bot. 32: 38. 1968. *Barba de león.*

Vine twining over shrubs or trees, at 1,500–2,500 m. Alta Verapaz; Huehuetenango; possibly El Progreso. Mexico (Chiapas).

Twining and often reed-like herbaceous or suffrutescent vines. Stems slender, striated at least when dry, internodes 2–4 cm. long, sparsely puberulent to glabrous and somewhat vernicose, mostly 0.5–1 mm. in diameter; leaves sparse, soon deciduous, linear or linear-lanceolate, acute-apiculate to acuminate, with 2–3 pairs of obscure lateral nerves, the lowest pair subparallel to the margin, glabrous or dorsally the mid-nerve puberulent, about 1–3 cm. long and 0.1–0.4 cm. broad; inflorescence sessile (not pedunculate), few-flowered (1–5) fascicles at leafless nodes, pedicels of the flowers mostly about 2 mm. long, glabrous or puberulous; calyx to about 0.5 mm. long, the lobes lanceolate-triangular, acute, puberulous; corolla campanulate, glabrous, about 1 mm. long, the lobes subtriangular, obtuse, about 0.3 mm. long; corona lobes lanceolate, obtuse, about 0.3 mm. long, overtopping the gynostegium; gynostegium stipitate, about 0.5 mm. long; capsule slender, 4–5 cm. long.

Among the species in this flora this may be distinguished by the sessile fascicles of flowers, the very small glabrous flowers in which the corolla is divided only about a third its length. The species has relatively few leaves and these soon fall away.

Cynanchum palustre (Pursh) Heller, Cat. N. Am. Pl. 6. 1898. *Ceropegia palustris* Pursh, Fl. Am. Sept. 1: 184. 1814. *Vincetoxicum palustre* Gray, Syn. Fl. N. Am. 2[1]: 102. 1878.

A vine in salt marshes. Manatee Lagoon, British Honduras, *Peck 405*. Southeastern United States. West Indies.

Slender vine to about a meter long, stems glabrous. Leaves linear, acute or acuminate, lateral veins none, to about 45 mm. long and 1.5 mm. broad; inflorescence axillary, subumbellate, few–many-flowered, peduncles 2–3 cm. long, pedicels about 0.5 cm. long; calyx lobes linear-lanceolate, acute, ciliolate, about 2 mm. long and 0.7 mm. broad; corolla green, divided almost to the base, tube about 0.5 mm. long, lobes lanceolate or linear-lanceolate, acuminate, 4–5 mm. long and about 1.5 mm. broad; corona lobes oblong, retuse, about 2 mm. long, slightly exceeding the gynostegium.

The description is from the specimen cited, the only one known from Central America. It does not fit well into the genus *Cynanchum*.

Cynanchum rensonii (Pittier) Woodson, Ann. Mo. Bot. Gard. 28: 210. 1941. *Roulinia rensonii* Pittier, Contr. U. S. Nat. Herb. 13: 101, *f. 8*. 1910. *Cynanchum guatemalense* Dugand, Caldesia 9, No. 45: 412. 1966. *Cuchamper*.

Moist or wet thickets or often in roadside hedges, 1,400 m. or lower; Zacapa; Chiquimula; Santa Rosa; Guatemala; Suchitepéquez. El Salvador; Honduras.

A slender vine, glabrous almost throughout, the young stems sometimes bifariously puberulent, the petioles and inflorescence sparsely puberulent or glabrous;

leaves slender-petiolate, membranaceous, ovate-cordate or deltoid-cordate, 4–7 cm. long, 1.5–5.5 cm. broad, shortly cuspidate-acuminate, shallowly or deeply cordate at the base, somewhat paler beneath; inflorescences axillary, racemose, usually much shorter than the leaves, the peduncles 3 cm. long or shorter, the pedicels 2.5–3.5 mm. long, the flowers yellowish white, scarcely 3 mm. long; calyx glabrous outside, the lobes oblong-elliptic, obtuse; corolla globose in bud and rounded at the apex, glabrous, the lobes obtuse or rounded at the apex; lobes of the corona obscurely hastate-trilobate, exceeding the gynostegium; follicles about 10 cm. long and 2–3 cm. thick, attenuate to the apex, terete, smooth, glabrous.

Sometimes called "champer" in El Salvador. The young fruits often are used as a vegetable. The status of this species is very uncertain, and it is quite probable that an older name may be found for it. It has been reported from Guatemala as *Enslenia ligulata* Benth. and *Roulinia unifaria* Engelm.

Cynanchum rubens L. Wms. Fieldiana, Bot. 32: 39. 1968.

Known only from the type collected in cypress forests, Santa Elena, Chimaltenango, *Skutch 503*. Endemic.

Twining vines to a meter or perhaps longer. Stems slender, crisped pubescent in lines or glabrous, 1–1.5 mm. in diameter; leaves linear-lanceolate or lanceolate, acuminate, obscurely ciliolate, lateral nerves 4–5 pairs, obscure, 2–5 cm. long and 0.4–0.8 cm. broad, petiole short, puberulent, 1–5 mm. long; inflorescence axillary, subumbellate, mostly 5–8-flowered, the peduncle short, about 2–3 mm. long, the pedicels of the flowers 2–3 mm. long, obscurely puberulent; flowers maroon; calyx lobes ovate-lanceolate, acute, puberulent, about 1 mm. long and half as broad; corolla rotate, completely glabrous, about 2 mm. long, deeply lobate, the lobes oblong-ovate, acute, about 1.3 mm. long and 1 mm. broad; corona fleshy, 5-lobate, the lobes alternate with the corolla lobes, subcochleate, rounded, about 0.5 mm. high; gynostegium about 1 mm. high.

Distinctive among all the species of Central America and Mexico by the broad rounded lobes of the corona and the maroon-colored flowers with glabrous corollas.

Cynanchum schlechtendalii (Dcne.) Standl. & Steyerm. Field Mus. Bot. 23: 226. 1947; L. Wms. Fieldiana, Bot. 32: 40. 1968. *Metastelma schlechtendalii* Decaisne in A. DC. Prodr. 8: 513. 1844. *M. decipiens* Pittier, Contr. U. S. Nat. Herb. 13: 98, *fig. 4*. 1910 (type from San Miguel Uspantán, *Heyde & Lux 3060*).

Moist or dry thickets, often in rocky places, 2,000 m. or less; Petén; Alta Verapaz; Quezaltenango; Sololá; Guatemala; Santa Rosa; Jutiapa; Zacapa. Mexico; British Honduras.

Usually a small vine, the stems sometimes elongated, much branched and forming mats over other plants; bifariously puberulent or glabrous; leaves short-petio-

FIG. 119. *Cynanchum schlechtendahlii*. A, habit, natural size; B, flower, × 10; C, calyx and gynostegium, × 10.

late, lanceolate to ovate-lanceolate, about 2–4 cm. long and 1–1.5 cm. broad, rounded to subacute or short-acuminate at the apex and usually mucronate, rounded at the base, glabrous or nearly so, paler beneath, penninerved; inflorescences usually numerous, umbelliform, laxly few-flowered, puberulent, on relatively short peduncles, the flowers on short slender pedicels, white or whitish, about 2–3 mm. long; calyx short, the lobes oblong or ovate-oblong, obtuse, puberulent or glabrous; corolla glabrous outside, oblong or obovoid in bud, obtuse or somewhat pointed at the apex, the lobes oblong-lanceolate, subacute, erect or ascending, densely white barbellate within; gynostegium stipitate, the stipe about equalling the anthers; corona scales ligulate or linear-subulate, exceeding the gynostegium; follicles slender, about 5.5 cm. long and 7 mm. thick, narrowly long-acuminate, smooth, glabrous.

This is the commonest species in south Mexico and Guatemala. It seems not to extend into Central America further. *Cynanchum*

chiapense is a closely related species but is usually distinguished by the narrower leaves which do not have obvious lateral nerves.

Cynanchum sepium (Dcne.) Standl. Contr. U. S. Nat. Herb. 23: 1177. 1924; L. Wms. Fieldiana, Bot. 32: 40. 1968. *Vincetoxicum sepium* Dcne. in DC. Prodr. 8: 526. 1844. *Bejuco de San Julian.*

Twining over herbs or trees in thickets. Quezaltenango; Chimaltenango. Mexico.

A small vine, usually herbaceous but possibly sometimes woody, glabrous or with sparse pubescence on petioles and new growth; leaves on short slender petioles 3–5 mm. long, the blade lanceolate or narrowly lanceolate, acuminate, 2.5–6 cm. long and 0.4–2 cm. broad, glabrous or nearly so, the lowest veins of the leaves nearly parallel to the margin, only 3–5 pairs; inflorescence umbellate, axillary, the peduncle 1 cm. long or less, with ten or fewer flowers; flowers greenish-white, 1.5–2 mm. long; calyx lobes lance-ovate, obtuse or acute, puberulent, about 0.5 mm. long; corolla lobes ovate, acute, glabrous outside, inner face except the margins pulvinate, about 1 mm. long; follicles not known.

This is the only species in Guatemala in which the lowest veins on the leaves follow the leaf margin, there are relatively few lateral veins. This name has been used for a wide variety of species of *Cynanchum* in Guatemala and elsewhere.

Cynanchum stenomeres Standl. & Steyerm. Field Mus. Bot. 23: 224. 1947.

British Honduras, at or little above sea level, in open places or in thickets, often or usually in open pine forest; endemic; type from All Pines, *W. A. Schipp 674.*

A very slender vine, herbaceous or suffrutescent, the stems sometimes 2 m. long, obscurely and bifariously puberulent or glabrous, sometimes purplish; leaves thick-membranaceous, on slender petioles 4–5 mm. long, penninerved, glabrous or sparsely and minutely puberulent on the veins, linear-lanceolate, 3–6 cm. long, 4–7 mm. broad, narrowly long-attenuate, obtuse or acute at the base, deep green above, the costa and nerves often shallowly impressed, paler beneath, the costa prominent, the lateral nerves obscured, 10 or more pairs; inflorescences umbelliform, about 10-flowered, on slender peduncles 8 mm. long or shorter, the pedicels glabrous or sparsely puberulent, 2.5–4 mm. long; flowers white, fragrant, 4 mm. long; calyx lobes minute, ovate-oblong, obtuse, sparsely and minutely puberulent or glabrous; corolla in bud oblong-ovoid or oblong, obtuse, deeply lobate, the lobes lance-oblong or oblong-linear, usually somewhat narrowed near the base, glabrous outside, densely white-pilosulous within; gynostegium long-stipitate, the stipe more than twice as long as the calyx; lobes of the corona with a small ovoid base, attenuate into a long hair-like tip, almost equalling the corolla lobes; stigma short-rostrate, the beak little longer than the appendages of the anthers.

The leaf blades are sharply reflexed from the apex of the petioles and this shows even in many herbarium specimens. The lobes of the corona are as long as the corolla or nearly so, the only species in this flora with such long corona lobes.

Cynanchum trichophyllum L. Wms. Fieldiana, Bot. 32: 41. 1968. *Pak-chan.*

Moist or dry thickets or forests, 800–1,200 m.; Huehuetenango. Mexico; Honduras.

Slender, often twining plants forming dense mats over trees and shrubs, stems to several meters long and mostly about 1 mm. in diameter, herbaceous or at most suffrutescent, entire plant soft pilose-pubescent; leaves oblong-lanceolate to ovate-lanceolate, acuminate, apiculate, obtuse or rounded at the base, lateral nerves evident, sparsely or densely pubescent on both surfaces, about 1–3 cm. long and 0.5–1 cm. broad, petioles slender, 2–4 mm. long; inflorescences abundant, subumbellate, usually borne in alternate axils of each succeeding pair of leaves, sometimes in the axils of both leaves of a pair, each bearing 4–10 flowers, from shorter to about as long as the subtending leaf or rarely longer, peduncles 2–10 mm. long, pedicels very slender, mostly 2–3 mm. long; flowers white or cream color; calyx deeply 5-lobed, pilose outside, the lobes about 0.5–0.7 mm. long, lanceolate-oblong, obtuse; corolla subcampanulate, divided almost to the base, 2.5–3 mm. long, the lobes 2–2.5 mm. long and 0.6–0.8 mm. broad, linear-oblong or linear-lanceolate, obtuse, tip reflexed, glabrous outside, prominently barbellate at the tip inside with two lateral lines of pubescence extending to the base of the lobe; corona about 1 mm. long or less, the lobes linear-lanceolate, slightly longer than the gynostegium; capsule 2.5–5 cm. long, rostrate, densely pubescent.

Known from Guatemala from a single specimen. Abundant in Central Honduras.

Cynanchum woodsonianum L. Wms. Fieldiana, Bot. 32: 42. 1968. *Metastelma pedunculare* Decaisne in DC. Prodr. 8: 514. 1844, non *Cynanchum pedunculare* Lam., 1786.

Twining over shrubs or on trees, 1,500–2,000 m.; Guatemala (type from Cuesta de Pinula, *Hartweg 601*); Sacatepéquez; Chiquimula. Endemic.

Rampant or twining herbs or subshrubs, slender, the stems glabrous. Leaves elliptic-lanceolate or elliptic-oblong, acute or short-acuminate, glabrous, about 1.5–5 cm. long and 0.5–1.7 cm. broad, lateral nerves 8–10 pairs and inconspicuous, petiole slender, puberulent or glabrous, 3–6 mm. long; inflorescence subumbellate, few-flowered, borne on relatively long peduncles, 1.5–2 cm. long, puberulent; flowers white or greenish-white; calyx lobes subtriangular, acute or obtuse, fleshy, glabrous, about 1 mm. long; corolla rotate, the lobes ligulate-lanceolate, acute, the tips reflexed in natural position, obscurely puberulent within but often appearing glabrous, about 2 mm. long and 0.8 mm. broad, the corolla tube about 1 mm. long.

This species is easily distinguished by the long pedunculate, few-flowered inflorescence.

FISCHERIA De Candolle

Herbaceous or suffrutescent vines, often large, setose or villous; leaves opposite, usually large and long-petiolate, membranaceous; flowers medium-sized, umbellate or short-racemose, axillary, long-pedunculate, the inflorescence usually blackening when dried; calyx 5-parted, 5-glandular within at the base, the lobes narrow; corolla subrotate, deeply 5-lobate, the lobes broad, contorted; outer corona annular, thick-carnose, adnate to the base of the corolla, the outer margin somewhat 5-sinuate; hoods of the corona 5, thick-carnose, obtuse; stamens inserted near the base of the corolla, the filaments connate into a short tube; anthers terminated by an inflexed, membranaceous or thickened appendage; pollinia solitary in each cell, oblong or subobovate, subcompressed, the caudicle short, pendulous or oblique; stigma depressed at the apex, 5-angulate; follicles thick and hard, the seeds connate.

There are perhaps not more than a dozen species of *Fischeria* in the American tropics. The genus is doubtfully distinct from *Matelea*. One other species is known in Central America.

Fischeria martiana Dene. in DC. Prodr. 8: 601. 1844. *F. martiana* var. *funebris* Donn.-Sm. Bot. Gaz. 24: 398. 1897. *F. funebris* Blake, Journ. Wash. Acad. Sci. 14: 293. 1924. *F. briquetiana* Standl. Field Mus. Bot. 11: 139. 1932 (type from British Honduras, *Schipp 962*).

Thickets in the lowlands, 700 m. or less; Petén. British Honduras; Mexico; Costa Rica; Panama; probably in all the Atlantic lowlands of Central America. South America to Brazil.

A suffrutescent vine often to 10 m. long and 2.5 cm. in diameter, the young stems densely puberulent and with sparse to dense spreading hirsute pubescence, petioles to 7 cm. long or shorter, puberulent and hirsute; leaf blades broadly elliptic to ovate, 7–22 cm. long, 3.5–15 cm. broad, obtuse or rounded at the apex and short-caudate, shallowly cordate at the base, with rounded lobes, rough-hirtellous or hirsute-pilose above, almost concolorous beneath, densely velutinous-pilosulous or hirsute-pilose, the hairs often longer on the costa beneath; peduncles 4.5–10 cm. long, the umbels many-flowered, the slender pedicels 12–35 mm. long, viscid-puberulent and sparsely hirsute; buds ovoid-globose, very obtuse; calyx lobes lance-linear, long attenuate, 7–15 mm. long, slightly exceeding the corolla, viscid-puberulent and sparsely hirsute; corolla 12–18 mm. broad, deeply 5-lobate, light green and yellow, the lobes ovate to ovate-oblong, obtuse to subacute, crispate, densely hirtellous on both surfaces; outer corona carnose, entire, half as long as the gynostegium; hoods of the corona carnose, obtuse, longer than the gynnotegium.

GONOLOBUS Michaux

Plants herbaceous or more or less woody, usually scandent, variously pubescent or glabrate; leaves opposite, petiolate, generally cordate; flowers rather large

FIG. 120. *Fischeria martiana*. A, habit, × ½; B, corolla from above, × 2; C, calyx, corona and pistils, × 3.

or small, usually in umbelliform cymes, these lax, mostly few-flowered, axillary, pedunculate or subsessile; calyx 5-lobate, usually 5-glandular within at the base; corolla tube short or almost none, the limb rotate or somewhat campanulate, the lobes broad or narrow, dextrorsely contorted; corona adnate to the corolla, various in form, the outer corona usually annular, often ciliate, a fleshy true corona borne at the base of the stamen column; stamens inserted on the base of the corolla, the filaments connate into a very short tube; anthers short and broad, bearing a more or less conspicuous, fleshy, usually laminate, dorsal appendage, the appendages variable in form, sometimes reniform, often deeply bilobate or entire, sometimes trilobate; pollinia solitary in the cells, obovate or oblong, horizontal or somewhat pendulous; stigma depressed at the apex, conspicuously 5-angulate; follicles usually thick and acuminate, smooth or tuberculate; seeds bearing a copious coma of long white silky hairs.

There have been about 85 species described from Mexico and Central America that may reasonably be referred to *Gonolobus* as here defined. This and most of the related genera are much in need of revision and no really good account of them can be prepared until a revision is written.

The name "cuchamper" is applied in Guatemala and Central America to the fruits of *Gonolobus* and related genera. The tender young fruits are commonly used as vegetables, especially by the country people and even are to be found in the big markets in Guatemala City. "Gatillo" is a name sometimes given in Guatemala to the pods of these vines, in reference to the abundant "silk" of the pods.

Faucal corona erect and mostly more than 1 mm. high, ciliate at the apex; surface variously pubescent or glabrous.
- Corona deeply 5-lobate, the lobes half the length of the corona and rounded. *G. lasiostemma.*
- Corona entire, digitate or obscurely lobate, the lobes if present very short.
  - Corolla lobes pubescent dorsally with a few long, segmented or hispid hairs; leaves attenuated to truncate or somewhat cordate at the base.
    - Pubescence of back of corolla lobes soft hispid, the lobes about 5 mm. long and obtuse; pubescence of the top of the corona continuous.
      - Leaves deeply cordate; petioles puberulent ..... *G. roeanus.*
      - Leaves acute or truncate at the base; petioles spreading pilose pubescent. *G. donnellsmithianus.*
    - Pubescence of back of corolla lobes of long segmented hairs, the lobes about 10 mm. long, acute; corona glabrous.
      - Faucal corona adorned with flattened hairs and with similar hairs near the apex of the inner surface; calyx lobes linear-lanceolate. *G. xanthotrichus.*
      - Faucal corona glabrous; calyx lobes linear ..... *G. chiapensis.*
  - Corolla lobes glabrous dorsally.
    - Faucal corona ciliate *only* at the apex, not pubescent on the sides and base. *G. calycosus.*
    - Faucal corona ciliate at the apex and at the base, the sides sparsely to densely pilose ..... *G. stenosepalus.*

Faucal corona not erect, or if erect not pubescent.

Corolla calcarate at the juncture of the lobes; leaves not cordate at the base. *G. longipetiolatus.*

Corolla not calcarate at the juncture of the lobes; leaves cordate.

Corolla lobes densely barbate along one margin with long flat hairs. *G. barbatus.*

Corolla lobes not barbate, glabrous, short pilose or puberulent.

Lobes of the corolla short-pilose or puberulent within, the hairs of appreciable length.

Leaves glabrous or glabrate.

Corolla lobes linear, hispidulous in a line within..... *G. cteniophorus.*

Corolla lobes oblong or ovate, puberulous within and without.... *G. salvinii.*

Leaves pilose on both surfaces.

Corolla distinctly tubular at the base, the apex rounded in bud. *G. lasiostemma.*

Corolla not at all tubular at the base, acute or acuminate in bud.

Inflorescence sessile or nearly so, peduncles mostly less than 1 cm. long. *G. lanugiflorus.*

Inflorescence conspicuously pedunculate, the peduncles 1–3 cm. long. *G. uniflorus.*

Lobes of the corolla glabrous within or farinose-puberulent.

Corolla lobes farinose-puberulent within along one side.

Calyx lobes lanceolate or linear-lanceolate; corolla bicolored and reticulate-nerved..... *G. uniflorus.*

Calyx lobes ovate; corolla concolorous, not reticulate-nerved. *G. leianthus.*

Corolla lobes glabrous within unless at the very base.

Calyx lobes oval, obtuse or rounded at the apex..... *G. calycosus.*

Calyx lobes ovate or lanceolate and acute or acuminate, rarely obtuse, but then lanceolate.

Corolla in bud lanceolate or narrowly lanceolate, long-tapering at the apex.

Calyx lobes linear from a somewhat broadened base; corolla about 2.5–3 cm. long..... *G. versicolor.*

Calyx lobes lanceolate; corolla 1.5–2 cm. long..... *G. stenanthus.*

Corolla in bud subglobose or ovoid, rounded or short acuminate, not tapering to the apex.

Corolla dark purple, drying black, about 7 mm. long..... *G. niger.*

Corolla greenish or yellowish, not drying black, usually larger than 7 mm.

Corona hirtellous or short-pilose..... *G. stenosepalus.*

Corona glabrous.

Basal lobes of the leaves strongly incurved..... *G. steyermarkii*

Basal lobes of the leaves not at all incurved..... *G. prasinanthus.*

Gonolobus barbatus HBK. Nov. Gen. & Sp. Pl. 3: 209, *t. 239.* 1819. *Vincetoxicum barbatum* Standl. Contr. U. S. Nat. Herb. 23: 1192. 1924. *Bubsaac* (Petén, Maya).

Moist or dry thickets, often in rocky places, 200–1,600 m.; reported from Petén; El Progreso; Zacapa; Jutiapa; Santa Rosa; Escuintla; Huehuetenango. Western and southern Mexico; Honduras; El Salvador; Nicaragua.

A small or large vine, herbaceous or usually somewhat lignescent, the stems pale, finely puberulent, short-pilose, or glabrate; leaves firm-membranaceous, on long slender petioles, broadly deltoid-cordate or ovate-cordate, mostly 2–5 cm. long, acuminate, rather shallowly and openly cordate at the base, glabrous; flowers umbellate, the umbels sessile or short-pedunculate, the pedicels very slender, mostly 2–3 cm. long, puberulent; calyx green, lobate almost to the base, the segments lanceolate, attenuate-acuminate, sparsely puberulent or almost glabrous; corolla about 1 cm. long, in bud globose and short-cuspidate, glabrous or inconspicuously puberulent outside, green and yellow, deeply lobate, very densely yellow-barbate with long hairs in the throat and along one side of the lobes; stigma depressed, very deeply 5-lobate; follicles ovoid, 8–12 cm. long, glabrous, with broad longitudinal wings.

Called "Matacoyote" and "cuchamper de zope" in El Salvador; "xtuchcahoy" (Yucatán, Maya); "cuayote" (Honduras).

Gonolobus calycosus (Donn.-Sm.) Woodson, Ann. Mo. Bot. Gard. 28: 242. 1941. *Fimbristemma calycosa* Donn.-Sm. Bot. Gaz. 16: 196, *t. 16*. 1891.

Alta Verapaz (the type from Chucaneb, 1,800 m., *Tuerckheim 1500*). Nicaragua.

Leaves long-petiolate, oblong-cordate, 10–25 cm. long, acuminate, deeply cordate at the base, more or less pubescent; peduncles shorter than the petioles, 1–2 cm. long, the 6–8 pedicels longer than the peduncle, the flowers 2.5 cm. broad; calyx deeply 5-lobate, the segments oval, pale, obtuse or rounded at the apex, pubescent outside; corolla 5-lobate almost to the base, the lobes dextrorsely convolute, deep yellow, very obtuse, oblong; outer corona elobate, densely long-fimbricate; lobes of the inner corona ovate, equalling the fimbriae, bidentate, naked; anthers appendiculate below with a 2-cornute wing.

Gonolobus chiapensis (Brandegee) Woodson, Ann. Mo. Bot. Gard. 28: 242. 1941. *Vincetoxicum chiapense* Brandegee, Univ. Calif. Publ. Bot. 6: 190. 1915. *Matelea chiapensis* Shinners, Sida 1: 366. 1964.

Moist mixed forest, 1,300–1,500 m.; San Marcos (Volcán de Tajumulco). Mexico (type from Cerro del Boquerón, Chiapas). Nicaragua.

A somewhat woody vine, the stems rather densely hirsute with long spreading brownish multicellular hairs; leaves short-petiolate, lance-oblong or oblanceolate-oblong, mostly 9–12 cm. long and 3–4.5 cm. broad, long acuminate, subcordate at the base, thin, copiously hirsute on both surfaces; inflorescences axillary, subumbellate, sessile or on very short peduncles, 3–4-flowered, the pedicels 10 mm. long or shorter; calyx lobes lanceolate, hirsute, 4 mm. long; corolla rotate, dull green, pilose outside, 5 mm. long, the lobes broadly lanceolate; corona simple, annular, the margin undulate; disk of the stigma pentagonal, dark purple, flat.

FIG. 121. *Gonolobus barbatus.* A, habit, natural size; B, part of the calyx, disk and pistils; C, orifice of the corolla with one corolla lobe complete, × 5; D, winged fruit, × ½; E, cross-section of fruit, × ½; F, pollinia, × 7½.

Gonolobus cteniophorus (Blake) Woodson, Ann. Mo. Bot. Gard. 28: 243. 1941. *Vincetoxicum cteniophorum* Blake, Contr. Gray Herb. 52: 84. 1917. *V. tortum* Brandegee, Univ. Calif. Publ. Bot. 10: 414. 1924. *V. lundellii* Standl. Field Mus. Bot. 8: 148. 1930 (type from Honey Camp, British Honduras, *Lundell 540*). *Matelea cteniophora* Shinners, Sida 1: 366. 1964.

Moist or wet thickets, sometimes in wooded swamps, 150 m. or less; Petén; Izabal. Southern Mexico; British Honduras (type from Toledo, *Peck 821*).

A small or rather large, slender vine, herbaceous or suffrutescent, the stems almost glabrous, sparsely appressed-pilosulous at the nodes; leaves membranaceous, on long slender petioles, oblong-ovate to deltoid-cordate, mostly 5–9 cm. long, acuminate or long-acuminate, deeply cordate at the base, glabrous; peduncles axillary, 2–3 cm. long, glabrous, the flowers few, umbellate, the pedicels slender, unequal, 1–2.5 cm. long; calyx lobes ovate or lance-ovate, acuminate, ciliolate, 3 mm. long; corolla rotate, 3.5 cm. broad, lobate almost to the base, the lobes linear or nearly so, glabrous outside, hsipidulous in a line along the middle inside; outer corona short, densely ciliate, the inner corona short, carnose, glabrous, broadly 5-lobate; fruit narrowly ovoid, glabrous, smooth or somewhat white-tuberculate, about 6.5 cm. long and 2.5 cm. wide, acuminate.

Gonolobus dasystephanus (Blake) Woodson, Ann. Mo. Bot. Gard. 28: 243. 1941. *Vincetoxicum dasystephanum* Blake, Contr. Gray Herb. 52: 84. 1917.

Known only from the type, British Honduras, in forest and thickets, Manatee Lagoon, *M. E. Peck 323*.

A rather large vine, the stems slender, hispid and hispidulous, the hairs subretrorse, bulbous-thickened at the base; leaves short-petiolate, oblong-oval, 3.5–5 cm. long, 1.2–2 cm. broad, short acuminate, obtuse or rounded at the base, green above, slightly paler beneath, rather densely hispid-pilose on both surfaces with fulvous hairs; peduncles incurved-hispidulous, 7–10 mm. long, the umbels 6–9-flowered, the pedicels 1.5 cm. long; calyx lobes ovate, obtuse, hispidulous, 2 mm. long; corolla rotate, green when dry, 5-lobate almost to the base, 12 mm. broad, the lobes oval-ovate, obtuse, hispidulous outside, glabrous within; outer corona annular, erect, obscurely 5-lobate, densely pilose-ciliate; inner corona shorter, glabrous, carnose, few-crenulate.

Gonolobus donnellsmithianus L. Wms. Fieldiana, Bot. 32: 45, *fig.* 1968.

Known only from the type, Lacandon, Department of Petén, *Contreras 3364*.

A herbaceous or suffrutescent vine with stems spreading pilose pubescent. Leaves elliptic or elliptic-oblong, acuminate, acute to obscurely truncate at the

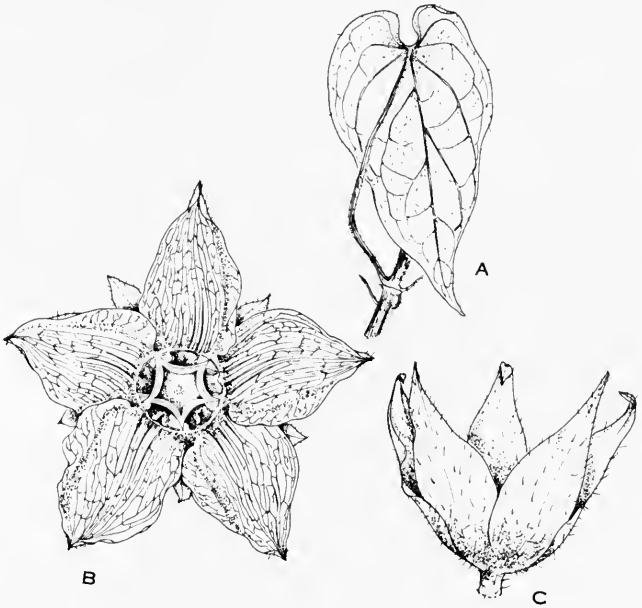

FIG. 122. *Gonclobus donnellsmithianus*. A, habit, × ½; B, flower in natural position showing petals, corona and gynostegium, × 4; C, calyx and ovaries (stigma removed), × 5.

base, sparsely fulvous pilose on both surfaces, the blade (2–)6–10 cm. long and (1–)2.5–4 cm. broad, the petioles of a pair slightly unequal, spreading pilose-pubescent, about 4–14 mm. long; inflorescence a subumbellate cyme 6–10-flowered, the peduncle about 1 cm. long, the pedicels to 1.5 cm. long, puberulent; calyx pubescent dorsally, divided nearly to the base, the lobes triangular-lanceolate or lanceolate, acute, 2–3 mm. long; corolla sparsely pubescent dorsally, deeply lobate, the lobes linear-oblong, obtuse, cucullate, glabrous within, about 5 mm. long and 2 mm. broad; faucal corona about 1 mm. high, obscurely lobate and ciliate at the apex, sides and base glabrous; staminal appendages furcate, the branches slender and arcuate; fruit unknown.

This species is allied to *G. xanthotrichus* Brandegee but is easily distinguished by floral detail.

Gonolobus lanugiflorus Woodson, Ann. Mo. Bot. Gard. 28: 282. 1941.

Moist or wet, mixed forest, 2,300–2,800 m.; known only from the vicinity of the type locality, Volcán de Tajumulco, near Tajumulco, the type being *Steyermark 36906*.

Plants scandent, herbaceous or lignescent, densely fulvous-hispid or hirsute on the stems, leaves, and inflorescence, the hairs slightly harsh to the touch, the stems

stout; leaves on petioles 2–3 cm. long, membranaceous, ovate-cordate or broadly oblong-ovate, 9–14 cm. long, 4.5–7.5 cm. broad, rather abruptly and narrowly long-acuminate, deeply cordate at the base; inflorescence umbelliform, subsessile, many-flowered, the flowers greenish, on pedicels 1 cm. long or shorter; calyx lobes lanceolate, 1 cm. long, acuminate; corolla rotate, fulvous-hispidulous inside and outside, the lobes ovate-lanceolate, 1.5 cm. long, narrowly acuminate; annulus of the throat conspicuous, minutely fulvous-hispidulous, entire; corona rotate, 5-parted, glabrous, the margin minutely crenulate; gynostegium subsessile, 4.5 mm. in diameter.

Gonolobus lasiostemma (Hemsl.) Woodson, Ann. Mo. Bot. Gard. 28: 243. 1941. *Lachnostoma lasiostemma* Hemsl. Biol. Centr. Am. Bot. 2: 335. 1882. *Gatos.*

Moist or dry, often rocky thickets or in hedges, 1,200–2,300 m.; endemic; type collected in Guatemala by Skinner, the locality unknown; Santa Rosa; Guatemala; Sacatepéquez; Sololá; Huehuetenango.

A rather large and coarse vine, herbaceous or somewhat woody, the stems densely short-hirsute with fulvous retrorse hairs; leaves long-petiolate, membranaceous, broadly oblong-ovate, mostly 6–13 cm. long and 3–7 cm. broad, acuminate or acute, sometimes abruptly acuminate, rather shallowly and openly cordate, densely velutinous-pilose with short spreading hairs on both surfaces, little paler beneath; inflorescences lax and few-flowered, umbelliform, short-pedunculate, the pedicels mostly 2 cm. long or shorter, densely pilosulous, the flowers 2–3 cm. broad; calyx densely pilosulous, deeply 5-lobate, 5-glandular within, the segments linear-lanceolate, acute, almost equalling the corolla; corolla green, tubular at the base, more or less hirtellous outside and within, the tube shorter than the lobes, the lobes narrow, obtuse; corona adnate to the corolla tube, the outer corona of 5 large subgaleate scales opposite the corolla lobes, these barbate on all sides, the inner corona of 5 bifid glabrous scales alternate with the corolla lobes; gynostegium free, the stigma depressed; ovaries glabrous; young follicles broadly ovoid, acuminate, 6 cm. long and more than 3 cm. broad (at maturity doubtless much larger).

Gonolobus leianthus Donn.-Sm. Bot. Gaz. 48: 296. 1909. *Vincetoxicum schippii* Standl. Field Mus. Bot. 8: 37. 1930 (type from Middlesex, British Honduras, *W. A. Schipp S19*). *Sucrixcám* (Cobán, Quecchí).

Moist or wet thickets or open forest, sometimes in roadside hedges, 500–2,400 m., or sometimes at lower elevations; Petén; Alta Verapaz; Sacatepéquez; Quezaltenango; Huehuetenango. Mexico, British Honduras.

A large or small, herbaceous vine, sometimes suffrutescent, rarely trailing over the ground, the stems, petioles, and inflorescence pilose with rather stiff, spreading or reflexed, short hairs, or the stems sometimes glabrate and the peduncles and pedicels glabrous or nearly so; leaves firm-membranaceous, on long slender petioles, oblong-ovate, mostly 6–12 cm. long and 2.5–5 cm. broad, acuminate, deeply cordate

at the base, rather densely short-pilose on both surfaces or often glabrate, especially on the upper surface, slightly paler beneath; peduncles few-flowered, mostly 2-flowered, 2–4 cm. long or often very short, the pedicels very unequal, mostly 2–5 cm. long; flowers as much as 5 cm. in diameter but often not more than 3.5 cm.; calyx lobes ovate or broadly ovate, green or pale, 1.5 cm. long or shorter, acute or acuminate; corolla puberulent or almost glabrous outside, papillose-puberulent within along one side of each lobe, deeply lobate, olive-green within, dull yellow-green outside, the lobes lance-oblong, obtuse or subacute; corona annular, subentire, adnate to the very short gynostegium; gynostegium 6 mm. in diameter; follicles about 13 cm. long and 4.5 cm. thick, longitudinally winged, smooth.

Gonolobus longipetiolatus Woodson, Ann. Mo. Bot. Gard. 28: 282. 1941.

Known only from the type, San Marcos, southern slopes of Volcán de Tajumulco, above Finca El Porvenir, 1,300–1,500 m., *Steyermark 37428*.

Plants slender, suffrutescent, the stems sparsely fulvous-hirsute with short hairs; leaves on long slender petioles, membranaceous, oblong-elliptic or oblong-ovate, 4.5–10 cm. long, 2–5 cm. broad, narrowly long-acuminate, rounded or truncate at the base, glabrous; petioles 2–5 cm. long, glabrous; inflorescence subracemose, lax, few-flowered, the peduncle 2–2.5 cm. long, the pedicels of about the same length; calyx lobes narrowly lanceolate, long-acuminate, 7 mm. long, minutely papillose outside; corolla green, rotate, glabrous, the lobes broadly linear, 9 mm. long, acuminate, with involute margins, short calcarate at the juncture of corolla lobes; corona conspicuously 5-lobate, the lobes erect, broadly oblong, 2 mm. long, truncate or subemarginate at the apex; gynostegium borne on a stipe 2 mm. long; stigma pentagonal, 3.5 mm. broad, conspicuously rostrate.

This is the only species of Gonolobus which we know that has obscure calcarate processes at the juncture of lobes of the corolla.

Gonolobus niger (Cav.) R. Br. Wern. Soc. 1: 35. 1809. *Cynanchum nigrum* Cav. Icon. Pl. 2: 45, *t. 159*. 1793. *Vincetoxicum cavanillesii* Standl. Contr. U. S. Nat. Herb. 23: 1188. 1924. *Millona*.

Dry rocky thickets, about 1,600 m.; Huehuetenango (above San Ildefonso Ixtakuacán, *Steyermark 50678*). Southern Mexico.

A slender vine, herbaceous or somewhat woody, the stems minutely puberulent and short-hirsute with sparse, fulvous, spreading or reflexed hairs, sometimes glabrate; leaves firm membranaceous, on long slender petioles, oblong-ovate or deltoid-ovate, 4–7.5 cm. long, acuminate or cuspidate-acuminate, rather shallowly and openly cordate at the base and sometimes subhastate, thinly hirtellous or almost glabrous on the upper surface, paler beneath, puberulent on the veins or glabrate; inflorescences umbelliform or racemiform, very open and few-flowered, often equalling the leaves, the peduncles often much longer than the petioles, the pedicels 1–2.5 cm. long, puberulent or almost glabrous; calyx lobes ovate or ovate-lanceolate, much shorter than the corolla, acute, greenish, glabrous or nearly so;

corolla deep dark purple, blackish when dried, puberulent outside, glabrous within, about 6 mm. long, lobate almost to the base, the lobes oblong or ovate, obtuse, reflexed in anthesis; corona very short and shallowly lobate.

Gonolobus prasinanthus Donn.-Sm. Bot. Gaz. 46: 114. 1908.

Vine in thickets or over shrubs, up to about 800 m. altitude (type: Cubilquitz, Alta Verapaz, *Tuerckheim 8711*); Petén; Alta Verapaz; Suchitepéquez; San Marcos. Southern Mexico. British Honduras.

Vines, herbaceous or suffrutescent, the branches glabrous or pubescent. Leaves nearly glabrous above, subglabrous or pubescent below, the blades lanceolate-ovate, cordate, acuminate, 5–13 cm. long and 3–6 cm. broad, the petioles pubescent, long and slender, 4–6 cm. long; inflorescences borne on peduncles 15–25 mm. long; pedicels 3–6, about 12–20 mm. long; flowers 15–20 mm. across; calyx lobes lanceolate or linear-lanceolate, acute, obscurely puberulent outside, 5–6 mm. long and about 1.5 mm. broad; corolla deeply 5-lobed, the tube very short, the lobes lanceolate or narrower, acuminate, glabrous, 8–12 mm. long and about 4 mm. broad at the base; corona fleshy, lobate, less than 1 mm. broad; folicle smooth when immature.

The specimens which we refer to this species have usually been referred to the Mexican *G. fraternus* Schlecht. and *G. prasinanthus* placed there as a synonym. No authentic material or type photographs of *G. fraternus* are available and the description is not adequate for determination of the species.

Gonolobus roeanus L. Wms. Fieldiana, Bot. 32: 47. 1968.

Vine in scrub forest, alt. 1,500 m. Endemic (type *Roe, Roe & Mori 813*, Alotenango, Sacatepéquez).

Branched vines with sparsely hirsute stems. Leaves long petiolate, the blades cordate or oblong-cordate, acute or somewhat acuminate, sparsely and obscurely short pubescent on both surfaces, nerves conspicuous, about 5 pairs with secondary reticulate nerves, mature leaves 4–6 cm. long and 2–3 cm. broad, petioles slender, puberulent, 2–4 cm. long; inflorescences subumbellate, axillary, pedunculate, few–several-flowered, peduncles 1–2 cm. long, pedicels 0.5–1.5 cm. long; flowers pale brown, small; calyx glabrous or nearly so, divided to the base, lobes linear or linear-lanceolate, acute, about 5-nerved, 2.5–3 mm. long and 0.5–0.7 mm. broad; corolla puberulent outside, glabrous within except corona, deeply lobed, subrotate or lobes reflexed, 10–12 mm. broad, lobes oblong or oblong-ovate, obtuse, reticulate veined, about 4 mm. long and 2 mm. broad; faucal corona fleshy, erect, margin ciliate, about 0.5 mm. high; inner corona surrounding gynostegium, carnose, lobate or somewhat fimbriate, glabrous, shorter than the gynostegium; gynostegium about 1 mm. high; follicles unknown.

Gonolobus salvinii Hemsl. Biol. Centr. Am. Bot. 2: 334. 1882. *Cuchamper.*

Moist or dry thickets or forest, sometimes in oak forest, 900–2,400 m.; Jalapa; Santa Rosa; Escuintla; Quiché; Quezaltenango (type from Volcán de Zunil, *Salvin*). British Honduras; El Salvador; Honduras.

A small or large vine, the stems pale, puberulent, short-pilose, or almost glabrous; leaves firm-membranaceous, on long slender petioles, oblong-ovate or oblong-deltoid, mostly 5–12 cm. long, acuminate or long-acuminate, rather shallowly and openly cordate at the base, glabrous or nearly so, pale beneath; peduncles mostly 1 cm. long or shorter, few-flowered, the flowers subumbellate, the pedicels 2 cm. long or shorter, pubescent; calyx lobes linear or lanceolate, puberulent outside, acute, 5–6 mm. long; corolla subrotate, about 1.5 cm. broad, green, deeply 5-lobate, sparsely puberulent outside and within, the lobes oblong or ovate, obtuse or subacute, reflexed in anthesis; outer corona 5-lobate, the lobes bifid; scales of the inner corona obovate-oblong, recurved at the apex; ovaries glabrous.

Sometimes called "Siguamper" in El Salvador. The tender fruits are sold there in the markets, being eaten raw when almost mature, and cooked and eaten at almost all stages of growth.

Gonolobus stenanthus (Standl.) Woodson, Ann. Mo. Bot. Gard. 28: 243. 1941. *Vincetoxicum stenanthum* Standl. Field Mus. Bot. 4: 255. 1929.

Moist or wet thickets, at or little above sea level; British Honduras (type from Tower Hill, *J. S. Karling 27*). Mexico (Quintana Roo, Campeche). Atlantic coast of Honduras.

A slender, herbaceous or woody vine, the stems sparsely puberulent, especially at the nodes, or glabrate; leaves membranaceous, on slender petioles 1–8 cm. long, oblong-ovate or elliptic-ovate, 4–14 cm. long, 2–8.5 cm. broad, acuminate or abruptly acuminate, shallowly or deeply and openly cordate, glabrous or sometimes with a few scattered short hairs on the upper surface, paler beneath; inflorescences umbelliform, 1–5-flowered, on peduncles 1–2.5 cm. long, the pedicels unequal, very slender, 1–5 cm. long, sparsely and minutely puberulent or glabrous; calyx lobes narrowly lanceolate, 1.5 cm. long or shorter, attenuate to the apex, glabrous; corolla rotate, 5-lobate almost to the base, glabrous within except at the base of the lobes, green, the lobes almost linear, 15–20 mm. long, 3 mm. broad at the base, attenuate, spreading; corona short, 4 mm. broad, conspicuously 5-lobate, the lobes broad, densely hirtellous.

Called "Cuchamper" in Honduras. The young pods there are boiled or otherwise cooked with sugar, to make sweetmeats or *dulces*.

Gonolobus stenosepalus (Donn.-Sm.) Woodson, Ann. Mo. Bot. Gard. 28: 243. 1941. *Fimbristemma stenosepala* Donn.-Sm. Bot. Gaz. 18: 208. 1893.

Occasionally common in oak forests or ciliar forests (the type from Santa Rosa, *Heyde & Lux 4004*); Huehuetenango; Quiché; Chimaltenango. Southern Mexico.

Large herbaceous or suffrutescent vines, hirsute with erect hairs. Leaves oblong-lanceolate to ovate, acuminate, truncate subcordate to cordate at the base, the petioles pubescent with spreading hairs, half or less the length of the blades, strigillose pubescent on both surfaces to glabrescent above, 4–15 cm. long and 2.5–7 cm. broad; inflorescences of umbelliform cymes shorter than the leaves, peduncles mostly 2–4 cm. long, about as long as the longest pedicels, mostly 5–10-flowered; calyx lobes lanceolate or lanceolate-ovate, puberulent but the margins prominently ciliolate, mostly 6–8 mm. long and 2–4 mm. broad; corolla green, as much as 3 cm. broad at anthesis, divided nearly to the base, glabrous outside and glabrous inside except near the faucal corona, the lobes mostly 8–15 mm. long and 2–4 mm. broad, oblong-lanceolate, acute, one margin usually obscurely sphacellate; faucal corona mostly 3–4 mm. high, the margin obscurely lobulate, the surface sparsely or usually densely pilose; the gynostegium longer than the corona; the follicels about 15 cm. long, lanceolate-ovoid and arcuate, with prominent thin wings.

This species is easily distinguished from all other species of the genus in Mexico and Guatemala by the usually abundantly pilose outer surface of the faucal corona. Assumed to be quite rare, it is actually quite widespread in the area of south Mexico and Guatemala.

Gonolobus steyermarkii Woodson, Ann. Mo. Bot. Gard. 28: 283. 1941.

Moist or wet thickets or forest, 1,200–1,400 m.; so far as known, endemic; Suchitepéquez (Volcán de Zunil); Quezaltenango (Volcán de Santa María); San Marcos (type from Volcán de Tajumulco, along Río Negro near Finca La Patria, *Steyermark 37661*).

A large vine, the stems fulvous-hispidulous with spreading hairs; leaves on slender petioles 2–6 cm. long, membranaceous, oblong-ovate or elliptic-ovate, 7–25 cm. long, 2.5–12 cm. broad, narrowly long-acuminate, deeply cordate at the base and subauriculate, thinly fulvous-hispidulous on both surfaces, slightly paler beneath; inflorescences racemiform or sometimes corymbiform, few-flowered, the peduncles 2–4 cm. long, the pedicels 2–3 cm. long, sparsely pilosulous; calyx lobes oblong-lanceolate or ovate-lanceolate, acuminate, 15 mm. long, 5–7 mm. broad, foliaceous, glabrous or papillose; corolla rotate, pale green, glabrous, the lobes broadly oblong-elliptic, ascending, subacute, about 12 mm. long and 5 mm. broad, with revolute margins; throat of the corolla annulate, the ostiole densely pilose; corona annular, the margin minutely crenulate, adnate to the corolla, 5-parted; stigma pentagonal, 4 mm. broad.

This species is closely related to *G. calycosus* (Donn.-Sm.) Woodson, *G. stenosepalus* (Donn.-Sm.) Woodson and to *G. oblongifolius* (Donn.-Sm.) Woodson. They may all eventually prove to be variants of a single species.

FIG. 123. *Gonolobus uniflorus*. A, a leaf, natural size; B, flower from above, × 1½; C, calyx, × 3.

Gonolobus uniflorus HBK. Nov. Gen. & Sp. Pl. 3: 207, *t. 228.* 1819. *Vincetoxicum uniflorum* Standl. Contr. U. S. Nat. Herb. 23: 1192. 1924.

Moist thickets and open woods, 1,300–2,000 m.; Alta Verapaz; Huehuetenango; Quiché; Santa Rosa. Mexico; British Honduras; Honduras; Nicaragua.

A small or large vine, the stems slender, densely fulvous-pilose with short, spreading or reflexed hairs; leaves membranaceous, on long slender petioles, oblong-ovate, 5–10 cm. long, acuminate or long-acuminate, deeply cordate at the base with usually somewhat incurved basal lobes, rough-hispidulous on the upper surface, softly short-pilose beneath, usually sparsely so; peduncles mostly shorter than the petioles, 1–few-flowered, the long slender petioles often longer than the peduncle, densely hispidulous; calyx lobes pale, lanceolate to ovate-lanceolate, 1–1.5 cm. long, long-attenuate, pilosulous; corolla green, rotate, 3–5 cm. broad, sparsely hirtellous outside or glabrous, deeply lobate, the lobes lance-oblong, papillose-puberulent within along one margin, acuminate, annulate, the annulus densely hirtellous; follicle ovoid, about 10 cm. long and 4.5 cm. broad, acuminate, smooth, glabrous, with narrow thick longitudinal wings, the valves hard and lignescent; seeds blackish, about 7 mm. long, flat.

There are a number of names which have been applied to the material which we believe represents one rather variable species. The names which have been most commonly used are *G. macranthus* Kunze which may be a synonym and *G. leianthus* Donn.-Sm. used in error. The reticulate venation in the corolla makes this one of the more attractive of the Asclepiads in Guatemala.

Gonolobus versicolor Woodson in Standl. & Steyerm. Field Mus. Bot. 23: 80. 1944.

Known only from the type, Huehuetenango, near Maxbal, about 17 miles north of Barillas, 1,500 m., *Steyermark 48768.*

A large vine, climbing over trees, the stems pilose with spreading hairs; leaves membranaceous, on petioles 1.5–3.5 cm. long, oblong-ovate, 4.5–8 cm. long, 2–3.5 cm. broad, acuminate, truncate or subcordate at the base, sparsely pilose above along the costa, otherwise glabrous, beneath setose-pilose on the veins or glabrate; inflorescences extra-axillary, few-flowered, the peduncle glabrous, 3–5 cm. long, the pedicels 2–2.5 cm. long, glabrous; calyx lobes linear-lanceolate, 2 cm. long, long-acuminate, spreading or reflexed, glabrous, yellowish brown outside near the base, blackish brown above; corolla rotate, the lobes lance-linear, long-acuminate, 2.5–3 cm. long, ascending, glabrous outside, brownish yellow or brownish green, within yellow-brown, pale green, and reddish brown, papillose, the ostiole with a shallowly 5-lobate annulus; corona patelliform, 5 mm. broad, shallowly 5-lobate, the margin entire or obscurely crenulate, pale green; stigma pentagonal, almost flat or somewhat depressed.

Gonolobus xanthotrichus Brandegee, Zoe 5: 251. 1908. *Trichostelma oblongifolius* Donn.-Sm. Bot. Gaz. 48: 296. 1909. *Vincetoxcum xanthotrichum* Standl. Contr. U. S. Nat. Herb. 23: 1193. 1924. *Gonolobus oblongifolius* Woodson, Ann. Mo. Bot. Gard. 28: 243. 1941.

Moist or wet forest areas or thickets, 1,000–1,500 m.; Alta Verapaz (type *Trichostelma oblongifolius* Donn.-Sm., *Tuerckheim II 1747*). Mexico.

Plants scandent, usually herbaceous, the stems, petioles, leaf blades, and inflorescence densely hispid-hirsute with long spreading stiff fulvous hairs; leaves membranaceous or thick-membranaceous, on rather short petioles, oblong or obovate-oblong, mostly 8–11 cm. long, shortly cuspidate-acuminate, rounded or shallowly cordate at the narrow base; inflorescences umbelliform, few-flowered, sessile or subsessile, the pedicels mostly 2–3 cm. long, hispid; calyx densely hirsute, the lobes ovate-lanceolate, scarcely half as long as the corolla lobes; corolla rotate, densely hirsute outside, about 1 cm. long, the lobes triangular-oblong, hirsute within along one margin near the apex; outer corona annular, densely hirsute-barbate, the inner corona consisting of fleshy quadrate scales; gynostegium 2 mm. high; stigma pentagonal, umbonate.

EXCLUDED:

GONOLOBUS EDULIS Hemsl. in Godman & Salvin, Biol. Cent. Am. Bot. 2: 331. 1882. *Vincetoxicum edule* Standl. Contr. U. S. Nat. Herb. 23: 1680. 1926.

This species was based by Hemsley on two specimens without indication of which was the type, a not unusual procedure at that time. One specimen cited is *Endres 213* from Costa Rica, the other *Friedrichsthal* from Guatemala. Miss S. M. King at Kew has made analytical drawings from the "syntypes" which indicates that they are the same species and similar to a fairly common Costa Rican species. Friedrichsthal's collections were made in Costa Rica, Nicaragua and Guatemala but only the ones with Guatemalan labels have ever been cited, to the best of my knowledge. It is almost certain that Nicaraguan and Costa Rican specimens were distributed under a "Guatemalan" label and *Gonolobus edulis* is probably one of these.

HOYA CARNOSA (L.) R. Br., the wax-plant, native of southeastern Asia, is rather frequently grown for ornament in the higher regions of Guatemala, especially about the capital. It is a small or large, almost glabrous vine with very fleshy, oval-oblong, short-acuminate leaves, and pedunculate umbels of waxy white flowers. It is grown occasionally as a pot plant in the United States, but is not very common. In Guatemala it is called "flor de cera."

MARSDENIA R. Brown

Reference: Walter Rothe, Ueber die Gattung *Marsdenia* R. Br. und die Stammpflanze der Condurangorinde, Bot. Jahrb. 52: 354–434. 1915.

Plants herbaceous or more or less woody, usually scandent, rarely erect, pubescent or glabrous; leaves opposite, usually broad; cymes umbelliform or sometimes branched, terminal or solitary in the leaf axils, the flowers small or medium-sized; calyx 5-parted, 5–many-glandular within at the base, 5-squamulate, or rarely eglandular, the segments obtuse; corolla campanulate to urceolate or subrotate, shallowly or deeply 5-lobate, the throat usually closed by hairs or by an annulus, rarely naked, the lobes obtuse, contorted, rarely subvalvate; hoods of the corona 5, adnate to the stamen tube and to the dorsal surface of the anthers, erect, free at the apex, plane, membranaceous or thickened, sometimes biauriculate at the base; stamens inserted near the base of the corolla, the filaments connate into a short tube, the anthers terminated by a small inflexed membrane; pollinia oblong or ovoid, erect; stigma depressed, flat, or convex at the apex, sometimes rostrate; follicles often very thick, acuminate, smooth or longitudinally winged, the pericarp often hard when dried; seeds comose.

There are perhaps more than 50 species of *Marsdenia* in the tropics and warmer regions of both hemispheres. We believe that there are about 27 or 28 species in Mexico, Central America and Panama.

Plants erect; leaves linear-lanceolate, long-attenuate at the base.... *M. neriifolia.*
Plants scandent; leaves usually much broader than linear-lanceolate.
Leaves abundantly pubescent beneath.
Leaf blades acute or acuminate at the base..... *M. trivirgulata.*
Leaf blades cordate or rounded at the base.
Leaves glabrous on the upper surfade or nearly so..... *M. propinqua.*
Leaves densely pubescent on the upper surface.
Calyx lobes obtuse; pedicels with closely appressed pubescence of short hairs..... *M. gualanensis.*
Calyx lobes attenuate-acuminate; pubescence of the pedicels of rather long, stiff, spreading hairs..... *M. bourgeana.*
Leaves glabrous throughout or nearly so.
Leaves mostly 5–10 cm. broad or larger, broadly rounded at the base.
Tube of the corolla about half as long as the lobes..... *M. schlechteriana.*
Tube of the corolla about as long as the lobes.
Peduncles of the inflorescences much shorter than the petioles.
Calyx lobes pubescent dorsally; inflorescence pubescent. *M. marcophylla.*
Calyx lobes ciliate only, glabrous dorsally; inflorescence glabrous. *M. maculata.*
Peduncles of the inflorescence almost equaling the petioles. *M. stephanotidifolia.*
Leaves mostly 2–4 cm. broad, if broader the blades acute or subacute at the base.
Inflorescences sessile; leaf blades attenuate at the base.

Calyx lobes glabrous dorsally or essentially so, ciliate.

Lateral nerves 6–8 pairs visible on lower surface of leaves; lowland species from British Honduras and Yucatan.....*M. mayana.*

Lateral veins not visible or very obscure on lower surface of leaves; highland species of Guatemala.....*M. cuneata.*

Calyx lobes densely strigose dorsally.....*M. blepharodes.*

Inflorescences conspicuously pedunculate, often long-pedunculate.

Pedicels filiform, mostly 15–25 mm. long; corolla lobate almost to the base.....*M. laxiflora.*

Pedicels mostly less than 7 mm. long; corolla with a conspicuous tube.

Leaf blades acute or subacute at the base; calyx lobes conspicuously ciliate.....*M. pseudoedulis.*

Leaf blades rounded at the base; calyx lobes eciliate or nearly so. *M. steyermarkii.*

Marsdenia blepharodes Standl. & Steyerm. Field Mus. Bot. 23: 226. 1947.

Known only from the type, Quezaltenango, climbing on a tree fern at border of forest, San Juan Patzulín, about 1,500 m.; *Steyermark 33615.*

A suffrutescent vine, the slender stems terete, when young sparsely puberulent, soon glabrate; leaves on slender petioles 6–15 mm. long, oblong-lanceolate, 7.5–10.5 cm. long, 2–2.5 cm. broad, acuminate or long-acuminate, long-attenuate to the base, glabrous, slightly paler beneath, the lateral nerves about 3 on each side, prominent beneath; inflorescences axillary, sessile, many-flowered, dense, about 1.5 cm. in diameter, the pedicels rather stout, 4–5 mm. long, sparsely puberulent; calyx 2.5–3 mm. long, densely whitish-strigose outside, 5-lobate to the middle, the lobes oval, rounded at the apex, densely ciliate; corolla dull purple outside, grayish within, 4.5 mm. long, glabrous outside, the 5 lobes broadly oblong, very obtuse, densely papillose-puberulent within, somewhat longer than the tube, spreading; scales of the corona broadly rhombic-ovate, scarcely more than 1 mm. long; stigma flat or nearly so at the apex.

Marsdenia bourgeana (Baill.) Rothe in Engler, Bot. Jahrb. 52: 408. 1915; L. Wms. Fieldiana, Bot. 32: 50. 1968. *Pseudomarsdenia bourgeana* Baill. Hist. Plantes 10: 268. 1890. *M. gymnemoides* Rothe, l.c. 409 (type from Guaxacaná, *Seler & Seler 2904*). *M. gilgiana* Rothe, l.c. 410 (type from Mexico, *Purpus 2095,* or from Guatemala, *Heyde & Lux 4542*).

Woody vines in thickets or forests or on rocky slopes, 1,200–1,900 m.; Santa Rosa; Escuintla; Guatemala; Sacatepéquez; Huehuetenango. Southern Mexico. Possibly Honduras.

A small or large, more or less woody vine, the stems and petioles very densely fulvous-pilose with short spreading hairs; leaves on long or short, slender petioles, membranaceous, broadly ovate to rounded-ovate, 5–15 cm. long and 3–8 cm. broad, very obtuse to acuminate, rounded to cordate at the base, very densely velutinous-pilose on both surfaces or sometimes tomentose beneath; cymes pedunculate, usu-

ally lax and many-flowered, mostly longer than the petioles, repeatedly dichotomous, densely hirtellous; calyx lobes linear to lanceolate, acute, hirtellous; corolla urceolate, sparsely hirtellous outside, 4.5–6 mm. long, barbate within, the lobes semiovate, rounded at the apex; scales of the corona shorter than the stamens; style with a short conic beak; follicles densely tomentose, about 9 cm. long and 3 cm. broad, obtuse.

This has been reported from Guatemala as *M. mexicana* Dcne.

Marsdenia cuneata L. Wms. Fieldiana, Bot. 32: 50. 1968.

Known only from the type, *Steyermark 51206*, Paso del Boquerón, Huehuetenango. Endemic.

Suffruticose vines, the stems glabrous, with few lenticular lenticels. Leaves of a pair subequal, lighter in color below, oblanceolate, acute or acuminate, cuneate to the base, glabrous, the blades 8–14 cm. long and 2–3 cm. broad, the lateral veins inconspicuous, petioles to 1.5 cm. long, each provided with 2 narrowly triangular stipules at the base, these about 0.7 mm. long, interpetiolar lines evident; inflorescences axillary, fascicular, several–many-flowered, peduncles very short or none, pedicels puberulent, 2–4 mm. long; calyx divided to the base, the lobes ovate or oblong-ovate, obtuse, ciliate-fimbriate, 2–3 mm. long, provided with a small horn-shaped callus in each sinus; corolla purple, glabrous outside, campanulate, divided to about the middle, 4–5 mm. long, the lobes suborbicular, 2–2.5 mm. long and as broad, obscurely pubescent on inner surface; gynostegium stipitate, about 1.5 mm., faucal corona obscurely lobate, fleshy, anthers terminated with an inflexed ovate membrane about 0.5 mm. long; follicles unknown.

Most closely related to *M. blepharodes* Standl. & Steyerm. but easily distinguished superficially by the nearly nerveless leaves which are cuneate to the base and the glabrous instead of strigillose calyx lobes.

Marsdenia gualanensis Donn.-Sm. Bot. Gaz. 49: 456. 1910.

In thickets or dry rocky slopes, 200–600 m.; Zacapa (type from Gualán, *Deam 6333*); Jalapa. Apparently endemic.

A small or large, coarse, woody vine, the branches and petioles densely pubescent; leaves on short or elongate, slender petioles, membranaceous, oblong-ovate to broadly ovate or rounded-deltoid, 5–10 cm. long, short-acuminate or sometimes narrowed to an obtuse apex, rounded or truncate at the base or sometimes cordate, very densely and softly pubescent on both surfaces, somewhat paler beneath; inflorescences much branched, many-flowered, about equaling the petioles, the branches and pedicels densely and finely pubescent with mostly appressed hairs, the flowers slender-pedicellate; calyx appressed-puberulent, deeply lobate, the segments oblong, obtuse; corolla about 2.5 mm. long, glabrous outside, barbate within, much longer than the short tube; scales of the corona minute; ovaries glabrous; follicles glabrous, about 8 cm. long and 2.5 cm. thick, obtuse, smooth, the valves very thick and somewhat ligneous.

FIG. 124. *Marsdenia macrophylla*. A, habit, × ½; B, flower, × 3; C, calyx and pistil showing basal gland, × 4; D, pollinia, × 40; E, gland from base of leaf, × 5.

This has usually been assumed to be a synonym of *Marsdenia coulteri* Hemsl., a Mexican species that seems to be quite different.

Marsdenia laxiflora Donn.-Sm. Bot. Gaz. 40: 7. 1905.

Moist or wet thickets or forest, often on limestone, 350 m. or less; Alta Verapaz (type from Cubilgüitz, *Tuerckheim 8558b*); Petén; Izabal. British Honduras; reported from Costa Rica.

A very slender, glabrous, herbaceous or suffrutescent vine; leaves on short slender petioles, membranaceous or chartaceous, often lustrous, lanceolate or oblong-lanceolate, 7–14 cm. long, 1.5–5 cm. broad, gradually or very abruptly acuminate, acute or obtuse at the base, bearing several small glands on the upper surface at the base of the blade; inflorescences axillary, few–many-flowered, extremely lax and open, longer or shorter than the leaves, the peduncles 4–6 cm. long or longer, the filiform pedicels 1.5–2.5 cm. long; calyx lobes ovate, obtuse, 2 mm. long, ciliate; corolla purple, rotate, the tube 2 mm. long, the lobes oblong or triangular-oblong, 5–6 mm. long, glabrous outside and within, ciliate; follicles very slender, 20–25 cm. long, 1 cm. thick, smooth, glabrous; seeds brown, thin, 1 cm. long, the coma of very numerous soft silky white hairs.

Marsdenia macrophylla (Humb. & Bonpl.) Fourn. in Mart. Fl. Bras. 6[4]: 321. 1885. *Asclepias macrophylla* Humb. & Bonpl. ex Roem. & Schult. Syst. Veg. 6: 86. 1820. *Cuchampera; cuchamperillo.*

Moist or dry thickets or forest, often in rocky places, sometimes in hedges, 2,250 m. or lower; Baja Verapaz; Escuintla; Quezaltenango. Mexico; Central America; South America.

Usually a large and coarse, more or less woody vine, glabrous or nearly so outside the inflorescence; leaves on rather long, stout petioles, chartaceous or when fresh somewhat succulent, ovate to elliptic, oval or rounded, 7–19 cm. long, mostly 7–13 cm. broad, usually rounded or very obtuse at the apex and shortly cuspidate-acuminate, broadly rounded to shallowly cordate at the base, paler beneath, glandular on the upper side at the base of the blade; cymes many-flowered, short-pedunculate or sometimes long-pedunculate, shorter or longer than the petioles, sparsely or densely puberulent, very dense or rather open, the flowers on stout pedicels; calyx segments broad, obtuse or rounded at the apex, ciliate, usually pubescent outside; corolla yellowish or greenish, 5–6 mm. long, glabrous outside, the lobes broad, somewhat shorter than the urceolate tube or about equaling it; follicles terete, about 10–23 cm. long and about 5 cm. in diameter, smooth.

The Maya name of Yucatan is recorded as "xemtzul"; "estropajo cimarrón" (Oaxaca).

Marsdenia maculata Hook. f. Bot. Mag. 73: *t. 4299.* 1847; L. Wms. Fieldiana, Bot. 32: 51. 1968. *Bejuco de leche.*

A vine over shrubs and trees at 600 m. or less; Petén. Mexico; Honduras; Panama; Lesser Antilles. Perhaps South America.

A large coarse vine to 20 m. or perhaps more, the stems to 1 cm. in diameter or possibly more. Leaves elliptic-oblong to ovate or suborbicular, the base truncate to cordate, glabrous, with 5–6 pairs of secondary nerves, 9–25 cm. long and 5–21 cm. broad, petiole 1.5–4 cm. long, with a group of 2–5 small mammillate calluses at its juncture with the blade; inflorescence subumbellate, many-flowered, peduncle shorter than the petioles, to about 1.5 cm. long, pedicels 1 cm. or less long; calyx divided to the base, the lobes ovate, obtuse, the margins sphacelate, ciliate, 3–4 mm. long and 2–2.5 mm. broad; corolla divided to about the middle, the tube 3–4 mm. long, the lobes 3–4 mm. long and oblong-ovate, obtuse, ciliate, otherwise glabrous except obscurely pubescent at the base within; corona scales linear-oblong, obtuse, shorter than the styles; follicles ellipsoidal, up to 22 cm. long and 5 cm. in diameter.

This species is one of the complex often called *M. macrophylla*. The group is in need of restudy.

Marsdenia mayana Lundell, Contr. Univ. Mich. Herb. 4: 23. 1940.

British Honduras, the type from Valentín, El Cayo District, on limestone, *C. L. Lundell 6192*. Mexico.

A large woody vine as much as 10 m. long, glabrous except in the inflorescence; leaves short-petiolate, the petioles 12–20 mm. long, the blades membranaceous or chartaceous, narrowly oblong or oblong-lanceolate, 10–15 cm. long, 2.5–4.5 cm. broad, acuminate or long-acuminate, long-attenuate to the base, green above, often lustrous, paler beneath, the lateral nerves 6–8 on each side; inflorescences sessile, dense, many-flowered, shorter than the petioles, the pedicels 3 mm. long or less, sparsely puberulent or glabrate; calyx lobes broadly ovate, 2.5–3 mm. long, rounded at the apex, ciliate, glabrous dorsally or nearly so; corolla greenish, 5 mm. long, glabrous outside, minutely tomentulose within, the tube campanulate, slightly longer than the lobes, these broadly ovate, rounded at the apex; scales of the corona oblong, 3 mm. long; ovaries glabrous.

Marsdenia neriifolia (Dcne.) Woodson, Ann. Mo. Bot. Gard. 28: 244. 1941. *Blepharodon neriifolium* Dcne. in DC. Prodr. 8: 604. 1844. *Nephradenia neriifolia* Benth. & Hook. ex Hemsl. Biol. Cent. Am. Bot. 2: 336. 1882. *N. fruticosa* Donn.-Sm. Bot. Gaz. 16: 196. 1891 (type from Río Rubelcruz, Alta Verapaz, *Tuerckheim 1251*).

Along stream banks or on rocks in streams, 200–750 m.; Alta Verapaz. Oaxaca and perhaps elsewhere in southern Mexico.

An erect glabrous shrub 1–2 meters high, sparsely branched; leaves on short slender petioles, linear-lanceolate, mostly 8–20 cm. long and 1–2.5 cm. broad, narrowly long-acuminate, long-attenuate to the base, deep green above, somewhat paler beneath; inflorescences umbellate, axillary, solitary, slender-pedunculate, mostly 5 cm. long or shorter, few-flowered, the pedicels long and slender; calyx lobes ovate or suborbicular, ciliate, rounded at the apex; corolla cream-colored, about 1.5 cm. broad, glabrous outside, the lobes broad, obtuse; stigma convex, not at all umbonate or rostrate.

Marsdenia propinqua Hemsl. Biol. Cent. Am. Bot. 2: 337. 1882.

Moist or dry thickets, 300–1,400 m.; Jutiapa; Escuintla; Guatemala; Huehuetenango. Southern Mexico.

A large, coarse, more or less woody vine, the stems somewhat puberulent or glabrous; leaves thick, on rather short, slender petioles, oval to rounded-oval or ovate-oval, mostly 8–17 cm. long and 7–10 cm. broad, usually rounded and abruptly short-pointed at the apex, broadly rounded or subcordate at the base, glabrous above or nearly so, velutinous-tomentose or densely short-pilose beneath; cymes very dense and many-flowered, short-pedunculate, about 3 cm. in diameter, the branches and stout pedicels tomentulose; calyx thinly tomentose, the lobes broad, obtuse; corolla 7–8 mm. long, sometimes dark red, pubescent outside and sparsely pilose within, the lobes broad, rounded at the apex; follicles 11–15 cm. long, obtuse, smooth, the valves thick and hard; seeds nearly 1 cm. long, flat, comate with long silky white hairs.

Marsdenia pseudoedulis Woodson, Ann. Mo. Bot. Gard. 28: 284. 1941.

Known definitely only from the type, San Marcos, lower southern slopes of Volcán de Santa María, along the great barranco between Finca Pirineos and San Juan Patzulín, 1,300–1,500 m., *Steyermark 33633*.

A slender woody vine, the stems puberulent when young; leaves membranaceous, on slender petioles 1–2.5 cm. long, elliptic, 4.5–11 cm. long, 1.5–5 cm. broad, acuminate, acute or subacute at the base, glabrous, slightly paler beneath; inflorescences umbelliform, few-flowered, the peduncles 5 mm. long, sparsely pilosulous, the pedicels of about the same length; calyx lobes ovate, obtuse, 2 mm. long, pilosulous; corolla campanulate, white, sparsely pilosulous outside, more densely pilosulous within, the lobes slightly longer than the tube, ovate-elliptic, obtuse, spreading; stigma flat or nearly so; anthers 1 mm. long; scales of the corona reniform, obtuse, 0.5 mm. long.

Marsdenia schlechteriana Rothe in Engler, Bot. Jahrb. 52: 418, *fig. 5*. 1915.

Known only from the type, Sololá, La Corona, 1,500 m., *J. D. Smith 2773*.

A woody vine, the branches glabrous; leaves on petioles about 3 cm. long, oval, 5–11 cm. long, 4–7 cm. broad, acuminate, truncate at the base, membranaceous, glabrous; inflorescences umbelliform, dense, many-flowered, pedunculate, the peduncle 3 cm. long, the pedicels about 1 cm. long, stout; calyx lobes spreading, pilosulous outside, ciliate, 2.5 mm. long; corolla tube 2 mm. long, the lobes 4 mm. long, rounded at the apex, ciliate; gynostegium 2.5 mm. high; scales of the corona acuminate; stigma bearing a short, thick-conic beak.

This is closely related to *M. macrophylla*, and it may be that some of the specimens we have referred to that species belong rather with

M. schlechteriana. The key characters used by Rothe, however, would refer all our material rather to *M. macrophylla,* from which *M. schlechteriana* may not be distinct.

Marsdenia stephanotidifolia Woodson in Standl. & Steyerm. Field Mus. Bot. 23: 79. 1944.

Moist or wet, mixed forest or thickets, 2,200 m. or less; Quezaltenango (type collected near Santa María de Jesús, along Río Samalá, *Standley 84593*).

A large, more or less woody vine, glabrous except in the inflorescence, the stems stout, conspicuously lenticellate; leaves on stout petioles 2.5–4.5 cm. long, subchartaceous, oblong-ovate to rounded-ovate, 10–25 cm. long, 6–17 cm. broad, obtuse or rounded at the apex and cuspidate-acuminate, broadly rounded or subcordate at the base; inflorescences extra-axillary, umbelliform or corymbiform, repeatedly dichotomous, few–many-flowered, the peduncles almost equaling the petioles, papillose-puberulent; the pedicels about 8 mm. long, papillose-puberulent; calyx lobes ovate, obtuse, 5 mm. long; corolla urceolate, 11 mm. long, glabrous outside, densely villosulous within except on the margins of the lobes, the lobes erect or somewhat spreading, equaling the tube; gynostegium included, the beak of the stigma exserted; anthers 5 mm. long; beak of the stigma 4 mm. long.

Marsdenia steyermarkii Woodson, Ann. Mo. Bot. Gard. 28: 285. 1941.

Moist or wet forest or thickets, 1,300–2,500 m.; San Marcos (type collected on Volcán de Tacaná, *Steyermark 36019*). Mexico (Chiapas).

A small or large, more or less woody vine, glabrous throughout or nearly so; leaves on slender petioles 1–2 cm. long, oblong or elliptic-oblong, mostly 6–10 cm. long and 2–3.5 cm. broad, abruptly short-acuminate, rounded at the base, rather thick, deep green and often lustrous above, somewhat paler beneath; inflorescence few-flowered, the peduncle bifid, 2.5 cm. long, the pedicels 4 mm. long, sparsely puberulent or glabrate; calyx lobes ovate, acute, 2 mm. long, minutely papillose-puberulent; corolla campanulate, white, glabrous outside, pilosulous within, the tube 3 mm. long, the lobes ovate, obtuse, 2.5 mm. long, spreading; gynostegium 3 mm. long; scales of the corona 2 mm. long; stigma broad, conic.

Marsdenia trivirgulata Bartlett, Proc. Am. Acad. Sci. 44: 632. 1909.

Dry rocky slopes, climbing over *Opuntia,* about 200 m.; Zacapa (*Steyermark 29320*). Southwestern Mexico; Honduras; Panama.

A very slender, somewhat woody vine, the stems puberulent in 2 lines or glabrate; leaves slender-petiolate, membranaceous, elliptic, narrowly elliptic, or ovate-elliptic, usually 2.5–7.5 cm. long, acuminate or long-acuminate, acute or attenuate at the base or rarely obtuse, rather densely puberulent on both surfaces; cymes almost sessile, few-flowered, sparsely puberulent, the flowers on rather stout, short

pedicels; calyx lobes ovate, very obtuse, white-ciliate, sparsely puberulent; corolla glabrous outside, white or pale pink striped with lilac, 6 mm. long, the lobes linear-oblong, several times as long as the short tube, spreading, obtuse, sparsely and minutely hirtellous within; stigma ending in a beak 1–1.5 mm. long.

MATELEA Aublet

Plants herbaceous or sometimes woody below, usually scandent, sometimes prostrate or erect, pubescent or almost glabrous; leaves petiolate, various in form, most often cordate; flowers small or medium-sized, sometimes rather large, the cymes usually umbelliform; calyx 5-lobate, 5-glandular within at the base; corolla usually rotate or nearly so, shallowly or deeply 5-lobate, the lobes narrow or broad, dextrorsely contorted; corona very variable in form, the outer corona entire or lobate, often annular or fimbriate, sometimes consisting of a large disk adnate to the corolla throat; stamens inserted near the base of the corolla, the filaments connate into a short tube, the anthers not evidently vesicular, without dorsal appendages; pollinia solitary in each cell, clavate or obovoid, horizontal or subpendulous; stigma depressed at the apex, more or less pentagonal; follicles slender or broad, smooth or costate, often tuberculate-muricate.

More than 100 species are listed for North America by Woodson, and many others are found in South America. A few additional species are found in southern Central America. The genus is wholly American.

We have followed Woodson (Ann. Mo. Bot. Gard. 28: 217–238. 1941) in the treatment of *Matelea* with some misgivings. Looking at the material from Mexico and Central America that has been placed here there would seem to be several genera involved. Some of these have been described, as Woodson points out, as distinct genera. Certainly, some species included here are less closely related (*M. balbisii* and *M. quirosii* are examples) than certain other Mateleas are to Gonolobi or even to Fischerias.

Leaves not cordate at the base.
- Plants erect, not scandent, herbaceous, hirsute ..... *M. balbisii.*
- Plants scandent.
  - Leaves glabrous beneath.
    - Leaves 13–18 cm. long; corolla glabrous outside ..... *M. glaberrima.*
    - Leaves 4.5–7.5 cm. long; corolla puberulent outside.
      - Peduncles 3–5 mm. long; calyx lobes broadly ovate; corolla 1 cm. broad. *M. tenuis.*
      - Peduncles 8–12 mm. long; calyx lobes linear-lanceolate; corolla about 2 cm. broad ..... *M. belizensis.*
  - Leaves pilose beneath, at least on the nerves.
    - Leaves long-hirsute beneath on the nerves, membranaceous; corolla about 2 cm. broad ..... *M. tuerckheimii.*
    - Leaves sparsely puberulent beneath on the nerves, thick; corolla scarcely 1 cm. broad ..... *M. campechiana.*

Leaves cordate at the base.
Leaf blades broadest at or above the middle, narrowed to a narrow, shallowly-cordate base; stems hirsute.
Calyx lobes lance-linear; inflorescence lax, few-flowered, the pedicels mostly 2–3 cm. long ..... *M. grandiflora.*
Calyx lobes ovate or broadly ovate; inflorescence dense and congested, many-flowered, the pedicels usually very short ..... *M. pleistantha.*
Leaf blades broadest at the base or at least below the middle, not at all narrowed toward the base.
Corolla densely pilose within, large, about 3.5 cm. broad ..... *M. sylvicola.*
Corolla glabrous within or rarely arachnoid-tomentose.
Lobes of the corolla linear or linear-deltoid, 1–2 mm. broad or sometimes to 5 mm. broad.
Inflorescence racemose; leaf blades deeply cordate at the base. *M. prosthecidiscus.*
Inflorescence umbellate; leaf blades shallowly cordate or rounded at the base.
Leaves glabrous beneath; pubescence of the calyx of minute appressed hairs ..... *M. belizensis.*
Leaves hirsute beneath on the nerves; pubescence of the calyx of stiff spreading hairs.
Corolla lobes pale green, 1 mm. broad ..... *M. medusae.*
Corolla lobes purple-brown, 2–2.5 mm. broad ..... *M. gonoloboides.*
Lobes of the corolla triangular-lanceolate to suborbicular, usually much more than 2 mm. broad.
Lobes of the corolla rounded at the apex, usually as broad as long, rarely only oval.
Flowers small, the corolla 3–7 mm. long.
Calyx lobes acute, longer than broad.
Plant glabrous; calyx lobes less than 3 mm. long ... *M. pusilliflora.*
Plant hirsute; calyx lobes more than 5 mm. long ... *M. molinarum.*
Calyx lobes suborbicular, apex rounded ..... *M. velutina.*
Flowers relatively large the corolla usually more than 1 cm. long (sometimes only 8 mm. in some flowers).
Calyx lobes rounded at the apex and subulate-cuspidate; plants densely hirsute throughout ..... *M. guatemalensis.*
Calyx lobes acute to very obtuse at the apex, not cuspidate.
Calyx lobes very obtuse.
Corolla merely puberulent outside ..... *Vincetoxicum hatchii.*
Corolla hispid or hirsute outside ..... *M. velutina.*
Calyx lobes acute or acuminate.
Leaves lance-oblong, shallowly cordate at the base; lobes of the corolla much longer than broad ..... *M. steyermarkii.*
Leaves rounded-ovate, deeply cordate at the base; lobes of the corolla about as broad as long ..... *M. quirosii.*
Lobes of the corolla acute or at least pointed, sometimes attenuate, usually much longer than broad, sometimes broadly triangular.
Corolla glabrous outside.
Leaves glabrous or nearly so, 12–15 cm. long ..... *M. tikalana.*
Leaves pubescent on both surfaces, 4–7 cm. long .... *M. megacarpha.*
Corolla sparsely or densely pubescent outside.
Corolla arachnoid-tomentose within the throat ..... *M. araneosa.*

Corolla not arachnoid-tomentose within.
Leaves oblong-ovate.
Corolla about 14 mm. long, the lobes linear-lanceolate. *M. patalensis.*
Corolla about 7 mm. long, the lobes broadly ovate. . *M. violacea.*
Leaves broadly ovate-cordate.
Corolla lobes broadly ovate; calyx long-hirsute; follicles glandular-puberulent . . . . . *M. pseudobarbata.*
Corolla lobes triangular; calyx hirtellous; follicles glabrous.
Calyx lobes 4–5 mm. long; corolla about 8 mm. long. *M. diffusa.*
Calyx lobes about 8 mm. long; corolla about 15 mm. long. *M. ceratopetala.*

Matelea araneosa (Donn.-Sm.) Woodson, Ann. Mo. Bot. Gard. 28: 222. 1941. *Gonolobus araneosus* Donn.-Sm. Bot. Gaz. 47: 257. 1909.

Known only from the type, Alta Verapaz, mountains between Tactic and Cobán, 1,650 m., *Tuerckheim II. 2332.*

Plants scandent, suffrutescent, the branches, petioles, inflorescence and calyx pilose with spreading hairs; leaves on peticles 1–2 cm. long, oblong-ovate or lance-ovate, 6–8 cm. long, 2.5–3.5 cm. broad, acuminate, shallowly cordate at the base, with a broad open acute sinus, softly pilose; inflorescence umbelliform, slightly longer than the petioles, the peduncle 3–5 mm. long, the 4–5 pedicels 3–7 mm. long; calyx lobes linear-lanceolate, 5 mm. long; corolla reticulate-veined, lobate to the middle, whitish-arachnoid within below the lobes, 8 mm. long, rotate, the lobes glabrous within, sparsely pilosulous outside, ciliate at the apex; corona cyathiform, equalling the gynostegium and free from it, 5-denticulate, 1 mm. high, 2 mm. broad.

Matelea balbisii (Dcne.) Woodson, Ann. Mo. Bot. Gard. 28: 231. 1941. *Asclepias villosa* Balb. Mem. Acad. Sci. Torino 7: 386. 1803, *not* Mill. 1768. *Lachnostoma balbisii* Dcne. in DC. Prodr. 8: 602. 1844. *Gonolobus pogonanthus* Hemsl. Biol. Cent. Am. Bot. 2: 333. 1882. *Pherotrichis balbisii* Gray, Proc. Am. Acad. 21: 400. 1886.

Grassy open slopes, 2,000 m.; Huehuetenango (southeast of Huehuetenango, *Steyermark 48172*). Mexico.

Plants herbaceous, erect, arising from a usually somewhat tuberous-thickened root, the stems usually simple, stout, abundantly leafy, densely hirsute with spreading yellowish hairs; leaves short-petiolate, rather thick, broadly ovate to lanceolate or even oblanceolate, 3.5–8 cm. long, 1–5.5 cm. broad, rounded or very obtuse at the apex, usually rounded or very obtuse at the base, rarely attenuate, sparsely or densely hirsute on both surfaces or sometimes glabrate; flowers pale green, umbellate, the umbels appearing in most of the leaf axils above the middle of the stem, sessile or nearly so, rather few-flowered, densely hirsute, the pedicels 6 mm. long or shorter; calyx lobes short, lanceolate, hispidulous; corolla campanulate-rotate, 5–7 mm. long, densely white-barbate within; crown composed of 5 quadrate ex-

cised-truncate scales, these longer than the hyaline-tipped anthers; stigma bearing a large, globose or conic appendage; follicles rather slender, terete, narrowly long-acuminate, not tuberculate, very densely hirsute with long spreading hairs.

In general appearance this plant resembles an *Asclepias*, and is very unlike other Central American species of *Matelea* and perhaps does not belong in this genus.

Matelea belizensis (Lundell & Standl.) Woodson, Ann. Mo. Bot. Gard. 28: 232. 1941. *Vincetoxicum belizense* Lundell & Standl. ex Standl. Field Mus. Bot. 17: 268. 1937. *Dama de la noche.*

Known only from the type, British Honduras, Corozal District, little above sea level, *Gentle 299.*

Stems herbaceous, scandent, appressed-pilose; leaves on petioles 5–17 mm. long, ovate or ovate-oblong, 4.5–7.5 cm. long, 2–4.5 cm. broad, acutely acuminate, shallowly cordate at the base or only rounded, rather thick, glabrous above except for a few appressed hairs along the nerves, paler beneath, with a few short hairs along the costa, otherwise glabrous; peduncles 8–12 mm. long, puberulent, the inflorescence subumbellate, 8–12-flowered, the pedicels slender, puberulent, 6–10 mm. long; calyx 5-parted, the segments linear-lanceolate, 3 mm. long, subobtuse, puberulent outside, alternating with 5 small basal appendages; corolla campanulate, 5-lobate almost to the base, about 10 mm. long, the lobes narrowly lanceolate, 9 mm. long, 2–3 mm. broad, subacute, glabrous within, sparsely puberulent outside; outer corona glabrous, fleshy, deeply 5-lobate, the lobes 3–4-dentate.

Matelea campechiana (Standl.) Woodson, Ann. Mo. Bot. Gard. 28: 234. 1941. *Vincetoxicum campechianum* Standl. Carnegie Inst. Wash. Publ. 461: 82. 1935.

Moist or wet thickets, about 100 m.; Petén; Alta Verapaz. Mexico (Campeche); British Honduras.

A somewhat woody vine, the stems slender, rather densely pilose with short spreading hairs or in age glabrate; leaves on petioles 5–15 mm. long, subcoriaceous, lance-oblong to oblong-ovate or broadly ovate, 3–7 cm. long, 1–4.5 cm. broad, acute or short-acuminate, rounded at the base, somewhat lustrous above, appressed-pilosulous along the costa, paler beneath, glabrous; inflorescences umbelliform, 3–6-flowered, the peduncle 3–5 mm. long, the pedicels stout, 3–6 mm. long, puberulent; calyx 1.5–2 mm. long, the lobes oval or broadly ovate, obtuse or rounded at the apex, minutely appressed-pilosulous; corolla spreading or reflexed, dull green with bronze-green reticulations, minutely hirtellous outside, 5 mm. long, the lobes broadly elliptic or almost rounded, rounded at the apex, glabrous within or puberulent only at the base; gynostegium pentagonal, 2 mm. broad, borne on a short thick stipe; corolla pale, narrow, subentire; follicles narrowly lanceolate, narrowly long-acuminate, about 7.5 cm. long and almost 2 cm. broad, glabrous, bearing few thick fleshy tubercles 2–4 mm. long.

Matelea ceratopetala (Donn.-Sm.) Woodson, Ann. Mo. Bot. Gard. 28: 236. 1941. *Dictyanthus ceratopetalus* Donn.-Sm. Bot. Gaz. 18: 208. 1893. *Cochita; cochitos; chununa; corazón de loro* (Escuintla); *sombreros, sombreritos* (flowers).

Moist or dry, brushy, often rocky plains and hillsides, 1,350 m. or lower; Jalapa; Jutiapa; Santa Rosa (type from Santa Rosa, *Heyde & Lux 3999*); Escuintla. Southern Mexico (Oaxaca, Puebla); Honduras.

A small or rather large, more or less woody vine, or the stems sometimes prostrate, the older stems ochraceous, the stems thinly hispid with bulbous-based hairs and minutely puberulent; leaves on long slender petioles, broadly ovate-cordate, membranaceous, 2–7 cm. long, acuminate or short-acuminate, usually deeply cordate at the base, scaberulous and hispidulous above, hispidulous beneath on the nerves and veins, the veins usually elevated and closely reticulate; inflorescence umbellate, 2–8-flowered, sessile or short-pedunculate, the flowers slender-pedicellate; calyx lobes lanceolate, 12 mm. long or shorter; corolla green and brown-purple within, about 2 cm. long, rotate-campanulate, puberulent outside, more or less puberulent within or almost glabrous, 5-lobate to about the middle, the lobes triangular, acute or with a narrow obtuse tip, the margins revolute; follicles glabrous, 6.5–10 cm. long, narrowly long-acuminate, bearing few or numerous, fleshy, long or short tubercles.

The young fruits of this and other species are cooked and eaten. Called "*cuchampel*" and "*chanchitos*" in Honduras.

Matelea decaisnei Woodson, Ann. Mo. Bot. Gard. 28: 232. 1941. *Polystemma viridiflora* Dcne. in DC. Prodr. 8: 602. 1844, not *M. viridiflora* Woodson, 1941. *Malacate.*

Moist or dry, often rocky, brushy slopes, 200–900 m.; Zacapa; Chiquimula. Southern Mexico; Honduras.

A small woody vine, the slender stems puberulent and sparsely hispid; leaves slender-petiolate, broadly or narrowly ovate-cordate, 2.5–6.5 cm. long, usually long-acuminate, rather deeply and narrowly cordate at the base, densely puberulent and sparsely hispidulous on both surfaces, membranaceous; umbels 1–4-flowered, often equaling the leaves, the peduncles 2 cm. long or shorter, the pedicels equaling or longer than the peduncles; sepals pale green, lanceolate, about 8 mm. long, acuminate, puberulent and hispidulous; corolla in bud lanceolate and long-acuminate, glabrous outside or very minutely puberulent, 1.5–2 cm. long, green within and glabrous or nearly so, the lobes triangular-lanceolate, attenuate to an obtuse tip; corona adnate to the gynostegium, composed of 5 ligulate scales and 20 small hair-like ones; stigma flat; follicles rather slender, smooth, about 9 cm. long and 1.5 cm. thick, glabrous.

So far as known, the range of this species in Guatemala is narrowly limited, and confined to the dry hills and plains of Zacapa and Chiquimula. Woodson has referred some of the specimens to *M. decais-*

nei and to *M. rupestris* (Brandegee) Woodson, but apparently all the material represents a single species.

Matelea diffusa Woodson, Ann. Mo. Bot. Gard. 28: 236. 1941. *Dictyanthus prostratus* Brandegee, Univ. Cal. Publ. Bot. 7: 329. 1920, not *M. prostrata* Woodson, 1928. *Chinuna.*

Dry open slopes, 800–1,600 m.; Jalapa; Huehuetenango. Southern Mexico; El Salvador.

A small vine, the stems herbaceous or suffrutescent, sometimes prostrate, densely puberulent and thinly hispid; leaves thick-membranaceous, very broadly ovate-cordate, mostly 2–2.5 cm. long and about as broad, acute or short-acuminate, deeply and narrowly cordate at the base, densely hispidulous on both surfaces, the veins prominent beneath and closely and conspicuously reticulate; peduncles very short, mostly 2-flowered, the peduncles and pedicels together scarcely equaling the petiole; calyx lobes ovate, acuminate, 3 mm. long; corolla broadly campanulate or rotate-campanulate, about 7 mm. long, puberulent outside, minutely puberulent within, dark brown-purple, the lobes triangular, narrowed to a narrow obtuse tip, revolute; outer corona deeply 5-lobate, the lobes narrow, wholly adnate to depressions in the lower half of the corolla tube; stigma pentagonal, umbonate; follicles about 5 cm. long and 1.5 cm. broad, long-acuminate, glabrous, somewhat lustrous, bearing few large stout fleshy spine-like tubercles.

Here probably belongs a collection reported from Huehuetenango by Loesener as *Dictyanthus parviflorus* Hemsl.

Matelea glaberrima Woodson, Ann. Mo. Bot. Gard. 28: 281. 1941.

Known only from the type, Petén, Uaxactún, *Bartlett 12300.*

A glabrous woody vine; leaves on petioles 1–3 cm. long, ovate-elliptic, 13–18 cm. long, 5–11 cm. broad, acuminate, rounded at the base, coriaceous; inflorescence umbelliform, few-flowered, subsessile, the pedicels about 1 cm. long; flower green and brown; calyx lobes ovate-lanceolate, 5 mm. long, acuminate, minutely papillose-puberulent; corolla rotate, glabrous outside, papillose-puberulent within, 17 mm. broad, the lobes ovate-elliptic, acute, 8 mm. long, spreading; crown cup-shaped, strongly pentagonal, the margin undulate, the sinuses bilamellate and bearing an inconspicuous ligule; gynostegium substipitate; stigma strongly pentagonal, depressed.

We have not seen material of this species. The large, coriaceous leaves should help in distinguishing this species.

Matelea gonoloboides (Rob. & Greenm.) Woodson, Ann. Mo. Bot. Gard. 28: 222. 1941. *Urostephanus gonoloboides* Rob. & Greenm. Am. Journ. Sci. III. 50: 159. 1895.

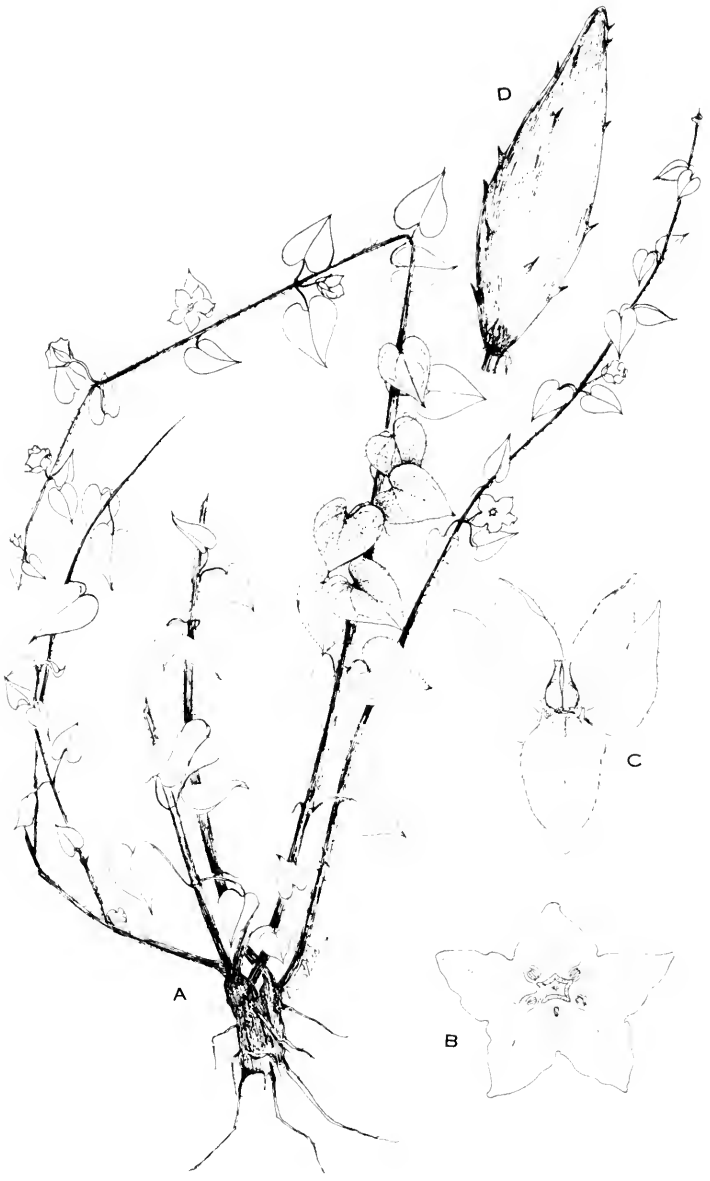

FIG. 125. *Matelea diffusa*. A, habit, × ½; B, corolla, × 2; C, calyx and pistil, × 4; D, follicle, × 1.

Moist thickets or forest, 1,800–2,300 m.; Quezaltenango; Sololá; also collected elsewhere (Barranco de los Condenados ?), at a locality of uncertain position. Mexico (Chiapas, Morelos).

A very slender, apparently herbaceous vine, the stems hirsute with deflexed fulvous hairs; leaves thin, ovate-cordate to oblong-ovate, 5–6.5 cm. long, acuminate or long-acuminate, rather shallowly and narrowly cordate at the base, thinly hirsute on both surfaces; inflorescence umbellate, 1–5-flowered, the peduncle 4 mm. long, the pedicels longer than the peduncle; calyx lobes ovate-lanceolate, acute, almost 4 mm. long, hirtellous; corolla brown-purple, about 1–2 cm. long, rotate, 5-lobate almost to the base, the lobes linear to narrowly deltoid-lanceolate, mostly 2–5 mm. broad, arachnoid-pubescent within near the base, thinly hirtellous outside; corona attached to the lower part of the stamen tube, almost equaling the gynostegium, shallowly lobate at the summit with 5 internal horn-like processes opposite the stamens and 5 outer lobes alternate with them and produced on their outer surface into 2 filiform flexuous tails; stigma depressed.

Matelea grandiflora (Standl.) Woodson, Ann. Mo. Bot. Gard. 28: 235. 1941. *Vincetoxicum grandiflorum* Standl. Carnegie Inst. Wash. Publ. 461: 83. 1935. *Gonolobus fulvidus* Ballard, Bot. Mag. 163: *t. 9611*. 1940.

Moist or wet forest or thickets, 270 m.; Petén; Alta Verapaz. British Honduras, the type from Machaca, *Schipp S575*.

A large coarse vine, probably somewhat woody, as much as 9 m. long, the stems stout, very densely villous or hirsute with long spreading fulvous several-celled hairs; leaves rather thick, on petioles scarcely 1 cm. long, oblong, mostly 10–16 cm. long and 4–7 cm. broad, shortly cuspidate-acuminate, narrowly rounded at the base and deeply and narrowly cordate, densely setose-pilose on the upper surface with long subappressed hairs, paler beneath, densely setose-pilose with long spreading yellowish hairs; flowers large, bright yellow, umbellate, the umbels short-pedunculate, few-flowered, the slender pedicels 3.5 cm. long or shorter; sepals lance-linear, about 1 cm. long, long-attenuate, pilose; corolla rotate, 4–5 cm. broad, 5-lobate to the middle or less, setose-pilose outside, the lobes ovate-orbicular, rounded at the apex and shallowly emarginate, pilose or pilosulous within, especially near the base, conspicuously reticulate-veined; corona double, arising from the staminal column near its base, the outer corona yellow, a short fleshy cup, pentagonal; inner corona of 10 minute liguliform appendages; carpels of the ovary pubescent.

Matelea guatemalensis (Schum.) Woodson, Ann. Mo. Bot. Gard. 28: 235. 1941. *Gonolobus velutinus* var. *calycinus* Donn.-Sm. Bot. Gaz. 13: 189. 1888 (type from Pansamalá, Alta Verapaz, *Tuerckheim 1124*). *G. guatemalensis* Schum. in Engler & Prantl, Pflanzenf. 4, pt. 2: 302. 1895.

Moist or wet forest or thickets, sometimes on limestone, 2,000 m. or lower; Alta Verapaz; Izabal (?); Huehuetenango. Endemic.

A large or small, herbaceous or suffrutescent vine, densely hirsute throughout with long, spreading, stiff, yellowish or brownish hairs; leaves slender-petiolate, ovate or oblong-ovate, mostly 6–11 cm. long and 3.5–5.5 cm. broad, shortly caudate-acuminate at the broad apex, rather deeply and narrowly cordate at the base; inflorescences umbelliform, very slender, few-flowered, equaling or somewhat shorter than the leaves, the peduncles as much as 8 cm. long, the pedicels very unequal, 4.5 cm. long or shorter; calyx lobes almost equaling the corolla, oval, rounded and caudiculate at the apex, sparsely hirsute, pale; corolla 2.5 cm. broad, flat, glabrous or nearly so, yellowish-brown, lobate almost to the base, the lobes oval-orbicular, rounded at the apex, venose; corona dark-colored, cupular, about 3 mm. broad, carunculate, no outer corona present; young follicles slender, sparsely fleshy-tuberculate, densely fulvous-hirsute.

Vincetoxicum hatchii Standl. Field Mus. Bot. 17: 269. 1937.

Probably a forest plant at about 1,000 m.; Alta Verapaz (type, *Hatch & Wilson 107*). Apparently endemic.

A large, herbaceous or suffrutescent vine, the stems hirtellous and puberulent; leaves on very long, slender petioles, thin, orbicular-cordate, about 20 cm. long and of about the same breadth, acute or acuminate, or usually abruptly cuspidate-acuminate, deeply and narrowly cordate at the base, finely and rather densely hirtellous; calyx lobes broadly elliptic, 10–14 mm. long, obtuse; corolla brownish or green, about 3 cm. broad, rotate, pubescent outside, glabrous within, the lobes suborbicular, rounded at the apex; outer corona annular, the inner one thick, torulose, with 5 erect rounded lobes.

The type specimen is inadequate and the species should not have been described from it. In June, 1941 Woodson annotated the type as "?*Matelea magnifolia* (Pittier) Woodson" but did not publish the reduction. It would seem not to belong to that species.

Matelea medusae Woodson, Field Mus. Bot. 23: 78. 1944.

Rocky slopes and thickets, 1,400–1,900 m.; Huehuetenango (type from Cerro Pueblo Viejo, *Steyermark 50987*). Mexico (Chiapas).

Plants very slender, scandent, herbaceous or suffrutescent, the stems very densely and finely glandular-puberulent and sparsely short-hirsute; leaves thin-membranaceous, on slender petioles about 1–1.5 cm. long, oblong-elliptic or oblong-ovate, 4–9 cm. long, 1.5–3.5 cm. broad, sparsely appressed hirsute pubescent with multicellular hairs, hirsute on the nerves, scarcely paler beneath, inconspicuously glandular above at the very base of the blade; inflorescences extra-axillary, umbelliform, 5–10-flowered, the peduncles 5–10 mm. long, the pedicels about equaling the peduncle; calyx lobes linear-lanceolate, caudate-acuminate, 3–4 mm. long, hirsute dorsally; corolla pale green, cleft almost to the base, the lobes linear, 15–20 mm. long, 1–2 mm. broad, revolute, glabrous within except minutely pilose at base, pubescent outside; gynostegium long-stipitate, the corona purple, columnar, 1.3 mm. high, the 5 lobes spreading, obtuse, callous-emarginate; stigma flat, 1.3 mm. broad.

Matelea megacarpha (Brandegee) Woodson, Ann. M o. Bo Gard. 28: 236. 1941. *Vincetoxicum megacarphum* Brandegee, Univ. Cal. Publ. Bot. 4: 381. 1913. *Pachystelma cordatum* Brandegee, l.c. 7: 330. 1920. *Dictyanthus brachistanthus* Standl. Field Mus. Bot. 8: 38. 1930 (type from Atitlán, Sololá, *Heyde & Lux 6346*).

Moist or wet thickets, about 400–1,000 m.; El Progreso; Santa Rosa; Sololá; Quiché. Mexico (Chiapas, Veracruz); Honduras; Nicaragua.

A slender vine, herbaceous or somewhat lignescent, the stems puberulent and short-hirsute; leaves membranaceous, on long slender petioles, deltoid-ovate, 4–7 cm. long, acuminate or long-acuminate, shallowly cordate at the base, green above and rather densely short-hirsute, paler beneath, densely puberulent or short-pilose; cymes umbelliform, few-flowered, the peduncles usually longer than the petioles, the pedicels long and slender, very unequal; calyx deeply lobate, the lobes ovate-lanceolate, puberulent and sparsely hirtellous, conspicuously ciliate, acuminate; corolla rotate, 5-lobate to the middle, about 6 mm. long, dull brown-purple, puberulent outside, very minutely puberulent within, the lobes deltoid, narrowed to the obtuse apex, reticulate-veined; outer corona deeply lobate, the lobes narrow, elongate, partially adnate to the corolla, obtuse; gynostegium sessile; stigma depressed at the apex, pentagonal.

Matelea molinarum L. Wms. Field Mus. Bot. 32: 54. 1968.

A vine growing over brush or in open forests, at about 1,200 m.; Alta Verapaz; Huehuetenango; apparently endemic.

Vines of unknown length, the stems spreading hirsute, up to about 4 mm. in diameter. Leaves ovate, cordate, short-acuminate, 4–10 cm. long and 2.5–7 cm. broad, sparsely fulvous-hirsute on both surfaces, especially on the nerves, and with abundant very short puberulence, petioles slender, spreading hirsute pubescent, 3–4 cm. long, inflorescence axillary or near leaf axils, a few-flowered subumbellate cyme, abundantly hirsute, peduncles 2–4 cm. long, the pedicels 1–3 cm. long; flowers small, green; calyx deeply lobed, long hirsute pubescent outside, glabrous within, lobes broadly lanceolate, acuminate, about 7 mm. long and 3 mm. broad; corolla rotate, or the lobes reflexed, fleshy, about 1.2–1.5 cm. across, glabrous within, provided with a tuft of hirsute pubescence near the apex outside and with minute subglandular pubescence, lobes broadly ovate or suborbicular, about 6 mm. long and 5 mm. broad; faucal corona erect, fleshy, the margin with many small unbonate processes, about 1 mm. high; gynostegium stipitate; follicles subfusiform, 10–12 cm. long and 3 cm. in diameter, covered with fleshy spines 1 cm. or less long.

This species seems to be quite closely related to *M. nigrescens* (Schlecht.) Woodson, but is easily distinguished superficially by the glabrous inner face of the corolla as well as by other detail.

Matelea patalensis (Donn.-Sm.) Woodson, Ann. Mo. Bot. Gard. 28: 223. 1941. *Gonolobus patalensis* Donn.-Sm. Bot. Gaz. 47: 256. 1909.

Known only from the type, Baja Verapaz, Patal, 1,600 m., *Tuerckheim II. 2371.*

Plants scandent, suffrutescent, the stems, petioles and inflorescence pilose with spreading hairs; leaves on petioles 1.5–3 cm. long, oblong-ovate, 7–11 cm. long, 3.5–6 cm. broad, acuminate, shallowly cordate, sparsely and minutely strigillose; peduncles 10–13 mm. long, about 5-flowered, the pedicels 15–20 mm. long; calyx lobes linear-lanceolate, 5 mm. long; corolla rotate, 14 mm. long, glabrous and reticulate within, sparsely pilose outside, deeply lobate, the lobes oblong, obtuse; corona cyathiform, free from the gynostegium and almost enclosing it, 2 mm. high, 3 mm. broad, the 5 scales minute, bifid.

Matelea picturata (Hemsl.) Woodson, Ann. Mo. Bot. Gard. 28: 233. 1941; L. Wms. Fieldiana, Bot. 32: 55. 1968. *Gonolobus picturatus* Hemsl. Biol. Cent. Am. Bot. 2: 332, *t. 56, B, ff. 5, 6.* 1882.

Moist or wet forest, 1,300–1,500 m.; endemic; Quezaltenango (type from Volcán de Zunil, *Salvin*; collected also on Volcán de Santa María, between Santa María de Jesús and Calahuaché).

Plants scandent, herbaceous or suffrutescent, glabrous throughout or nearly so except for the flowers, or the young parts sometimes minutely puberulent; leaves membranaceous, on long slender petioles, cordate-ovate, mostly 7–12 cm. long, rather abruptly long-acuminate, shallowly cordate at the base; peduncles long and slender, often 5 cm. long, few-flowered, the flowers umbellate, about 2.5 cm. broad, the slender pedicels mostly 1–2.5 cm. long; calyx lobes lanceolate, 3–4 mm. long; corolla rotate, yellowish green or often with brownish lines, glabrous outside, rather densely villous within with very slender, weak hairs, the lobes broadly ovate or rounded-ovate, obtuse or rounded at the apex; gynostegium very short; corona very short, fleshy, undulate; stigma depressed at the apex.

Matelea pittieri from Panama is closely related and possibly synonymous.

Matelea pleistantha (Donn.-Sm.) L. Wms. Fieldiana, Bot. 32: 55. 1968. *Macroscepis pleistantha* Donn.-Sm. Bot. Gaz. 20: 543. 1895 (type, *Heyde & Lux 6350*). *Macroscepis congestiflora* Donn.-Sm. l.c. 25: 149. 1898 (type, same as preceding). *Matelea congestiflora* Woodson, Ann. Mo. Bot. Gard. 28: 224. 1941.

Most common in dry thickets or on rocky slopes, 200–1,200 m.; Huehuetenango; Zacapa; Santa Rosa. El Salvador; Honduras; Nicaragua; Costa Rica.

A rampant vine with stout stems, densely setulose-hirsute with long, spreading, fulvous or brownish hairs; leaves membranaceous, on petioles 3.5 cm. long or usu-

ally much shorter, broadly obovate or rounded-obovate, 10–20 cm. long, 7–12 cm. broad, broad at the apex and shortly cuspidate-acuminate, narrowed to the rounded, narrow, shallowly cordate base, densely hirtellous or puberulent on both surfaces and long-hirsute on the nerves and veins; inflorescence short-pedunculate or almost sessile, very dense and head-like, few–many-flowered, the bracts very small or none, the inflorescences little longer than the petioles or sometimes shorter, the pedicels sometimes 12 mm. long but mostly much shorter; calyx lobate almost to the base, the lobes ovate, acuminate, about 9 mm. long; corolla glabrous outside, the tube 6 mm. long, the lobes papillose within, the limb spreading, almost 2 cm. broad, lobate to the middle, the lobes rounded; corona scales deltoid, incurved and truncate at the apex, connate below; ovaries glabrous, the stigma flat.

In El Salvador the name "cuchamper de mico" sometimes is applied to the plant.

Matelea prothecidiscus Woodson, Ann. Mo. Bot. Gard. 28: 223. 1941. *Prothecidiscus guatemalensis* Donn.-Sm. Bot. Gaz. 25: 150, *t. 12.* 1898, not *Matelea guatemalensis* Woodson.

Moist forest, 1,100–1,300 m.; Santa Rosa (type from Cerro Gordo, *Heyde & Lux 3845*); Huehuetenango (Paso del Boquerón, below La Libertad). Nicaragua (Managua).

A large coarse vine, probably somewhat lignescent, the stems, petioles, and inflorescence densely glandular-pubescent and sparsely setose-hirsute; leaves membranaceous, on long slender petioles, broadly rounded-ovate, 7–13 cm. long, 8–12 cm. broad, rounded at the apex or obtuse and shortly cuspidate-acuminate, very sparsely setose-hispidulous on the upper surface with short whitish hairs, paler beneath, rather densely glandular-puberulent, somewhat setose-hispidulous on the nerves and veins, the veins dark and conspicuous when dry; inflorescences short-racemose, shorter than the leaves, few-flowered, the peduncles equaling or shorter than the petioles, the flowers long-pedicellate, the pedicels refracted in age; calyx deeply lobate, the lobes lanceolate, 3–5-glandular within; corolla lobate almost to the base, abruptly reflexed, pale green, blackish when dried, glabrous within, sparsely pubescent outside, the lobes linear, 2 cm. long; outer corona elongate-annular, 5-crenate, the inner one reduced to 5 keels adnate to the dorsal surface of the filaments; immature follicles 9 cm. long, densely glandular-pubescent, densely covered with long spine-like fleshy tubercles.

Matelea pusilliflora L. Wms. Fieldiana, Bot. 32: 55. 1968. *Mosquito whist* (British Honduras).

Slender vine growing over other plants, known only at low elevations; Petén. British Honduras (type, *Gentle 6050*).

Slender, glabrous, much branched, herbaceous or suffrutescent vines, stems becoming 2-edged and finally corky, internodes on old stems short, mostly about 8 cm. long, those on lateral flowering branches mostly 2–3 cm. long. Leaves short petiolate, glabrous or nearly so, lanceolate, acute or acuminate, truncate to subcordate at the base, lateral nerves 3–5 prominent pairs, these mostly not opposite,

FIG. 126. *Matelea quirosii*. Photograph of flower on herbarium specimen, Roe, Roe & Mori 494, showing highly evolved gynostegium, × 3.

2.5–5 cm. long and 0.8–2.2 cm. broad, petioles slender, 2–10 mm. long, obscurely puberulent, with 3–5 digitiform calluses at its juncture with the blade; inflorescence axillary, 1–2-flowered, nearly sessile, peduncle 1–2 mm. long, pedicel 1–2 mm. long; flowers smallest of the genus, green with petals white tipped; calyx lobed to near the base, glabrous lobes ovate-lanceolate, acute, 1.5–2 mm. long; corolla rotate, glabrous, prominently veined, 5–6 mm. broad, lobate to about the middle, the lobes orbicular, obtuse, about 2 mm. long and as broad, the apex usually white; corona fleshy, low with thin margin, 5-umbonate within; gynostegium about 1 mm. broad, the stigma depressed; fruits unknown.

This is the smallest flowered of all the Mateleas having a rotate corolla; it is easily distinguished by the nearly sessile 1–2-flowered inflorescences, the small leaves and short internodes on secondary branches.

Matelea quirosii (Standl.) Woodson, Ann. Mo. Bot. Gard. 28: 224. 1941; L. Wms. Fieldiana, Bot. 32: 56, *fig.* 1968. *Labidostelma guatemalense* Schlechter, Bull. Herb. Boiss. II. 6: 843. 1906, not *M. guatemalensis* Woodson, 1941 (type from Nentón, Huehuetenango,

C. & E. Seler 3279). *Vincetoxicum quirosii* Standl. Field Mus. Bot. 18: 959. 1938 (type from Puntarenas, Costa Rica).

Moist or wet thickets or forest, 300–800 m. or perhaps higher; Baja Verapaz; Chiquimula; Guatemala; Huehuetenango. Southern Mexico; El Salvador; Nicaragua; Honduras; Costa Rica.

A large or small vine, herbaceous or lignescent, the stems slender, densely puberulent and sparsely hirsute with long spreading slender hairs, also short-hirtellous; leaves long-petiolate, membranaceous, broadly ovate or usually rounded-cordate, mostly 5–9 cm. long, rather abruptly acuminate or cuspidate-acuminate, deeply cordate at the base, green above, densely pilose with both long and short hairs, paler beneath, densely velutinous-pilose; peduncles long and slender, mostly 1–3-flowered, or the flowers sometimes more numerous, subumbellate, the pedicels 2.5 cm. long or shorter; calyx pale green, lobate almost to the base, the lobes oblong-lanceolate, acuminate, 8 mm. long, sparsely pilose outside, long-ciliate; corolla rotate, about 2.5 cm. broad, puberulent outside, glabrous within, white toward the base, reticulate-veined with brown-purple, shallowly lobate, the lobes triangular or rounded-triangular, obtuse; corona scales 5, adnate to the base of the gynostegium and to the corolla, carnose, connate only at the base, bearing near the apex 2 falcate-ligulate processes; anthers short, hyaline-appendaged; follicles very slender, 7–13 cm. long, 1 cm. thick, long-attenuate to each end, smooth, glabrous.

This species is a very distinctive one because of the complicated gynostegium. It is found mostly at low elevations near the Pacific. It is the type species of Schlechter's genus *Labidostelma*.

Matelea steyermarkii Woodson, Ann. Mo. Bot. Gard. 28: 278. 1941.

Moist or wet, mixed forest, 2,500–3,500 m.; endemic; San Marcos (type from Volcán de Tajumulco, southern slopes near Las Canojas, *Steyermark 35810*).

A large or small, chiefly herbaceous vine, the stems slender, densely hirsute with brownish, spreading or reflexed hairs; leaves slender-petiolate, membranaceous, oblong-ovate, 5–13 cm. long, 1.5–7.5 cm. broad, narrowly long-acuminate, shallowly cordate at the base, green above, densely short-hirsute, densely short-hispid beneath along the nerves and veins; inflorescences umbelliform, few-flowered, the peduncle 2.5 cm. long, the pedicels 1.5 cm. long, fulvous-hispidulous; calyx lobes oblong-ovate, 7–8 mm. long, acuminate, brownish-pilose; corolla rotate, white with green veins, glabrous or minutely papillose, the lobes 12 mm. long, broadly ovate, rounded at the apex, spreading; gynostegium 4 mm. high; corona urceolate, 3 mm. high, deeply much cleft in the upper half, slightly inflated at the base and minutely papillose.

Matelea sylvicola L. Wms. Fieldiana, Bot. 32: 57. 1968.

In forest near Pansamalá, Alta Verapaz, 1,200 m. (type, *Tuerckheim 680*). Endemic.

Herbaceous vines of unknown size, the stems slender, glabrous or with obscure pubescence in lines, internodes to about 20 cm. long; leaves oblong-ovate, abruptly long acuminate, shallowly cordate at the base, completely glabrous, 7–12 cm. long and 3–5.5 cm. broad, the petiole 3–4 cm. long, bearing at its apex on base of leaf about 5 small digitiform glands; inflorescence axillary, few-flowered, subumbelliform, peduncles 6–8 cm. long, pedicels slender and to about 3 cm. long, both obscurely puberulent; flowers relatively large, about 4 cm. in diameter; calyx 6–8 mm. long, divided nearly to the base, the lobes lanceolate, acuminate, puberulous outside; corolla rotate, divided nearly to the base, obscurely puberulent outside, inside prominently pilose toward the center and puberulent, lobes narrowly lanceolate, acute or acuminate, about 15 mm. long and about 6 mm. broad at the base; corona fleshy, low, about 10-lobate with principal internal lobes opposite sinuses of corolla; stigma 2–3 mm. broad, depressed, white; follicles unknown.

It is curious that this species was not described by Donnell-Smith or Standley since it was passed by both of them as *Gonolobus picturatus* Hemsl. or *Matelea picturata* (Hemsl.) Woodson, a quite different species which is beautifully illustrated in *Biologia Centrali-Americana*. The species does belong in subgenus *Heliostemma* (Woodson, Ann. Mo. Bot. Gard. 28: 233. 1941) and is most closely allied to *Matelea pilosa* (Benth.) Woodson, a Mexican species. Superficially it is easily distinguished by the much larger, glabrous leaves and the smaller and narrow calyx lobes. The "bosses" on the corona are not digitate.

Matelea tenuis Woodson, Ann. Mo. Bot. Gard. 28: 279. 1941.

Known only from the type, Izabal, near Quiriguá, 75–225 m., *Standley 24036*.

Plants scandent, the stems slender, inconspicuously pilosulous; leaves on petioles 5–7 mm. long, elliptic-oblong, 5–7 cm. long, 1.5–2.3 cm. broad, acuminate, obtuse at the base, thin-membranaceous, glabrous; inflorescence extra-axillary, racemiform, few-flowered, the peduncle 3–5 mm. long, the pedicels 5 mm. long, minutely papillose-puberulent, the flowers green; calyx lobes broadly ovate, acute, 2.5 mm. long, papillose-puberulent; corolla almost rotate, 1 cm. broad, the lobes ovate, obtuse, minutely puberulent outside and inside; corolla patelliform, obscurely 5-lobate, 4 mm. broad; gynostegium borne on a stipe 2 mm. long; stigma pentagonal, 2 mm. broad.

Matelea tikalana Lundell, Phytologia 16: 446. 1968. *Marsdenia tikalana* Lundell, Wrightia 4: 49. 1968.

Forest edges and openings, known only from around ruins at Tikal, Petén (type, *Lundell 15763*), endemic.

Slender vines almost completely glabrous. Stems to about 2 mm. in diameter, glabrous, internodes 20–30 cm. long; leaves oblong-lanceolate to broadly oval, acute or short acuminate, narrowly cordate at the base, glabrous or very obscurely

puberulent at the base below, submembranaceous, with 4–6 pairs of lateral nerves, provided with a bipartite gland with several "bosses" at juncture with the petiole, blade 12–15 cm. long and 5–8.5 cm. broad, petioles rather stout, glabrous, 2–3.5 cm. long; inflorescence extra axillary, 1-(or 2-)flowered, peduncle none, pedicels obscurely dark glandular, about 5–10 mm. long; calyx divided nearly to the base, obscurely punctate glandular, the lobes lanceolate, acuminate, about 5 mm. long and 1 mm. broad; corolla campanulate, or rotate at anthesis, lobate to near the gynostegium, obscurely puberulent on the inner surface, about 17–20 mm. broad, the lobes ovate-lanceolate, acuminate, appearing marginate due to strong lateral nerves, 7–9 mm. long and 3–3.5 mm. broad, corona adnate to the corolla, fleshy and five lobate, saccate (not vesicular) and with "bosses" within; stigma 5-angulate, the pollinia apparently erect, fusiform but flattened on the inner surface; follicles unknown.

An unusual species in the large, essentially glabrous leaves and the much reduced inflorescence without a peduncle.

Matelea tuerckheimii (Donn.-Sm.) Woodson, Ann. Mo. Bot. Gard. 28: 234. 1941. *Gonolobus tuerckheimii* Donn.-Sm. Bot. Gaz. 44: 116. 1907 (type from Alta Verapaz, *Tuerckheim II 1301*). *Vincetoxicum trichoneuron* Standl. in Yuncker, Field Mus. Bot. 17: 388. 1938 (type from Honduras).

Twining over shrubs in deciduous or pine forest regions, mostly at less than 1,300 m.; Petén; Alta Verapaz. British Honduras; Honduras.

A slender vine, the stems puberulent and short-hirsute with fulvous, spreading or refracted hairs; leaves on petioles 1–2 cm. long, membranaceous, oblong or lance-oblong, 7–12 cm. long, 3–4 cm. broad, long-acuminate, broadly rounded or subtruncate at the base, green above, appressed-pilose on the nerves, paler beneath, softly pilose with short spreading brownish hairs; inflorescence umbellate, the umbels 1–9-flowered, the peduncle short and stout, the pedicels 1.5 cm. long or shorter; calyx green, 7–8 mm. long, pilosulous, lobate almost to the base, the lobes oblong-lanceolate, long-acuminate; corolla yellow and brown-reticulate within, almost 2 cm. broad, rotate, minutely pilosulous outside, glabrous within, lobate to the middle, the lobes orbicular, rounded at the apex; corona simple, the lobes semi-orbicular; gynostegium 1.5 mm. long; ovaries glabrous; stigma 2.5 mm. broad, the center depressed.

Matelea velutina (Schlecht.) Woodson, Ann. Mo. Bot. Gard. 28: 234. 1941; L. Wms. Fieldiana, Bot. 32: 59. 1968. *Gonolobus velutinus* Schlecht. Linnaea 8: 521. 1833. *Vincetoxicum velutinum* Standl. Contr. U. S. Nat. Herb. 23: 1189. 1924. *V. gentlei* Lundell & Standl. ex Standl. Field Mus. Bot. 17: 269. 1924 (type from British Honduras, *Lundell 1799*). *Matelea gentlei* Woodson, l.c.

Usually at edges of forests from near sea level to 2,000 m.; Chimaltenango; Petén. Southern Mexico; British Honduras.

A large, herbaceous or suffrutescent vine, the stems, petioles, and inflorescence densely glandular-pubescent and also hirsute with long spreading hairs; leaves membranaceous, on long slender petioles, broadly ovate to rounded-ovate, mostly 6–16 cm. long, short-acuminate or more often abruptly and shortly cuspidate-acuminate, deeply cordate at the base, very densely velutinous-pilosulous on both surfaces, somewhat paler and yellowish beneath; peduncles longer or shorter than the petioles, few–many-flowered, the pedicels slender, unequal, mostly about 2 cm. long; calyx deeply lobate, the lobes whitish or pale green, ovate or broadly ovate, 4–10 mm. long, acute or acuminate, densely pubescent and sparsely long-pilose; corolla yellowish green, about 3 cm. broad, densely short-pilose outside, glabrous and reticulate-veined within, the lobes suborbicular, minutely retuse at the apex; corona annuliform, the outer margin entire, bearing within 5 somewhat inflated lobes adnate to the gynostegium; immature fruit 6–7 cm. long, densely glandular-pubescent, bearing very numerous, slender, fleshy, spine-like tubercles 1 cm. long or even longer.

Matelea velutina is a fairly widely distributed species covering an unusually large altitudinal range. Lundell and his associates have made about a dozen collections of the species around Tikal in recent years.

Matelea violacea Woodson, Ann. Mo. Bot. Gard. 28: 280. 1941.

Known definitely only from the type, San Marcos, southeastern slopes of Volcán de Tacaná, 2,000–3,000 m., *Steyermark 36445*.

A suffrutescent vine, the stems fulvous-pilose with short hairs; leaves membranaceous, on petioles 3.5 cm. long or shorter, oblong-ovate, 9–13 cm. long, 4–6 cm. broad, long-acuminate, shallowly and openly cordate at the base, densely and softly short-pilose on both surfaces; inflorescences subsessile, few-flowered, the peduncle 5 mm. long or less, the pedicels 1 cm. long, pilose; calyx lobes broadly ovate, long-acuminate, fulvous-pilose; corolla rotate, pale purple and brown-reticulate, fulvous-pilosulous outside, minutely papillose within, the lobes broadly ovate, obtuse, 5 mm. long, spreading; gynostegium sessile; stigma pentagonal, almost flat; corona rotate, spreading, broadly 5-lobate, about 1 cm. in diameter, multilaciniate.

OXYPETALUM R. Brown

Mostly scandent herbs, sometimes suffrutescent, usually pubescent; leaves opposite, generally cordate and long-petiolate; flowers medium-sized, white or purplish, the cymes usually umbelliform, terminal or axillary; calyx 5-parted, glandular or eglandular within at the base; corolla tube very short, campanulate or subglobose, the limb deeply 5-lobate, the lobes usually narrow, contorted; scales of the corona 5, shortly adnate to the corolla or free from it, distinct from the stamen tube or more or less connate with it, erect, usually thick, retuse, emarginate or bifid, appendaged within or naked; stamens inserted near the base of the tube,the filaments connate into a short tube; anthers terminated by an inflexed membrane; pollinia solitary in each cell, oblong, pendulous; stigma with or without a bifid or biparted beak; follicles slender or thick, smooth or tuberculate; seeds with a coma of soft white hairs.

FIG. 127. *Oxypetalum cordifolium.* A, habit, × ½; B, flower, × 2; C, calyx, corona and pistils, × 4; D, inner face of corona segment, × 8; E, pollinia, × 20.

Fifty species or more, all American and mostly South American. Only one has been found in Mexico and Central America.

Oxypetalum cordifolium (Vent.) Schlechter in Urban, Symb. Antill. 1: 269. 1899. *Gothofreda cordifolia* Vent. Choix Pl. Cels. 7, *t. 60.* 1803. *O. riparium* HBK. Nov. Gen. & Sp. 3: 197. 1819.

Santa Rosa (Ojo de Agua, *Heyde & Lux 4000*); to be expected elsewhere in Guatemala. Southern Mexico; Honduras; Costa Rica. West Indies; South America.

A slender, chiefly herbaceous vine, finely velutinous-pilosulous on the stems, leaves, and inflorescence; leaves slender-petiolate, soft, membranaceous, cordate-ovate, mostly 5–10 cm. long, acuminate or cuspidate-acuminate, shallowly and openly or deeply and narrowly cordate at the base, paler beneath; umbels few-flowered or only 1-flowered, on long slender peduncles, often longer than the subtending leaves, the very slender pedicels often longer than the peduncles; calyx lobes linear-lanceolate or linear-subulate, densely pubescent, about equaling the corolla tube; corolla pale yellowish, puberulent outside, glabrous or minutely papillose within, the campanulate tube about 4 mm. long, the lobes linear-attenuate, ascending or spreading, 1.5–2 cm. long; follicles about 8 cm. long, long-acuminate.

SARCOSTEMMA R. Brown

Reference: Richard W. Holm, The American species of Sarcostemma, Ann. Mo. Bot. Gard. 37: 477–560. 1950.

Slender vines, herbaceous or suffrutescent, pubescent or glabrous, often glaucous; leaves opposite; flowers rather large or small, umbellate, the umbels axillary, usually pedunculate, generally white or greenish white, sometimes purplish, the corolla in bud mostly depressed-globose; calyx small, 5-parted, minutely 5-glandular within, the lobes acute; corolla very broadly campanulate or subrotate, very shallowly or rather deeply 5-lobate, the lobes contorted; outer corona submembranaceous, annular, adnate to the base of the corolla, its margin entire, the inner corona of 5 scales adnate to the base of the stamen tube, their blades free, broad, membranaceous or subcorneous, flat or concave or saccate; stamens inserted on the base of the corolla, the filaments connate into a short tube, the anthers terminated by an inflexed membrane; pollinia solitary in each anther cell, oblong or elongate, pendulous from the apex; stigma flat or umbonate at the apex or bearing a short bifid beak; follicles rather thick or often slender, acuminate, smooth.

About 35 species, in tropical and warm regions of both hemispheres. Additional species are known from Mexico and Central America.

Leaves not cordate at the base, usually obtuse or sometimes acute, linear to oblong. *S. clausum.*

Leaves cordate at the base.

Corolla glabrous outside.

Leaves lanceolate-oblong to oblong-ovate; petals ciliate; highland species. *S. refractum.*

Leaves ovate to orbicular; petals eciliate; lowland species ..... *S. bilobum.*

Corolla densely pubescent outside ..... *S. odoratum.*

Sarcostemma bilobum Hook. & Arn. Bot. Beech. Voy. 438. 1841. *Philibertia biloba* Gray, Proc. Am. Acad. 21: 395. 1886.

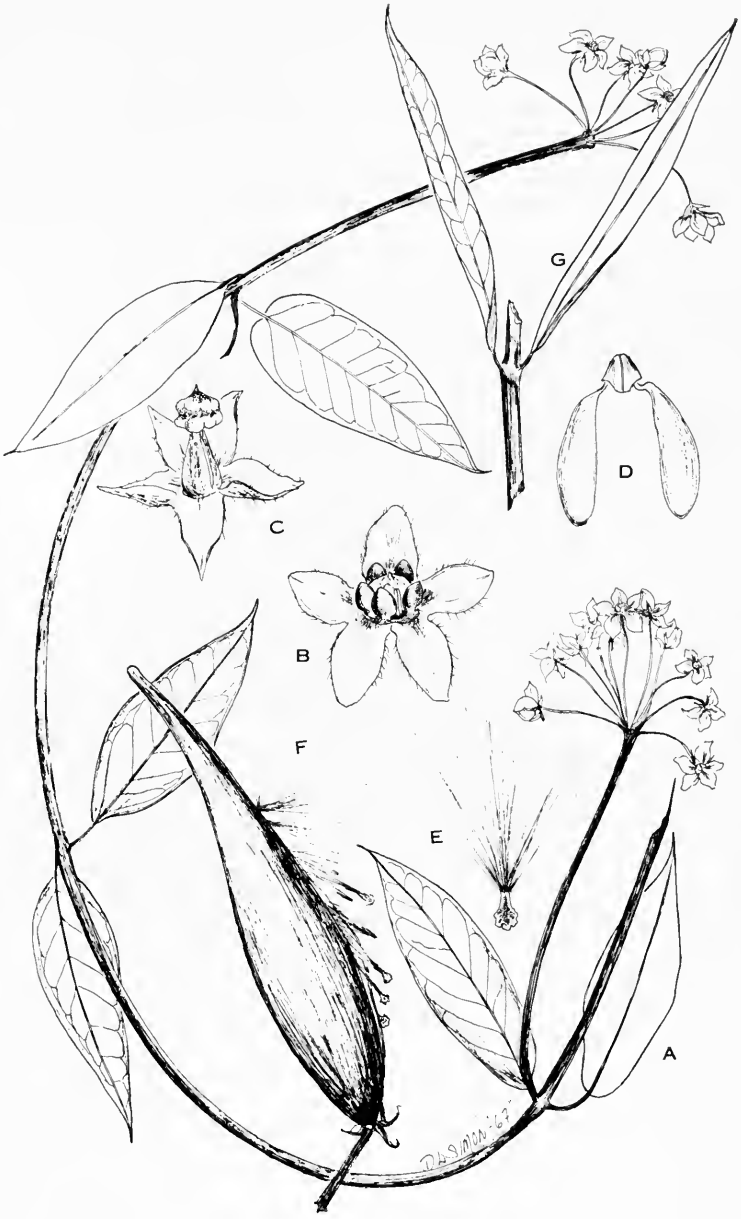

FIG. 128. *Sarcostemma clausum.* A, habit, natural size; B, flower, × 2; C, calyx and pistils, × 4; D, pollinia, × 25; E, seed, × 2; G, pair of leaves from another collection to show variation, natural size.

Occasional in damp or dry thickets near sea level; Petén; Alta Verapaz. Mexico; British Honduras; Honduras.

Trailing or twining pilosulose vines; leaves oblong-ovate to suborbicular, short acuminate, deeply cordate with the basal lobes converging, 2–5 cm. long and 1.5–4 cm. broad, pilosulose on both surfaces, sometimes glabrate, petiole 1–2.5 cm. long; inflorescence umbelliform with as many as 25 flowers, peduncles 1.5–6 cm. long, pedicels to 3 cm. long, very slender; calyx lobate to the base, the lobes linear to ovate, about 2.5 mm. long, puberulent outside, glabrous within; corolla subrotate, the tube about 2 mm. long, the lobes lanceolate, obtuse, reflexed, puberulent within, ciliate, about 5–6 mm. long; corona ring fleshy, free from the vesicles, vesicles pyramidal, widest below the middle, about 2 mm. long; follicles subfusiform, up to 8 cm. long and 2 cm. thick, puberulent, striate; seeds about 7 mm. long and coma about 3 cm. long.

Sarcostemma clausum (Jacq.) Schult. Syst. Veg. 6: 114. 1820. *Cynanchum clausum* Jacq. Stirp. Am. 1: 87, *t. 60*. 1763. *S. cumanense* HBK. Nov. Gen. & Sp. 3: 195. 1819. *S. crassifolium* Dcne. in DC. Prodr. 8: 540. 1844. *Philibertia crassifolia* Hemsl. Biol. Cent. Am. Bot. 2: 318. 1881. *P. cumanensis* Hemsl. l.c. *Funastrum cumanense* Schlechter, Fedde Repert. Sp. Nov. 13: 284. 1914. *F. clausum* Schlechter, l.c. 283. *Bejuco de pescado; flor de Castilla* (Guatemala, fide Morales).

Wet to dry thickets or thin forest, often in thickets along streams, 1,275 m. or lower; Petén; Izabal; Alta Verapaz; Zacapa; Chiquimula; Jutiapa; Santa Rosa; Escuintla; Guatemala; Suchitepéquez; Retalhuleu; Sololá; San Marcos. Mexico; British Honduras to El Salvador and Panama. West Indies; South America.

A small or large, herbaceous vine, often forming large and dense tangles over shrubs, pale and usually glaucescent, the stems glabrous or nearly so; leaves short-petiolate, rather thick and fleshy, almost linear to oblong, 3–7 cm. long, acuminate or cuspidate, usually obtuse or rounded at the base, glabrous, or sometimes pubescent beneath; umbels long-pedunculate, few–many-flowered, the pedicels long and slender, short-pilose; calyx densely short-pilose; corolla 10–14 mm. broad, greenish white, rather deeply lobate, densely short-pilose outside, the lobes broadly ovate, rounded or very obtuse and apiculate; follicles 5–6.5 cm. long, about 1 cm. broad, long-acuminate, pubescent or glabrate.

Called "dama de noche" in British Honduras. The plant is abundant in the lowlands of Guatemala, especially in rocky or gravelly thickets along or near streams, where it often forms dense masses that almost conceal the foliage of the supporting plants. When in full flower it is a conspicuous vine. The flexible tough stems are used commonly for stringing fish (hence the name *bejuco de pescado*) and as a substitute for twine. Along sandbars the branches often lie flat

on the ground, sometimes running over the sand for a great distance. Under such conditions the internodes of the stems become greatly elongated. The leaves vary greatly in shape, being sometimes linear or nearly so, but more often lanceolate or oblong.

Sarcostemma odoratum (Hemsl.) Holm, Ann. Mo. Bot. Gard. 37: 520. 1950. *Funastrum odoratum* Schlechter, Repert. Sp. Nov. 13: 286. 1914. *Philibertia odorata* Hemsl. Biol. Cent. Am. Bot. 2: 319. 1881. *Cuchamperillo.*

Moist or dry thickets, sometimes in roadside hedges, 1,500–2,200 m.; Guatemala; Sacatepéquez (type from Dueñas, *Salvin*); Huehuetenango. Endemic.

A small or large herbaceous vine, the slender stems densely pilose with short spreading hairs; leaves membranaceous, on long slender petioles, orbicular-cordate or ovate-cordate, 3.5–7 cm. long, 2–5.5 cm. broad, rounded or very obtuse at the apex and cuspidate, deeply cordate at the base, densely and softly pilose on both surfaces, sometimes white-tomentose beneath; umbels many-flowered, about equaling the leaves, on long slender peduncles, the slender pedicels 1–1.5 cm. long, densely tomentose; flowers greenish white, 10–15 mm. broad, the calyx lobes narrow, acute, 6 mm. long or less; corolla subrotate, deeply 5-lobate, pilose outside, the lobes ovate-oblong, obtuse, densely puberulent within; outer corona annular, undulate; hoods of corona 2 mm. long, inflated-cucullate, slightly longer than the gynostegium; follicles 7–9 cm. long, about 1.5 cm. thick, densely pilose, narrowly long-acuminate.

Sarcostemma refractum (Donn.-Sm.) L. Wms. Fieldiana, Bot. 32: 59. 1968. *Philibertia refracta* Donn.-Sm. Bot. Gaz. 18: 207. 1893.

Wooded slopes in the mountains, 1,800–2,300 m.; Huehuetenango; Quiché; Sacatepéquez. Southern Mexico.

Slender herbaceous vines. Stems somewhat pilose, to 2 mm. in diameter; leaves oblong-lanceolate to oblong-ovate, shallowly cordate with basal lobes diverging, acute or acuminate at the apex, sparsely pilose or ciliate to completely glabrous, blade 2.5–5 cm. long and 1–2.5 cm. broad; inflorescence umbelliform, many-flowered, peduncle 3–7 cm. long, pedicels filiform, 1.5–2.5 cm. long, crisped puberulent; calyx divided to the base, pilose pubescent outside and ciliate, glabrous within, linear-lanceolate, acute, about 4 mm. long and 1 mm. broad; corolla rotate or the lobes reflexed, 5–7 mm. long, divided to near the base, glabrous outside, puberulent within especially at the base of the lobes, tube short, about 1–1.5 mm. long, lobes narrowly ovate to ovate-obtuse, obscurely ciliate on one margin, 4–5 mm. long and 3–4 mm. broad; corona ring undulate-lobate, about 0.5 mm. high, adnate to the base of the vesicles; vesicles about 2.5–3 mm. long; fruits unknown.

This species was included in *S. bilobum* by Holm in his monograph of the genus. However the distinctively shaped leaves, difference in

corolla although not outstanding, and the highland distribution indicates that it should be treated as a separate species.

Some of the species of *Stapelia* are cultivated rarely in Guatemalan gardens. They are natives of South Africa, low, succulent plants with more or less 4-angulate, leafless stems, and often very large, luridly colored, usually very fetid flowers.

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