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FLORA OF GUATEMALA

PAUL C. STANDLEY

AND

LOUIS O. WILLIAMS

MYRSINACEAE

by

CYRUS LONGWORTH LUNDELL

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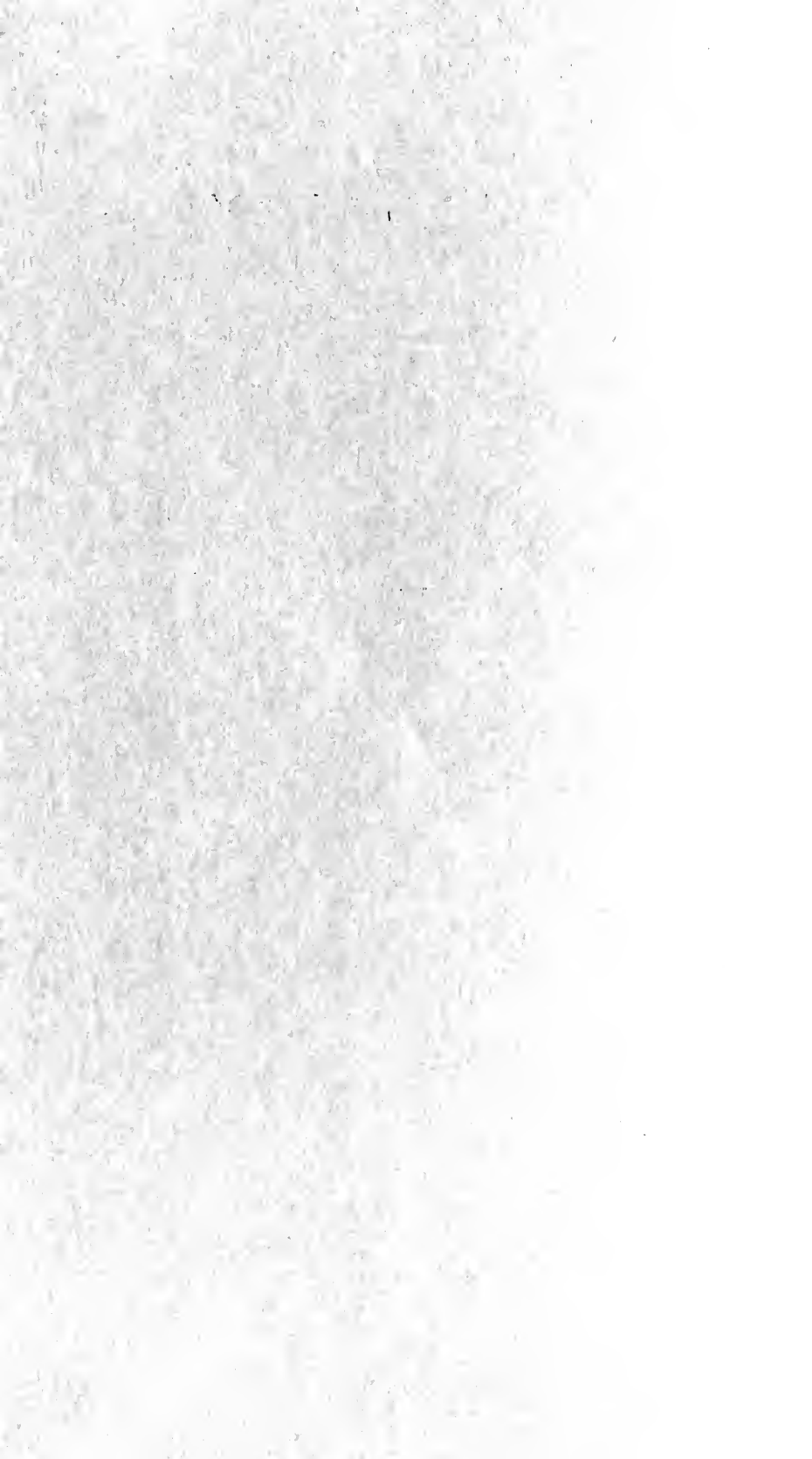
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FIELDIANA: BOTANY
VOLUME 24, PART VIII, NUMBERS 1 AND 2

Published by

CHICAGO NATURAL HISTORY MUSEUM

FEBRUARY 24, 1966



FLORA OF GUATEMALA
PART VIII

FLORA OF GUATEMALA

PAUL C. STANDLEY

The Late Curator of the Herbarium

LOUIS O. WILLIAMS

Chief Curator, Botany, Chicago Natural History Museum

MYRSINACEAE

by

CYRUS LONGWORTH LUNDELL

Director and Chief Research Scientist

Texas Research Foundation

FIELDIANA: BOTANY

VOLUME 24, PART VIII, NUMBERS 1 AND 2

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CHICAGO NATURAL HISTORY MUSEUM

FEBRUARY 24, 1966

In Memory of
JOHN DONNELL SMITH
1829 – 1928

Who, with reason, may be said to be
the Father of Central American Botany

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CONTENTS

Families Included in Part VIII, Number 1

| | PAGE | | PAGE |
|------------------------|------|----------------------|------|
| Araliaceae | 1 | Cornaceae | 67 |
| Umbelliferae | 21 | Garryaceae | 70 |

Families Included in Part VIII, Number 2

| | | | |
|-------------------------|----|---------------------------|-----|
| Clethraceae | 74 | Theophrastaceae | 127 |
| Pyrolaceae | 81 | Myrsinaceae | 135 |
| Monotropaceae | 86 | Primulaceae | 200 |
| Ericaceae | 88 | Plumbaginaceae | 207 |

ILLUSTRATIONS

| FIGURE | PAGE |
|---|------|
| 1. <i>Aralia humilis</i> | 3 |
| 2. <i>Dendropanax arboreus</i> | 6 |
| 3. <i>Oreopanax lacnocephalus</i> | 15 |
| 4. <i>Sciadodendron excelsum</i> | 20 |
| 5. <i>Arracacia annulata</i> | 28 |
| 6. <i>Arracacia bracteata</i> | 30 |
| 7. <i>Centella asiatica</i> | 33 |
| 8. <i>Coaxana purpurea</i> | 35 |
| 9. <i>Donnellsmithia guatemalensis</i> | 40 |
| 10. <i>Enantiophylla heydeana</i> | 42 |
| 11. <i>Eryngium cymosum</i> | 45 |
| 12. <i>Hydrocotyle mexicana</i> | 51 |
| 13. <i>Micropleura renifolia</i> | 54 |
| 14. <i>Myrrhidendron donnellsmithii</i> | 55 |
| 15. <i>Spananthe paniculata</i> | 63 |
| 16. <i>Tauschia steyermarkii</i> | 65 |
| 17. <i>Cornus disciflora</i> | 68 |
| 18. <i>Garrya lauriflora</i> | 71 |
| 19. <i>Clethra mexicana</i> | 77 |
| 20. <i>Clethra oleoides</i> | 78 |
| 21. <i>Chimophila maculata</i> | 82 |
| 22. <i>Monotropa coccinea</i> | 87 |
| 23. <i>Arbutus xalapensis</i> | 90 |
| 24. <i>Arctostaphylos cratericola</i> | 93 |
| 25. <i>Befaria guatemalensis</i> | 96 |
| 26. <i>Cavendishia guatemalensis</i> | 100 |
| 27. <i>Disterigma humboldtii</i> | 102 |
| 28. <i>Empedoclesia brachysiphon</i> | 103 |
| 29. <i>Gaultheria odorata</i> | 107 |
| 30. <i>Leucothoe mexicana</i> | 109 |
| 31. <i>Macleania insignis</i> | 111 |
| 32. <i>Pernettya ciliata</i> | 113 |
| 33. <i>Satyria meiantha</i> | 117 |
| 34. <i>Sphyrospermum majus</i> | 119 |

| FIGURE | PAGE |
|--|------|
| 35. <i>Vaccinum lundellianum</i> | 124 |
| 36. <i>Deherainia smaragdina</i> | 129 |
| 37. <i>Jaquinia aurantiaca</i> | 131 |
| 38. <i>Ardisia paschalis</i> | 148 |
| 39. <i>Ardisia Tuerkheimii</i> | 154 |
| 40. <i>Ardisia verapazensis</i> | 155 |
| 41. <i>Gentlea tacanensis</i> | 158 |
| 42. <i>Gentlea Vatterii</i> | 159 |
| 43. <i>Parathesis columnaris</i> | 167 |
| 44. <i>Parathesis cubana</i> | 169 |
| 45. <i>Parathesis membranacea</i> | 174 |
| 46. <i>Parathesis oblanceolata</i> | 176 |
| 47. <i>Parathesis papillosa</i> | 177 |
| 48. <i>Parathesis rufa</i> | 180 |
| 49. <i>Parathesis sessilifolia</i> | 181 |
| 50. <i>Parathesis Skutchii</i> | 183 |
| 51. <i>Parathesis subcoriacea</i> | 185 |
| 52. <i>Parathesis tomentosa</i> | 188 |
| 53. <i>Rapanea myricoides</i> | 190 |
| 54. <i>Stylogyne laevis</i> | 194 |
| 55. <i>Synardisia venosa</i> | 196 |
| 56. <i>Yunckeria amplifolia</i> | 199 |
| 57. <i>Anagallis arvensis</i> | 202 |
| 58. <i>Centunculus minimus</i> | 204 |
| 59. <i>Lysimachia steyermarkii</i> | 205 |
| 60. <i>Samolus ebracteatus</i> | 206 |
| 61. <i>Plumbago scandens</i> | 210 |

UMBELLIFLORAE

The Umbelliflorae were treated in Engler & Prantl's *Natürliche Pflanzenfamilien*, by Harms, as three families—Araliaceae, Umbelliferae and Cornaceae. The order is characterized by the tendency for the flowers to be borne in determinate umbels, either simple or compound (or sometimes apparently in heads); by the reduction and simplification in the floral structure; and by epigyny. The carpels are reduced to two.—The Araliaceae are mostly woody and tropical; the Umbelliferae are mostly herbaceous, with a few suffrutescent members, widely distributed over the world but most abundant in temperate regions of the northern hemisphere. The Cornaceae, the smallest family of the order, is made up mostly of trees or shrubs, with occasional small suffrutescent plants. It is most abundant in temperate regions of Asia and North America but extends into the southern hemisphere.

Many plants of economic importance are found in the order. Food and condiment plants are abundant, especially in the Umbelliferae. However, none are of great importance as crops in Guatemala or in Central America. Trees are common in the Araliaceae but the wood is of poor quality and little, if at all, used in our region. A few ornamentals of this order, mainly Araliaceae, are found in Guatemala.

ARALIACEAE¹

Reference: Smith, Albert C., Araliaceae, North American Flora 28B: 3-41. 1944.

Trees or shrubs, sometimes woody vines, rarely herbs, sometimes epiphytic, glabrous or usually pubescent, the pubescence often of branched hairs; leaves usually (ours) alternate, simple, lobed, palmately lobed, pinnatifid or ternately compound or decompound; stipules adnate to the petioles, connate and produced into a coriaceous ligulate sheath, or hardly distinct or none; flowers in umbels or

¹ The field work and travel by the junior author involved in the preparation of this number of the *Flora of Guatemala* has been made possible through a grant from National Science Foundation, which we are happy to acknowledge.

heads and in solitary racemose, corymbose, paniculate, or usually umbellate inflorescences; bracts subtending the branches of the inflorescence small, usually soon deciduous; pedicels continuous or articulate; flowers perfect or unisexual, usually small and greenish; calyx tube cupular or annular, adnate to the ovary, erect or spreading, sometimes wanting; petals 3-10, generally 5, valvate or imbricate, deciduous, sometimes connate and calyptriform; stamens as many as the petals and alternate with them, rarely more; anther ovate or oblong or subglobose, dorsifixed, straight or recurved, didymous, the cells longitudinally dehiscent; disc epigynous, explanate or conic, the margin entire or undulate; ovary inferior, 1-many-locular; the styles as many as the locules, erect or recurved, sometimes connate; the stigmas terminal or decurrent on the inner surface; ovules solitary in the cells, pendulous from the apex of the cell, anatropous; fruits baccate or usually drupaceous, the exocarp usually fleshy, the endocarp divided into 1-many distinct, osseous, crustaceous, cartilaginous, or rarely membranaceous nutlets; seeds laterally compressed or triquetrous in cross-section, the testa thin; endosperm copious, cartilaginous or carnose; embryo minute, the cotyledons ovate or oblong, the radicle superior.

A family of about 70 genera (nine in North America according to Smith, *loc. cit.*) and 600-800 species. Widely distributed in tropical regions, a few in temperate areas. One other genus, *Schefflera*, with several species is in southern Central America and Panama. The species in Central America are mostly in the mountains.

Leaves pinnately or ternately compounded or decomposed.

Petals in bud valvate; cultivated plants rarely flowering *Nothopanax*.

Petals in bud imbricated; native plants usually flowering.

Flowers mostly 5- (4-6)-merous *Aralia*.

Flowers 7-12-merous *Sciadodendron*.

Leaves simple, lobate or palmately compounded.

Woody vines with lobate leaves; cultivated, rarely flowering *Hedera*.

Trees or shrubs with simple or palmately compounded leaves; native plants usually flowering.

Flowers in heads, sessile or short pedicellate, polygamodioecious; petiole without an obvious ligule *Oreopanax*.

Flowers in umbels, perfect or polygamomonoecious.

Styles and locules 2 or 3 *Didymopanax*.

Styles and locules 5-9, usually 5 *Dendropanax*.

ARALIA [Tournef.] L.

Perennial herbs or (ours) shrubs or small trees, glabrous or pubescent; leaves alternate, pinnately or ternately compounded or decomposed, the leaflets serrated; inflorescence with two or more umbels, radiating or laxly corymbose or in large compound racemes, the bracts small; the pedicels articulate with the calyx and the apex often tumid; flowers polygamomonoecious, 5-6-merous, glabrous; the calyx obconic or cupuliform, truncate, repand, lobed or minutely dentate; petals imbricated, white or green, obtuse or inflexed-acuminate; anthers mostly oblong, straight; disc almost flat, fleshy; styles 4-6, connate at their bases, free above and/or even to the base; fruit baccate, often laterally compressed, nutlets orbicular to oblong, compressed, crustaceous or harder, as many as the styles.

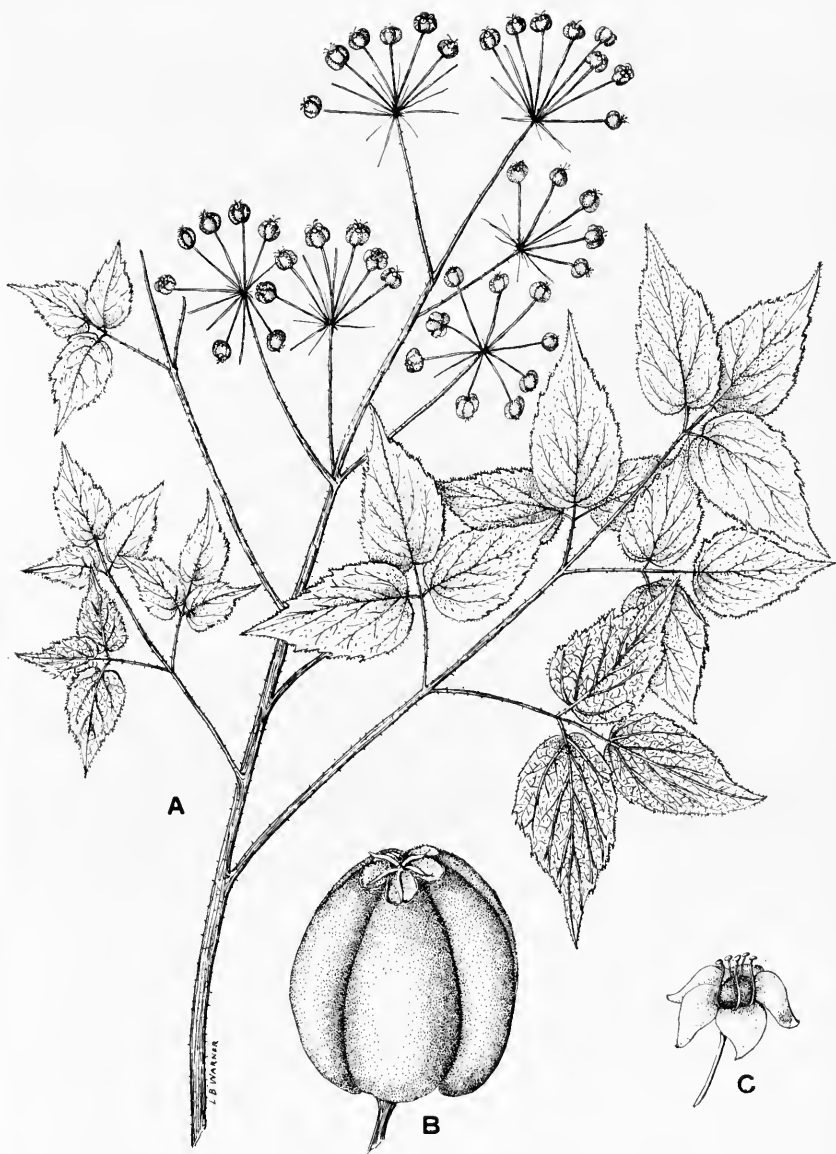


FIG. 1. *Aralia humilis*. A, Branch; $\frac{1}{2}$ natural size. B, Fruit; about $\times 5$. C, Flower; about $\times 5$, from an unpublished Sessé and Mociño drawing.

A genus most common in temperate regions in America, only the following is found in Central America. There are perhaps 30-40 species, mostly in eastern Asia.

Aralia humilis Cav. Icon. Pl. 4: 7, t. 313. 1797. *Tacamajaca* (Jalapa); *sombrillero* (fide Aguilar).

Moist or dry, brushy slopes, often in pine-oak forest, sometimes on limestone, 500-1,900 meters; Zacapa; Chiquimula; Jalapa; Jutiapa; Sacatepéquez; Quiché; Huehuetenango. Southern New Mexico and Arizona; Mexico; Honduras.

An unarmed shrub or small tree, commonly 1-3 meters high, sometimes a tree of 5 meters with a trunk 30 cm. in diameter, the branches brown, terete, pilose with coarse, simple or sparsely branched hairs; leaves large, pinnate or bipinnate, deciduous, long-petiolate, leaflets numerous, sessile or short-petiolulate, membranaceous, oblong-ovate to broadly ovate, 2-8 cm. long, acuminate, rounded or shallowly cordate at the base, serrate or crenate, sparsely or densely pilose with coarse, simple or sparsely branched, white hairs, often glabrate on the upper surface; umbels few or often numerous, usually paniculate, glabrous or somewhat pubescent, the flowers 5-merous, numerous, greenish, on very slender but stiff pedicels about 2 cm. long; petals 2.5-3 mm. long; fruit black-purple, 3-7 mm. in diameter.

This is not a common plant of Guatemala, but it is plentiful locally in the drier regions, most often in forests or scrubby thickets of *Quercus*.

EXCLUDED SPECIES: *Aralia sololensis* Donn.-Sm. Bot. Gaz. 56: 58. 1913. = *Sambucus* sp.

DENDROPANAX Decaisne & Planchon

Shrubs or trees, glabrous; leaves simple, petiolate, entire or often lobate, often highly variable on the same plant or even branch; inflorescence of a lateral or terminal umbel or occasionally many umbels (or heads) in racemes or umbels; peduncles subtended by small bracts, sometimes bracteate and articulate above the base, often swollen distally into a fleshy receptacle; flowers 5-9-merous, perfect or polygamomonoecious; calyx obconic or cupuliform, usually dentate; petals usually 5 (6-8), cucullate, valvate; stamens as many as the petals, inflexed; disc fleshy, short-conic, confluent with the styles; the styles nearly free or usually connate to the middle or beyond, the stigmas sessile or short stipitate; fruit globose or ovoid, usually 5-sulcate when dry, black or dark purple, nutlets compressed or subtrigonal.

Perhaps 50 species in tropical America and Asia,—a few additional ones are in southern Central America and Panama. The wood of this genus is grayish, light in weight but firm and tough, and easily worked. In consistency it is similar to *Liriodendron*. The wood is not used in Central America, so far as we know. Many authors have

used the name *Gilibertia* Ruiz & Pavón for this genus. For a discussion of the use of the generic name see A. C. Smith in *Tropical Woods* 66: 1. 1941.

Umbels 3-20 per inflorescence.

Inflorescence slender, the peduncles (3-) 5-7 cm. long, the pedicels 10-20 mm. long.....*D. leptopodus*.

Inflorescence comparatively compact, peduncles 1-5- (7) cm. long, the pedicels to 8- (12) mm. long.

Peduncles striate or smooth, bracts, if present, rarely connate; common species.
D. arboreus.

Peduncles rugose, bracts usually connate into a small coriaceous cupule.
D. oliganthus.

Umbels 1 per inflorescence.....*D. schippii*.
(See also rare forms of *D. arboreus*).

Dendropanax arboreus (L.) Dcne. & Planch. *Rev. Hort.* 4, 3: 107. 1854; Smith, *No. Am. Fl.* 28B: 16. 1944. *Aralia arborea* L. *Syst. Nat.* ed. 10. 967. 1759. *Gilibertia arborea* Marchal, *Bull. Soc. Bot. Belg.* 30: 281. 1891. *G. stenocarpa* Donn.-Sm. *Bot. Gaz.* 55: 435. 1913 (type from Barranco Eminencia, Guatemala, *J. D. Smith 2666*). *G. Smithiana* I. M. Johnston, *Contr. Gray Herb.* 70: 81. 1924 (type from Cubilgüitz, Alta Verapaz, *Tuerckheim II.* 407). *G. concinna* Standl. *Trop. Woods* 18: 30. 1929 (type from Honey Camp, British Honduras, *Lundell 115*). *D. concinnus* Lundell, *Field & Lab.* 13: 11. 1945. *Mano de león*; *sac-co* (Alta Verapaz); *chonte* (Quezaltenango); *mazorco* (Suchitepéquez); *matapalo*; *mano de mico*; *xup* (Petén, fide Lundell).

Moist or wet, usually mixed forest or thickets, often in second growth, sometimes in hedges, 1,500 meters or lower, or very rarely at higher elevations; Petén; Alta Verapaz; Baja Verapaz; Izabal; Zacapa; Chiquimula; Jutiapa; Santa Rosa; Escuintla; Guatemala; Suchitepéquez; Sololá; Retalhuleu; Quezaltenango; San Marcos; Huehuetenango; Quiché. Mexico; British Honduras to El Salvador and Panama. West Indies; South America.

A glabrous tree, rather sparsely branched, sometimes 20 meters high but often only a shrub, the crown spreading, the trunk as much as 60 cm. in diameter, the bark medium brown or grayish brown, slightly scaly or almost smooth; leaves on long or short petioles, chartaceous, very variable in size and outline, those on sterile or juvenile branches often deeply trilobate, those of older or fertile branches ovate to elliptic or obovate and entire or undulate; umbels of flowers usually numerous (or rarely solitary) and disposed in a short or elongate raceme, the peduncles short or elongate; flowers few or numerous in the umbel, yellowish or greenish white, the pedicels mostly 5-10 mm. long; fruit black or dark purple, very juicy, 6-8 mm. in diameter.

Known in British Honduras by the names "white gumbolimbo," "potatowood," and "sac-chacah" (Maya); "palo de agua" (Honduras); "tamalcoahuite" (Veracruz); "mano de sapo" (Veracruz); "palo blanco" (Veracruz). This is a very common small tree of Guatemala and of many other parts of Central America, often springing up in abundance in second growth. The tree has a wide range and exhibits great variation, not only in foliage but in characters of inflorescence. It seems difficult, if not impossible, to coordinate or to limit definitely these variations, with the result that there have

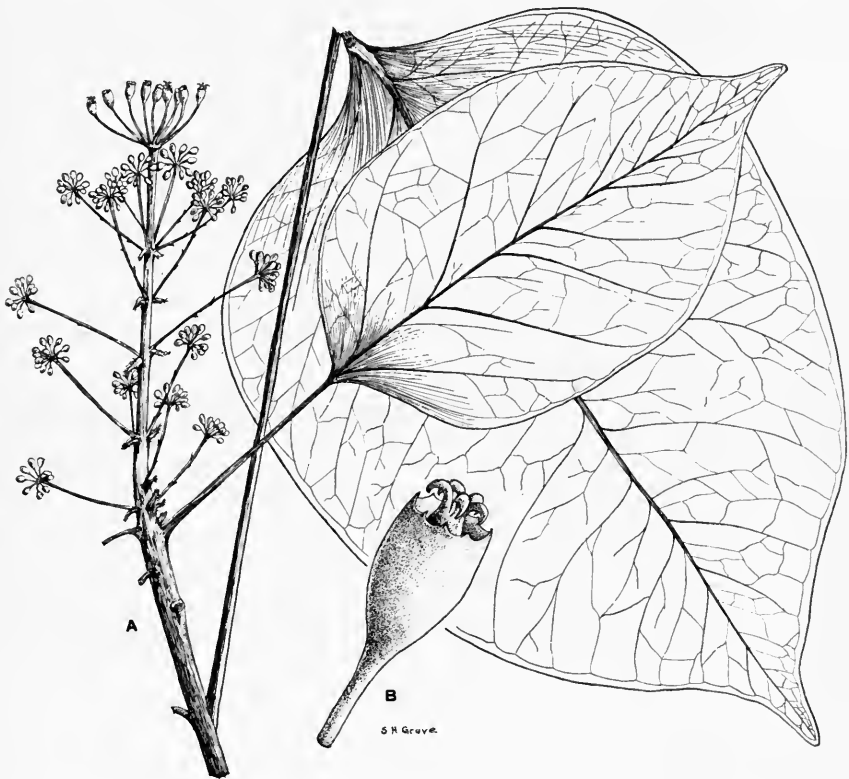


FIG. 2. *Dendropanax arboreus*. A, Flowering branch; $\times \frac{2}{3}$. B, Immature fruit, $\times 3$.

accumulated in recent or earlier years many names that apparently must be relegated to synonymy. It is, of course, possible that further collection may make it possible to divide the material now referred to *D. arboreus*, but it seems more probable that the result will be further reductions.

Dendropanax leptopodus (Donn.-Sm.) A. C. Smith, Trop. Woods 66: 3. 1941. *Gilbertia leptopoda* Donn.-Sm. Bot. Gaz. 57: 421. 1914.

Moist or wet, mixed, mountain forest, 950–2,500 meters; Izabal; Alta Verapaz (type from Cobán, *Tuerckheim 4166*); El Progreso; Izabal; Zacapa; Chiquimula; Suchitepéquez; Sololá; Quezaltenango. Mexico (Chiapas); Honduras.

A glabrous shrub or tree, sometimes 9 meters high, with slender branches; leaves on long or short, slender petioles, chartaceous or membranaceous, lanceolate or elliptic-lanceolate, mostly 7–14 cm. long, acuminate or narrowly long-acuminate, obtuse or acute at the base, slightly paler beneath; umbels terminal or lateral, the peduncles very slender, often exceeding the leaves, 11 cm. long or shorter, naked or usually with a few very inconspicuous bracts near the base; flowers pale green, few or rather numerous, the pedicels very slender, mostly 10–20 mm. long, sometimes shorter in early anthesis; petals 1.5 mm. long, apiculate; fruits about 5 mm. long, purple or almost black.

One specimen referred to here has deeply trilobate leaves similar to those of *D. arboreus*, but generally all the leaves are entire, while in *D. arboreus* trilobate leaves sometimes are found even on the flowering branches.

Dendropanax oliganthus A. C. Smith, Trop. Woods 66: 3. 1941. *Gilbertia oligantha* A. C. Smith, Brittonia 2: 251. 1936.

Moist or wet, mixed forest, 2,100–2,400 meters, or at lower elevations; Alta Verapaz (type from Finca Sepacuité, *O. F. Cook & R. F. Griggs 98*); Zacapa (Sierra de las Minas).

A glabrous tree of 15 meters, the branches very thick; leaves coriaceous, on stout petioles 1.5–6 cm. long, oblong or obovate-oblong, 9–15 cm. long, 3–6 cm. broad, short-acuminate to obtuse, acute or obtuse at the base, entire or nearly so, the veins prominent and reticulate beneath; umbels many-flowered, on very thick peduncles 2–2.5 cm. long, these fasciculate or very shortly racemose, conspicuously bracteate below, articulate above the base; pedicels thick, 3–7 mm. long; flowers 7–9-parted (5-parted in other species); calyx 3–4 mm. broad, denticulate; petals oblong-deltoid, 2.5–3 mm. long, subacute.

The leaves are pale green beneath when fresh; the petals creamy white.

Dendropanax schippii A. C. Smith, Trop. Woods 66: 3. 1941.
Gilbertia schippii A. C. Smith, Brittonia 2: 252. 1936.

Known certainly only from the type, British Honduras, Sittee River, in forest on river bank, at sea level, *W. A. Schipp* 641.

A glabrous shrub 1.5 meters high, the branches slender; leaves thick-membranaceous, on slender petioles 1-2.5 cm. long, oblong or obovate-oblong, 7-13 cm. long, 3-5 cm. broad, obtuse or subacute, acute or narrowly cuneate at the base, remotely callose-denticulate and somewhat undulate; umbels terminal, solitary, the peduncles 1.5-2.5 cm. long, bracteate above the base, the pedicels in fruit 5-7 mm. long; flowers 10-20 in each umbel; fruit subglobose, 5-7 mm. in diameter.

This may be a form of *D. arboreus* with inflorescence reduced to a solitary umbel.

DIDYMOPANAX Decaisne & Planchon

Mostly large trees, the inflorescence and the lower leaf surface generally covered with a whitish or brownish, minute, often lustrous tomentum; leaves large, long-petiolate, digitately compound, the leaflets coriaceous, entire, long-petiolulate, radiately spreading from the apex of the petiole and appearing verticillate; stipules small, adnate to the petiole; flowers small, greenish, the umbellules usually forming large panicles; bracts minute or none; pedicels not articulate at the apex; margin of the calyx repand-5-denticulate; petals 5, thick, valvate; stamens 5, the filaments very short, the anthers ovate, large; disc explanate, the margin undulate; ovary 2-celled, the styles distinct, stout, erect, in age recurved-spreading, stigmatose within near the apex; fruit strongly compressed, broadly subdidymous, the exocarp thin, carnose; pyrenes strongly compressed laterally, cartilaginous or hard.

About 20 species, in tropical America. One other Central American species grows in Costa Rica and Panama.

Didymopanax morototoni (Aubl.) Dene. & Planch. Rev. Hort. 4, 3: 109. 1854. *Panax morototoni* Aubl. Hist. Pl. Guiane Fr. 2: 949, t. 360. 1775.

Wet mixed lowland forest at or little above sea level; Petén; Ixabal. Mexico (Oaxaca); British Honduras, along the Atlantic coast (and southward both coasts) to Panama; South America.

A large tree, commonly 15-30 meters high, the trunk slender, about 30 cm. in diameter or sometimes thicker, the bark pale gray or pinkish brown, somewhat scaly, the trunk not buttressed; the crown often umbrella-shaped, rather small; leaves very large, the petioles commonly 40-60 cm. long; leaflets 7-10, long-petiolate, thick, elliptic or oblong, 20-40 cm. long, acuminate, rounded or often subcordate at the base, green and glabrous above, densely pale-sericeous beneath, juvenile leaflets often mucronate-serrate, hispid-pilose above; panicles usually very large and much branched, with very numerous, small umbellules, the stout pedicels 2-6 mm. long; petals small, white; fruit glaucous, blackish at maturity, 6-7 mm. broad.

Called "mountain trumpet" in British Honduras; known in Oaxaca by the names "chancarro blanco," "roble blanco," and "mano de danto."

This is one of the most common and characteristic trees of the rain forest of the Atlantic lowlands of Central America, where it is often the most abundant and conspicuous tree of the tallest stratum of the understory forest. The trees may be recognized from the ground because of their large size, striking form, and pale under surface of leaves. They grow rapidly and reproduce abundantly. The wood is grayish or pale brownish throughout, of medium luster, rather light and soft to moderately heavy and hard, with a specific gravity of about 0.50; its texture is medium to rather fine, the grain mostly straight, easy to work, finishing smoothly; not resistant to decay. In some regions the wood has been used for match sticks and boxes.

HEDERA L. Ivy

Woody vines, usually climbing by aerial roots; leaves simple, often lobate, coriaceous; stipules none; umbels paniculate, the flowers polygamous, small, the bracts minute or none, the pedicels not articulate; margin of the calyx entire or nearly so; petals 5, valvate; stamens 5, the anthers ovate, straight or finally recurved; disc convex, thick-conic, the style columnar; ovary 5-celled, the stigmas sessile at the ends of the style branches; fruit subglobose, juicy; nutlets ovoid-triangular, membranaceous or chartaceous; seed ovoid, the endosperm ruminant.

Three species, or perhaps only one, in Europe and Asia. One is cultivated for ornament in most temperate regions of the earth.

Hedera helix L. Sp. Pl. 202. 1753. *Hiedra* (often written *Yedra*); *siempre-verde*.

Native of Europe, Asia, and northern Africa, often grown for ornament in other regions; planted occasionally in Guatemala, usually creeping over walls; noted in Guatemala, Cobán, Momostenango, Huehuetenango, Quezaltenango, and elsewhere.

Plants high-climbing or sometimes creeping, with numerous aerial roots; leaves thick and somewhat fleshy when fresh, mostly 3-5-lobate and about as broad as long, dark green above, pale or yellowish green beneath, those of flowering branches usually entire and ovate; inflorescence covered with whitish stellate hairs; fruit juicy, usually black at maturity.

The Guatemalan climate, at least in the higher regions, seems well suited to the growth of ivy, which usually grows luxuriantly in the rather few places where it is planted.

NOTHOPANAX Seemann

Shrubs or small trees, glabrous or somewhat lanate; leaves digitately or pinnately compound, the leaflets usually membranaceous, entire, dentate, or incised; flowers small, umbellate, usually polygamous, the umbels racemose or paniculate, the bracts small and caducous or none; pedicels articulate below the flower; margin of the calyx entire or 5-denticulate; petals 5, valvate; stamens 5, the anthers ovate or oblong; ovary usually 2-celled, the styles distinct, erect or in age recurved, the stigmas decurrent on the inner surface; fruit laterally compressed, the exocarp fleshy; nutlets compressed, indurate, often sulcate or rugose.

About 15 species, in the southern hemisphere, mostly natives of the South Pacific. Several of the species are widely grown for ornament in tropical America, especially as hedge or patio plants. They are common in the lowlands of Guatemala and other countries of Central America. The shrubs are well adapted to hedge culture since usually they are densely branched, always green, and stand severe pruning. They attract attention because their leaves are often variegated with white or cream. They and the species of *Codiaeum* are almost equally popular for lowland hedges.

Leaves twice pinnate.....*N. fruticosus*.
Leaves once pinnate.

Leaflets 11-17, green.....*N. ornatus*.
Leaflets 5-7, usually margined or blotched with white.....*N. guilfoylei*.

Nothopanax fruticosus (L.) Miq. Fl. Ind. Bat. 1, pt. 1: 765. 1856. *Panax fruticosum* L. Sp. Pl. ed. 2: 1513. 1763.

Probably of Malayan origin, but now grown in most tropical countries; commonly planted in Guatemala, chiefly in the lowlands, where it and the other species are used for hedges; sometimes grown at places as high as Guatemala.

All three species are alike except in the form of their leaves, and the three are about equally common. In *N. fruticosus* the leaves are twice pinnate, the leaflets few or numerous, mostly incised-dentate and green throughout. The leaves often have a plume-like appearance. The shrubs are common in the lowland parks and often are seen in the cemeteries.

Nothopanax guilfoylei (Cogn. & March.) Merrill, Philip. Journ. Sci. Bot. 7: 242. 1912. *Aralia guilfoylei* Cogn. & March. Pl. Ornament. t. 58. 1874.

Probably of Polynesian origin; frequent in cultivation in Guatemala.

Leaves once pinnate, the leaflets 5-7, large, long-petiolulate, elliptic or broadly elliptic, obtuse or acute, deep green, usually edged with white, coarsely serrate.

Nothopanax ornatus (Bull.) Merrill, Philip. Journ. Sci. Bot. 7: 241. 1912. *Panax ornatum* Bull. Cat. 9. 1888.

Probably of Polynesian origin; frequently planted in Guatemala.

Leaves once pinnate, the leaflets 11-17, green, deeply pinnate-lobate, the leaves often very large and long-petiolate.

Flowers seem to be infrequent on cultivated plants of this genus, but they are found sometimes. They are so small and inconspicuous that they are easily overlooked, and severe pruning probably removes most of the flowering branches before the flowers open.

OREOPANAX Decaisne & Planchon

Shrubs or trees, frequently epiphytic, glabrous or tomentose, the pubescence often of branched hairs; leaves long-petiolate, entire, lobate, or digitately compound, the margins entire or dentate, the leaves often variable in form on sterile and fertile branches, usually coriaceous; stipules none or small and inconspicuous; inflorescence terminal or subterminal, bearing heads of flowers in panicles or racemes; flowers small, polygamodioecious, bracts scale-like, ternate; margin of the calyx entire or nearly so; petals 4-7, generally 5, valvate; stamens as many as the petals, short or somewhat elongate, the anthers ovate or oblong; disc explanate; ovary usually 3-5-celled, the styles free or somewhat connate, usually deciduous, the stigmas terminal; fruit globose, often sulcate when dried, baccate, the endocarp membranaceous or indistinct; seeds ovoid-subtriquetrous; endosperm ruminant or almost simple.

About 80 species, in tropical America, chiefly in mountain regions. A few others occur in southern Central America. Some of the species constitute an important element of the wet mixed forest of the mountains of Central and western Guatemala. Because of their generally handsome, large, and conspicuous deep green leaves they are of unusually attractive appearance. The often large inflorescences also contribute to the beauty of the trees. The wood in this genus is grayish, of medium luster and moderate density, or occasionally very light and soft, of rather fine and uniform texture, and straight-grained; its durability is low. So far as we know, no use is made of the wood in Guatemala or other Central American countries.

Leaves simple, often lobate.

Leaves all deeply lobate, often peltate, densely pubescent beneath with stellate stipitate hairs, or sometimes glabrate.

- Pistillate flower heads at anthesis about 1.5 cm. in diameter; lobes of the leaves entire or nearly so *O. lachnocephalus*.
- Pistillate heads at anthesis less than 1 cm. in diameter; lobes of the leaves usually coarsely dentate or undulate-lobate *O. peltatus*.
- Leaves entire, not lobate, at least on the fertile branches, the leaves of juvenile or sterile branches frequently lobate, or the leaves of fertile branches rarely shallowly lobate but the leaves then glabrous.
- Leaves finely stellate-pubescent on both surfaces, often glabrate above but usually rough to the touch *O. arcanus*.
- Leaves usually glabrous, never rough to the touch on the upper surface.
- Leaf blades lanceolate or lance-oblong, mostly 2.5-6 cm. broad, usually more than 3 times as long as broad, acute or obtuse at the base.
- Fruits about 4 mm. in diameter; nerves and veins usually conspicuous on the lower surface of the leaf *O. liebmannii*.
- Fruits 6-7 mm. in diameter; nerves inconspicuous on the lower leaf surface, the veins obsolete *O. steyermarkii*.
- Leaf blades suborbicular to broadly ovate or rounded-obovate, usually much wider, generally less than twice as long as broad, rounded or cordate at the base.
- Leaves rounded or very obtuse at the apex *O. obtusifolius*.
- Leaves acute or abruptly acuminate at the apex.
- Leaves all entire *O. capitatus*.
- Leaves, at least usually part of those on each branch, more or less lobate, with very acute lobes *O. sanderianus*.
- Leaves digitately compound.
- Leaflets mostly 5-12 cm. broad or larger, with sparse or dense, stipitate, branched hairs on the upper surface; fruiting heads about 4 cm. in diameter *O. echinops*.
- Leaflets mostly 2.5-4.5 cm. broad, glabrous on the upper surface or bearing sessile stellate hairs; fruit heads usually less than 2 cm. in diameter.
- Leaflets densely stellate-pubescent beneath, the hairs stipitate. *O. langlassei*.
- Leaflets glabrous beneath or the pubescence of minute sessile stellate hairs. *O. xalapensis*.

Oreopanax arcanus A. C. Smith, No. Am. Fl. 28B: 38. 1944.

Moist or wet, mixed forest, 2,100-2,800 meters; endemic; Sololá; Huehuetenango (type from Cerro Pixpax, *Steyermark 50645*; collected also above San Juan Ixcoy).

Terrestrial or epiphytic, sometimes 7.5 meters high, the branches thick, glabrous; leaves coriaceous, on petioles 4-10 cm. long, broadly oblong-ovate or ovate-elliptic, mostly 11-16 cm. long and 6-9 cm. broad, acute or abruptly acute or short-acuminate, rounded or even subcordate at the base, entire, minutely and sparsely stellate-puberulent on the upper surface or glabrate, lustrous, slightly paler beneath, rather densely and minutely stellate-puberulent or in age glabrate, the nerves elevated and conspicuous; inflorescence (perhaps incompletely developed or abnormal) about 4 cm. long, open, stellate-pilose, the heads rather numerous, long-pedunculate, the pistillate ones 2-3-flowered.

Oreopanax capitatus (Jacq.) Dcne. & Planch. Rev. Hort. 108. 1854. *Aralia capitata* Jacq. Stirp. Am. 89, t. 61. 1763. *Tronador*;

palo de cohéttilo; *cohéttilo*; *tapacopal* (Huehuetenango); *c'ab-choh* (chuh, fide Seler); *pata de león* (fide Seler).

Moist or wet forest, 2,800 meters or lower; Alta Verapaz; El Progreso; Izabal; Guatemala; Suchitepéquez; Sololá; Quezaltenango; San Marcos; Quiché; Huehuetenango. Southern Mexico; Costa Rica; Panama; West Indies; South America.

A terrestrial tree, or often an epiphytic shrub or tree, sometimes a tree of 15 meters but generally smaller, glabrous outside the inflorescence; petioles very unequal in length (as in most other species), sometimes very short, often much elongated; leaf blades chartaceous or coriaceous, broadly ovate to elliptic or rounded, mostly 10–25 cm. long, acute or abruptly acute or short-acuminate, rounded to rather deeply cordate at the base, entire, the nerves conspicuous and elevated beneath; young leaves apparently not at all lobate; pistillate flower heads few-flowered, pedunculate, forming dense or rather open, very stout racemes, these mostly about 9 cm. long, the rachis more or less whitish-pubescent or in age glabrate; fruits about 5 mm. in diameter, pale green or at maturity white or nearly so.

With its wide distribution, this is a variable species. More than that, some of the species treated as distinct, such as *O. sanderianus* and even *O. liebmannii*, cannot be separated sharply from it, distinct as their extremes appear to be. The entire-leaved *Oreopanax* species of Central America are most unsatisfactory to treat on this account, and it is far from certain how many specific units should be recognized. Like other members of the genus, this plant often begins life as an epiphyte but in the course of time becomes an independent tree, after the host is killed and decayed.

Oreopanax echinops (Schlecht. & Cham.) Dcne. & Planch. Rev. Hort. 108. 1854. *Aralia Echinops* Schlecht. & Cham. Linnaea 5: 174. 1830. *Castaño*, *huihuixl* (Quezaltenango).

Moist or wet, mixed forest, often on the steep sides of barrancos in rather open places, sometimes on white-sand slopes, 1,100–2,700 meters; Alta Verapaz; Quiché; Huehuetenango; Quezaltenango; San Marcos. Southern Mexico.

A terrestrial shrub or tree, commonly 4–9 meters high, usually with a slender trunk and few thick branches, densely and coarsely pilose or hirsute throughout with branched, usually long-stipitate hairs, these often or usually yellowish; leaves digitately 5-foliolate, or the uppermost leaves sometimes only lobate, long-petiolate, the petioles as much as 75 cm. long; leaflets sessile or short-petiolulate, thin, soft, obovate to oblanceolate-oblong, sometimes 45 cm. long and 22 cm. broad but usually not more than half as large, gradually or abruptly acuminate or caudate-acuminate, remotely sinuate-dentate or almost entire; heads very dense and many-flowered, subglobose, densely pale-tomentose, at anthesis usually 2 cm. in diameter,

in fruit often 4 cm. or more in diameter, forming long simple racemes; bractlets long-acuminate; stamens long-exserted; mature heads with very numerous fruits.

A common and conspicuous tree at many places in western Guatemala, very much in evidence at some places along the road above Rodeo in San Marcos. It is highly ornamental and of striking and unusual appearance, and has been introduced into cultivation in southern California. The inflorescences are larger and more showy than those of other species. The leaves of seedlings are simple and broadly ovate-cordate.

Oreopanax lachnocephalus Standl. Carnegie Inst. Wash. Publ. 461: 77. 1935.

Moist or wet forest, 600–1,500 meters; Petén (type collected at Camp 31, British Honduras Boundary, *W. A. Schipp 1272*); Zacapa; Jalapa. British Honduras; Honduras.

A tree as much as 18 meters high with a trunk 30 cm. in diameter, the young branches stout, covered with a rather dense, ferruginous, stellate tomentum; leaves coriaceous, on slender petioles 15–18 cm. long or more, palmately 5–7-lobate, about 26–30 cm. broad, openly cordate at the base and sometimes short-peltate, the lobes about half the length of the blade, long-acuminate, somewhat contracted toward the base, glabrous above or when young more or less stellate-pilose, ferruginous-tomentose beneath with branched hairs, usually densely so, the venation elevated and very closely reticulate on both surfaces, the margins of the leaves remotely serrate or in adult leaves entire or nearly so; heads numerous, globose, 1.5 cm. in diameter at anthesis, very dense and many-flowered, on stout peduncles 1–1.5 cm. long, forming large terminal panicles as much as 20 cm. long, very densely ferruginous-tomentose; bracts triangular-ovate, acuminate, 7–8 mm. long; immature fruit oblong, 7 mm. long, glabrous, depressed at the apex.

This is easily distinguished from *O. peltatus* when in flower but the two are often indistinguishable from sterile material. It is possible that *O. geminatus* Marchal, described from Nicaragua, may be an older name for this species.

Oreopanax langlassei Standl. Contr. U. S. Nat. Herb. 23: 1083. 1924.

Rare in mountain forests or oak-pine forests, 2,100–2,400 meters; Baja Verapaz; Zacapa. Mexico (Michoacán or Guerrero, Oaxaca).

A shrub or small tree of 4–8 meters, the branches thick, when young covered with a close subappressed brownish tomentum; leaves on long slender stellate-tomentose petioles, digitately 5–7-foliolate; leaflets on short or somewhat elongate petiolules, narrowly lance-oblong or narrowly lanceolate, 10–16 cm. long, 2.5–3 cm. broad, narrowly long-acuminate, cuneate-attenuate at the base, entire or remotely serrate, finely stellate-pubescent above or in age glabrate, deep green, somewhat



FIG. 3. *Oreopanax lacnocephalus*. Flowering branch; $\times \frac{1}{2}$.

lustrous, paler beneath, rather densely and coarsely pubescent beneath with stipitate branched hairs; staminate heads 5–6 mm. in diameter, dense, many-flowered, long-stipitate, forming racemes 25–40 cm. long or longer, the branches densely stellate-pubescent; fruits several in each head, the fruiting heads as much as 1.5 cm. broad, the individual fruits 5–6 mm. in diameter, glabrous, greenish white.

Very closely allied to *O. xalapensis*.

Oreopanax liebmannii Marchal, Bull. Acad. Brux. II. 47: 87. 1879. *O. oligocarpum* Donn.-Sm. Bot. Gaz. 16: 194. 1891 (type from Alta Verapaz, *J. D. Smith* 1743). *O. microcephalum* Donn.-Sm. Enum. Pl. Guat. 6: 71. 1903, *nomen*. *O. meiocephalum* Donn.-Sm. Bot. Gaz. 37: 210. 1904 (type from Alta Verapaz, *J. D. Smith* 1743). *Matapalo; cercil* (Chiquimula).

Moist or wet forest, sometimes on white-sand slopes, 1,000–3,000 meters; Alta Verapaz; Baja Verapaz; Zacapa; Chiquimula; Sololá; Quiché; Huehuetenango; Quezaltenango; San Marcos. Southern Mexico; British Honduras; Honduras; Costa Rica; Panama.

A shrub or tree, sometimes 9 meters high with a trunk 20 cm. in diameter, glabrous except in the inflorescence; leaves chartaceous, on slender, usually long but sometimes short petioles, mostly oblong-lanceolate or oblong and 8–20 cm. long, attenuate to the acute base, somewhat paler beneath or almost concolorous, the nerves evident or conspicuous beneath, slender; staminate heads 3–4 mm. in diameter, few-flowered, slender-pedunculate, racemose or paniculate, the panicles sometimes 15 cm. long, usually much shorter, the heads often few but sometimes very numerous, the branches more or less pubescent or almost glabrous; fruits usually only 2 in each head, about 4 mm. in diameter, white at maturity.

The Maya name “yaxyulup” is reported from British Honduras. The species is a variable one in almost every character, and some of the forms closely approach *O. capitatus*. As a rule it may be recognized by its narrow leaves, but there are some forms intermediate in leaf characters.

Oreopanax obtusifolius L. Wms. Fieldiana, Bot. 31: 20. 1964. *Aralia guatemalensis* Hort. ex Lemaire, Fl. Serres 3: Misc. 44. 1847, *in synonym., nomen illeg.* *Oreopanax guatemalense* Dcne. & Planch. ex Hemsl. Biol. Cent. Am. Bot. 1: 573. 1881, *nomen nudum*; *Sciadophyllum guatemalense* Lemaire ex Hemsl., *loc. cit., in synonym.*

Epiphyte or terrestrial in damp or wet lowland forests, 0–200 meters (type from Forest Home, British Honduras, *Schipp* 1031); Petén; Izabal; Alta Verapaz. Mexico; British Honduras; Honduras.

Large epiphytic shrubs or occasionally trees to 10 m. with a trunk to 10 cm. in diameter, glabrous except the young branches and inflorescences, with thick

terete branches. Leaves broadly obovate to broadly ovate or suborbicular-ovate, broadly round or obtuse at the apex, rounded to obtuse or subcordate at the base, chartaceous to subcoriaceous, the blade 8-20 (-35) cm. long and 3-18 (-25) cm. broad, the nerves conspicuous, with 3-5 prominent ones arising at the base, secondary nerves few; inflorescence paniculate, to 25 cm. long and as broad, rachis stellate-pubescent, becoming glabrescent, subtending bracts deltoid, 2-8 mm. long, puberulent, the peduncles 2-10 mm. long, the flower heads ovoid, 6-8 mm. across; calyx-limb truncate; petals narrowly oblong, 1.5-2 mm. long; fruits few in each head, 5-6 mm. in diameter, creamy-white.

The species is closely related to the more widespread *O. capitatus*.

Oreopanax peltatus Linden ex Regel, *Gartenflora* 11: 170, t. 363. 1862. *O. salvinii* Hemsl. *Diag. Pl. Mex.* 16. 1878 (type from Volcán de Fuego, *Salvin*). *Mano de león*; *tronador*.

Moist or rather dry forest, often in pine or oak forest, 1,500-2,700 meters; Alta Verapaz; Baja Verapaz; Zacapa; Jalapa; Guatemala; Sacatepéquez; Chimaltenango; Quiché; Quezaltenango; San Marcos. Mexico.

A shrub or a large tree, the smaller plants simple or sparsely branched, the trees with a large crown, the young branches densely tomentose with branched ferruginous hairs; leaves on long slender petioles, coriaceous but when fresh flexible, 15-50 cm. broad, deeply 5-7-lobate, the lobes broad or narrow, obtuse to acuminate, sinuate-lobate to sinuate or remotely serrate, coarsely stellate-pilose on the upper surface with stipitate hairs or in age glabrate, somewhat paler beneath, usually densely stellate-tomentose when young or even in age; flower heads variable in size, pedunculate, usually forming large and much branched, densely ferruginous-tomentose panicles; fruits few or numerous in each head, black at maturity, about 6 mm. in diameter, glabrous.

A frequent tree in some regions, and a highly ornamental one. It has been introduced into cultivation in southern California, and occasionally is planted for ornament in Guatemala, sometimes as a pot plant. The tree is of some considerable economic importance in Guatemala, for the large durable leaves are much used for covering baskets or food containers, and as wrapping for soap and other articles. Bunches of them often are offered for sale in the markets for this purpose. It might be thought that any large leaf would be suitable for such purposes but this is untrue, for most leaves either wither too quickly or else are not sufficiently tough, pliable, and substantial. Consequently, the leaves of only a small number of plants are used ordinarily for wrapping purposes; the most important of all in Guatemala being *Calathea* and *Musa* leaves.

Many of the specimens available are sterile and it is quite probable that some of these belong to *O. lacnocephalus* Standl. We have

no fertile specimens from Honduras or Nicaragua and think it likely that those so determined may be *O. lacnocephalus*.

Oreopanax sanderianus Hemsl. Gard. Chron. III. 11: 718. 1892. *Cohete; tronador; tronador de montaña; coheteillo*.

Moist or wet, usually mixed, mountain forest, 1,200-3,000 meters; Alta Verapaz; Chiquimula; Guatemala; Sacatepéquez; Chimaltenango (type from Volcán de Fuego, *Salvin*); Quezaltenango; San Marcos. Mexico (Chiapas).

A large shrub or a small tree, glabrous outside the inflorescence, terrestrial or most often epiphytic; leaves long-petiolate, subcoriaceous, very variable in size and shape, truncate to obtuse at the base, or sometimes deeply and narrowly cordate, usually angulately 3-lobate or sometimes 5-lobate, the lobes mostly shallow and triangular, acute or acuminate, often spreading at a right angle to the costa, the blades mostly 12-25 cm. broad, almost concolorous; inflorescence usually large and paniculate, with a sparse, more or less appressed tomentum or almost glabrous, the heads very numerous, pedunculate, rather few-flowered, the mature fruiting heads 1.5 cm. broad; fruits usually 3-4 in each head, about 5 mm. in diameter, white at maturity.

A very handsome plant, cultivated in the mountains of Guatemala for ornament either as a tree or as a pot plant. The young leaves when 5-lobate remind one of a large ivy (*Hedera*) leaf. They are of a bright and vivid green and usually glossy. The form of the leaves is more variable than in any other local species.

Oreopanax steyermarkii A. C. Smith, No. Am. Fl. 28B: 36. 1944.

Moist or wet forest; 1,400-2,500 meters; endemic; El Progreso; Zacapa (type from Sierra de Las Minas, *Steyermark* 42649); Huehuetenango.

Plants epiphytic or terrestrial, sometimes becoming a tree of 12 meters, glabrous except in the inflorescence or the young branches somewhat tomentulose; leaves on long or short, stout petioles, oblong or narrowly oblong, 13-22 cm. long, 4-6 cm. broad, acuminate or short-acuminate, acute or obtuse at the base, thick-coriaceous, entire, green and lustrous above, the venation not elevated, usually much paler beneath or glaucescent, the costa stout and elevated, the lateral nerves almost obsolete, very inconspicuous, the veins obsolete; heads very numerous, dense, many-flowered, forming sessile panicles 10-14 cm. long, the branches stout, tomentulose, the tomentum pale and appressed; fruits 2-3 in each head, globose, 7-8 mm. in diameter.

At first glance this appears to be a very distinct species, and further collections may prove this to be the case, but it has little to separate it from some of the forms of *O. capitatus* and *O. liebmannii*.

Oreopanax xalapensis (HBK.) Dcne. & Planch. Rev. Hort. IV. 3: 108. 1854. *Aralia xalapensis* HBK. Nov. Gen. & Sp. 5: 8. 1821. *O. Taubertianum* Donn.-Sm. Bot. Gaz. 19: 4. 1894 (type from Barranco de Corona, Guatemala, *J. D. Smith* 1905). *O. loesenerianus* Harms, Bot. Jahrb. 23: 127. 1896 (type from Volcán de Fuego, Chimaltenango, *Osbert Salvin*). *Mano de león*; *mano de tigre*; *aticuej* (Volcán de Agua); *chilil mazorco* (Sacatepéquez); *mazorco*; *mata-gente*; *m'shal* (Volcán de Santa María).

Moist or wet, mixed, mountain forest, sometimes on white-sand slopes, 750-3,100 meters; Alta Verapaz; Baja Verapaz; Zacapa; Chiquimula; Santa Rosa; Guatemala; Sacatepéquez; Chimaltenango; Suchitupéquez; Sololá; Quiché; Huehuetenango; Quezaltenango; San Marcos. Central and southern Mexico; Honduras and El Salvador to Panama.

A shrub or usually a tree, sometimes 18 meters high with a trunk 45 cm. in diameter, glabrous or nearly so except in the inflorescence; leaves on long slender petioles, digitately 5-9-foliolate; leaflets chartaceous or subcoriaceous, narrowly oblong-lanceolate to obovate, mostly 10-25 cm. long, acute to long-acuminate, attenuate at the base, entire or somewhat serrate, green and lustrous above, paler beneath, when young minutely stellate-puberulent but in age usually glabrous; flower heads 5-15 mm. in diameter, few-many-flowered, forming short or often much elongated, terminal racemes, these often 30 cm. long or more; fruits few or numerous in each head, subglobose, 5-6 mm. long, becoming white and at maturity black, very juicy.

It is called "Brazil" in El Salvador and is one of the most abundant and conspicuous trees of the mountain forest of the central and western mountains, almost the dominant tree in some regions. Frequently, the trees are planted for ornament in the parks. Wherever the trees are found, there is an abundance of seedling plants. The earliest leaves of these are simple and broadly cordate-ovate, the succeeding ones deeply lobate or with 3 leaflets.

SCIADODENDRON Grisebach

Large or medium-sized, glabrous trees, usually with few branches; leaves very large, deciduous, long-petiolate, twice pinnate, the leaflets membranaceous, short-petiolulate, serrate; flowers arising on naked branches or at least on old wood, often when the trees are leafless, umbellate, the umbels long-pedunculate, paniculate, or subracemose, the pedicels slender, not articulate; margin of the calyx subentire; petals 10-12, oval-linear, somewhat imbricate in bud; stamens 10-12; ovary subglobose, 10-12-celled, the styles recurved in age.

A single species is known.



FIG. 4. *Sciadodendron excelsum*. A, Paul C. Standley (1884-1963) with a mature leaf, much reduced. B, Leaflet; $\times \frac{1}{3}$. C, Inflorescence; about $\times \frac{1}{3}$. D, Flower with petals in place; $\times 5$. E, Flower with petals fallen; $\times 5$. F, Fallen petals; $\times 5$.

Sciadodendron excelsum Griseb. *Bonplandia* 6: 7. 1858.

Moist or dry thickets or open lowland forest, usually on dry rocky banks, 600 meters or lower; Zacapa; Chiquimula; Retalhuleu. El Salvador to Panama; Haiti; Colombia.

A tree, sometimes 20 meters high, the trunk straight, pale, sometimes a meter in diameter but usually smaller, the crown generally rather small and spreading, sparsely branched, the bark smooth or somewhat roughened; leaves very large, often a meter long, two or more times pinnate-ternate, the leaflets numerous, ovate or ovate-oblong, mostly 4.5–8.5 cm. long, long-acuminate, coarsely serrate, green above, paler beneath; umbels many-flowered, the pedicels mostly 5–8 mm. long; calyx 3 mm. broad; petals about 4 mm. long.

Called "corroncha de lagarto" or "lagarto" in El Salvador. While often attaining a considerable size, this plant often flowers when only a shrub of 2–3 meters. In Panama the long petioles are used for making bird cages. The wood is gray or yellowish gray throughout, its luster rather low, moderately light but firm, brittle, of rather coarse texture, mostly straight-grained and easy to work, but perishable in contact with the ground. No local uses are made of it, as far as we know.

UMBELLIFERAE¹ Carrot Family

References: John M. Coulter and J. N. Rose, A synopsis of the Mexican and Central American Umbelliferae, *Proc. Wash. Acad. Sci.* 1: 111–159, *tt. 3–13*. 1900. Hermann Wolff, *Umbelliferae*, *Pflanzenreich* IV. 228. 1910–27. Mildred E. Mathias and Lincoln Constance, *Umbelliferae*, *No. Am. Fl.* 28B: 43–295. 1944–45.

Annual or perennial herbs, very rarely suffrutescent; leaves alternate or rarely opposite, often all radical, the radical leaves usually larger and more conspicuous than the cauline ones, the petiole often dilated at the base into a sheath; leaf blades simple or usually compound or decomposed; stipules usually none; inflorescence almost always umbellate, rarely capitate, the umbels simple or generally compound, often subtended at the base by an involucre of bracts, the umbellules usually subtended by bractlets; flowers small, regular or nearly so, perfect or often polygamous-monoecious; petals mostly white, yellow, purple, or greenish; calyx tube adnate to the ovary, the limb obsolete or of 5 small teeth; petals 5, inserted on the margin of the calyx, equal or the outer ones larger, erect or spreading, often incurved at the apex or with an inflexed acumen, the apex of the petal then appearing emarginate, the petals usually imbricate or reduplicate-valvate in bud; stamens 5, the filaments filiform, inflexed in bud; anthers ovoid or subglobose, versatile, the cells parallel, longitudinally dehiscent; ovary inferior, 2-celled; epigynous disc bilobate or bifid, various in form, often continuous with the stylopodium (enlarged

¹ An alternative name for this family, *Apiaceae* of Lindley, is sanctioned for those who wish to be consistent in the termination of family names.

style bases); styles 2, distinct, filiform, straight or after anthesis often recurved; ovules solitary in each cell of the ovary, pendulous from the apex of the cell, anatropous; fruit inferior, dry, composed of 2 indehiscent 1-seeded merocarps, these attached by their inner surface or commissure, separating from a usually persistent carpophore; merocarps bearing dorsally usually 5 costae, 2 marginal ones, 1 dorsal one, and 2 intermediate ones between the dorsal and marginal ones, the costae often extended into broad wings; pericarp usually containing oil tubes; seed 1 in each merocarp, pendulous from the apex of the cell, the inner face flat, concave, or sulcate.

A large family with some 200, often not very distinct, genera of which there are more than 90 in North America, best represented in temperate regions, in the tropics, except for a few weedy species, almost confined to mountain regions. Probably all the Central American genera are represented in Guatemala. The family contains a considerable number of important cultivated plants, used for both food and condiment. Some few "umbels" are poisonous. Plants of this family are easily recognized, as a rule, by their umbellate inflorescences and characteristic fruits. Most also have a characteristic odor. The separation and recognition of the genera is often difficult.

Radical and principal cauline leaves simple.

Flowers capitate, sessile; leaves often with spine-tipped teeth. *Eryngium*.

Flowers not capitate, pedicellate; leaves never with spine-tipped teeth.

Umbels compound; leaves terete, fistulous, septate. *Ottoa*.

Umbels simple or, if compound, the leaves flat, orbicular to reniform or broadly ovate, never terete.

Petiole with a dense tuft of hairs at the apex. Erect branched herbs with usually ovate and cordate leaves. *Spananthe*.

Petiole without a tuft of hairs at the apex.

Umbels compound, the umbellules 3-flowered; leaves reniform.

Micropleura.

Umbels simple or proliferous, not normally compound, when proliferous the leaves peltate.

Petals acute, valvate; leaves peltate or reniform. *Hydrocotyle*.

Petals obtuse, imbricate; leaves reniform. *Centella*.

Radical and principal cauline leaves compound.

Fruit bearing conspicuous, straight or uncinete bristles or spines.

Fruit covered throughout with short uncinete bristles; leaves palmately divided. *Sanicula*.

Fruit with bristles only on the costae; leaves pinnately dissected or ternate-pinnate.

Fruit linear-clavate, the bristles straight. *Osmorhiza*.

Fruit broad, the bristles usually uncinete or barbate at the apex. . . . *Daucus*.

Fruit without either bristles or spines, usually glabrous.

Fruit compressed dorsally (parallel with the commissure) or not at all compressed.

Plants annual; cultivated plants.

Flower white or tinged with pink.....*Coriandrum*.
 Flowers yellow.....*Anethum*.

Plants perennial; native plants.

Fruit oblong or almost linear, twice as long as broad or longer.
 Fruit almost linear; leaflets glabrous.....*Myrrhidendron*.
 Fruit oblanceolate; leaflets somewhat pubescent beneath on the veins.
Enantiophylla.

Fruit broader, almost or quite as broad as long.
 Stylopodium lacking, face of the seed sulcate; divisions of the leaves
 crenate-serrate, not lobate.....*Prionosciadium*.
 Stylopodium present, depressed to conic, face of the seed plane; divi-
 sions of the leaves deeply cleft and dentate.....*Rhodosciadium*.

Fruit more or less compressed laterally (contrary to the commissure) or almost
 terete.

Plants cultivated, or else native but then annuals.

Bracts of the involucre present and conspicuous.
 Flowers greenish yellow; rays 10-20.....*Petroselinum*.
 Flowers white; rays 50-60.....*Ammi*.

Bracts of the involucre none or few, small, and inconspicuous.
 Flowers yellow; plants very glaucous.....*Foeniculum*.
 Flowers white or nearly so; plants not conspicuously glaucous.
 Ribs of the fruit filiform and very inconspicuous; plants puberulent.
Pimpinella.

Ribs of the fruit well developed; plants glabrous.....*Apium*.

Plants native or thoroughly naturalized, perennial.

Leaves pinnate, the leaflets serrate or incised.....*Berula*.
 Leaves not simply pinnate, usually two or more times compound.
 Mericarps of the fruit conspicuously winged. Involucre none or of 1
 bract; tall plants with purple flowers.....*Coaxana*.

Mericarps not winged.
 Umbels simple. Dwarf plants with scapiform stems; flowers white
 or tinged with purple.....*Oreomyrrhis*.

Umbels compound.
 Stylopodium conical.
 Fruit cordate, emarginate at the base, somewhat didymous.
Arracacia acuminata.

Fruit not cordate, neither emarginate at the base nor didymous.
Arracacia.

Stylopodium none or depressed.
 Plants dwarf, the stems scapiform; umbels with very few rays.
Tauschia.

Plants very large and tall, with leafy stems; umbels with many
 rays.
 Involucre none; flowers yellow.....*Donnellsmithia*.
 Involucre present; flowers white.....*Conium*.

AMMI L.

Slender, glabrous annuals or perennials from slender tap roots; leaves ternately
 or pinnately dissected, petiolate, the ultimate divisions filiform to lanceolate. In-
 florescence a terminal or lateral compound umbel; involucral bracts entire or

divided, many; involucels of many entire bractlets; flowers usually white; petals ovate or obovate with inflexed tips; calyx very small; styles slender, about twice as long as the stylopodium; fruit oblong to ovoid, laterally compressed, the ribs acute, oil tubes one at each interval and two on the commissures.

The genus is adventive in America.

Ammi majus L. Sp. Pl. 243. 1753. *Madre perla; encajes; lluvia de plata.*

Native of southern Europe. Sparingly introduced as an ornamental in Guatemala and elsewhere in Central America.

Erect branching annuals often a meter or more tall, glabrous or the upper part of the plant obscurely puberulent; leaves ternate or usually pinnate, to 20 cm. long and nearly as broad, the segments lanceolate, serrate to somewhat lacerate, those of the stem bipinnate with linear divisions; involucre of the inflorescences exceeding the rays, the involucels linear-subulate, entire or sometimes divided, about as long as or shorter than the pedicels; fruit oblong, to about 2 mm. long and half as broad.

ANETHUM L. Dill

Glabrous erect annuals, strong-scented, often very glaucous; leaves dissected into linear or filiform segments, these very numerous, entire, the long petioles dilated below into a broad, nerved sheath; flowers very small, yellow, in large compound umbels; involucre and involucels none; fruit oblong to elliptic, strongly compressed dorsally, the lateral costae winged, the dorsal ones slender, acute.

Two species are known, native in southeastern Europe and in Asia.

Anethum graveolens L. Sp. Pl. 263. 1753. *Eneldo; hinojo.*

Native of southeastern Europe; cultivated commonly in Guatemalan gardens, and rarely found as an escape in corn fields or other cultivated ground.

Plants usually a meter high or less, often much branched, very pale and glaucous throughout, the stems striate; leaves much dissected into very numerous, almost filiform segments; umbels as much as 15 cm. broad, with several or very numerous rays; fruits pedicellate, about 6 mm. long and 3 mm. broad.

The plant has a distinctive odor and the fruits a characteristic flavor. Both the "seeds" and foliage are much used for flavoring food, in the United States principally and very commonly for giving their peculiar taste to cucumber and other pickles. Dill is much grown about Cobán and thrives in that wet and cool climate. The plants often grow very tall, and some of those seen at various places in Baja Verapaz must have been at least 2.5 meters high.

APIUM L.

Annual or perennial herbs, glabrous or nearly so; leaves pinnate or ternate-pinnate; flowers yellow or white, the umbels compound, usually opposite the leaves or terminal and in the forks of the branches; bracts of the involucre very few, 1, or none, the bractlets of the involucels numerous or none; calyx teeth obsolete; petals ovate, generally acute and concave, or produced into an inflexed acumination, entire or rarely emarginate; stylopodium depressed or low-conic; fruit ovate or broader than long, laterally compressed, constricted at the commissure, often didymous; carpels 5-angulate; carpophore undivided or short-bifid at the apex.

About 15 species, in tropical and temperate regions of both hemispheres. No other species are known from Central America.

Divisions of the leaves linear or nearly so; native plants *A. leptophyllum*.

Divisions of the leaves cuneate or broadly cuneate; cultivated plants . . *A. graveolens*.

Apium graveolens L. Sp. Pl. 264. 1753. *Apio*. Celery.

Native of Europe; grown occasionally for food in Guatemala at middle or rather high elevations; rarely escaping to cultivated ground (a weed in street at San Juan, Sacatepéquez, Guatemala).

A coarse glabrous strong-scented perennial, 30-90 cm. high, sparsely branched; leaves pinnate, the basal and lower cauline ones long-petiolate, the upper cauline ones short-petiolate or sessile; leaf segments 3-5, petiolulate or sessile, thin, broadly ovate to oval or cuneate, coarsely dentate and often incised; umbels terminal and opposite the leaves, 3-7-radiate, the involucre and involucels small or none; flowers small, white, on very short pedicels; fruit oval, 1 mm. long, the ribs slightly winged.

Celery is occasionally cultivated in Guatemala, and elsewhere in the highlands of Central America for sale in the markets, principally to Europeans. It rarely does well and the petioles are often pithy. It is used more as a flavoring material, especially for soups, than as a vegetable. The horticultural form most common is apparently var. *dulce* (Mill.) Pers. although large rooted celeriac, var. *rapaceum* DC., may be grown. Celery is often imported from the United States for the market of Guatemala City.

Apium leptophyllum (DC.) F. Muell. ex Benth. Fl. Austr. 3: 372. 1866. *Helosciadium leptophyllum* DC. Prodr. 4: 105. 1830. *A. ammi* Urban in Mart. Fl. Bras. 11¹: 341, t. 91. 1879, non Crantz. *Culantrillo*; *anis de ratón*; *culantro de chuchó*.

Wet to dry thickets or fields, frequently in pine-oak forest, often in waste or cultivated ground, 900-2,300 meters; Alta Verapaz; Chiquimula; Jalapa; Guatemala; Sacatepéquez; Chimaltenango; Sololá; Huehuetenango; Totonicapán; Quezaltenango. Southern United

States; Mexico; Honduras and El Salvador to Panama; West Indies; South America; Australia.

A very slender, usually erect annual, generally 50 cm. high or less, glabrous, sparsely or much branched; leaves thrice ternately parted into numerous, linear or filiform segments, the lower leaves on rather long petioles, the upper ones on short vaginate petioles; umbels sessile or nearly so, opposite the leaves, 1-3-radiate, the rays 8-15-flowered, the pedicels 2-7 mm. long, the flowers white; fruit ovoid, 1.5-2.5 mm. long, slightly compressed laterally; mericarps with 5 prominent ribs, the carpophore shortly bifid at the apex.

A common but very inconspicuous, often weedy plant.

ARRACACIA Bancroft

Large or small, perennial herbs, glabrous or puberulent, the roots or rhizomes sometimes tuberous-thickened; leaves often large, pinnate or pinnately compound, the leaflets usually broad, dentate or pinnatifid; flowers generally white, small, the umbels compound, with few or numerous rays; bracts of the involucre usually foliaceous, sometimes none; bractlets of the involucels numerous or few, undivided; calyx teeth small or obsolete; petals ovate or broader, subentire, the acumen inflexed; stylopodium conic, the margin undulate; fruit ovate or ovate-oblong, usually attenuate at the apex, laterally compressed, constricted at the commissure; merocarps transversely subterete or 5-angulate, the primary costa prominulous, the dorsal and intermediate ones usually more elevated; carpophore 2-parted; seed subterete, the face deeply sulcate, the margins commonly involute.

About thirty species or perhaps fewer, chiefly in the mountains from Mexico to the South American Andes. Only one additional species is found in Central America. The generic name is a modification of the vernacular one used in Colombia and other Latin American countries.—*Neonelsonia* Coulter and Rose, Contr. U. S. Nat. Herb. 3: 307, t. 9. 1895, is here treated as a generic synonym although it is maintained by Mathias and Constance in North American Flora.

Nodes of the rachis and petiolules pubescent in rings or with annulate callus thickenings.

With annulate callus thickenings; leaflets ovate or cordate-ovate, rounded, truncate or cordate at the base. *A. annulata*.

With rings of pubescence; leaflets linear-lanceolate to ovate-lanceolate, narrowed to the base.

Leaflets mostly 1.5 cm. broad or less and linear or linear-lanceolate; stylopodium depressed and relatively indistinct; fruits ovoid. *A. donnellsmithii*.

Leaflets mostly 1.5 cm. broad or mostly broader, lanceolate to ovate-lanceolate; stylopodium prominent; fruits ovoid-cordate. *A. acuminata*.

Nodes of the rachis glabrous and smooth.

Plants cultivated for their edible (yellow) roots. *A. xanthorrhiza*.

Plants native and found only wild.

Stylopodium depressed and indistinct; plants in flower less than 1 m. tall.

A. vaginata.

Stylopodium evident, conic; plants in flower more than a meter tall.

Leaflets mostly deeply lobate, usually glaucous or glaucescent beneath.

A. atropurpurea.

Leaflets mostly serrate or dentate (a few rarely lobate), green beneath.

A. bracteata.

Arracacia acuminata Benth. Pl. Hartw. 187. 1845. *Neonelsonia ovata* Coulter & Rose, Contr. U. S. Nat. Herb. 3: 307, t. 9. 1895. *N. acuminata* Coulter & Rose ex Drude in Engler & Prantl, Nat. Pflanzenf. 3, Abt. 8: 167. 1898.

Moist or wet mixed mountain forests, 1,400–2,900 meters; El Progreso; Sacatepéquez; Chimaltenango; Sololá; Quezaltenango; San Marcos. Mexico; Costa Rica; Colombia to Peru in the Andes.

Large coarse herbs, commonly erect and 1–1.5 meters tall, sometimes more elongate and as much as 3 meters long, then decumbent and trailing, the stems hollow, often purplish, glabrous, leafy; basal leaves very large, mostly 30 cm. long or more, long petiolate, the leaflets numerous, lanceolate to ovate-lanceolate, usually 4–6 cm. long or larger and 2–4 (4.5) cm. broad, thin, bright green, acuminate or caudate-acuminate, coarsely and unevenly serrate and often lobate or lobulate, usually somewhat scabrous or at least somewhat roughened beneath on the pale veins; umbels few, on long peduncles, compound, often to 16 cm. broad, the rays very numerous, slender, unequal, glabrous; pedicels slender, glabrous, 18 mm. long or shorter, usually very unequal; bractlets of the involucre sometimes 5 cm. long but usually shorter; fruit as broad as or usually broader than long, 4–5 mm. long and 5–7 mm. broad.

A common and showy plant in the wet forests of the mountains of the Western Guatemalan highlands, often in great abundance. The range of the species is curious. It is distributed in Mexico and Guatemala and appears again in Costa Rica and then in the Andes from Colombia to Peru. It has been segregated as *Neonelsonia* but seems too near to *A. donnellsmithii* and to some Andean species to maintain it distinct from *Arracacia*.

Arracacia annulata L. Wms. Fieldiana, Bot. 31: 46, fig. 9 1964.

Cool mountain forests, 1,650 to 3,100 meters; Huehuetenango (type from Sierra de los Cuchumatanes, *Steyermark* 48965). Mexico (Vera Cruz and perhaps Puebla).

Large, coarse, essentially glabrous suffrutescent perennial herbs to 1.5 m. or more tall. Leaves deltoid-ovate in general outline, ternate-pinnate, or ternate-bipinnate, 10–35 cm. long (excluding petiole) and as broad or broader, petiole to 15 cm. long and sheathing at the base, all junctures of petiolules with rachis and petioles with rugose annulate callus thickenings, usually also at the junction of

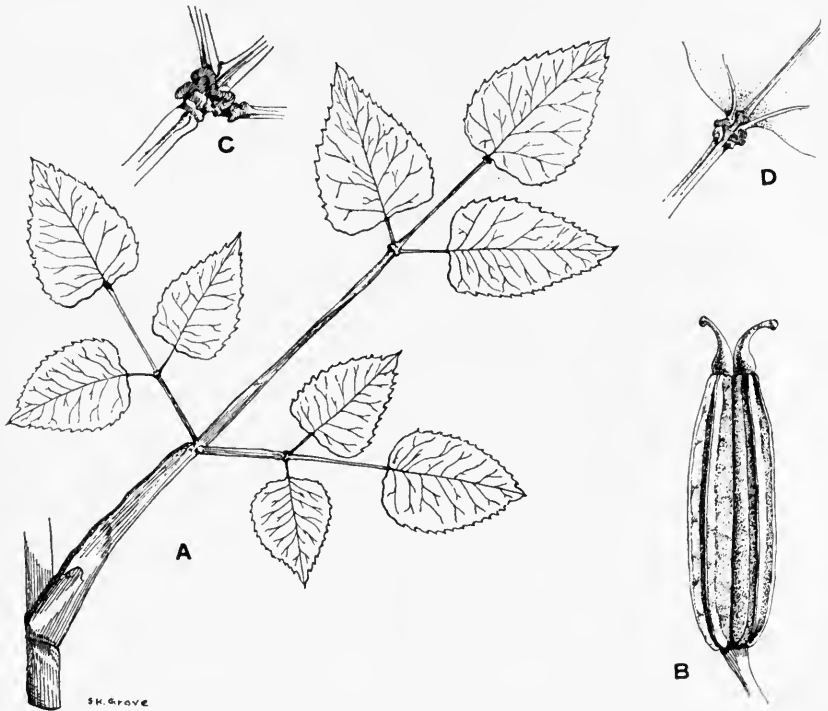


FIG. 5. *Arracacia annulata*. A, Leaf from upper part of stem; $\times \frac{1}{2}$. B, Mature fruit; $\times 5$. C, Annulate callus thickening on petiole; $\times 5$. D, Annulate callus thickening at the base of a terminal leaflet; $\times 5$.

the petiolule with the leaflet; the uppermost leaves much reduced, occasionally to a sheathing bract; leaflets ovate to cordate-ovate, acuminate, the base round, truncate or shallowly cordate, serrate-dentate except at the base, 3.5–9 cm. long and 2–4.5 cm. broad (those on upper reduced leaves much smaller), the petiolule on lateral leaflets 0–1 cm. long, that (rachis?) on terminal leaflets to 3.5 cm. long; inflorescence cymosely branched, the umbels few-many; peduncles of fertile, mature umbels 3–5 cm. long; involucre of few short, soon deciduous bracts or none; involucre of several linear or filiform bractlets 2–5 mm. long and deciduous with age, fertile rays 2–20, spreading, the pedicels 2–10 mm. long; flowers purple; petals oblong, ± 0.5 mm. long; sepals broadly ovate, ± 1 mm. long; stylopodium narrowly conic, the styles slightly reflexed, the stigmas capitate, the whole 1.5–2.5 mm. long; the fruit narrowly lanceolate, about 7 mm. long and 1.5–2 mm. broad, the ribs prominent, subalate on young fruit.

Easily distinguished from the other species of the genus by the rugose annulate callus thickenings at the juncture of rachis and petiolules.

Arracacia atropurpurea (Lehm.) Benth. & Hook. ex Hemsl. Biol. Cent. Am. Bot. 1: 564. 1880. *Pentacrypta atropurpurea* Lehm. Ind. Sem. Hort. Hamb. 17. 1828. *A. luxeana* Coult. & Rose, Bot. Gaz. 18: 55. 1893 (type from San Miguel Uspantán, Quiché, Heyde & Lux 3354). *A. humilis* Rose, Contr. U. S. Nat. Herb. 8: 336. 1905 (type collected between Totonicapán and Los Encuentros, C. & E. Seler 2352).

Moist or wet, mixed forest, or often with pine, *Cupressus*, *Abies*, or *Juniperus*, sometimes on limestone, 1,800–3,700 meters; Zacapa; Jalapa; Sacatepéquez (Volcán de Agua); Chimaltenango; Huehuetenango; Quezaltenango; San Marcos. Central and southern Mexico; Costa Rica; Panama.

A perennial herb, sometimes a meter high but usually much lower, erect or sometimes decumbent, glabrous throughout or nearly so, the stems often purplish and glaucescent, leafy; leaves long-petiolate or the uppermost cauline ones short-petiolate, ternate, the divisions pinnate; leaflets petiolulate or sessile, oblong-ovate to broadly rhombic-ovate, mostly 2–4 cm. long, obtuse or acute, usually glaucous or glaucescent beneath, thin, most of them deeply lobate and irregularly crenate-serrate with mucronate teeth; umbels few, long-pedunculate, 10 cm. broad or less, the rays numerous, very unequal, often scabrous at the base, the pedicels stout, very unequal; involucre none, the bracts of the involucels few, linear or lanceolate, entire or lacinate, usually much longer than the flowers; fruit glabrous, about 7 mm. long and 2.5 mm. broad.

Arracacia bracteata Coult. & Rose, Contr. U. S. Nat. Herb. 3: 295. 1895. *Cicuta* (Jalapa); *arracacha de monte*; *chunch-botch*.

Moist or wet, mixed, mountain forest, or often in pine or oak forest, 2,200–3,150 meters; Jalapa; Guatemala; Sacatepéquez (Volcán de Agua); Chimaltenango; Huehuetenango; Quezaltenango; San Marcos. Southern Mexico; Honduras.

A coarse, somewhat succulent herb, commonly 1–3 meters high, or often lower, the stems thick, hollow, simple or branched, glabrous; radical leaves very large, on long slender petioles, biternate, the ultimate segments usually pinnate; leaflets sessile, thin, oblong or ovate-oblong, mostly 5–12 cm. long, acuminate or long-acuminate, green beneath, unevenly and closely serrate, rarely some of the leaflets shallowly lobate, glabrous; flowers white, the umbels sometimes 20 cm. broad, naked at the base, the rays numerous, very unequal, sometimes scabrous at the apex; pedicels stout, unequal, often very numerous, glabrous or puberulent; fruit glabrous, about 6–8 mm. long and 3–4 mm. broad, rounded or emarginate at the base.

Arracacia donnell-smithii Coult. & Rose, Bot. Gaz. 15: 261, t. 15. 1890. *Sis* (Huehuetenango); *Solojo* (San Marcos).



FIG. 6. *Arracacia bracteata*. A, Leaf and inflorescence; about $\times \frac{1}{2}$. B, Fruit; $\times 4$. C, Apex of fruit; $\times 8$.

Moist or wet, mixed forest, or more often in the higher belts of pine forest on the high mountains, sometimes in *Cupressus* forest or in wet thickets, 2,400–3,600 meters; Sacatepéquez (type from Volcán de Agua, *J. D. Smith* 2196); Chimaltenango; Huehuetenango; Quezaltenango; San Marcos; known only from Guatemala but to be expected in Chiapas.

A large coarse perennial herb, usually 1.5–3 meters high, almost glabrous, the foliage bright green, the stems thick, hollow, often purplish; simple or sparsely branched, leafy; radical leaves very large, 2–3 times ternate, the ultimate divisions mostly pinnate, the nodes densely pubescent or tomentose; leaflets very numerous, oblong-lanceolate to almost linear-lanceolate, mostly 5–9 cm. long, 0.5–1.5 (2.5) cm. broad, glabrous, green beneath, attenuate-acuminate, sessile and often decurrent on the rachis, finely and evenly serrate, usually not at all lobate; flowers white, the umbels usually numerous, sometimes 12 cm. broad, the rays numerous, stout, unequal, densely puberulent, the pedicels short, unequal, stout, puberulent; involucre none, the bracts of the involucels lanceolate or linear-lanceolate, greenish, longer than the flowers; fruit glabrous, ovate, about 6 mm. long and 4 mm. broad.

A rather handsome and showy, tall plant, often occurring in abundance throughout or especially at the bases of the highest pine-clad slopes of the volcanoes. On the Volcán de Acatenango it is found everywhere as one emerges from the dense wet *Chiranthodendron* forest into the open pine forest, where most of the ground is covered with coarse bunch grasses.

Arracacia vaginata Coult. & Rose, Contr. U. S. Nat. Herb. 3: 297. 1891. *Tauschia vaginata* Coult. & Rose, Proc. Wash. Acad. Sci. 1: 137, f. 8. 1900.

At 2,500–2,800 meters; Huehuetenango. Mexico (Michoacán; Oaxaca).

Plants perennial from a thick perpendicular root, 20–75 cm. high, erect or decumbent, the stems glabrous or nearly so; lowest leaves twice pinnate or pinnate and with deeply lobate leaflets, long-petiolate, the petioles broadly sheathing at the base; leaflets thin, ovate or lance-ovate, coarsely dentate or cleft, acute or obtuse, cuneate at the base, pubescent on the margins and veins or almost glabrous, green beneath; peduncles short or elongate, the involucre none or of a few linear bracts; bractlets linear, acuminate, green, entire, about as long as the flowers; rays of the umbel 6–25 mm. long, the pedicels 2–4 mm. long, glabrous or minutely puberulent; petals yellow; fruit ovoid, 5–6 mm. long, the styles long, recurved, the costae stout and prominent.

This species appears quite different from the other species of *Arracacia* in Guatemala and is easily distinguished from them by having the stylopodium depressed and indistinct rather than quite evident and conic.

Arracacia xanthorrhiza Bancroft, Trans. Agri. Hort. Soc. Jamaica 1825: 5. 1825. *A. esculenta* DC. Prodr. 4: 244. 1830. *Arracacia*.

Believed to be native of the mountains of Colombia; planted occasionally for food in mountain regions of other parts of tropical America; cultivated occasionally in Guatemala.

An erect perennial from a tuberous, yellow or white root, this bearing several exterior tubers, these as much as 20 cm. long and 5-6 cm. thick; stems erect, 50-100 cm. high, glabrous, branched, often streaked with purple; radical leaves large, with usually 5 ovate-acuminate pinnae, these deeply and irregularly pinnatifid, or the lowest ones pinnate, the ultimate segments acuminate and serrate, green beneath; umbels few or numerous; involucre none; bractlets of the involucre 2-3, small, setaceous; fruit oblong, the mericarps with 5 subequal obtuse ribs; styles slender, almost equaling the fruit.

An extended account of this plant is given in connection with plate 3092 of Curtis' *Botanical Magazine*. It is propagated from cuttings of the tubers, much like the common potato, and is said to yield a crop of roots within about four months. It is reported that in the region of Bogotá, Colombia, the root is a rather important and popular vegetable but apparently it has found little favor in Costa Rica and Guatemala, where it is sometimes cultivated. We do not recall having seen it served on the table in Guatemala, although it may be eaten by the Indians, or perhaps it is used only in soups and not eaten alone.

BERULA Hoffmann

Glabrous perennial herbs, erect, simple or branched, growing in wet soil or in shallow water; leaves pinnate, the segments few or numerous, serrate or incised; flowers small, white, the umbels terminal, compound; involucre and involucrels of several narrow bracts and bractlets; calyx teeth very small; stylopodium conic, the styles short; fruit subglobose, emarginate at the base, slightly compressed laterally, glabrous, the ribs very slender, the pericarp thick and corky; face of the seed flat.

The genus consists of a single species.

Berula erecta (Huds.) Coville, Contr. U. S. Nat. Herb. 4: 115. 1893. *Sium erectum* Huds. Fl. Angl. 103. 1762.

Wet soil along streams, 2,100-2,500 meters; Huehuetenango, Canada and United States; Mexico; Europe; and Asia.

Plants rather stout, erect, usually less than a meter high, simple or often much branched, the stems striate; leaves pinnate, long-petiolate, the leaflets 7-19, ovate to oval or narrowly oblong, 1.5-3.5 cm. long, acute, sessile, deeply serrate, lacinate, or lobate; umbels numerous, short-pedunculate, 10-20-rayed, the rays short or elongate; pedicels 3-6 mm. long; bracts and bractlets lanceolate or linear-lanceolate, entire; fruit scarcely 2 mm. long, suborbicular, subcordate at the base, the ribs inconspicuous.

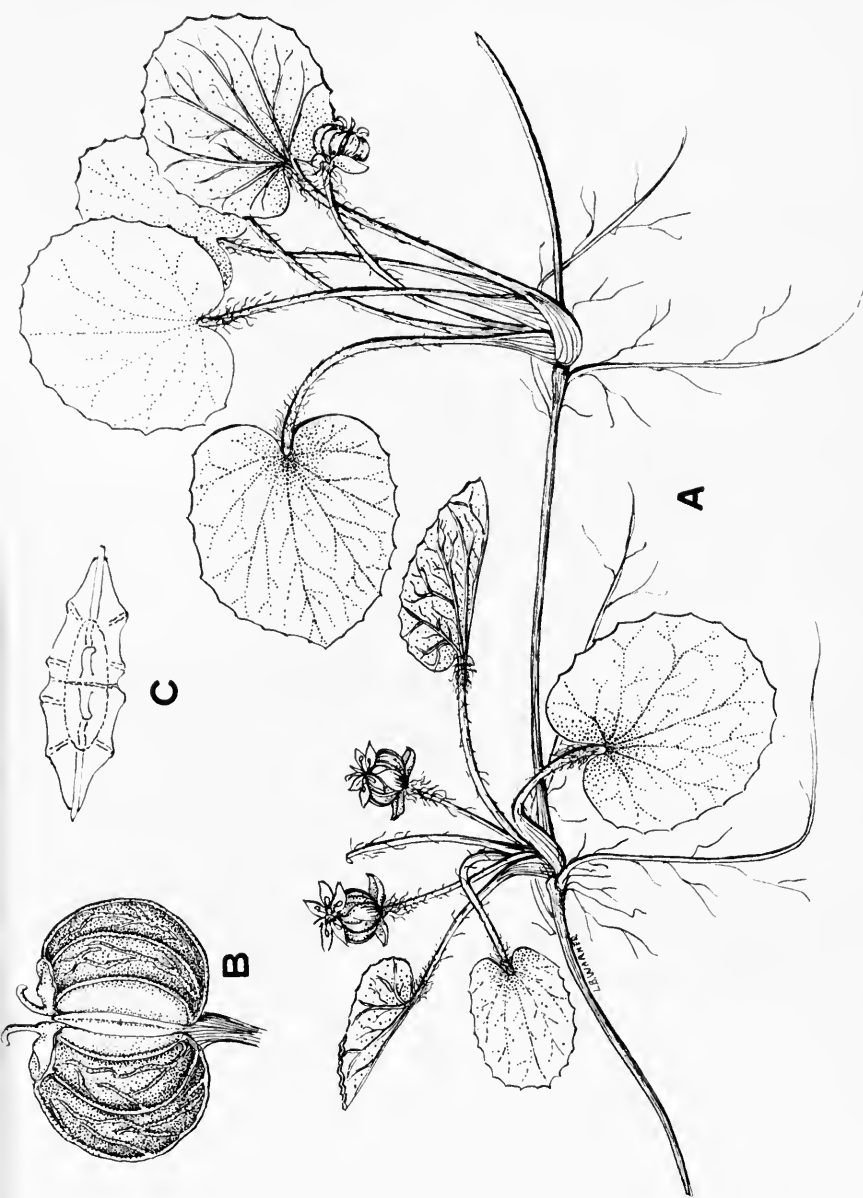


FIG. 7. *Centella asiatica*. A, Habit; about $\times 1\frac{1}{2}$. B, Fruit; $\times 8$. C, Outline of fruit as seen from above; $\times 8$.

CENTELLA L.

Perennial, glabrous (ours) herbs, the stems prostrate and rooting, with several long petiolate leaves at the nodes; leaves petiolate, dentate or undulate, palmately veined, cordate at the base, the petioles with vaginate bases; inflorescence of simple, subcapitate, few-flowered umbels (ours), peduncles axillary, about as long as the leaves or usually shorter, involucrel bracts usually two and conspicuous; calyx teeth none; stylopodium flat or none; styles short, filiform; fruits laterally compressed, prominently costate, oil tubes none.

A genus of some twenty species found in both hemispheres, most abundant in Africa. The following is the only species found in America.

Centella asiatica (L.) Urban in Mart. Fl. Bras. 11, pt. 1: 287. 1879. *Hydrocotyle asiatica* L. Sp. Pl. 234. 1753. *H. erecta* L. f. Suppl. 177. 1781. *H. asiatica* f. *luxurians* Donn.-Sm. Enum. Pl. Guat. 1: 15. 1889, *nomen*. *Centella erecta* Fernald, Rhodora 42: 295. 1940; Math. & Const. No. Am. Fl. 28B: 59. 1944.

Wet meadows or thickets, stream banks, marshes, sometimes in wet pine woods, 1,900 meters or less; Petén; Alta Verapaz; Jalapa; Huehuetenango. Eastern and southeastern United States; Mexico; British Honduras; Honduras. West Indies; South America; Old World tropics.

Stems rather stout and somewhat fleshy, short or elongate, creeping and rooting at the nodes; petioles 3-30 cm. long; leaf blades broadly ovate to orbicular-ovate, 2-7 cm. long, rounded at the apex, openly and often deeply cordate at the base, rather thick and fleshy, repand-dentate; peduncles usually shorter than the leaves, mostly 1-5 cm. long, the umbels head-like, 2-4-flowered, subtended by 2 ovate bracts, the flowers sessile or subsessile; fruit 3-4 mm. long and 3-5 mm. broad, conspicuously costate and somewhat reticulate.

COAXANA Coulter & Rose

Large coarse perennial herbs, glabrous or nearly so, the stems simple or sparsely branched, leafy; leaves large, bi-trinervate, the leaf sheaths conspicuous and somewhat inflated, the leaflets thin, lobate and serrate; involucre none or of a single bract; involucels conspicuous, narrow, serrate or incised; umbels compound, many-radiate, the rays unequal; flowers purple; the calyx teeth obsolete; fruit oblong, glabrous, laterally flattened, glaucous; stylopodium low-conic; styles long and slender, recurved; merocarps 3-4-winged; face of the seed plane or concave.

The genus consists of two species. The generic name is an anagram of the word Oaxaca, the name of the state of Mexico in which the plant was first collected.



FIG. 8. *Coaxana purpurea*. Habit, slightly reduced. A, Dorsal view of fruit; about $\times 5$. B, Cross-section of fruit; about $\times 8$. [Illustration from original publication, courtesy of the Smithsonian Institution.]

Coaxana purpurea Coult. & Rose, Contr. U. S. Nat. Herb. 3: 297, t. 5. 1895.

Moist or wet, mixed forest, 2,100–3,000 meters; Chimaltenango; Sololá; Quezaltenango; San Marcos. Mexico (Michoacán, Oaxaca).

Plants a meter high or lower, or in Mexico reported as 2 meters tall, the stems glabrous, glaucous, often purplish; radical leaves very large, triternate or bipinnate, the leaflets ovate to ovate-oblong, very unequal in size and shape, acute, petiolulate or sessile, irregularly and often deeply lobate and unequally doubly serrate, with acuminate teeth, paler beneath, the cauline leaves reduced upward, the sheaths conspicuously inflated; peduncles short or elongate, puberulent at the base of the umbel; involucre of a single foliaceous bract, or none; the pedicels 5 mm. long or less, glabrous or minutely scaberulous; involucels lanceolate or linear, much longer than the flowers, green, most of them with a few teeth or lacinations; fruit about 5 mm. long, each merocarp with 3 or 4 conspicuous broad wings.

CONIUM L. Poison hemlock

Tall glabrous biennial herbs with branched stems from a stout tap-root; leaves pinnately decomposed, the numerous segments pinnatifid and dentate; flowers small, white, polygamous, the umbels large, compound, many-radiate; bracts and bractlets of the involucre and involucels numerous, small; calyx teeth obsolete; petals obovate or cuneate, obtuse and entire or with a short inflexed acumen; stylopodium depressed; fruit broadly ovate, laterally compressed, more or less constricted at the commissure; merocarps somewhat 5-angulate, the primary costae prominent, obtuse, undulate-crenate or smooth, the lateral ones distinct; carpophore undivided; seed deeply and narrowly sulcate on the inner face.

Probably two species, the other one African.

Conium maculatum L. Sp. Pl. 243. 1753. *Perejil de monte; perejil de chucho.*

Sometimes abundantly naturalized in waste ground, especially in wet soil, 1,800–2,500 meters; Chimaltenango (Patzicía); Quezaltenango. Native of Europe, now widely naturalized around the world.

Plants erect, about a meter high, the stems stout, hollow; lower and basal leaves petiolate, the upper cauline ones sessile or nearly so, pinnately dissected, the leaflets very numerous, ovate in outline, thin, incised and dentate; petioles much dilated and vaginate at the base; umbels 2.5–7 cm. broad, with slender elongate rays, the pedicels filiform, 4–6 mm. long in fruit; bracts and bractlets few, poorly developed, inconspicuous, entire; fruit 3 mm. long, the costae very conspicuous in the dry state.

This is the hemlock famous in the history of Greece and other Mediterranean countries. It is supposed to be the plant by which Socrates was put to death, and was employed commonly in the poi-

soning of criminals. It has become abundantly naturalized about Quezaltenango, and there are some very large and luxuriant colonies of it in the lower part of that city.

CORIANDRUM L. Coriander

Slender annuals, branched, glabrous; leaves petiolate or the upper ones sessile, the basal leaves with ovate incised segments, those of the cauline leaves linear; flowers white or tinged with pink; inflorescence of loose, compound umbels, usually few-rayed; involucre usually none; the bractlets of the involucels few, filiform; calyx teeth acute, generally unequal; petals usually unequal, those of the outer flowers of the umbel usually larger, obovate, with an inflexed tip, more or less bilobate at the apex; stylopodium conic, entire; fruit globose or ovoid, the mericarps transversely semiterete, not easily separable, the costae prominulous; carpophore bifid; seed strongly compressed dorsally, orbicular, somewhat concave on the face.

Two species, native in Europe and western Asia.

Coriandrum sativum L. Sp. Pl. 256. 1753. *Culantro*: *Culantro de Castilla*.

Native of Europe, cultivated commonly in most civilized regions, and grown frequently in Guatemalan gardens; often naturalized rather freely in waste and cultivated ground, at 900–2,500 meters; Alta Verapaz; Zacapa; Santa Rosa; Jutiapa; Sacatepéquez; San Marcos, and doubtless other departments.

Plants erect, usually 50 cm. high or less; lowest leaves pinnately divided, the segments ovate to obovate, variously lobate and dentate, the upper leaves divided into very numerous, short, linear, pale segments; umbels 2.5–5 cm. broad, with slender rays, the pedicels 2–4 mm. long, the flowers rather conspicuous and showy; bractlets of the involucels deciduous; fruit about 4 mm. long, the ribs subacute, narrower than the intervening intervals.

Coriander is grown in Guatemala as elsewhere for its aromatic "seeds" of distinctive taste that are used to flavor various articles of food. The fresh plants often are sold in Guatemalan markets, for use in soups and meat dishes.

DAUCUS L.

Annual or biennial herbs, usually with harsh pubescence; leaves pinnately compound, the segments small or narrow; flowers small, white, the outer ones often larger than the inner ones; umbels compound, the outer rays longer and in age connivent above the inner ones, or the rays equal or unequal and all spreading even in fruit; calyx teeth small and acute or obsolete; petals usually unequal, obovate, with an inflexed or involute acumen, emarginate, or sometimes entire; stylopodium depressed or short-conic, sometimes undulate-crenulate on the margin; fruit ovate

or oblong, subterete or more or less dorsally compressed; merocarps semiterete or dorsally convex, the ribs more or less prominent, all or only the secondary ones aculeolate or setulose; carpophore entire or bifid; seed semiterete or dorsally compressed, the face flat.

About 50 species, almost all of them in temperate or warm regions of the Old World, only two species native in America. Only the following are known in Central America.

Outer rays of the umbel in age connivent above the inner ones; cultivated plants.

D. carota.

Outer rays of the umbel widely spreading in fruit; native plants *D. montanus.*

Daucus carota L. Sp. Pl. 242. 1753. *Zanahoria.* Carrot.

Native of Europe and Asia, cultivated for food in almost all civilized parts of the earth; grown commonly as a vegetable in Guatemala.

Plants biennial, setulose-hispidulous or hirsute throughout, erect, a meter high or usually lower, branched; basal and lower leaves 2-3-pinnate, the segments lanceolate, dentate or pinnatifid, the upper leaves smaller and less divided; bracts of the involucre parted into linear or filiform lobes; umbels 5-10 cm. broad, the inner rays shorter than the outer ones, the slender pedicels 2-4 mm. long; flowers white, the central one of each umbel usually dark purple; fruit 3-4 mm. long, setulose on the somewhat winged ribs.

The carrot is a common and fairly popular vegetable in Guatemala although the Indian peoples probably use it little. It grows well at most elevations, but the root is usually quite hard and woody. Most vegetables of the temperate zone are grown in Guatemala. It may be noted, however, that parsnips are rare in Central America and the few which we have seen tended to be excessively woody.

Daucus montanus Humb. & Bonpl. ex Schult. Syst. Veg. 6: 482. 1820. *Alfilería* (Quezaltenango).

Moist or dry, often rocky, brushy or open fields and hillsides, sometimes in meadows in *Alnus* forest, in gravel along streams, or a weed in waste or cultivated ground, 1,000-3,000 meters, most frequent at middle or higher elevations; Alta Verapaz; Zacapa; Chiquimula; Jalapa; Guatemala; Sacatepéquez; Chimaltenango; Sololá; Totonicapán; Quiché; Huehuetenango; Quezaltenango; San Marcos. Mexico; El Salvador; Honduras; Costa Rica; South America.

Plants sometimes annual but probably enduring often for more than one year, erect, sparsely or much branched, generally 50 cm. high or less, sparsely or densely hispidulous; leaves mostly small, divided into very numerous, small, narrow, ob-

tuse and apiculate segments; bracts of the involucre much divided and resembling leaves; umbels many-flowered, usually rather open, as much as 15 cm. broad but usually much smaller, the rays stiff, very unequal; bractlets of the involucre linear; pedicels in fruit usually conspicuously elongate and mostly 5-8 mm. long; fruit about 5 mm. long, with dense rows of stout pale spines along the winged angles, the spines barbate at the apex.

A rather common plant in meadows of the highlands, often plentiful in overgrazed areas, since no animals eat the foliage. The burlike fruits adhere closely to clothing and to the hair of animals, thus aiding in wide dispersal of the seeds.

DONNELLSMITHIA Coulter & Rose

Slender glabrous caulescent perennials arising from slender, somewhat thickened roots, the stems simple or sparsely branched, sparsely leafy; leaves 1-4-ternate or ternate-bipinnately decomposed, the rather few segments linear or broader, entire or variously cleft; inflorescence of loose compound umbels; flowers very small, pedicellate, yellow or purple, involucre present or none, of linear or filiform bracts; involucre none; calyx teeth obsolete; stylopodium obsolete; fruit rounded-ovoid, glabrous, somewhat compressed laterally; merocarps with equal filiform costae, the intermediate one distant from the lateral ones; seed face deeply and narrowly sulcate.

About 12 species, in Mexico and Central America. Only the following have been found in Central America. The genus was named for John Donnell Smith, who might, with much justice, be called the father of Guatemalan botany.

Segments of the leaves linear, 1-3 mm. broad. *D. peucedanoides*.
Segments of the leaves lanceolate or broader, 5-18 mm. broad. *D. guatemalensis*.

Donnellsmithia guatemalensis Coult. & Rose, Bot. Gaz. 15: 15, t. 2. 1890. *Tauschia guatemalensis* Macbride, Contr. Gray Herb. 56: 33. 1918.

Moist or wet meadows or open, pine or oak forest, 1,200-2,500 meters; endemic; Baja Verapaz (type from Santa Rosa, *Tuerckheim* 1311); Zacapa; Chimaltenango; Chiquimula; Huehuetenango. Honduras.

Plants slender, glabrous, a meter high or less, glaucescent, erect, simple or usually sparsely and openly branched above; leaves few, at or near the base of the stem, the lower ones long-petiolate, the uppermost short-petiolate or subsessile, 2-3 times ternate, the leaflets few, very variable in shape and size, linear-lanceolate to lanceolate or rhombic, 2.5-5.5 cm. long, acute to long-acuminate, cuneate at the base, mostly entire and with revolute margins, sometimes lobulate; umbels compound, few-rayed, terminating long slender naked peduncles; involucre often present and consisting of 3-4 trifid bracts, sometimes absent; pedicels 4-6 mm. long; fruit 2-3 mm. long.

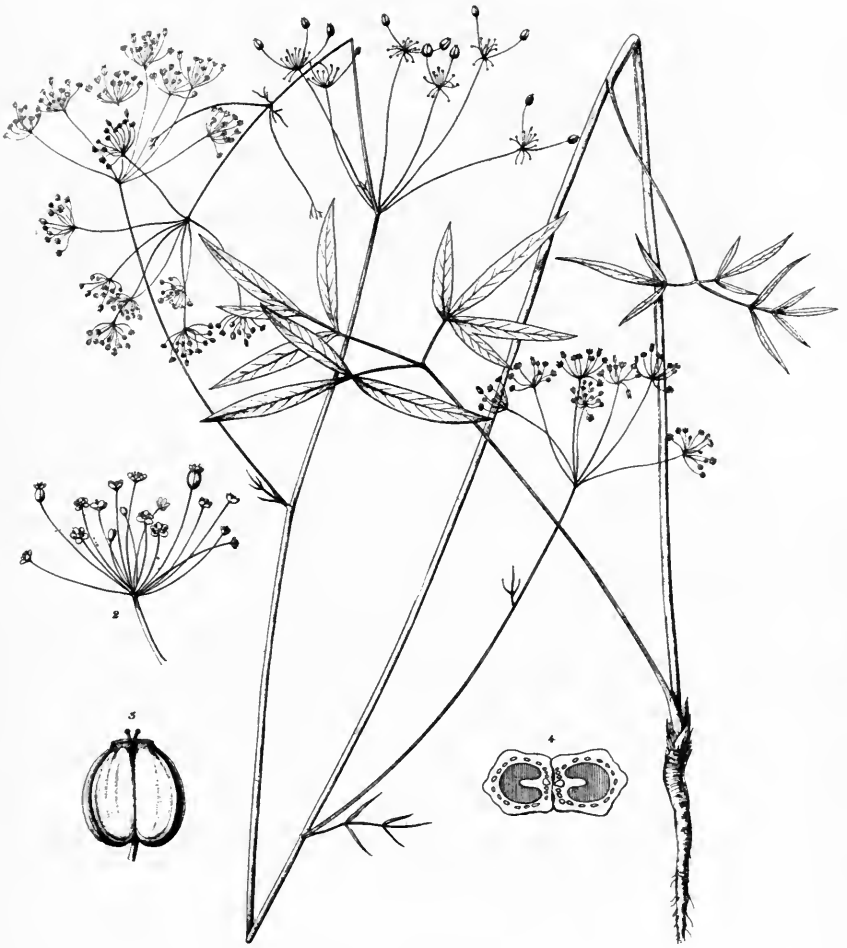


FIG. 9. *Donnellsmithia guatemalensis*. 1, Habit; $\times \frac{1}{2}$. 2, Umbellule; about $\times 1$. 3, Fruit; $\times 6$. 4, Cross-section of fruit; about $\times 8$. [Illustration, drawn by C. E. Faxon, is from original publication, courtesy of The University of Chicago Press.]

Donnellsmithia peucedanoides (HBK.) Mathias & Constance, Bull. Torr. Bot. Club 68: 122. 1941. *Cnidium peucedanoides* HBK. Nov. Gen. & Sp. 5: 15. 1821. *Smyrniium* ? *lineare* Benth., Pl. Hartw. 83. 1841 (type Guatemala, *Hartweg 578*). *Eulophus peucedanoides* Benth. & Hook. Gen. Pl. 1: 885. 1867. *Musenopsis peucedanoides* Coult. & Rose, Contr. U. S. Nat. Herb. 3: 303. 1895. *Perejil de rana* (fide Aguilar); *valeriana* (Huehuetenango).

Usually in rather dry, open, pine or oak forest, 1,000–3,000 meters; El Progreso; Jalapa; Santa Rosa; Guatemala; Chimaltenango; Quiché; Huehuetenango. Mexico; Honduras; South America (Colombia).

Plants very slender, erect, glaucous, 35–90 cm. high, the stems mostly solitary, simple or sparsely branched, terete, naked or usually bearing 1–2 leaves below; basal leaves on very long, slender petioles, 2–3 times ternate, the divisions few or rather numerous, linear or narrowly linear, 7.5 cm. long or shorter, often revolute, entire; umbels few, on very long and slender, naked peduncles, compound, the rays 3–5; involucre of 2–3 small 3-fid bracts, these frequently deciduous; fruit glaucous, 2–3 mm. long.

This is rather widely distributed in pine and oak forests at middle elevations in the mountains, but the plants usually are few and isolated, inconspicuous among the tall grasses with which they usually grow.

ENANTIOPHYLLA Coulter & Rose

Large coarse perennials, herbaceous or suffrutescent, the stems simple or branched, leafy, the plants almost glabrous; leaves opposite, very large, the radical and lower cauline ones long-petiolate, ternately compound, the primary divisions pinnate or bipinnate, the uppermost leaves with short sheathing petioles, pinnate, the leaflets large, thin, lanceolate or lance-ovate, long-acuminate, serrate; umbels compound; bracts of the involucre few, elongate-linear, entire; bractlets few, linear, the flowers long-pedicellate, probably white; calyx teeth obsolete; fruit oblanceolate-oblong, rather large, somewhat compressed dorsally, glabrous; merocarps dorsally compressed, the dorsal and intermediate ribs prominent, acute, the lateral costae with broad pale wings; stylopodium slender-conic; style stout, erect, conspicuously thickened and subcapitate at the apex; seed strongly compressed dorsally, the face concave.

The genus consists of a single species.

Enantiophylla heydeana Coulter & Rose, Bot. Gaz. 18: 56, t. 5. 1893. *Canonera* (Sacatepéquez).

Brushy or wooded, often rocky and steep hillsides, 1,000–2,050 meters; Chiquimula; Jalapa; Santa Rosa; Guatemala; Sacatepéquez (type from Santiago, *Rosalio Gómez 788*); Chimaltenango; Quezaltenango. Mexico (Mexico); El Salvador.



FIG. 10. *Enantiophylla heydeana*. Leaf and inflorescence; about $\times \frac{1}{2}$. Dorsal view of fruit is about $\times 1\frac{1}{2}$. Outline shows cross-section of fruit but dorsal wings usually more prominent. [Illustration, drawn by C. E. Faxon, is from original publication, courtesy of The University of Chicago Press.]

Plants 1-3 meters high, sometimes somewhat woody and with a stout erect trunk a meter high and 10 cm. thick, the stems hollow, simple or sparsely branched; lower leaves very large and on long thick hollow petioles, the leaflets lanceolate or lance-ovate, mostly 5-10 cm. long, thin, sessile, closely and rather finely serrate with somewhat incurved, mucronate teeth, slightly paler beneath, conspicuously short-villosulous or puberulent beneath on the veins; inflorescence very large and usually much branched, the peduncles and pedicels scabrous; umbels many-radiate, the rays straight or nearly so, spreading, subequal, the pedicels 6-8 mm. long; bracts and bractlets few, linear or lance-linear, scarious-marginate; fruit 10-12 mm., long and 4 mm. broad, slender-rostrate; carpophore 2-cleft.

In Mexico, the plant is reported to attain a height of 6 meters which, if true, indicates a much greater size than has been observed in Central America.

ERYNGIUM L.

References: Hermann Wolff, Pflanzenreich IV. 228: 106-271. 1913. Mildred E. Mathias and Lincoln Constance, A synopsis of the North American species of *Eryngium*, Amer. Midl. Nat. 25: 361-387. 1941.

Biennial or perennial herbs, caulescent or acaulescent, usually glabrous, with stout taproots or rootstocks; leaves coriaceous or membranaceous, simple and entire to pinnately or palmately lobate or cleft, often with spine-tipped teeth or divisions, the venation parallel or reticulate; petioles vaginate; inflorescence capitate, the heads solitary, cymose, or racemose; involucre of 1 or more series of entire or lobate bracts at the base of the head; involucre of entire or lobate bractlets subtending the flowers, these white to purple, sessile; petals ovate to oblong, the tips inflexed and lobate to fimbriate; sepals ovate to lanceolate, acute or obtuse, entire or rarely spinose-dentate; stylopodium none; fruit globose to obovoid, scarcely compressed laterally, variously covered with scales or tubercles; ribs obsolete, the commissure broad; seed subterete in cross section, the face plane or slightly concave.

Species about 200, widely distributed in both hemispheres, in North America most numerous in Mexico. At least one other species is found in Central America.

Leaves with parallel veins, narrow spine-tipped lobes *E. cymosum*.
Leaves with reticulate venation.

Leaves acute to attenuate at the base, the petiole broadly marginate to the base, the teeth tipped with long sharp stiff spines.

Bracts white or bluish on the inner surface *E. carlinae*.

Bracts green on the inner surface *E. foetidum*.

Leaves cordate to obtuse at the base, on long naked petioles, the teeth obtuse or with very short spines.

Bracts of the involucre lobate or coarsely dentate; leaf blades not cordate at the base *E. scaposum*.

Bracts of the involucre entire; leaf blades deeply cordate to subcordate at the base.

Leaves with conspicuous callous margins, the teeth muticous. . . . *E. gracile*.

Leaves not callous-marginate, the teeth with short spinose tips.

E. ghiesbreghtii.

Eryngium carlinae Delwar. *Eryng.* 54, t. 23. 1808. *C. reptans* Hemsl. in Hook. *Icon.* 26, t. 2543. 1897 (type from Quezaltenango, Bernoulli & Cario 2745). *E. affine* Wolff, Fedde *Rep. Sp. Nov.* 7: 345. 1909. *Escorcionera*; *piñapunta* (Jalapa); *quixtán* (Huehuetenango, perhaps an erroneous name).

Moist or dry meadows often in alpine regions, frequently on dry rocky slopes or in pastures, sometimes on limestone, 1,000–3,400 meters; most frequent at the higher elevations; Alta Verapaz; Baja Verapaz; Jalapa; Guatemala; Sacatepéquez; Chimaltenango; Sololá; Quiché; Huehuetenango; Totonicapán; San Marcos. Mexico; Costa Rica; Panama.

Plants perennial from a thick root, the stems few or numerous, prostrate to erect, usually less than 30 cm. high, the plants glabrous throughout, the stems simple or branched, stout, naked or bearing only a few leaves; basal leaves usually persistent in age and forming a rosette flat on the ground, oblanceolate or obovate, mostly 3–10 cm. long, rounded or obtuse at the apex, long-attenuate to the base and practically sessile, serrate or lacinate-lobate, the teeth spine-tipped; heads 1–many, ovoid or short-cylindric, usually bearing several large and conspicuous bractlets at the apex, these equaling or often longer than the flowers, the heads mostly 1 cm. long or shorter; bracts at the base of the head 8–10, bluish or whitish, rigid, broadly lanceolate or oblanceolate, 10–15 mm. long, with a few spine-tipped teeth or rigid lobes.

A common plant in meadows of the higher mountains, persisting in dry places through the dry season. Guatemalan material is highly variable and some of it might be referred to related Mexican species on the basis of the key in Mathias and Constance's account of the genus. The key characters that they use, particularly the relative length of bractlets and styles, evidently are not dependable for separation of species in this group of the genus. Either the close relatives that they recognize in Mexico are not distinguishable from *E. carlinae* or else better characters must be found for separating them. In Alta Verapaz this plant is employed in domestic medicine, especially as a remedy for diarrhea and for the treatment of some afflictions peculiar to women. Although *E. reptans* is keyed by Wolff and by Mathias and Constance far apart from *E. carlinae*, examination of the original illustration and study of the description reveal no characters by which the two may be separated, despite Hemsley's glib statement that *E. reptans* "is not closely related to any species," something that could not be said of many species in this genus of poorly marked entities.

Eryngium cymosum Delar. Eryng. 63, t. 31. 1808. *E. guatemalense* Hemsl. in Hook. Icon. IV. 8: sub t. 2766. 1903 (type collected near Hacienda Chancol, Huehuetenango, E. W. Nelson 3654). *Escarzionera*; *espino*; *escarzionera*; *cardosanto*; *c'ax* (Quezaltenango).



FIG. 11. *Eryngium cymosum*. A, Habit; $\times \frac{1}{2}$. B, Flower; $\times 7$.

Moist or dry thickets, meadows, or open hillsides, often in rocky places, open, pine or *Juniperus* forest, sometimes on limestone, 1,650-3,750 meters; El Progreso; Jalapa; Guatemala; Sacatepéquez; Chimaltenango; Huehuetenango; Totonicapán; Quezaltenango; San Marcos. Southern Mexico.

A very coarse and stout perennial, glabrous throughout, pale green, usually 1-1.5 meters high, the stems terete, striate, simple below, bearing few or numerous leaves; basal leaves usually numerous, linear or nearly so, mostly 10-30 cm. long, deeply pectinate-lobate, the lobes narrow, spine-like, very stiff, spreading, sessile or essentially so, parallel-nerved; inflorescence usually much branched and bearing numerous heads; bracts at the base of the head 10-12, 3.5 cm. long or shorter, spreading or reflexed in age, entire, linear-lanceolate, rigid and tipped by a stout sharp spine, longer than the head; flower heads globose, about 1.5 cm. in diameter; bractlets subulate, longer than the flowers; sepals acute or very obtuse, mucronate; petals 2 mm. long; fruit 2.5-4 mm. long, densely squamate.

In their monograph of *Eryngium* Mathias and Constance considered *E. guatemalense* a distinct species, separating it on the basis of its greater size, obviously not an important or stable character, and the obtuse rather than acute sepals, a character that is variable and apparently worthless, to judge from Mexican and Guatemalan material examined. *E. cymosum* has been reported from Guatemala as *E. pectinatum* Presl. It is a very common and conspicuous plant in the higher mountains of Los Altos, especially in those areas where coarse bunch-grass (*Epicampes*) abounds, and where large numbers of sheep are pastured. The plant is an offensive one, as well protected as any thistle (*Cirsium*), and a great pest in the regions where it occurs. Obviously, it is left severely alone by grazing animals, but the sheep probably help to spread it by carrying the small burlike fruits in their wool. It seems to be most plentiful in those too numerous parts of Guatemala where sheep grazing has been carried to excess.

***Eryngium foetidum* L. Sp. Pl. 232. 1753.** *Culantero; culantro extranjero; culantro real; alcapate; escorzonera; samat; xamat* (Cobán; Quechí); *silantro cimarrón* (Petén, fide Lundell).

Wet or moist, open banks or pastures, sometimes in waste ground; 1,300 meters or less; often cultivated in gardens; Petén; Alta Verapaz; Izabal; Jutiapa; Escuintla. Mexico; British Honduras to El Salvador and Panama. West Indies; South America; naturalized in Africa and Asia.

Plants perennial from a cluster of rather thick, fleshy roots, the stems solitary, simple, naked, or sometimes several, frequently branched and often leafy, the whole plant glabrous and strong-scented; basal leaves usually numerous and forming a rosette, narrowly or broadly oblanceolate, mostly 8-20 cm. long, obtuse, attenuate

to the base and essentially sessile, crenate or usually finely or coarsely serrate, the teeth tipped with a short yellowish spine; heads few or numerous, usually about 1 cm. long, cylindric, yellowish green; involucre bracts 5-6, foliaceous, lanceolate, acute, entire or sparsely spinulose-serrate, sometimes 3 cm. long but mostly shorter; bractlets at the apex of the head usually large, foliaceous, and forming a conspicuous apical tuft; sepals lanceolate to triangular-ovate, 1 mm. long or less; petals elliptic-oblong, less than 1 mm. long; fruit globose-ovoid, 2 mm. long, densely squamate.

Sometimes called "acapate" in El Salvador and Honduras. It is a weedy plant, widely distributed in Central America, found principally in waste ground near dwellings. It is well known in the region because of its use in the kitchen. The fresh plant has a very strong and most nauseous odor, but when boiled in soups or stews it imparts to them a delicious flavor, such as could never be expected from the living plant. The plant is used to some extent in household medicine in Guatemala.

Eryngium ghiesbreghtii Decaisne, Bull. Soc. Bot. France 20: 21. 1873. *Lechugilla* (Huehuetenango).

Moist or rather dry, oak forest, or on open hillsides or fields, 1,000-2,200 meters; Baja Verapaz; Santa Rosa; Chimaltenango; Guatemala; Quiché; Huehuetenango. Mexico; reported by Wolff from Bolivia.

Plants perennial from a cluster of rather thick fleshy roots, glabrous, erect, 75 cm. high or less, the stems solitary or few, somewhat fistulose, striate, simple or branched below, usually somewhat leafy; basal leaves often numerous, on very long, slender, rather weak petioles, cordate-triangular, as much as 10 cm. long and 6 cm. broad, acute or subacute, shallowly or deeply cordate at the base, densely and finely crenate with spinulose-mucronate teeth, 7-9-nerved from the base, the sinus broad and open, much paler beneath; upper cauline leaves sessile and clasping; bracts at the base of the head rigid, linear-lanceolate, about 1 cm. long, pale green with white nerves, acute and spine-tipped, entire or nearly so, conspicuously parallel-nerved; heads globose or depressed-globose, greenish white, much shorter than the involucre; sepals triangular-lanceolate, acute or obtuse, short-mucronate, 1.5 mm. long; petals broadly spatulate, deeply excised; styles much longer than the sepals; fruit compressed-globose, 2 mm. long, densely squamate.

Eryngium gracile Delar. Eryng. 54, t. 24. 1808. *E. longirameum* Turcz. Bull. Soc. Nat. Moscou 20, pt. 1: 171. 1847.

Moist or rather dry, oak or pine forest, or in alpine meadows, 1,800-3,300 meters; Jalapa; Chimaltenango; Quiché; Huehuetenango. Southern Mexico.

Plants glabrous, perennial from a cluster of slender, somewhat fleshy roots, the stems erect, simple or sparsely branched, usually 50 cm. high or less, generally bearing a few leaves below; basal leaves few, on long slender petioles, ovate-triangular or ovate-oblong, 5 cm. long or less, acute or obtuse, broadly rounded or cordate at the base, the margins narrowly cartilaginous-thickened, finely and closely crenate, the teeth not or scarcely apiculate, 7-9-nerved at the base, paler beneath; heads usually few, cobalt-blue; subglobose, 5 mm. in diameter; bracts about 10, subequal, much longer than the heads, elliptic-oblong or spatulate, subobtuse, mucronulate, entire, 5-nerved, about 1 cm. long, white tinged with blue on the inner surface; sepals ovate, obtuse or truncate, short-mucronate, petals oblong-spatulate, shallowly excised.

Eryngium scaposum Turcz. Bull. Soc. Nat. Moscou 20, pt. 1: 172. 1847.

Alpine meadows, 3,150-3,500 meters; Totonicapán; Huehuetenango. Southern Mexico; Costa Rica.

Plants glabrous, perennial, arising from a short rootstock bearing numerous long, somewhat fleshy roots, the stems 10-20 cm. high, usually naked and scape-like, simple or 2-3-furcate, solitary or several; basal leaves few, usually on petioles about as long as the blades, the petioles naked or winged; leaf blades elliptic to lance-oblong, 2-5 cm. long, obtuse or rounded at the apex, abruptly contracted at the base into the petiole and obtuse to rounded or sometimes acute, usually shallowly and inconspicuously crenate, the teeth mucicous, depressed; heads solitary or 2-3, bluish, subglobose, much shorter than the bracts, 6-8 mm. long; bracts of the involucre about 8, linear-lanceolate, acute or obtuse, mucicous or spinulose-acute, about 1 cm. long, entire or nearly so, whitish on the inner surface; bractlets equaling or longer than the flowers; sepals ovate-lanceolate, acuminate or obtuse and mucronate; petals oblong, deeply excised; styles longer than the sepals; fruit globose-ovoid, 2.5 mm. long, densely squamate.

FOENICULUM Adanson. Fennel

Erect, biennial or perennial, glabrous, often much branched herbs; leaves often large, pinnately decompose, the segments linear or capillary; flowers small, yellow, in compound umbels; involucre and involucels none; calyx teeth obsolete; petals obtuse or somewhat retuse; stylopodium large, conic; fruit linear-oblong, terete or nearly so; mericarps semiterete, compressed dorsally, conspicuously costate; face of the seed plane or slightly concave.

About four species, natives of the Old World.

Foeniculum vulgare Miller, Gard. Dict. ed. 8. *Foeniculum* 1. 1768. *Anethum foeniculum* L. Sp. Pl. 263. 1753. *Hinojo*.

Native of Europe, often cultivated in other parts of the earth; planted rarely in Guatemala, and uncommon.

Plants erect, perennial, usually much branched, a meter high or less, glaucescent; leaves much dissected into numerous long capillary segments, the petioles

broad and amplexicaul; umbels large, 9-25-rayed, the rays stout, often glaucous, 2.5-7 cm. long, the pedicels 2-8 mm. long; fruit about 6 mm. long.

In some parts of Europe the plant is grown for its enlarged tender leaf bases, which are eaten like celery.

HYDROCOTYLE L.

References: J. N. Rose and Paul C. Standley, The Central American species of *Hydrocotyle*, Journ. Wash. Acad. Sci. 17: 194-197. 1927. Mildred E. Mathias, The genus *Hydrocotyle* in northern South America, Brittonia 2: 201-237. 1936.

Small perennials with long slender creeping stems or with rootstocks, often growing in water or very wet soil, glabrous or pubescent; leaves long-petiolate, peltate or epeltate, usually more or less orbicular in outline; inflorescence a simple umbel, sometimes proliferous, or the flowers in interrupted spikes, the peduncles axillary; involucre none or sometimes present; flowers white, greenish, or yellow, very small; petals ovate, flat; calyx teeth minute or obsolete; stylopodium depressed to conspicuous and conic; fruit transversely ovate to orbicular, strongly compressed laterally, the dorsal surface rounded or acute, the lateral costae conspicuous, slender, acute, rarely obscure; mericarps orbicular to triangular in cross section.

About 75 species, widely distributed in tropical and temperate regions. A very few species besides those listed here are found in southern Central America.

Leaves not peltate.

Petioles glabrous; leaves deeply lobate *H. ranunculoides*.

Petioles pilose or puberulent; leaves not lobate.

Peduncles densely puberulent; pedicels usually longer than the fruit, often several times as long *H. mexicana*.

Peduncles thinly villous; pedicels equaling or shorter than the fruit. *H. leucocephala*.

Leaves peltate.

Umbels 2 or more on each peduncle.

Umbels compound *H. bonariensis*.

Umbels simple *H. verticillata*.

Umbels solitary on the peduncle.

Petioles glabrous; pedicels usually much longer than the fruit . . . *H. umbellata*.

Petioles pubescent; pedicels shorter than the fruit *H. pusilla*.

Hydrocotyle bonariensis Lam. Encycl. 3: 153. 1789. *H. yucatanensis* Millsp. Field Mus. Bot. 2: 81. 1900.

In shallow water, 300 meters; Huehuetenango; probably collected also in some other Guatemalan localities. Southeastern United States; Mexico; Nicaragua; Costa Rica; Panama. South America.

Plants glabrous, arising from tuberous roots, the stems slender, creeping; leaves on long slender petioles, peltate, orbicular or nearly so, 1.5-5 cm. in diameter, very shallowly crenate-lobulate; peduncles longer than the leaves, bearing one or more umbels, these proliferous, many-flowered, the flowers white or yellow; pedicels 2-20 mm. long, spreading and often reflexed; fruit transverse-ovate, 1-2 mm. long, 2-4 mm. broad, with distinct acute ribs; stylopodium depressed.

Hydrocotyle leucocephala Cham. & Schlecht. *Linnaea* 1: 364. 1826. *H. maxonii* Rose in Rose & Standl. *Journ. Wash. Acad. Sci.* 17: 197. 1927.

Moist or wet meadows or thickets, 1,300-1,600 meters; Alta Verapaz. Mexico; Costa Rica. South America.

Stems very slender, creeping, glabrous; leaves on long slender petioles, these laxly and rather sparsely villous; leaf blades orbicular-reniform, not peltate, 1-5 cm. broad, 9-11-nerved, glabrous or nearly so, very shallowly truncate-crenate or truncate-lobate; peduncles, at least in age, longer than the leaves, villous, especially toward the apex; umbels simple, 20-30-flowered, the pedicels 1-3 mm. long, spreading and reflexed, glabrous; flowers cream-colored; fruit suborbicular, 1 mm. long, 1-1.5 mm. broad, glabrous, the ribs filiform, acute; stylopodium depressed.

The plant is rare in Guatemala. It is reported as collected at "Cobán" by Tuerckheim, but this locality means little in the case of Tuerckheim collections. Many of those so labeled undoubtedly were obtained many miles distant from the city of Cobán.

Hydrocotyle mexicana Cham. & Schlecht. *Linnaea* 5: 208. 1830. *Berro cimarrón*; *malva Luisa de monte*.

Moist or wet, mixed forests, or sometimes in pine or *Cupressus* forest, open banks, thickets, usually in rich soil, occasionally in marshy places, 1,200-3,500 meters; Alta Verapaz; El Progreso; Zapaca; Jalapa; Jutiapa; Escuintla; Guatemala; Sacatepéquez; Chimaltenango; Sololá; Quiché; Retalhuleu; Huehuetenango; Quezaltenango; San Marcos. Mexico; El Salvador to Panama. Northwestern South America.

Plants small or often much elongate, creeping, often forming dense colonies or mats, the stems glabrous or hirsutulous; leaves on very long, more or less hirsute or puberulent petioles, orbicular-reniform, not peltate, 1-5 cm. broad, sparsely or densely hirsutulous on the nerves and veins, shallowly 7-11-lobate, the lobes crenate; peduncles slender, usually longer than the leaves, bearing a single simple 20-70-flowered umbel; flowers pale green or whitish, the pedicels 1-7 mm. long, spreading and reflexed, glabrous; fruit suborbicular, 1-1.5 mm. long and broad, glabrous, the ribs distinct, acute; stylopodium depressed.

This is perhaps the plant reported from Guatemala by Hemsley as *H. bonplandii* A. Rich., a South American species. *H. mexicana* is very common in dense rich forest at middle elevations, often occurring almost everywhere in such places and in the greatest abundance.

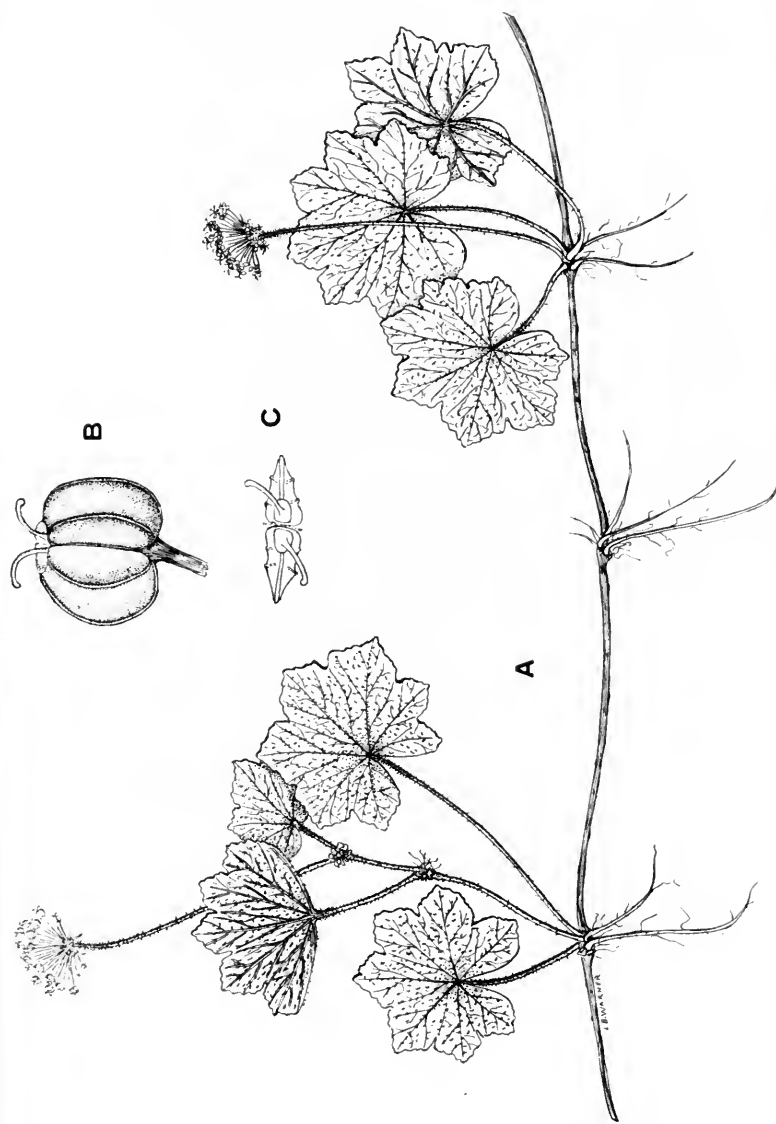


FIG. 12. *Hydrocotyle mexicana*. A, Habit; $\times 1$. B, Fruit; $\times 10$. C, Sketch of fruit seen from above; $\times 10$.

Hydrocotyle pusilla A. Rich. Ann. Gén. Sci. Phys. 4: 167, t. 52, f. 2. 1820. *H. costaricensis* Rose in Rose & Standl. Journ. Wash. Acad. Sci. 17: 195. 1927.

Dense wet mixed forest, or on wet banks, especially along streams, or on wet rocks, 1,500–3,000 meters; Alta Verapaz; Jalapa; Guatemala; Chimaltenango; San Marcos. Mexico; Costa Rica; Panama. Greater Antilles; South America.

Stems filiform, creeping, often forming dense interlaced mats; leaves on slender petioles 0.5–3 cm. long, these glabrous to densely retrorse-villous; leaf blades orbicular, peltate, 5–20 mm. broad, glabrous or sparsely villous above, glabrous beneath, shallowly 5–8-lobate, the lobes crenate; peduncles 5–15 mm. long, glabrous or retrorse-villous; umbels simple, solitary, 2–6-flowered, the flowers sessile or nearly so, greenish or pinkish; fruit transverse-elliptic, 0.5 mm. long, 1 mm. broad, sparsely hirsute or glabrous, the ribs obsolete; stylopodium depressed-conic.

Hydrocotyle ranunculoides L. f. Suppl. 177. 1781.

In mud along the borders of streams, or floating in shallow water, 1,600–2,450 meters; Chimaltenango; Quezaltenango. United States; Mexico; Nicaragua; Panama; Cuba; South America.

Plants rather stout and succulent, yellowish green, glabrous, the stems floating or creeping; leaves long-petiolate, not peltate, orbicular-reniform, 1–8 cm. in diameter, conspicuously 5–6-lobate, the lobes crenate or lobulate; peduncles shorter than the leaves, bearing a single simple umbel, this 5–10-flowered; pedicels 1–3 mm. long, spreading and ascending; fruit suborbicular, 1–3 mm. long, 2–3 mm. broad, the ribs obscure; stylopodium depressed.

Hydrocotyle umbellata L. Sp. Pl. 234. 1753. *Lechugilla*; *naab mejen* (Petén, Maya, fide Lundell).

Floating in shallow water or creeping in wet soil, often in marshes or at the margins of streams or ponds, sometimes on gravel or sandbars along streams, 2,400 meters or less; Petén; Baja Verapaz; Izabal; Zacapa; Chiquimula; Jutiapa; Santa Rosa; Escuintla; Guatemala; Sacatepéquez; Suchitepéquez; Chimaltenango; Sololá; Quiché; Huehuetenango; San Marcos. United States; Mexico; British Honduras to El Salvador and Panama. South America.

Plants perennial, glabrous, the stems slender or often somewhat fleshy, floating or creeping; leaves long-petiolate, peltate, orbicular, 1–6 cm. broad, crenate or very shallowly crenate-lobate; peduncles usually longer than the leaves, bearing a single simple umbel, this many-flowered; pedicels 2–25 mm. long, spreading to reflexed; flowers greenish yellow; fruit suborbicular, 1–2 mm. long, 2–3 mm. broad, glabrous, the ribs distinct, obtuse; stylopodium depressed.

Sometimes called “lechuga” in El Salvador. This has been reported from Guatemala as *H. prolifera* Kellogg.

Hydrocotyle verticillata Thunb. Diss. 2: 415, t. 3. 1798.

A species of wide distribution in the United States, represented in Central America by the following variety:

Hydrocotyle verticillata var. **triradiata** (A. Rich.) Fernald, Rhodora 41: 437. 1939. *H. polystachya* var. *triradiata* A. Rich. Ann. Gén. Sci. Phys. 4: 171. 1820. *H. racemosa* Sessé & Moc. ex DC. Prodr. 4: 70. 1830. *H. prolifera* Kellogg, Proc. Calif. Acad. 1: 15. 1854. *H. verticillata* var. *racemosa* Mathias, Brittonia 2: 204. 1936. *Hierba de jute*.

In wet soil, 1,500 meters or less; Petén; Guatemala. United States; Mexico; El Salvador; Costa Rica; South America.

A glabrous perennial, the stems slender, creeping; leaves on long slender petioles, peltate, orbicular, 1-6 cm. broad, 8-14-nerved, very shallowly 8-14-lobate; peduncles slender, bearing a spike of few simple umbels, these 4-15-flowered, the pedicels 1-10 mm. long, spreading or ascending; fruit oblong-ovoid, 1-3 mm. long, 2-4 mm. broad, the ribs distinct, acute; stylopodium depressed.

MICROPLEURA Lagasca

Herbs, glabrous or nearly so, arising from a cluster of small tuberous roots, caulescent; leaves long-petiolate, simple, reniform, palmate-nerved, crenate, the petiole abruptly dilated and scarious at the base; umbels long-pedunculate, irregularly compound; bracts of the involucre 1-2, small; flowers unisexual, the umbellule usually bearing 1 subsessile pistillate flower and 2 pedicellate staminate ones; calyx teeth obsolete; petals entire, broadly imbricate; disk flat, the styles filiform to the base; fruit laterally compressed, with a narrow commissure, emarginate at the base; mericarps laterally compressed; carpophore none; seed laterally compressed.

The genus consists of a single species. It is hardly distinct from *Centella* although we follow Mathias and Constance in maintaining it. The stems are erect or suberect and arise from tuberous roots. The stems of *Centella* are usually prostrate and root at the nodes, lacking tubers.

Micropleura renifolia Lagasca, Ocios Esp. Emigr. 4: 347. 1825. *Hydrocotyle grumosa* DC. Prodr. 4: 70. 1830. *Centella renifolia* Urban in Mart. Fl. Bras. 11¹: 347. 1879. *Cañan* (Huehuetenango); *guanimachaj* (fide Aguilar).

Wet to rather dry fields, banks, or forest, frequently in pine forest, 1,400-3,100 meters; Baja Verapaz; Chiquimula; Jalapa; Santa Rosa; Guatemala; Chimaltenango; Quiché; Huehuetenango. Mexico; Honduras; Costa Rica; South America.

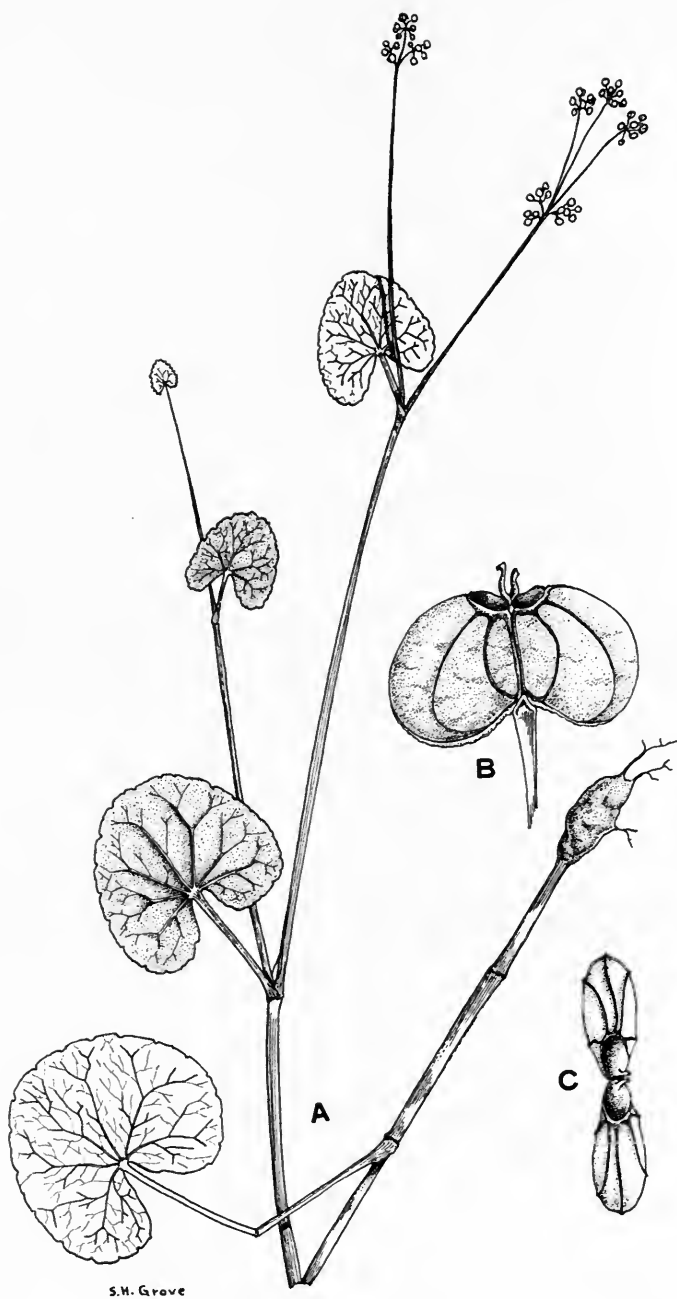


FIG. 13. *Micropleura renifolia*. A, Habit; $\times \frac{2}{3}$. B, Fruit; $\times 9$. C, Fruit as seen from above; $\times 9$.



FIG. 14. *Myrrhidendron donnellsmithii*. Leaf and inflorescence of plant; about $\times \frac{1}{2}$. Fruit from side; about $\times 2$. Cross-section of fruit; about $\times 8$. [Illustration, drawn by C. E. Faxon, is from the original publication. Courtesy of The University of Chicago Press.]

Plants arising from small thick tubers, the stems erect or suberect, short or elongate, often branched, the internodes much elongate; leaves on long slender petioles, these usually longer than the blades; leaf blades 2-7 cm. broad, membranaceous, broadly rounded, deeply but openly cordate at the base, conspicuously and evenly crenate except at the base, much paler beneath; inflorescence openly branched, the umbellules few or numerous, long-pedunculate or almost sessile, the flowers white, short-pedicellate or subsessile, the peduncles often somewhat pubescent; fruit greenish, about 2 mm. long and 3-4 mm. broad, glabrous, deeply constricted between the mericarps, the styles very short.

MYRRHIDENDRON Coulter & Rose

Large coarse perennial herbs or shrubs, or even small weak trees, simple or branched, the stems very thick, hollow, the whole plant almost glabrous; leaves alternate, very large, 3-4 times ternate or ternate-pinnate, the leaflets numerous, petiolulate or sessile, acuminate, serrate, ovate or oblong-ovate; flowers white, the umbels compound; bracts and bractlets conspicuous, dentate or lobate; calyx teeth obsolete; fruit linear or oblong-linear, dorsally compressed, glabrous; mericarps strongly compressed dorsally, the dorsal and intermediate costae slender, the lateral costae narrowly winged; stylopodium low-conic; seeds strongly compressed, the inner face plane.

One additional species from the mountains of Panama; others in the Andes.

Myrrhidendron donnellsmithii Coult. & Rose, Bot. Gaz. 19: 466, t. 32. 1894. In mountain forest, 2,500-3,200 meters; Quezaltenango. Costa Rica.

Plants 10 meters high, the stems very thick, more or less woody below; leaves very large, the lower ones long-petiolate, the upper ones with large broad sheathing petioles; leaflets numerous, ovate or lance-ovate, mostly 2.5-5 cm. long, acute to long-acuminate, rather thick and firm, unequally serrate, paler beneath, glabrous or nearly so, the petiolules with a dense tuft of short stout hairs at the base; bracts of the involucre few, dentate; bractlets numerous, several-dentate or lobate, scarios-marginate; inflorescence large and much branched, the umbels scabrous-puberulent, the rays numerous, subequal, the pedicels mostly 8-10 mm. long; fruit 10-12 mm. long, often dark purple.

This genus is not known to occur between Guatemala and Costa Rica. The single collection from Guatemala (Volcán Zunil, *Steyermark* 34750) seems to belong to *Myrrhidendron* but better material is needed to verify whether the Guatemalan plant belongs to the species given here.

OREOMYRRHIS Endlicher

Reference: Mildred E. Mathias and Lincoln Constance, The Genus *Oreomyrrhis*, Univ. Cal. Publ. Bot. 27: 347-416. 1955.

Perennial herbs, usually dwarf, pubescent or almost glabrous, the stems short, scapiform, often cespitose; leaves basal, pinnately dissected or decompose, usually with very numerous, small segments; umbels simple, solitary at the apex of the scape; bracts of the involucre numerous, ovate, lanceolate, or linear; calyx teeth obsolete; petals oblong, acute, incurved at the apex, entire; stylopodium depressed or subconic; fruit oblong or oblong-linear, usually contracted at the apex, slightly compressed laterally; mericarps subterete, conspicuously 3-costate, the costae obtuse; carpophore 2-parted; seed subterete, sulcate on the inner face.

About 23 species, in the mountains from Mexico to Patagonia, and in New Zealand, Australia and Tasmania to Borneo and Formosa. No other species is found in Central America.

Oreomyrrhis daucifolia I. M. Johnston, Journ. Arn. Arb. 19: 125. 1938.

Moist or dry, alpine meadows, sometimes on dry rocky slopes, 2,200–3,900 meters; endemic; Huehuetenango (Sierra de los Cuchumatanes, the type from Chancol, *A. F. Skutch* 1263).

Plants as much as 30 cm. high but usually 15 cm. tall or less, arising from a short thick hard root; stems usually 5–8, simple, stout, naked or bearing 1–2 leaves; leaves all or mostly basal, 3-pinnate, the rachis puberulent, the pinnae 5–10 pairs, 6–20 mm. long, the ultimate divisions linear or narrowly lanceolate, very numerous and often densely crowded, 1–3 mm. long, setuliferous at the apex; peduncles much longer than the leaves, puberulent, especially above; umbels 10–20-flowered, dense; bracts of the involucre pinnatisect; pedicels unequal, 1–5 mm. long; petals white tinged with purple; fruit 4–5 mm. long, 1–1.3 mm. broad, broadest below the middle, glabrous at maturity and purplish.

One of the typical alpine plants of the highest areas of Guatemala.

OSMORHIZA Rafinesque

Perennial herbs, pubescent or glabrous, usually arising from a cluster of rather slender, tuberous-thickened roots, the stems simple or branched; leaves ternate-pinnate, the numerous segments pinnatifid and dentate; flowers small, white, the umbels compound, open, with few rays; bracts of the involucre very few or none, the bractlets of the involucels numerous, narrow, and deciduous, or none; calyx teeth obsolete; petals obovate or oblong, with an inflexed acumen; stylopodium small, conic, entire; fruit oblong-linear or clavate, somewhat narrowed at the apex, long-attenuate to the base, subterete, constricted at the commissure; mericarps somewhat 5-angulate, slightly compressed dorsally, thinly ciliate on the low ribs; carpophore slender, bifid; seed dorsally compressed, broadly sulcate on the face.

Perhaps a dozen species in America and Asia, chiefly in temperate regions; in the tropics confined to the higher mountains. Only one species occurs in Central America.

Osmorhiza mexicana Griseb. Goetting. Abh. 24: 147. 1879.
Pimpinela (Quezaltenango).

Moist or wet, mixed, mountain forest, or often in forest of pine, *Abies*, or *Juniperus*, 2,400–3,700 meters; Sacatepéquez; Sololá; Quezaltenango; Huehuetenango. Mexico; Costa Rica.

Plants erect, a meter high or less, often much branched, rather weak, arising from a cluster of slender fleshy roots, sparsely pilose with whitish hairs; leaves rather large, very thin and soft, bright green, the lower ones long-petiolate, the uppermost cauline leaves short-petiolate, the segments rather numerous, deeply lobate and irregularly dentate; umbels large, open, with about 5 long slender rays, the flowers on long slender pedicels; fruit linear-clavate, 1–1.5 cm. long, less than 2 mm. broad.

OTTOA HBK.

Glabrous perennial herbs; leaves mostly radical, entire, terete, fistulose, transversely septate; stems simple, naked or bearing 1–2 leaves; flowers small, white, usually polygamous, the umbels compound; involucre and involucels none; calyx teeth obsolete; petals oblong, narrowed into a long inflexed acumen, entire at the apex; stylopodium thick-conic; fruit oblong, laterally compressed, constricted at the commissure; carpels somewhat 5-angulate, the central rib obtuse, inconspicuous, the lateral ones distinct; seed subterete, the race deeply sulcate.

The genus consists of a single species, which may be recognized at once by its terete fistulous leaves.

Ottoa oenanthoides HBK. Nov. Gen. & Sp. 5: 20, t. 423. 1821.

Mostly in exposed or shaded, rocky places, especially about the summits of mountain peaks, sometimes in high pine forest, 3,300–4,000 meters; Sacatepéquez; Huehuetenango; Quezaltenango; San Marcos. Southern Mexico; northwestern South America.

Plants erect, usually 15–40 cm. high, the stems often very numerous from a thick, apparently perpendicular, fleshy root; leaves several at the base of each stem, rather slender, terete, 35 cm. long or shorter; umbels few-rayed, the rays very unequal, the umbellules few-flowered, the central flower sessile or nearly so, the others on stout pedicels as much as 5 mm. long; fruit about 5 mm. long and 3 mm. broad.

It is rather strange that this plant has not been found in Costa Rica, where there are regions well suited to its growth. Its absence there would lead one to suspect that the North American plant might be a distinct species, but the collections from Guatemala and Mexico apparently do not differ from those made in Ecuador.

PETROSELINUM Hoffmann. Parsley

Annuals or biennials with strong-scented foliage, usually glabrous, branched; leaves ternately bipinnatisect or pinnatisect; flowers small, perfect or polygamous, yellow or white, in compound umbels; bracts and bractlets of the involucels nar-

row, entire; calyx teeth small and inconspicuous; petals subequal, orbicular or oval, emarginate, short-unguiculate; stylopodium short-conic, the styles short, erect or reflexed; fruit subglobose or subcordate-ovoid, more or less constricted at the commissure; costae of the mericarps filiform, equal, the mericarps coherent at base and apex, subpentagonal in cross section, the face flat.

Three species, natives of Europe and other parts of the Mediterranean region.

Petroselinum crispum (Mill.) Nyman ex Kew Hand-List Herb. Pl. ed. 3. 122. 1925. *Apium Petroselinum* L. Sp. Pl. 264. 1753. *A. crispum* Mill. Gard. Dict. ed. 8. no. 2. 1768. *P. hortense* Hoffmann, Gen. Umbell. 163. 1814. *P. sativum* Hoffmann, *op. cit.* 177. 1814. *Perejil*.

Native of the Mediterranean region, but cultivated in almost all regions of the earth; planted commonly in Guatemalan gardens.

Plants biennial or annual, glabrous, erect from a slender or fusiform root, the stems usually several, fistulose, leafy, branched; lower leaves long-petiolate, 2-3-pinnatisect, the pinnae and pinnules petiolulate, the leaflets ovate-lanceolate to broadly linear, trifid or lobulate; umbels numerous, long-pedunculate, 10-20-rayed, the rays subequal; bracts of the involucre few, narrow, shorter than the rays; bractlets of the involucels 5-6; umbellules 10-15-flowered; fruit ovoid or oblong-ovoid, 2-3 mm. long.

Parsley is grown commonly in Guatemalan gardens for use in garnishing and flavoring food. It is sold frequently in the markets of the larger cities.

PIMPINELLA L. Anise

Chiefly perennial herbs, sometimes annuals, glabrous or often pubescent about the inflorescence; leaves pinnate or ternately or pinnately decomposed; flowers small, white or yellow, the umbels compound; bracts of the involucre none or rarely 1-2, the bractlets of the involucels few and small or usually wanting; calyx teeth generally obsolete; petals commonly narrowed into an inflexed acumen, retuse or entire; stylopodium pulvinate or broadly or narrowly conic; styles usually elongate, rarely short; fruit ovate or broader than long, more or less compressed laterally, usually constricted at the broad commissure; mericarps slightly 5-angulate, dorsally compressed, the ribs slender and small; carpophore bifid or 2-parted; seed subterete or dorsally compressed, the face somewhat convex, plane, or slightly concave.

About 70 species, mostly in the Old World, generally in temperate or warm-temperate regions. None are native in Central America.

Pimpinella anisum L. Sp. Pl. 264. 1753. *Anis*.

Native of the eastern Mediterranean region; grown frequently in other parts of the earth for its aromatic fruits; cultivated occasionally in Guatemala but uncommon.

Plants annual, erect, branched, minutely puberulent almost throughout; lowest leaves rounded-cordate and incised, the middle ones trisect, the segments cuneate and lobate, the upper leaves sessile, cleft into linear or trifid segments; bracts and bractlets linear or often none; petals puberulent; fruit minutely appressed-pubescent, ovoid-pyriform, narrowed at the apex.

The "seeds" are employed for flavoring various kinds of foods, but they are not popular in Central America.

PRIONOSCIADIUM Watson

Large coarse perennial herbs, glabrous or sparsely pubescent; leaves large, 2-3 times ternate-pinnatifid, the segments usually deeply lobate or dentate; flowers yellow, the umbels compound; involucre none, the bractlets of the involucre small and narrow; calyx teeth short but usually equaling or surpassing the depressed stylopodium; fruit oval-rounded, dorsally compressed, with a broad commissure; lateral costae of the mericarps winged, the intermediate and dorsal ones acute or narrowly winged; seeds dorsally compressed, with involute margins; carpophore 2-parted.

About seventeen species in Mexico, one reaching Guatemala.

Prionosciadium thapsoides (DC.) Mathias, Brittonia 2: 245. 1936. *Elaeoselinum thapsoides* DC. Prodr. 4: 215. 1830. *Angelica mexicana* Vatke, Ind. Sem. Berol. App. 2. 1876. *P. mexicanum* Wats. Proc. Amer. Acad. 23: 275. 1888. *P. seleri* Rose, Contr. U. S. Nat. Herb. 8: 335. 1905 (type from Quezaltenango, the exact locality not indicated, C. & E. Seler 3106). *Axán xemel* (fide Seler); *cuscuta de sapo* (fide Aguilar); *pimientillo* (Huehuetenango).

Dry rocky open forest of oak and pine, or on brushy hillsides, 1,600-2,600 meters; Baja Verapaz; Sacatepéquez; Sololá; Quiché; Quezaltenango; Huehuetenango. Mexico.

Plants coarse and stout, as much as 3 meters high, the stems not hollow, terete, leafy below and with reduced leaves at the base of the inflorescence; radical leaves very large, long-petiolate, the blades often 35 cm. long or more and equally broad, ternate, the divisions pinnately decompound, the leaflets or their lobes cuneately long-decurrent on the rachis, obtuse, rather thick, crenate-serrate with mucronate teeth, glabrous above, somewhat puberulent or scabrous beneath on the veins with short thick hairs; petioles of the lower cauline leaves broadly winged and sheathing; inflorescence usually large and much branched, the branches scabrous; umbels compound, about 7 cm. broad, with numerous stout unequal rays, the bractlets lanceolate, scaberulous, the pedicels stout, very unequal; fruit when fully mature about 13 mm. long and 8 mm. broad, the pale wings as much as 4 mm. broad, glabrous.

While rather widely scattered in Guatemala, the plant is seldom if ever plentiful. The large coarse leaves, unlike those of any other

local plant, are conspicuous during the dry season. The Indians of Huehuetenango use the dry fruits for flavoring *atol*, so evidently they have the aromatic properties common to most plants of the family.

RHODOSCIADIUM Watson

Perennial herbs, usually glabrous or nearly so; leaves large, the lower ones 2 or more times ternately or pinnately decomposed; inflorescences usually large and much branched, the umbels compound; involucre none or of 1 or more bracts, the bractlets linear; flowers often or usually purple; calyx teeth very small; stylopodium depressed-conic, the disk with an undulate margin; fruit oblong or broader, glabrous, compressed dorsally; mericarps with 3 filiform dorsal costae and with 2 marginal wings; seed flat or concave on the inner surface.

About 13 species, in Mexico and Guatemala.

Leaflets entire to crenate-serrate *R. glaucum*.
 Leaflets serrate to encised or lobed *R. diffusum*.

Rhodosciadium diffusum (Coul. & Rose) Mathias & Constance, Bull. Torr. Bot. Club 68: 124. 1941. *Deanea diffusa* Coul. & Rose, Proc. Wash. Acad. Sci. 1: 155. 1900. *Ineldo* (a corruption of *Eneldo*).

Rocky hillsides, 1,900 meters; Huehuetenango. Mountains of central and southern Mexico.

Plants tall, erect, glabrous, the stems hollow, thick, glaucous and purplish; radical leaves very large, long-petiolate, 4-5 times ternate; leaflets numerous, thin, 2-3.5 cm. long, deeply cleft and dentate; inflorescence very large and much branched, glabrous, the peduncles short or elongate; rays of the umbel stout, straight, few or numerous, the pedicels 2-3 mm. long or longer in fruit, stout; involucre none; involucels of few filiform bractlets; mericarps oblong or oval, 12-14 mm. long, 8-10 mm. broad, cordate at the base, with broad thin wings; margins of the seed involute, the face concave.

Rhodosciadium glaucum Coul. & Rose, Contr. U. S. Nat. Herb. 3: 309. 1895; Mathias & Constance, N. Am. Fl. 28B: 215. 1945.

Guatemala (according to Mathias & Constance). Mexico.

Slender plants from a tuberous rootstock, 8-15 cm. tall, glaucous, the foliage scaberulous. Leaves ovate-deltoid, the blade 5-25 cm. long, biternate or ternate-pinnate, the leaflets lanceolate to ovate-lanceolate, acute or acuminate, cuneate to the base, sessile, 2-10 cm. long and 0.5-2 cm. broad, crenate-serrate, slightly incised, scabridulous on the veins, petiole to 35 cm.; inflorescence widely branched, the peduncles slender, 2-8 cm. long, involucre none or of 1-2 small bracts, rays 3-7, 1-3 cm. long, about equal; fruit oval, retuse at the apex and at the base, 6-10 mm. long and 5-8 mm. broad, dorsal ribs thin, the wings as broad or broader than the body of the fruit, seed face slightly concave to sulcate.

We have seen no Guatemalan material of this species.

SANICULA L.

Reference: Hermann Wolff, Pflanzenreich IV. 228: 48-80. 1913.

Mostly perennial herbs; leaves ternate, palmately parted, or variously pinnate; flowers small, usually yellow; the umbels simple or compound, often head-like, the involucre conspicuous or greatly reduced; perfect flowers central, sessile or on very short pedicels, solitary or several, borne in the same umbels with the few or numerous, pedicellate staminate flowers; sepals conspicuous, free in the fertile flowers, usually connate in the staminate flowers; petals imbricate, emarginate; stylopodium explanate; styles filiform, longer than the sepals; fruit globose to oblong, covered with uncinatate or straight prickles; carpophore none; mericarps broad or narrow on the commissural side, usually smooth.

About 40 species, widely distributed in both hemispheres, chiefly in temperate regions, in the tropics restricted to mountain areas. Only one species is found in Central America.

Sanicula liberta Cham. & Schlecht. *Linnaea* 1: 353. 1826.
S. mexicana DC. *Prodr.* 4: 84. 1830.

Moist or wet, usually dense, mixed, mountain forest, 900-2,500 meters; Alta Verapaz; El Progreso; Zacapa; Chiquimula; Guatemala; Sacatepéquez; Chimaltenango; Suchitepéquez; Quezaltenango; San Marcos. Mexico; Honduras; Nicaragua; Costa Rica; Panama. Northwestern South America.

Plants perennial, arising from a short thick rootstock emitting numerous fleshy-fibrous roots, the stems solitary or usually several, erect, simple or branched, the whole plant glabrous; basal leaves on very long, slender petioles, cordate-orbicular in outline, 4-10 cm. broad, palmately 5-parted, the segments petiolulate or sessile, ovate-lanceolate to obovate-cuneate, acute, cuneate at the base, more or less incised, lobulate, and crenate-dentate with spinulose-tipped teeth; involucre bracts 5-8, linear, acuminate, reflexed; staminate flowers few, slender-pedicellate, the sepals narrowly lanceolate, acuminate, scarcely 1 mm. long; petals broadly obtriangular; fruit 2 mm. long, pedicellate, about 4 mm. long, densely covered with uncinatate prickles.

A common but inconspicuous plant in the denser mountain forests, often occurring in abundance. The burlike fruits cling persistently to clothing.

SPANANTHE Jacquin

Branched herbs, usually annual, glabrous or nearly so; leaves mostly opposite, on long slender petioles, crenate-dentate, often cordate; stipules scarious, lacerate; flowers very small, white, the umbels simple, few or numerous and forming leafy panicles; calyx teeth evident; petals obovate, entire or retuse; stylopodium small, depressed-conic; fruit dorsally compressed, constricted at the very narrow commissure; mericarps compressed dorsally and flat, conspicuously tricostate on the dorsal surface; carpophore undivided; seed dorsally compressed, the face plane.

The genus consists of a single species.

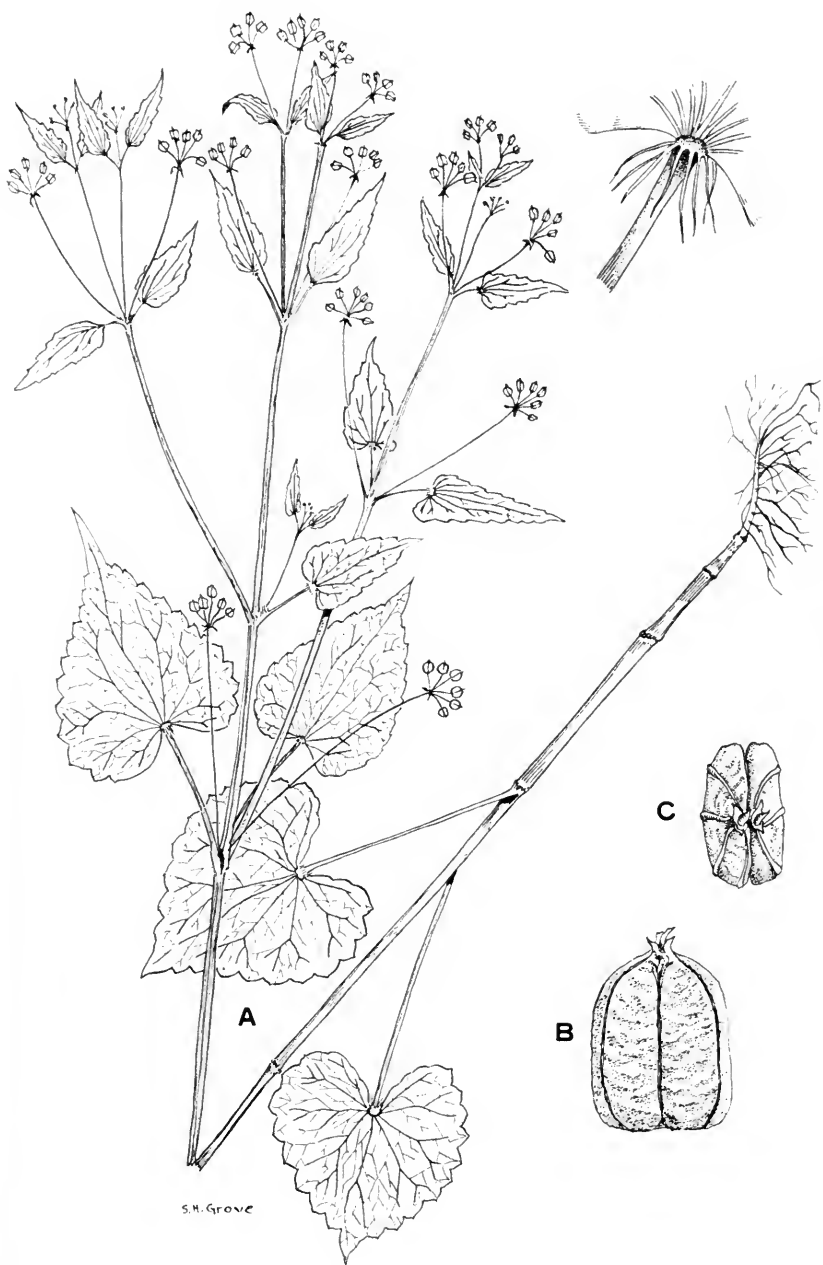


FIG. 15. *Spananthe paniculata*. A, Habit; $\times \frac{1}{2}$. B, Fruit seen laterally; $\times 10$. C, Sketch of fruit seen from above; $\times 10$.

Spananthe paniculata Jacq. Coll. Bot. 3: 247. 1789. *Culanthro de monte* (fide Aguilar); *canutillo* (Santa Rosa); *cola de pavito* (Guatemala, fide Morales); *valeriana* (Huehuetenango); *ocoán* (Huehuetenango).

Moist or wet thickets, meadows, fields, or open forest, sometimes in pine, oak, or *Liquidambar* forest, frequently a weed in waste or cultivated ground, 350–2,000 meters; Alta Verapaz; Zacapa; Jalapa; Santa Rosa; Guatemala; Sacatepéquez; Chimaltenango; Quiché; Huehuetenango; Quezaltenango. Mexico; British Honduras to El Salvador and Panama. South America.

Plants a meter high or less, usually or always annual, often much branched, the stems green, hollow, the whole plant glabrous or nearly so, green; leaves thin, mostly opposite, on long or very long, slender petioles, the petiole bearing slender bristles at the apex, the stipules bristly-ciliate; leaf blades broadly ovate to deltoid or lance-deltoid, mostly 4–9 cm. long, acute to long-attenuate, deeply cordate to truncate or rounded at the base, rather coarsely crenate-dentate, paler beneath; umbels slender-pedunculate, few-flowered, the flowers white, on long slender pedicels; fruit about 2.5 mm. long.

A common weedy plant in many parts of Guatemala and other Central American countries. It grows mostly in wet soil, sometimes along ditches, and is most plentiful during the rainy months.

TAUSCHIA Schlechtendal

Plants low, herbaceous, acaulescent or short-caulescent, glabrous or pubescent, with taproots or tubers; leaves entire to pinnate or ternately decomposed, the petioles vaginate; inflorescence of lax compound umbels, the peduncles longer than the leaves; involucre usually absent, the bractlets several, linear to ovate, free or connate, entire or dentate or lobate; flowers yellow, white, or purplish, the petals with a narrow inflexed apex; calyx teeth evident or obsolete; styles short, spreading or reflexed; stylopodium none; fruit oblong to orbicular, slightly compressed laterally, glabrous, the ribs prominent or filiform, not winged.

Species 20 or more, all American and mostly in Mexico.

Umbels simple. *T. oreomyrrhoides*.

Umbels compound.

Rachis of the leaves puberulent; ultimate division of leaves oblong-linear.

T. steyermarkii.

Rachis of the leaves not puberulent; ultimate division of leaves narrowly linear.

T. filiformis.

Tauschia filiformis Coult. & Rose, Proc. Wash. Acad. Sci. 1: 137. 1900. *Arracacia filiformis* Coult. & Rose, Contr. U. S. Nat. Herb. 3: 296. 1895, *nomen subnudum*; in Hook. Icon. t. 2429. 1896.

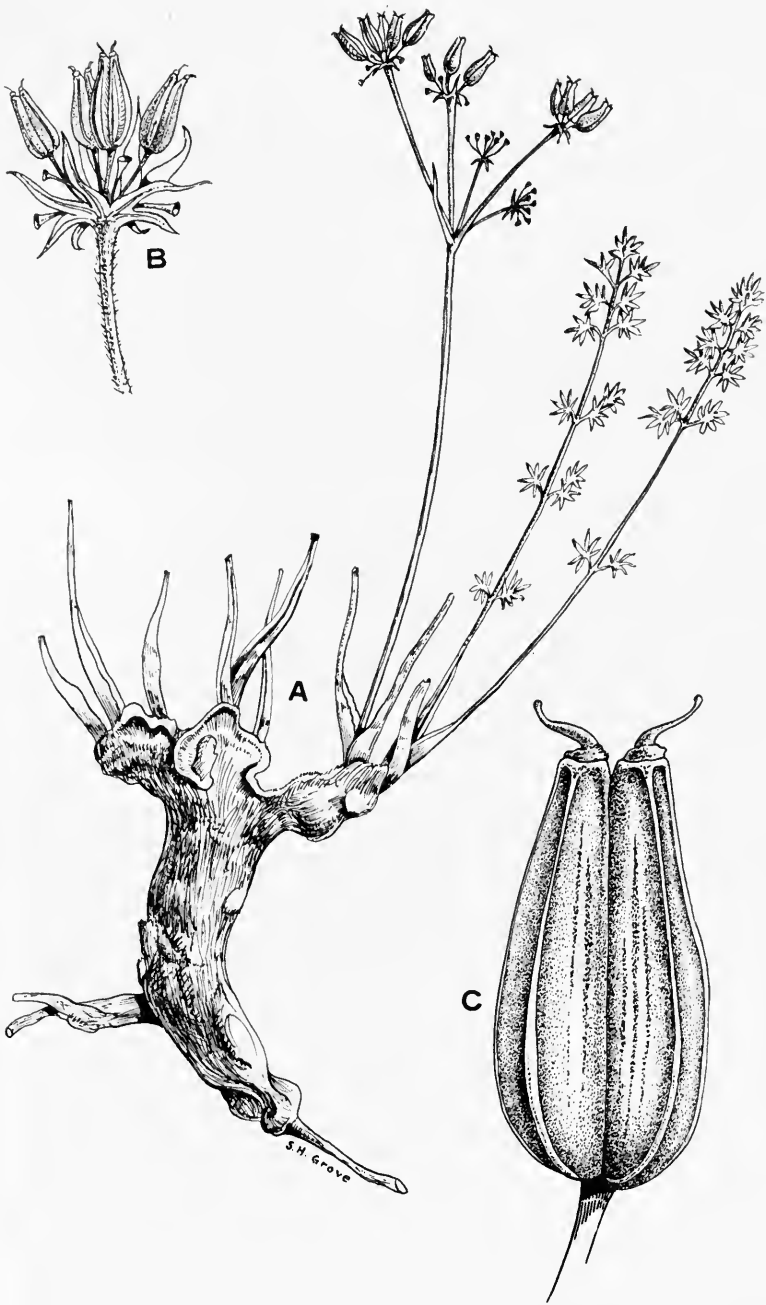


FIG. 16. *Tauschia steyermarkii*. A, Habit, about natural size. B, Umbellule; about $\times 2\frac{1}{2}$. C, Lateral view of fruit; about $\times 10$.

Collected in Chiapas on Volcán de Tacaná (perhaps on the Guatemalan side of the boundary), at 4,000 meters or lower, and doubtless occurring in San Marcos. Mexico (Oaxaca).

Plants glabrous, scapiform; leaves basal, 10–20 cm. long, on long slender petioles, 2–3 times ternately pinnatifid, the segments numerous, very small, linear, acute, mostly entire; scape naked, 6–15 cm. high, bearing a single compound umbel, the rays few, slender or stout, unequal, often much elongate; bractlets entire and linear to dentate or pinnatifid, large and conspicuous, much exceeding the flowers, the pedicels short; flowers dark purple; mericarps ovate-oblong, purplish, 3–4 mm. long.

Tauschia oreomyrrhoides Mathias & Constance, *Am. Jour. Bot.* 39: 652, *fig.* 1952.

Open slopes in area of pine-fir forests, Tajumulco volcano (type San Marcos, *Steyermark* 35495). San Marcos, endemic but surely also in Mexico.

Low, shortly caulescent, 8–15 cm. high, from a stout, thickened taproot, glabrous throughout; leaves oval to ovate, spreading, 1.5–4.5 cm. long, 1–3 cm. broad, 2–3-pinnate, the ultimate division linear-acuminate, mucronate, 2–7 mm. long, 1 mm. or less broad; petioles slender, 2–7 cm. long; peduncles slender, purplish, 4–6.5 cm. long; involucre of several lanceolate, pinnate bracts 3–10 mm. long, exceeding the flowers and fruit; rays lacking; pedicels 2–3 mm. long; petals not seen; styles short, recurved; carpophore bifid to the base, the halves divergent for their apical one-fourth, forming a V; fruit ovoid, 2–5 mm. long, 2 mm. broad, the ribs low and obtuse, narrower than the intervals; vittae and seed face not seen.

Tauschia steyermarkii Mathias & Constance, *Am. Jour. Bot.* 39: 653, *fig.* 1952.

High, cool meadows, mountains of western Guatemala, alt. about 3,000–3,500 meters; Huehuetenango; Totonicapán; endemic (type, Sierra de los Cuchumatanes, Huehuetenango, *Steyermark* 50280).

Acaulescent herbs, 10–15 cm. high, from a stout caudex, the foliage and inflorescence puberulent; leaves oblong, 3.5–6 cm. long, 1–2 cm. broad, pinnate, the leaflets ovate, 5–15 mm. long, 1–2-pinnately lobed, the ultimate divisions oblong to linear, callous-tipped, 1–4 mm. long; petioles 2–5 cm. long; peduncles 6–12 cm. long, puberulent at the summit; involucre lacking, or of a solitary foliaceous bract; fertile rays 3, stout, unequal, 5–25 mm. long, puberulent; involucre of several linear, entire, ciliolate bractlets 2–3 mm. long, about equaling the flowers but shorter than the fruit; pedicels 2–4 mm. long; calyx teeth obsolete; petals white; styles short, spreading; carpophore bifid to the base, the halves approximate; fruit ovoid, tapering slightly at the apex, 5 mm. long, 3 mm. broad, the ribs prominent, acute; vittae solitary, rarely 2, in each interval, 2 (rarely 3 or 4) on the commissure; seed face deeply sulcate.

CORNACEAE. Dogwood Family

References: Walther Wangerin, *Cornaceae*, *Pflanzenreich* IV. 229. 1910. Harold William Rickett, *Cornaceae*, *North American Flora* 28B: 299-311. 1945.

Trees or shrubs, rarely perennial herbs; leaves opposite or alternate, usually petiolate, entire or denticulate, usually without stipules; flowers small, perfect or by abortion unisexual and dioecious, regular, in dichotomous cymes or in racemes, rarely umbellate or capitate and surrounded by an involucre of petal-like bracts, mostly white or yellowish; calyx tube adnate to the ovary, the limb 4-5-lobate or subtruncate, sometimes obsolete; petals alternate with the calyx lobes, 4-5 or none, valvate or convolute; stamens as many as the petals and alternate with them, the filaments short or elongate, mostly subulate, the anthers introrse, dehiscent by lateral slits; disk epigynous and angulate, crenate, or lobate, generally glabrous, rarely annular or obsolete; ovary inferior, 1-4-celled, the style simple, sometimes divided almost to the base, or the styles several and free; ovules solitary in each cell, pendulous from the apex of the cell, anatropous; fruit drupaceous, the stone 1-4-celled, or the fruit rarely containing 2-4 osseous or crustaceous nutlets; seeds oblong, terete or semiterete, the testa membranaceous; embryo small or elongate, the radicle terete or subcomplanate, the cotyledons subfoliaceous; endosperm abundant, carnose.

Ten genera are recognized, of wide distribution. Only one genus is represented in America.

CORNUS L.

Trees or shrubs, rarely perennial herbs (in northern species); leaves opposite or very rarely alternate, entire; flowers small, perfect or rarely dioecious, in paniculate cymes or umbellate or in involucre heads; calyx limb turbinate, urceolate, or campanulate, terete or costate, more or less 4-dentate; petals 4, valvate; stamens 4, the filaments filiform or subulate, the anthers dorsifixed, versatile; disk pulvinar; ovary 2-celled, the style filiform or columnar, the stigma capitate or truncate; ovules solitary in each cell; drupe globose to ellipsoid or ovoid, areolate at the apex, the stone osseous or crustaceous, 2-celled, 2-seeded; seeds oblong, compressed, the testa membranaceous, the endosperm carnose.

About 40 species, chiefly in temperate regions of the northern hemisphere, a few in mountains of the tropics, and one species in Africa. In Central America only the following species are known.

Flowers in heads.....*C. disciflora*.
Flowers in cymes.....*C. excelsa*.

Cornus disciflora DC. *Prodr.* 4: 273. 1830. *C. floccosa* Wangerin, *Fedde Rep. Sp. Nov.* 6: 101. 1908. *C. disciflora* var. *floccosa* Standl. *Field Mus. Bot.* 8: 321. 1931. *C. disciflora* f. *floccosa* Rickett, *Bull. Torr. Bot. Club* 72: 223. 1945. *Palo bolitero* (fide Aguilar).

Moist or wet mountain forests or *Cupressus* forests, mostly 2,000-3,000 meters; Chiquimula; Chimaltenango; Sololá; Quiché; Huehue-

tenango; Quezaltenango; San Marcos. Mexico; El Salvador; Honduras; Costa Rica; Panama.



FIG. 17. *Cornus disciflora*. A, Flowering and fruiting branch; $\times \frac{1}{2}$. B, Flower; $\times 10$.

Shrubs or small trees 6–22 meters tall, the trunk to 40 cm. or more in diameter with light brown or grayish bark, somewhat roughened; leaves slender-petioled, lanceolate to lanceolate-oblong, mostly 6–15 cm. long and 2–6 cm. broad, acute to long acuminate, acute to the base, glabrous above, pale below (usually) and minutely pubescent with short, appressed malpighiaceus trichomes, sometimes also with spreading hairs; inflorescence a long pedunculate head about 1 cm. broad with 12–15 sessile flowers; petals whitish or greenish-yellow, 3–3.5 mm. long; fruit ellipsoidal, 12–14 mm. long, dark purple at maturity.

Closely related to the attractive *C. florida* of the United States and Mexico. The authority for this species is given as Mociño and Sessé by Wangerin and by Rickett. However, De Candolle did not mention Sessé and Mociño as authors when the name was published. Sessé and Mociño used the name *C. capitata* for this plant, a name which did not appear until 1893. The form with spreading hairs on the lower surface of the leaf is not known from Guatemala but may be expected. It is forma *floccosa* (Wang.) Rickett, but hardly deserving of a formal name.

Cornus excelsa HBK. Nov. Gen. & Sp. 3: 430. 1818. *C. toluensis* HBK. l.c.

Moist, mixed or pine-oak forest, often in thickets, sometimes growing along streams, 1,400–2,700 meters; Jalapa; Escuintla; Guatemala; Chimaltenango; Quiché; Huehuetenango. Mexico; Honduras (fide Rickett).

A shrub or a small tree, sometimes 9 meters high with a trunk 15 cm. in diameter, the branches slender, grayish or fuscous, often purplish or brown, puberulent at first; leaves ovate or lance-ovate, 5–10 cm. long, long-acuminate, obtuse or rounded at the base, green above and almost glabrous, the nerves conspicuously impressed, paler beneath and glabrate, the slender nerves very prominent; flowers in small cymes, pedicellate; petals white, 3.5–4.5 mm. long; fruit white, turning pale blue, 5–6 mm. in diameter, very juicy.

GARRYALES

An order containing a single family and a single genus with 12–15 species in temperate and tropical North America,—with the characters of the family.

The systematic position of the family is open to considerable question. Classically the family has been placed among the amentiferous families, often near Betulaceae. Other students have placed the family near the Cornaceae, in the Umbelliflorae, or included it in the Cornaceae. Recently Hutchinson in the second edition of "The Families of Flowering Plants" (1959) has placed it in the "Araliales," an order with a circumscription somewhat similar to that called Umbelliflorae in this flora.

The family is placed here, following the Umbelliflorae, but the Order Garryales is maintained for it. This position is in part a matter of convenience and in part the junior author's feeling that a family so different from the Umbelliferae, Araliaceae and Cornaceae would best be maintained in a separate order.

GARRYACEAE

Reference: Walther Wangerin, Garryaceae, Pflanzenreich IV. 56a. 1910.

Shrubs or trees, the young branchlets subquadrangular, the elder ones terete; leaves opposite, petiolate, entire or undulate, penninerved, persistent, coriaceous, the petioles connate at the base; stipules none; flowers small, dioecious, the staminate pedicellate, the pistillate sessile or nearly so, arranged in ament-like racemes, these chiefly axillary, the bracts opposite, often connate at the base, the flowers solitary or ternate in their axils; sepals 4 in the staminate flower, valvate, sometimes coherent at the apex; stamens 4, the filaments free, the anthers basifixed, elongate-elliptic or linear, introrse, dehiscent by longitudinal slits; sepals none in the pistillate flower, the ovary ovoid or oblong, 1-celled, inferior, the 2 styles subulate, erect or recurved, papillose within; ovules 2, pendulous from the apex of the cell, anatropous; fruit baccate, ovoid or subglobose, tipped with the styles and with 2-4 small calyx lobes at the base of the styles, 1-2-seeded; seeds ovoid or subglobose, with membranaceous testa, the endosperm carnose, abundant; embryo minute, the cotyledons oblong, the radicle terete.

The group consists of a single genus, with the characters of the family.

GARRYA Douglas

The genus consists of about 15 species, in North America. Only the following are known from Central America, but about 7 are recorded from Mexico.

Leaves small, mostly 2.5-4.5 cm. long, the nerves impressed on the upper surface; bracts of the staminate inflorescence very broadly ovate *G. corvorum*.

Leaves large, mostly 8-12 cm. long, the nerves not or scarcely impressed; bracts of the staminate inflorescence ovate-lanceolate *G. laurifolia*.

Garrya corvorum Standl. & Steyerl. Field Mus. Bot. 23: 16. 1943.

On slopes of bluffs or in *Juniperus* forest on limestone, 3,300-3,700 meters; endemic; Huehuetenango (type from Chémal, Sierra de los Cuchumatanes, *Standley* 81651).

A shrub or small tree 2-15 m. tall, branches blackish, lustrous; leaves coriaceous, oblong or elliptic-oblong, 2.5-4.5 cm. long, 1-1.5 cm. broad, obtuse or subacute at the apex and apiculate, obtuse or narrowly rounded at the base, lustrous



FIG. 18. *Garrya laurifolia*. A, Fruiting branch; $\times \frac{1}{2}$. B, Mature fruit; $\times 5$. C, Staminate flowers; about $\times 7$.

and almost glabrous above, the venation impressed, densely pilose beneath with whitish, subappressed, rather long hairs, the lateral nerves inconspicuous, the veins obsolete; staminate racemes 3–3.5 cm. long, short-pedunculate, simple, terminal, solitary, densely pilose with long whitish hairs, the bracts very broadly ovate, connate below, 8 mm. long or less, cuspidate-acute.

A single shrub of the species was found at the type locality.

Garrya laurifolia Hartweg ex Benth. Pl. Hartw. 14. 1839. *G. laurifolia* var. *quichensis* Donn.-Sm. Bot. Gaz. 54: 237. 1912 (type from San Miguel Uspantán, El Quiché, Heyde & Lux 3175). *Palo de hueso* (the usual name for the tree); *hediondillo* (San Marcos); *ajruch* (Volcán de Agua).

Moist or rather dry, mountain forest, often in pine-oak or *Cupressus* forest, 1,500–3,600 meters; Zacapa; Jalapa; Guatemala; Sacatepéquez; Chimaltenango; Sololá; Quiché; Huehuetenango; Quezaltenango; San Marcos. Mexico; Costa Rica.

A small or medium-sized tree, sometimes 12 meters high and probably even taller, often fruiting when only a shrub of 2 meters, the trunk 50 cm. or less in diameter, the branchlets at first pilose; leaves coriaceous, on petioles 2 cm. long or less, usually blackening in drying, lance-elliptic to oblong or narrowly lance-oblong, mostly 6–15 cm. long or even larger, 2–6.5 cm. broad, obtuse or acute and apiculate at the apex, acute at the base, in the adult stage glabrous or nearly so but when young usually appressed-pilose, at least beneath, the nerves and veins usually prominent on the upper surface; staminate racemes dense, often branched, the bracts ovate-lanceolate or narrowly lanceolate; bracts of the pistillate racemes often large and leaflike; fruit black, glabrous, lustrous, globose or ovoid, 8–10 mm. in diameter.

A characteristic and abundant tree in many of the barrancos of the central region, especially in Guatemala, Sacatepéquez, and Chimaltenango. So far as we know, no use is made of the wood.

Flora of Guatemala - Part VIII, Number 2

ERICALES¹

Shrubs, trees, or suffrutescent perennials and (in Monotropaceae) saprophytes or parasites without chlorophyll. Flowers mostly 5-4-merous; the corolla of distinct or free petals or the petals lightly adherent in the more primitive families (and in some genera of Ericaceae) but typically connate nearly to the apex (most Ericaceae); stamens commonly as many or twice as many as the corolla lobes, hypogynous or epigynous, often opening by terminal pores or sometimes lengthwise by slits; ovary superior or inferior, with axile placentation; fruit commonly a capsule or a berry.

The order Ericales is divided by Engler and Gilg into two suborders containing 4 families, of which three are in our area. Standley indicated a preference for placing *Monotropa* in a separate family, as was done in North American Flora. We maintain the family Monotropaceae.—The Lennoaceae were placed near the Monotropaceae by Standley in his preliminary manuscript. I believe that the Lennoaceae should be placed in the order Tubiflorae, where it was placed by Engler and Gilg and where most evidence seems to indicate it is related.

The Clethraceae are usually considered to be the most primitive of the Ericales, followed by Pyrolaceae, Monotropaceae, Ericaceae, and Epacridaceae,—the last mostly Australian.

¹ The field work and travel by the junior author involved in the preparation of this number of the *Flora of Guatemala* has been made possible through a grant from National Science Foundation, which we are happy to acknowledge.

CLETHRACEAE

Reference: Nathaniel Lord Britton, Clethraceae, No. Am. Fl. 29: 3-9. 1914.

Shrubs or large trees; leaves alternate, petiolate, entire or dentate, membranaceous or coriaceous, penninerved; flowers perfect, in terminal, simple or branched racemes; calyx deeply 5-cleft, the segments imbricate, persistent; petals 5, distinct or slightly united at the base, deciduous, usually or always fimbriate at the apex; stamens 10-12, the slender filaments short or elongate; anthers sagittate, inverted in anthesis, the cells opening by apical pores; disk none or obscure; ovary superior, pubescent, 3-celled, 3-lobate; style 1, the stigma entire or 3-lobate; ovules numerous; fruit a 3-celled capsule, loculicidally 3-valvate. A single genus.

The genus *Schizocardia* A. C. Smith & Standley described in the Clethraceae has been placed in the genus *Purdiaea* of the Cyrillaceae (cf. Thomas in Journ. Arn. Arb. 42: 110. 1961). It will be accounted for in the supplement of the flora.

CLETHRA L.

Large shrubs or small trees, pubescent, often tomentose; leaves mostly persistent, often coriaceous, entire or dentate; flowers small or medium-sized, racemose, white, cernuous, the racemes terminal, often spike-like, usually paniculate, the pedicels bracteate at the base, the bracts caducous; calyx 5-fid, the segments obtuse, imbricate; petals obovate-cuneate, rounded at the apex, often emarginate or bilobate, frequently erose, imbricate; filaments free or connate at the base; ovary globose, 3-gonous or 3-lobate; capsule subglobose or 3-lobate, 3-celled; seeds small, compressed or trigonous, the testa cellular, often produced into a wing; endosperm carnose.

Clethra is found in temperate and tropical America, eastern Asia, and Madeira. There have been more than 50 species described for temperate and tropical America though there are perhaps fewer than half so many.

Since preparing the manuscript for this genus Dr. H. Sleumer of Leiden has borrowed our material for a monographic study of the genus. We have studied the returned material. Many of Dr. Sleumer's annotations are accepted here but others are not.

Leaves glabrous or at most with a few peltate scales.

Under leaf surfaces conspicuously lighter colored than the upper surfaces.

C. oleoides.

Under and upper leaf surfaces concolorous. *C. suaveolens.*

Leaves sparsely to densely pubescent or tomentose beneath.

Leaves green below and glabrate or stellate puberulent; flower long-pedicellate.
C. johnstonii.

Leaves densely tomentose or pilose beneath and usually grayish or pale, the pubescence sometimes very close and fine.

Adult leaves densely pilose or tomentose, the hairs spreading and easily visible, the pubescence more or less velutinous and soft to the touch; lower surface of leaf usually green, not pale or whitish.

Calyx 4-5 mm. long; pedicels about equal calyx, very stout. . *C. licanioides*.

Calyx 2.5-3 mm. long.

Pedicels shorter than the calyx. *C. mexicana*.

Pedicels conspicuously longer than the calyx *C. johnstonii*.

Adult leaves covered beneath with fine, closely appressed whitish or grayish tomentum, hairs sometimes present on nerves and veins, pubescence not velutinous; lower surface of leaf blade white or grayish.

Calyx 3.5-4.5 mm. long; pedicels all or mostly longer than the calyx.

C. macrophylla.

Calyx 2-2.5mm. long; pedicels shorter than the calyx.

Leaves thin; rachis of inflorescence minutely whitish-tomentulose.

C. skutchii.

Leaves coriaceous; rachis of inflorescence brown-puberulent.

C. pachecoana.

Clethra johnstonii Standl. & Steyerl. Field Mus. Bot. 22: 258. 1940.

Type from Volcán de Pacaya, above Las Calderas, Dept. Guatemala, *Johnston* 1255; collected also in the same department, without definite locality.

Young branchlets densely pubescent; leaves on petioles 1-1.5 cm. long, chartaceous or subcoriaceous, oblong-ob lanceolate or narrowly ob lanceolate, 7-11 cm. long, 2-4 cm. broad, rounded at the apex or broadly obtuse and apiculate, cuneately long-attenuate to the base, glabrous above, at least in age, green beneath, sparsely and minutely stellate-puberulent, appearing glabrous to the naked eye, the lateral nerves about 17 pairs, oblique, almost straight; racemes slender and lax, few or numerous, forming a terminal panicle, the slender rachis stellate-pilosulous, the pedicels divaricate, 5-8 mm. long; calyx 3 mm. long, minutely stellate-tomentulose, the segments lance-ovate, acute, ciliate; ovary densely stellate-tomentose.

Clethra licanioides Standl. & Steyerl. Field Mus. Bot. 23: 17. 1943. *Zapotillo*.

Zacapa; Jalapa (type from Potrero Carrillo, 13 miles northeast of Jalapa, 1,500-1,700 meters, *Steyermark* 33124); Chimaltenango.

A tree of 9 meters, the stout branchlets brown, densely brown-tomentose; leaves on stout petioles 1-1.5 cm. long, rigid-coriaceous, rounded-obovate, 8-10 cm. long, 5-7 cm. broad, broadly rounded or truncate at the apex, slightly narrowed to the obtuse or narrowly rounded base, yellowish green above when dried, sparsely furnished with minute, depressed, radiately stellate hairs, but to the naked eye appearing glabrous, green beneath, velvety-stellate-pilose, the lateral nerves about 13 pairs, almost straight, ascending at an angle of about 45 degrees; racemes 25 cm. long or less, laxly flowered, numerous, the rachis stout, densely brown-tomentose, the stout pedicels 5 mm. long; calyx 4-5 mm. long, densely stellate-tomentulose, the segments broadly ovate or oval, very obtuse.

The flowers are fragrant, the petals white, the sepals buff with a faint tinge of pink. The species is closely related to *C. mexicana* A. DC. of which it may be but an extreme form.

Clethra macrophylla Mart. & Gal. Bull. Soc. Acad. Brux. 9: 539. 1842. *C. hondurensis* Britton, No. Am. Fl. 29: 7. 1914. *C. vicentina* Standl. Journ. Wash. Acad. Sci. 13: 353. 1923. *C. bimatrix* Standl. & Steyerl. Field Mus. Bot. 23: 17. 1943 (type from Entre Ríos, Izabal, *Kuylen 151*). *C. caloneura* Standl. & L. Wms. Ceiba 1: 157. 1950. *C. molinae* Standl. & L. Wms. l.c. 158. *C. occidentalis* auth. et sensu Sleumer.

Moist or dry mountain forest or lowland forests, 0-1,800 m. Izabal; British Honduras; El Salvador; Honduras.

A large shrub or a tree, sometimes 13 meters high with a trunk 25 cm. in diameter but usually lower; leaves short-petiolate, firm-chartaceous or subcoriaceous, narrowly obovate to narrowly oblong-obovate, broadly rounded to subacute at the apex, cuneately narrowed to the narrowly obtuse or acute base, deep green above and almost wholly glabrous, the nerves obscure, white or grayish beneath, covered with a minute, very dense, closely appressed tomentum, without long hairs on the nerves, the margins entire or somewhat serrate toward the apex, the lateral nerves slender but conspicuous beneath; racemes lax, short or greatly elongate, few or numerous, the slender rachis minutely whitish-tomentulose, the pedicels divaricate, 3-6 mm. long; calyx 3.5-4.5 mm. long, minutely whitish-tomentulose, the segments ovate or elliptic, obtuse; capsule somewhat depressed, 3-lobate, 6-7 mm. broad, tomentulose.

The name "nance de cerro" is said to be given to the tree in Honduras. The white flowers are fragrant.

The species is occasional on the east coast of Mexico, it is to be found in British Honduras and is common and occasionally abundant in Honduras. It has been found in Guatemala only in the department of Izabal. Dr. Sleumer has annotated much of this material as *C. vicentina* Standl. but another large part is annotated *C. occiden-*



FIG. 19. *Clethra mexicana*. A, Habit, $\times \frac{1}{2}$. B, Mature capsule and subtending calyx, $\times 2\frac{1}{2}$.

talis (L.) Kuntze. The name "occidentalis" has appeared several times in literature,—first in Steudel's *Nomenclator Botanicus* where it is given as a synonym of *C. tinifolia* Sw. without authority or basionym. It next appears in Kuntze's *Rev. Gen. Pl.* 3²: 192. 1898, again without basionym but with authority "OK. (L.)." Both uses would seem to be illegitimate. It is possible, even probable, that the acceptable name for this species is *C. tinifolia* Sw., in the broad sense.

Clethra mexicana A. DC. *Prodr.* 7: 590. 1839. *C. lanata* Mart. & Gal. *Bull. Acad. Brux.* 9: 538. 1842. *C. salvadorensis* Britton, *No. Am. Fl.* 29: 9. 1914.

Dry mountain forest, commonly in pine-oak woods, 550–2,500 m. Jalapa; Sacatepéquez; Guatemala; Escuintla; Quiché; Huehuetenan-



FIG. 20. *Clethra oleoides*. A, Habit, $\times \frac{1}{2}$. B, Expanded flower, $\times \frac{1}{2}$. C, Bud partly opened, $\times 4$. D, Average petal, $\times 2\frac{1}{2}$. E, Anther, $\times 20$. F, Type of pubescence from the inflorescence, $\times \pm 20$.

go; Quezaltenango; San Marcos. Mexico; El Salvador; Honduras to Panama and doubtless South America.

A large shrub or a tree, sometimes 20 meters tall, usually with a thick trunk and a not very dense, spreading crown, the young branchlets densely villous-tomentose; leaves on short stout petioles, usually chartaceous, obovate or oblong-obovate, mostly about 9-15 cm. long and 3.5-6 cm. broad, obtuse to rounded at the apex, somewhat narrowed to the acute to narrowly rounded base, entire or obscurely serrate toward the apex, green above but usually sparsely or sometimes rather densely stellate-pilose with mostly weak slender hairs, usually rufescent beneath, densely and softly villous-tomentose; racemes few or numerous, short or elongate, mostly rather dense, forming a large panicle, the rachis slender or rather stout, densely stellate-pilose, the pedicels 1-2 mm. long, sometimes slightly longer; calyx 3 mm. long, pale-tomentulose, the segments broadly ovate, obtuse; capsule tomentulose, 4 mm. broad.

This is possibly the commonest species in Guatemala, usually found in rather open oak-pine forest areas. The Guatemalan specimens have usually been called *C. salvadorensis* and sometimes also *C. lanata* Mart. & Gal.

Dr. Sleumer has annotated specimens with both *C. lanata* Mart. & Gal. and *C. mexicana* A. DC. We find it difficult to separate the two and would suggest that *C. lanata*, as well as *C. quercifolia* Lindl. should be placed here as synonyms.

Clethra oleoides L. Wms., Fieldiana, Bot. 31: 167. 1965. *Shiorsh.*
Moist mixed forests at 2,500-3,100 m.; Huehuetenango. Mexico.

Small evergreen trees or shrubs to 6 m. or more tall. Young branchlets gray, terete, glabrous or essentially so; leaves elliptic or elliptic-lanceolate, acute or obtuse at the apex, mostly obtuse at the base, glabrous or rarely with a few peltate scales, distinctly paler below and gray-green, densely but obscurely punctate-glandular below, (2-) 3.5-8 cm. long and 1.5-3.5 cm. broad, petiole 3-8 mm. long; inflorescence a several-flowered terminal raceme or sometimes several racemes in a fascicle, about as long or slightly longer than the subtending leaves, sparsely peltate or stellate pubescent, becoming glabrous; flowers slightly cernuous and unilateral on the rachis; pedicels short, about 3 mm. long; calyx-lobes ovate, acute, about 3-3.5 mm. long, sparsely stellate or peltate pubescent, ciliate, obscurely punctate-glandular; corolla white, the lobes free or only slightly adnate at the bases, the lobes (petals) oblong-ovate to broadly oblong-oval, emarginate and the truncate apex usually laciniate, 6-7 mm. long and 4-5 mm. broad, not all the same shape in one flower; stamens 10, lightly attached at the base of the corolla or below it and shorter than the lobes; pistil about 3 mm. long, trilobate at the stigmatic apex; mature capsules not seen.

The specimens from Guatemala are sterile but match in all vegetative detail the type from Mexico.

Clethra pachecoana Standl. & Steyerl. Field Mus. Bot. 22: 259. 1940. *Escobo; zapotillo; xiorsh* (Huehuetenango).

Damp or wet, usually mixed, mountain forest, often in *Chiranthodendron* forest on the volcanoes, frequently associated with pines or *Abies*, 2,000–3,200 meters; Alta Verapaz; Baja Verapaz; Jalapa; Guatemala; Sacatepéquez (type from Volcán de Agua, above Santa María de Jesús, *Standl.* 65123); Chimaltenango; Sololá; Quiché; Huehuetenango; Quezaltenango; San Marcos. Mexico; El Salvador.

A tree 6–15 meters high or larger with a dense crown and often with a tall slender trunk, the young branchlets densely ferruginous-tomentulose; leaves small, short-petiolate, coriaceous, the petioles 6–12 mm. long; leaf blades oblanceolate-oblong to obovate-oblong, 4.5–7 cm. long, 1.2–3 cm. broad, very obtuse at the apex or somewhat rounded and apiculate, sometimes subacute, narrowed to the subacute to truncate base, the margins entire or nearly so in adult leaves, in juvenile ones often coarsely serrate, glabrous above, somewhat paler beneath and appearing glabrous but actually covered with an almost microscopic and closely appressed tomentum, the lateral nerves about 10 pairs, almost straight or somewhat curved; racemes few or numerous, 10 cm. long or less, densely many-flowered, the rachis minutely brown-tomentulose, the stout pedicels scarcely more than 1.5 mm. long; calyx 2.5 mm. long, minutely brownish-tomentulose, oblong-ovate, obtuse; petals white, obovate, ciliate; capsule depressed-globose, 3–3.5 mm. broad, minutely stellate-tomentulose.

Leaves of young sterile plants or branches are often much larger than the adult ones, coarsely serrate, and frequently soft-pilose.

Clethra skutchii Standl. & Steyerl. Field Mus. Bot. 22: 260. 1940.

Moist or wet forest, 1,350–2,000 meters or more, Quezaltenango; type from Palmar, *Skutch* 1453; collected also on Volcán de Santa María above Santa María de Jesús; endemic.

A tree 10–22 meters tall with a trunk as much as 30 cm. in diameter, the young branchlets minutely hispidulous with brown hairs; leaves on slender petioles 12–20 mm. long, firm-membranaceous, oblanceolate-oblong or oblong-obovate, 8–13 cm. long, 3.5–7 cm. broad, rounded to subacute at the apex and often abruptly apiculate, somewhat narrowed to the cuneate to broadly obtuse base, almost glabrous above, sometimes pale-punctulate, grayish or whitish beneath and covered with a close and minute, very dense tomentum, the lateral nerves about 14 pairs,

almost straight, very oblique; racemes rather dense, 13 cm. long or less, fasciculate at the ends of the branches, the rachis minutely stellate-pubescent, the stout pedicels hardly 2 mm. long; calyx 2.5 mm. long, the segments ovate-oblong, subacute, recurved, minutely tomentulose; petals white, obovate, ciliate, slightly longer than the sepals.

Clethra suaveolens Turcz. Bull. Soc. Nat. Moscou 36, II: 230. 1863. *C. vulcanicola* Standl. Journ. Wash. Acad. Sci. 13: 353. 1923. *C. glaberrima* Lundell, Phytologia 1: 219. 1937. *C. nubium* Standl. & L. Wms., Ceiba 1: 159. 1950 (type from Montaña de los Nubes, Guatemala, *Williams & Molina* 15276). *C. viridifolia* Standl. & L. Wms. l.c. 161. *Ka-ut* (Cobán, Quecchí).

Occasional in oak-pine woods or broad leaf forest at middle or high elevations of 1,000–2,400 meters. Alta Verapaz; Baja Verapaz; El Progreso; Zacapa; Chiquimula; Jutiapa; Guatemala; Huehuetenango. Mexico; El Salvador; Honduras; Nicaragua.

Shrubs or usually trees 1–15 m. tall, glabrous or the inflorescence pubescent. Leaves elliptic or elliptic-lanceolate, acute or acuminate, acute or somewhat obtuse at the base, glabrous, chartaceous at least when dry, 5–15 cm. long and 1–6 cm. broad; inflorescence of 1–many terminal racemes shorter or usually longer than the subtending leaves, tomentulose, pedicels slender and 3–10 mm. long; calyx about 4 mm. long, tomentulose, the lobes ovate-oblong, obtuse or acute; corolla white, about 5 mm. long, the lobes erose or nearly entire; capsule about 6 mm. broad, tomentulose.

This is the only *Clethra* in Central America with completely glabrous leaves and is easily distinguished.

Clethra matudae Lundell, based on sterile material from Chiapas, probably belongs here.

PYROLACEAE

Reference: P. A. Rydberg, Pyrolaceae, No. Am. Fl. 29: 21–32. 1914.

Plants perennial, with creeping scaly rootstocks, the stems short, usually persisting for several years and suffrutescent; leaves coriaceous, alternate but often crowded and appearing verticillate, petiolate, usually serrate or crenate; stipules none; inflorescence racemose, corymbose, or subumbellate, the peduncles bearing several bracts; flowers perfect, rather small; sepals 5, slightly if at all united; corolla regular or nearly so, the petals 5, distinct, white, pink, or purplish, hypogynous; stamens 10, hypogynous, the filaments often dilated at the base; anthers 2-celled, usually attached at or near the middle, generally produced at the proxi-

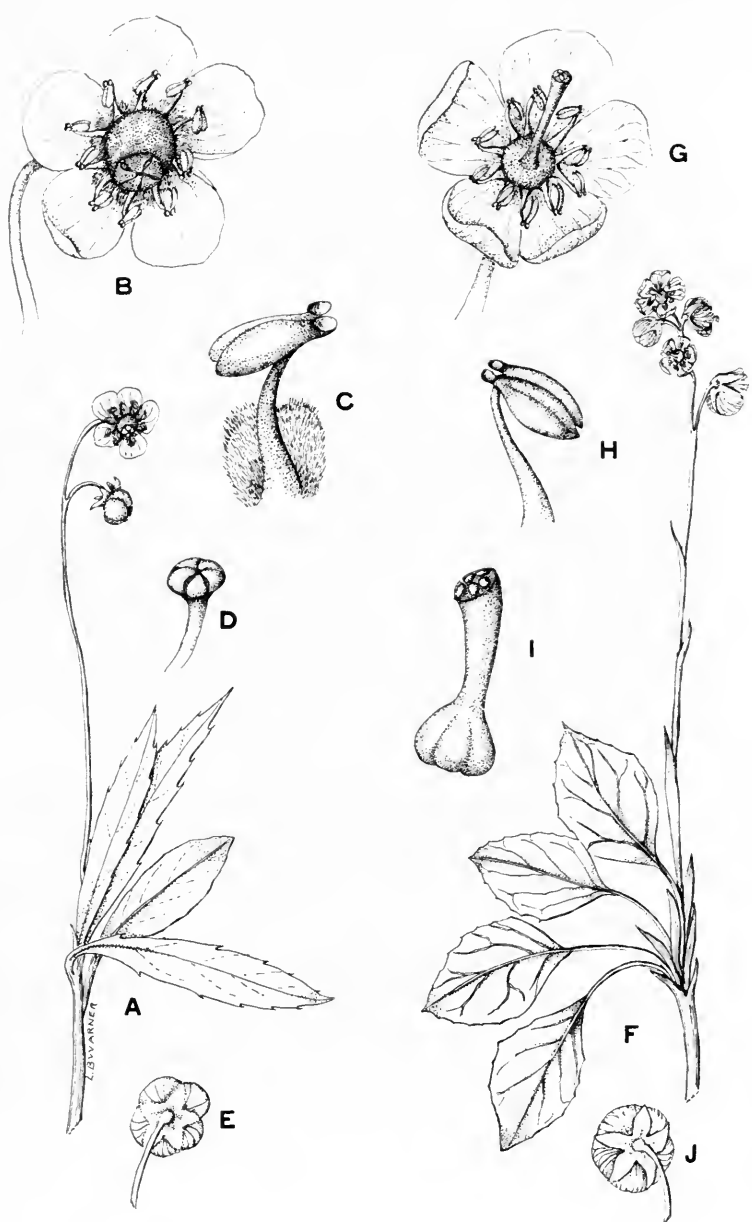


FIG. 21. *Chimophila maculata*. A, Habit, $\times \frac{1}{2}$. B, Flower, $\times 2\frac{1}{2}$. C, anther, $\times 5$. D, Stigma, $\times 2\frac{1}{2}$. E, Capsule from below, $\times 1$. *Pyrola angustifolia*. F, Habit, $\times \frac{1}{2}$. G, Flower, $\times 2\frac{1}{2}$. H, Anther, $\times 7\frac{1}{2}$. I, Style and immature ovary, $\times 5$. J, Capsule from below, $\times 1$.

mal end into 2 tubes, opening by round or oblong pores at the ends of the tubes; ovary subglobose, 5-celled, obtusely 5-angulate, the ovules numerous; styles wholly united, short or elongate, the stigma 5-papillate or 5-radiate; fruit capsular, obtusely 5-angulate, loculicidally dehiscent; seeds very numerous, with carnosé endosperm.

Three genera, in the northern hemisphere. Only the following are found in Central America.

Capsule dehiscent from above downward, without cobwebby threads; inflorescence corymbose or subumbellate; leaves coarsely serrate..... *Chimaphila*.

Capsule dehiscent from below upward, the edges of the valves connected by cobwebby threads; inflorescence racemose; leaves finely crenate or serrulate or entire..... *Pyrola*.

CHIMAPHILA Pursh

Plants perennial, suffrutescent, erect, with long creeping rootstocks, the stems simple or branched; leaves often subverticillate or subopposite, coriaceous, usually serrate; inflorescence subumbellate or corymbose; flowers few; sepals and petals each 5; stamens 10, the filaments expanded into a disk near the base, then curved upward; anthers ventricose, attached near the middle, the tubes rather long, distinct; style straight, short; stigma peltate, flat, 5-radiate, without papillae; capsule depressed to ovoid or globose, dehiscent from the apex downward.

About 5 species, in the northern hemisphere. The plants grow mostly in temperate regions, and in the tropics are restricted to the higher mountains. Only the following are known in Central America.

Leaves striped or blotched with silver on the upper surface, mostly acuminate; dilated portion of the filament glabrous or merely ciliolate.
C. umbellata var. *mexicana*.

Leaves green on the upper surface, acute or obtuse; dilated portion of the filament villous..... *C. maculata*.

Chimaphila maculata (L.) Pursh, Fl. Amer. Sept. 300. 1814. *Pyrola maculata* L. Sp. Pl. 396. 1753. *C. maculata* var. *acuminata* Lange, Vid. Medd. 1867: 112. 1868. *C. acuminata* Rydb. No. Am. Fl. 29: 31. 1914. *C. guatemalensis* Rydb. l.c. 32 (type from Santiago, Sacatepéquez, Rosalío Gómez 795). *C. dasystemma* Torr. ex Rydb. l.c. *Hierba de madroño* (fide Aguilar).

Mostly in pine-oak forest, 1,300–2,500 meters; Zacapa; Chiquimula; Jalapa; Guatemala; Sacatepéquez; Chimaltenango; Sololá; Quiché; Huehutenango; Quezaltenango; San Marcos. United States; Mexico; Honduras; Costa Rica.

Plants 10–20 cm. high; leaves few, in pseudoverticels of 2–4, short-petiolate, lanceolate or oblong-lanceolate, 3–9 cm. long, acute or acuminate, acute at the base, serrate, usually coarsely and sparsely so, deep green above and more or less mottled with silver along the nerves, paler beneath; peduncles much elongate, 1–4-flowered, the flowers long-pedicellate; sepals elliptic or rounded, ciliate; petals waxy white or pinkish, orbicular, 6–8 mm. long; dilated portion of the filament villous; capsule depressed-globose, 7–8 mm. long.

This has been reported from Guatemala as *C. umbellata* (L.) Barton. When in flower, the plant is a handsome one. It is locally common in some of the mountain forests of Guatemala.

Chimaphila umbellata (L.) Barton var. **mexicana** (DC.) L. Wms. Fieldiana, Bot. 31: 169. 1965. *C. umbellata* β *mexicana* DC. Prodr. 7: 775. 1839. *C. mexicana* Rydb. No. Am. Fl. 29: 31. 1914. *C. umbellata mexicana* DC. ex Rydb. l.c. *in syn.*

Dense and moist forest, 1,600–2,800 meters; Zacapa; Sololá; Huehuetenango. Mexico.

Plants perennial and suffrutescent, erect or decumbent, 30 cm. high or less, glabrous throughout or nearly so; leaves in whorls of 3–7, oblanceolate, 3–10 cm. long, acute or obtuse, coarsely serrate or spinulose-serrate, attenuate to the base, short-petiolate, coriaceous, deep green and somewhat lustrous above, the nerves impressed, paler beneath; peduncles about 10 cm. long, the flowers few, long-pedicellate, the pedicels in flower somewhat spreading or recurved; sepals broadly ovate, about as broad as long; petals creamy white tinged with rose, 7 mm. long; dilated portion of the filament obovate, ciliate on the edges or glabrous, the anthers 3 mm. long; capsule globose-ovoid, 6–10 mm. in diameter.

This plant as well as several other variations in America seem to vary slightly from the typical Old World form. The Mexican and Central American variations would seem to differ from temperate American forms but to separate them all as species, following Rydberg, seems hardly justifiable.

PYROLA L.

Plants perennial, with rootstocks, the stems very short, bearing a few leaves, the scapes much elongate, bearing 1 or more small bracts; leaves petiolate, mostly chartaceous; inflorescence racemose, the flowers usually nutant, short-pedicellate; sepals 5, slightly united; corolla broadly campanulate, the 5 petals distinct, broad, white, greenish, or purplish; stamens 10, the filaments subulate, somewhat dilated at the base, incurved; anthers oblong, dehiscent by pores at the ends of the tubes; ovary with 5 rounded angles; style straight, or deflexed at the base, then curved upward and gradually thickened toward the apex; stigma of 5 erect papillae; capsule depressed-globose, umbilicate, 5-valvate, dehiscent from the base upward.

About 20 species, or perhaps fewer, in the northern hemisphere and chiefly in temperate regions; in the tropics found only in the higher mountains.

Style strongly deflexed at the base; petals pinkish; leaves entire or obtusely and inconspicuously crenate.....*P. angustifolia*.

Style straight; petals greenish white; leaves finely serrate with acute teeth.
P. secunda.

Pyrola angustifolia (Alef.) Hemsl. Biol. Centr. Am. Bot. 2: 283. 1881. *Thelasia angustifolia* Alef. Linnaea 28: 52, t. 1, fig. 7. 1856. *P. liebmanni* Lange, Vid. Medd. 1867: 113. 1868.

Moist and usually dense, pine forest, 2,500–3,800 meters; El Progreso (east of Finca Piamonte) Sololá (volcanoes of Atitlán and Santa Clara); Quiché; Huehuetenango (Sierra de los Cuchumatanes); Quezaltenango (Volcán de Zunil). Southern Mexico.

Plants erect, with slender rootstocks, the portion of the stem above ground short, 1–7 cm. long, bearing a few leaves; leaves glabrous, the petioles slender, 2–7 cm. long; leaf blades elliptic or oval, 2–7 cm. long, subacute to rounded at the apex, acute and decurrent at the base, chartaceous, lustrous, minutely and remotely crenulate or practically entire; scapes 15–30 cm. high, 8–15-flowered, with 2–4 bracts near the base; sepals lanceolate, acuminate, 5 mm. long; petals 7–8 mm. long, pinkish or purplish; capsule depressed, 8 mm. broad.

It does not seem reasonable that anyone would name this plant “*angustifolia*” but the illustration provided by Dr. Alefeld leaves no doubt about the application of the name to this plant.

Pyrola secunda L. Sp. Pl. 396. 1753. *Ramischia secunda* Garcke, Fl. Deutschl. ed 4. 222. 1858. *Actinocyclus secundus* var. *elatior* Lange, Vid. Medd. 1867: 115. 1868. *Ramischia elatior* Rydb. No. Am. Fl. 29: 29. 1914.

Moist or dry forest, mostly in pine woods, 2,700–3,800 meters; Sacatepéquez; Totonicapán; Huehuetenango; Quezaltenango. Widely distributed in temperate and arctic Canada and United States; Europe and northern Asia; in Mexico apparently rare and local.

Plants erect, glabrous, from long creeping rootstocks, the stems above ground suffrutescent, 1–10 cm. high, bearing 1–4 or often more leaves; leaves thin, persistent, lustrous, on petioles 1–2 cm. long, ovate or elliptic, 1–5 cm. long, usually acute, finely serrulate; scapes 20 cm. high or less; racemes mostly 6–18-flowered, short or elongate, the pedicels short, the flowers nutant; sepals oval or elliptic, 1 mm. long, rounded at the apex; petals greenish white, oblong or elliptic, 4–5 mm. long; capsule subglobose, 4 mm. in diameter.

In many parts of the Rocky Mountains this is a very common plant, but it is rare in the high mountains of Guatemala, also apparently in Mexico. *Ramischia elatior*, originally described from Veracruz, seems to differ in no essential respect from northern specimens of *Pyrola secunda*, and is scarcely a good variety.

MONOTROPACEAE. Indian Pipe Family

Reference: John K. Small, Monotropaceae, No. Am. Fl. 29: 11-18. 1914.

Saprophytic plants or parasitic on roots of other plants, without chlorophyll, usually succulent and white to brown or red, the stems solitary or often clustered from matted roots, mostly simple and scapiform; leaves reduced to scales; flowers perfect, erect or nutant; sepals 2-6, distinct, often deciduous; corolla white or colored, of 3-6 distinct or partially united petals; stamens 6-12, hypogynous or sometimes inserted on a small glandular disk, the filaments slender or dilated; anthers 2-celled, sometimes with confluent cells dehiscent by valves or pores, sometimes appendaged; ovary superior, mostly of 4-6 united carpels, 4-6-celled or 1-celled, sessile; styles united, usually columnar, the stigma discoid, funnelliform, or capitate, often sublobate; ovules numerous; fruit capsular, 4-6-celled, sometimes 1-celled, often more or less fleshy, generally surrounded by the marcescent perianth, loculicidally dehiscent; seeds numerous, minute.

The family is often included in the Pyrolaceae or in the Ericaceae. It may be distinguished from both these families by its herbaceous and saprophytic habit, or parasitic habit. There are perhaps as many as 8 or 9 not very distinct genera, mostly with one or few species. One genus extends into tropical America.

MONOTROPA L.

Plants fleshy, with a somewhat waxy texture, white, pink, or red, glabrous or pubescent, the stems simple; leaves scale-like, approximate or crowded below, larger and more remote above; flowers solitary or racemose; sepals 2-5; petals 5-6, dilated above, ciliate, slightly saccate at the base; stamens 10 or 12, included, the filaments slender, often pubescent; anthers short, transverse, the cells opening by 2 slits; ovary 4-6-celled, the style short and thick, the stigma discoid.

Half a dozen species, in America, Europe, and Asia, mostly in temperate regions, in the tropics found only in the mountains. Different authors vary greatly in the number of species recognized. Only the following are known in Central America.

Flowers solitary, terminal. *M. coccinea*.
Flowers racemose, several or numerous. *M. hypopithys*.

Monotropa coccinea Zucc. Flora 15, pt. 2: Beibl. 100. 1832.
M. uniflora var. *variegata* Andres, Verh. Bot. Ver. Brandenb. 52: 94. 1911 (type from Guatemala, but no collection cited). *M. uniflora*

var. *coccinea* Domin, Sitzungsber. Boehm. Ges. Wiss. Prag, II Classe, 1915: 5. 1915. *Flor de tierra* (Chiquimula).

Mostly in dense, wet or moist, oak, pine, liquidambar, or mixed forest, 1,000–3,100 meters; Alta Verapaz; Baja Verapaz; Zacapa; Chiquimula; Jalapa; Guatemala; Huehuetenango. Central and southern Mexico; British Honduras; El Salvador; Honduras; Nicaragua; Costa Rica; Panama; Colombia.

Plants 10–20 cm. high, 1-flowered, coral-red or rose-red, blackening when dried, glabrous, often growing in dense colonies; leaf scales numerous, lanceolate or ovate-lanceolate, mostly 1 cm. long or shorter; flower nutant in anthesis, erect in fruit; sepals rose-red, oblong or linear-oblong, 12–14 mm. long, erose above the middle; petals obovate or spatulate, pinkish white, about equaling the sepals, glabrous, not ciliate; filaments glabrous; capsule subglobose, about 13 mm. long.

This has been reported from Guatemala as *M. uniflora* L., and probably is no more than a variety of that, which in its various forms is widely distributed in the northern hemisphere. *M. uniflora* in its typical state is a white plant, sometimes tinged with pink. It is well known in the United States under the names "Indian pipe" and "corpse plant."

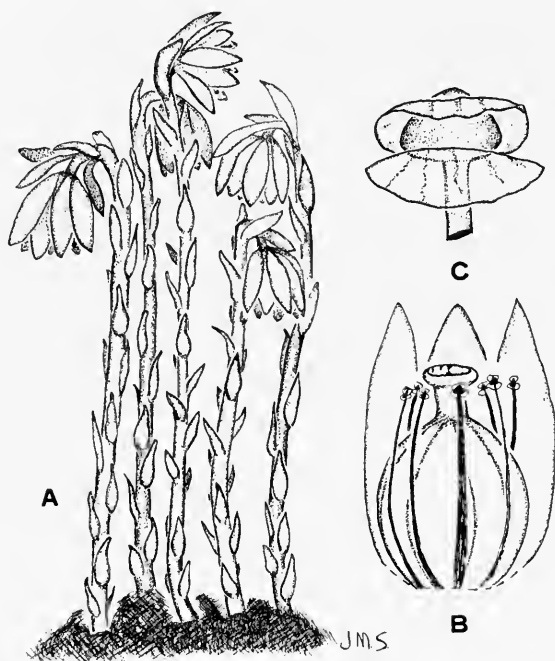


FIG. 22. *Monotropa coccinea*. A, Habit of plants, $\times \frac{1}{2}$. B, Portion of flower showing ovary, stamens, and petals, $\times 2\frac{1}{2}$. C, Anther dehiscent showing veil-like tissue of anther, $\times 5$.

Monotropa hypopithys L. Sp. Pl. 387. 1753. *Hypopityis latisquama* Rydb. Bull. Torr. Bot. Club 40: 461. 1913. *M. hypopityis* var. *latisquama* Kearney & Peebles, Journ. Wash. Acad. Sci. 29: 487. 1939.

Pine forest, 1,700–2,000 meters; Zacapa (Sierra de las Minas, below Finca Alejandría, *Steiermark* 29782). Canada and United States; Mexico; Europe and Asia.

Plants simple, erect, often forming colonies, more or less pubescent, red, pink, or yellowish, generally 10–20 cm. high; leaf scales mostly 1 cm. long or shorter, sessile, the lowest rounded or ovate, the upper ones oval or oblong; flowers in Guatemalan plants orange-red with yellow tips; sepals 6–8 mm. long, cuneate or spatulate, ciliate; petals cuneate or oblong, 1 cm. long or shorter, pilose and ciliate; capsule globose to oval, 6–9 mm. long.

The only known collection from Guatemala is in poor condition. It is not typical for the species but whether or not it is one of the varieties of this widespread plant or whether it is undescribed cannot be easily determined. The spelling of the specific name is that used by Linnaeus.

There is fair reason to separate this species as a monotypic genus *Hypopithys* as has been done by Small and others.

ERICACEAE. Heather Family

References: J. K. Small, *Ericaceae*, No. Am. Fl. 29: 33–102. 1914. Albert C. Smith, *The American species of Thibaudieae*, Contr. U. S. Nat. Herb. 28: 311–547, *tt. 1–19*. 1932. Hermann Sleumer, *Vaccinioideen-Studien*, Bot. Jahrb. 71: 375–510. 1941.

Shrubs, trees or vines, glabrous or pubescent; leaves alternate, opposite, or verticillate, usually persistent (in our region) and often coriaceous, entire or dentate, without stipules; flowers regular, perfect; calyx superior or inferior, 5–4-lobate, the segments imbricate or valvate; corolla hypogynous or epigynous, regular or rarely somewhat irregular, persistent or deciduous, with 5–4 lobes or rarely parted almost or quite to the base, the lobes imbricate, contorted, or rarely valvate in bud; stamens hypogynous or epigynous, sometimes adnate to the base of the corolla, usually twice as many as the corolla lobes, rarely of the same number, the filaments free or rarely connate; anthers 2-celled, basifixed or dorsifixed, 2-lobate at the base, 2–4-aristate dorsally or mucicous, produced above into distinct or united tubules, these dehiscent by pores or slits; disk usually annular or swollen, crenate or lobate, often obsolete; ovary superior or inferior, 2–12-celled, the carpels often free above; style cylindrical, filiform or columnar, the stigma peltate or capitate, often dentate, lobate, or marginate; ovules numerous to 1 in each cell, the placentae adnate to the interior angle of the cell or pendulous from the apex of the cell; fruit capsular or baccate, when capsular loculicidally or septicidally dehiscent into as many valves as there are cells, rarely separating into cocci; seeds 1–many in each cell, generally minute, angulate or compressed; endosperm carnosous, the embryo axial; cotyledons short, the radicle terete.

About 70 genera, the species found in almost all regions of the earth, in the tropics confined usually to the higher mountains. Five or six other genera are represented in southern Central America and Panama.

Ovary superior; fruit capsular or drupaceous.

Corolla of distinct petals; fruit capsular *Befaria*.

Corolla of united petals.

Fruit capsular, the calyx dry, not accrescent.

Corolla symmetric; native plants *Leucothoe*.

Corolla asymmetric; cultivated plants *Rhododendron*.

Fruit drupaceous or baccate, or capsular but then surrounded by a fleshy accrescent calyx.

Fruit capsular, surrounded by the fleshy accrescent calyx *Gaultheria*.

Fruit baccate or drupaceous, the calyx neither fleshy nor accrescent.

Fruit drupaceous; cells of the ovary 1-ovulate *Arctostaphylos*.

Fruit baccate; cells of the ovary few-many-ovulate.

Fruit papillose; large shrubs or trees *Arbutus*.

Fruit smooth; dwarf shrubs *Pernettya*.

Ovary inferior; fruit baccate, or rarely dry but then berry-like.

Corolla small, 1 cm. long or usually shorter, campanulate to urceolate or urceolate-tubular; leaves all or mostly penninerved.

Fruit dry at maturity and with thin fragile walls; plants epiphytic and pendent, or terrestrial and repent; leaves entire *Sphyrospermum*.

Fruit juicy at maturity, not with fragile walls.

Pedicels and usually also the calyx subtended by 2 broad bracts; stamens 10; small shrubs with very small, coriaceous leaves *Disterigma*.

Pedicels and calyx without bracts or these small and inconspicuous. *Vaccinium*.

Corolla usually 1.5-3 cm. long, if smaller the plants epiphytic and conspicuously 3-5-plinerved.

Inflorescences in bud covered with large, usually rose-colored bracts, these usually persistent in anthesis *Cavendishia*.

Inflorescences not covered with colored bracts in bud, the bracts not conspicuous.

Stamens all of equal length; anther sacs conspicuously granular *Macleania*.

Stamens unequal; anther sacs smooth or nearly so.

Filaments unequal, free or nearly so; inflorescence long-racemose and conspicuously secund *Empedoclesia*.

Filaments equal in length, connate for their whole length; inflorescence short, not secund *Satyria*.

ARBUTUS L.

Shrubs or trees, the bark usually smooth and peeling off in sheets; leaves alternate, usually on rather long petioles, generally coriaceous, entire or dentate; flowers perfect, paniculate, the panicles terminal, compound; calyx often persistent, the 5 lobes much longer than the tube, equal or nearly so; corolla white or pink, urceolate,

the 5 lobes spreading or recurved, rounded, much shorter than the tube; stamens 10, included, the filaments dilated at the base, usually pubescent, not appendaged; anthers broad, each with 2 slender awns; disk generally 10-lobate; ovary sessile, mostly 5-celled, the style columnar or subulate, the stigma subcapitate, obscurely 5-lobate; ovules numerous, attached at the inner angle of the cell; fruit drupaceous or baccate, globose or depressed-globose, rough-granular.

About 10 species, in North America and western Europe. Only the following is found in Central America.

Arbutus xalapensis HBK. Nov. Gen. & Sp. 3: 279. 1819. *A. rubescens* Bertol. Fl. Guat. 420. t. 42. 1840 (type from Antigua, Sacatepéquez, Velásquez). *A. varians* Benth. Pl. Hartw. 77. 1841 (type from Quezaltenango, Hartweg 542). *Arctostaphylos rubescens* Hemsl. Biol. Cent. Am. Bot. 2: 279. 1881. *Arbutus donnell-smithii* Small, No. Am. Fl. 29: 85. 1914 (type from San Lucas, Sacatepéquez, J. D. Smith 2190). *Madroño*; *guayabo* (Volcán de Santa María); *Guayabillo*; *encino*; *canelón* (fide Aguilar); *chulube* (Huehuetenango); *pulca* (Quezaltenango); *ucá* (Volcán de Santa María); *madrón*.

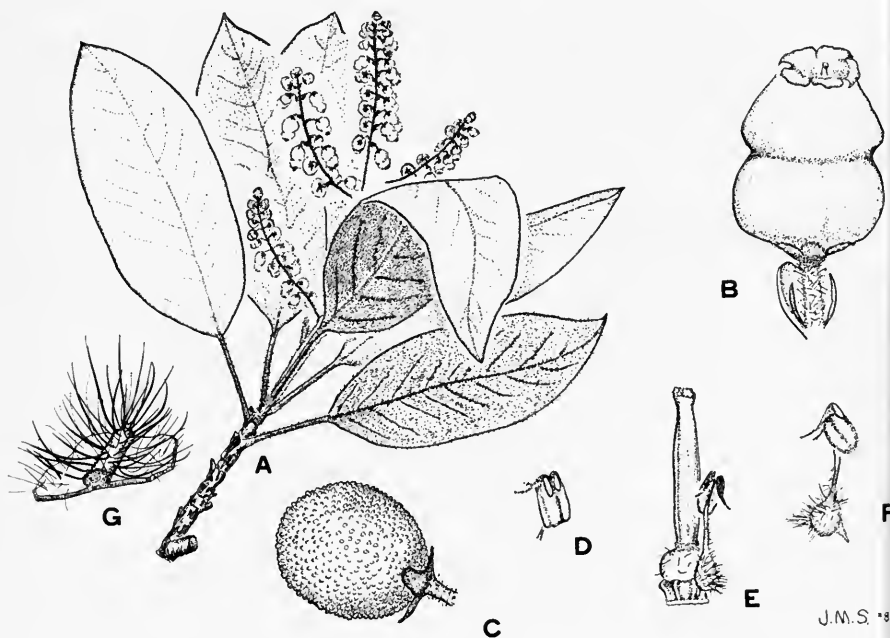


FIG. 23. *Arbutus xalapensis*. A, Flowering branch, $\times 2\frac{1}{2}$. B, Flower with subtending bract and bractlets, $\times 3\frac{1}{2}$. C, Fruit, $\times 2$. D, Anther from front, $\times 8$. E, Pistil, style, anther with subtending disk, $\times 6$. F, Stamen, $\times 8$. G, Pubescence along mid-nerve on undersurface of leaf, enlarged.

Brushy hillsides, usually in pine or oak forest, 1,300–2,800 meters; Baja Verapaz; Zacapa; Jalapa; Guatemala; Sacatepéquez; Chimaltenango; Sololá; Quiché; Huehuetenango; Quezaltenango; San Marcos. Western Texas; Mexico; El Salvador; Honduras; Nicaragua.

A shrub or tree, commonly 4–9 meters tall, at times probably larger, the bark smooth, brown, peeling off in large thin sheets, the branchlets reddish, when young tomentose with brown or whitish hairs and often pilose with long gland-tipped hairs; leaves rather long-petiolate, persistent for most of the year but often deciduous at the end of the dry season, broadly oblong to ovate, oval, or ovate-lanceolate, mostly 8–14 cm. long, obtuse or acute, subcordate to rounded at the base, entire or serrate, green and almost glabrous on the upper surface, usually densely tomentose beneath with rufous or whitish hairs when young, often glabrate in age; panicles 3–8 cm. long, many-flowered, the branches and pedicels densely tomentose and usually with scattered gland-tipped hairs; calyx 4–6 mm. broad, the lobes broadly ovate, obtuse, tomentulose or glabrate; corolla 6–8 mm. long, white or pinkish, glabrous; ovary pubescent or glabrous; fruits bright red, globose, 8–12 mm. long.

Called “indio desnudo” in Honduras, in reference to the smooth copper-colored bark. The usual names in Guatemala are “madroño” or “madrón.” The name “guayabo” is sometimes given because the bark suggests that of the guava (*Psidium*). The species has been reported from Guatemala as *A. glandulosa* Mart., a name given to a Mexican plant that probably is no more than a form of *A. xalapensis*. There is no reason for supposing that *A. donnell-smithii* is more than a casual form of *A. xalapensis*. Both it and *A. rubescens* were described from the same region and are presumed to be synonymous, although it is not stated whether the ovary of *A. rubescens* is glabrous or pubescent. Small separated *A. donnell-smithii* on the basis of the glabrous ovary, that of *A. xalapensis* being pubescent. It is absurd to suppose that the two species, otherwise exactly alike, occur in the same part of Guatemala, to be distinguished only by the absence or presence of a few hairs on the ovary.

ARCTOSTAPHYLOS Adanson

Erect or prostrate shrubs or often trees, glabrous or pubescent; leaves alternate, petiolate, coriaceous, entire or serrate; flowers small, white or pink, in terminal racemes or panicles, nutant, pedicellate, bracteate and bracteolate; calyx 5-parted, persistent, inferior; corolla globose to urceolate or subcampanulate, the limb 5-lobate, the lobes reflexed, imbricate; stamens generally 10, included, the filaments short, subulate, adnate at the very base of the corolla or sometimes inserted on the disc and free from the corolla; anthers short, laterally compressed, affixed dorsally below the apex, 2-porose at the apex, bearing 2 dorsal recurved awns; disc 10-lobate or entire; ovary sessile, 5-celled, the style filiform, the stigma small, obscurely bilobate; ovules solitary in the cells, pendulous from the upper part of the

cell; fruit drupaceous, globose, smooth or granular, containing 5 bony nutlets, or the putamen osseous and 5-10-celled, 5-seeded or by abortion 1-4-seeded; seeds pendulous, the funicle short, the testa membranaceous; endosperm carnos.

A genus of about 45 species, two of them widely dispersed in the northern hemisphere, the others in temperate North America or in the mountains of tropical North America. One other Central American species is found in Costa Rica.

The separation of *Arctostaphylos* and *Arbutus* is not always easy and it is not impossible that only one genus is represented. An additional genus, *Comarostaphylis* Zucc., is sometimes used and some of our species would belong here if it were maintained. *Comarostaphylis* is perhaps intermediate between *Arbutus* and *Arctostaphylos*. The differences between these genera are largely in the fruits. *Arbutus* has usually 5-celled fruits which are said to be berries, but would not seem always to be berries. The seeds are usually several contained in an osseous endocarp or one tending to become indurated. *Comarostaphylis* has a 4-5-celled ovary also, the endocarp is very hard and bony, but with the cells containing a single seed and these grown together to form a hard bony ovary surrounded by a granular covering (as in *Arbutus*). *Arctostaphylos* typically has 4-10 seed-like nutlets, usually (or always?) with a single ovule; the nutlets may be quite free in the pulp of the drupe or joined to form a solid stone. Because the nutlets do sometimes form a solid stone most botanists have placed *Comarostaphylis* into the genus *Arctostaphylos*. However, the nutlets of *Arbutus* also form a single stone so this character is not consistently one that can be said to belong only to *Arctostaphylos*.

Perhaps the only difference between *Arctostaphylos* (sens. lat.) and *Arbutus* is the single ovule in each cell of the ovary in the former and several seeds in each cell in *Arbutus*. However, there seems to be no other basic difference in flower or fruit structure of *Arbutus* and that part of the genus *Arctostaphylos* sometimes referred to as the genus *Comarostaphylis*.

Fruit smooth; prostrate shrubs; leaves small, mostly 2 cm. long or less, entire.

A. cratericola.

Fruit verrucose or granular; tall erect shrubs or small trees; leaves much larger, serrate to entire.

Leaves densely tomentose beneath when young, some of the pubescence usually persistent in age, usually entire or merely undulate. *A. arbutoides.*

Leaves glabrous in age, closely and very acutely serrate. *A. pyrifolia.*

Arctostaphylos arbutoides (Lindl.) Hemsl. Biol. Cent. Am. Bot. 2: 278. 1881. *Comarostaphylis arbutoides* Lindl. Bot. Reg. 29: t. 30. 1843. *Chilú* (Huehuetenango).

Dry or moist, brushy or rocky hillsides, often in pine or oak forest, 1,800–3,000 meters; Zacapa; Jalapa; Baja Verapaz; Guatemala; Chimaltenango; Quiché; Huehuetenango; Quezaltenango (described from plants grown in London, the seeds collected near Quezaltenango by Hartweg). Mexico; Honduras; Costa Rica; Panama.

A stout shrub 1–4.5 meters high, the branches terete, brown or blackish, when young rufous-tomentose, often also glandular-hispid; leaves short-petiolate, coriaceous, narrowly oblong to elliptic-oblong or oblanceolate-oblong, mostly 5–9 cm. long, acute to rounded and mucronate at the apex, acute or attenuate at the base, usually with strongly revolute margins, glabrous above, at least in age, usually persistently rufous-tomentose beneath, entire or undulate or on sterile branches often finely serrate; panicles laxly many-flowered, usually longer than the leaves, densely and laxly tomentose, often also hirsute; calyx 4–5 mm. broad, the lobes triangular-ovate or triangular-lanceolate, acute, tomentulose; corolla 6–7 mm. long, laxly tomentose, white; ovary pilose; fruit globose, glabrous, 5 mm. in diameter, coarsely granular.

Arctostaphylos cratericola Donn.-Sm. Bot. Gaz. 55: 437. 1913.
A. pungens var. *cratericola* Donn.-Sm. l.c. 16: 13. 1891. *Uvaursi cratericola* Abrams, No. Am. Fl. 29: 94. 1914. *Abril* (Volcán de Zunil).

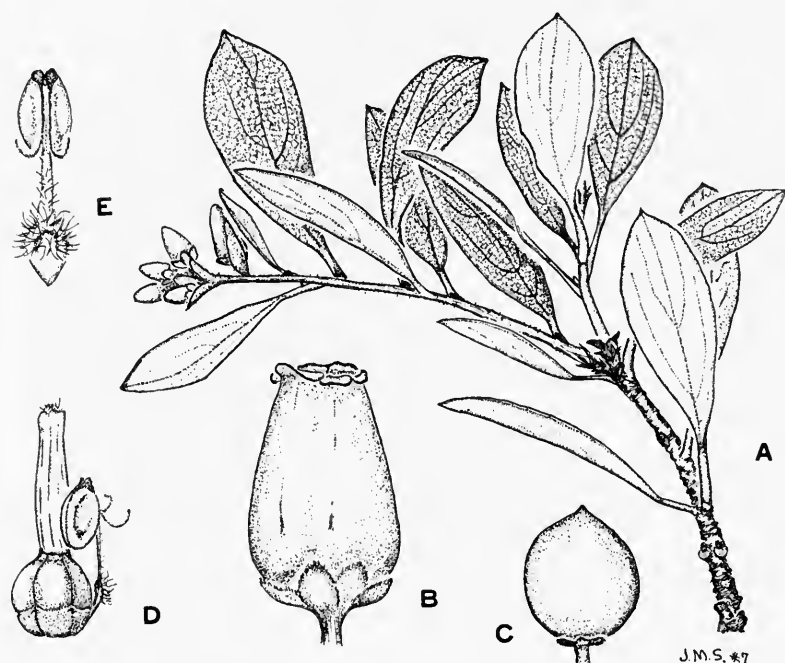


FIG. 24. *Arctostaphylos cratericola*. A, Flowering branch, $\times 2$. B, Flower, $\times 8$. C, Fruit, $\times 2$. D, Ovary, style, and stamen, $\times \pm 8$. E, Anther from rear, $\times \pm 12$.

Dry or wet, alpine meadows or hillsides, often in thickets of *Juniperus* 2,400–3,800 meters; endemic; Sacatepéquez (type from crater of Volcán de Agua, *J. D. Smith 2159*); Chimaltenango; Huehuetenango; Quezaltenango.

A depressed prostrate shrub, the stems a meter long or less, sometimes rooting, often forming dense close mats over the ground, branched, densely leafy, with exfoliating bark, the young branchlets puberulent; leaves short-petiolate, coriaceous, lustrous, obovate or obovate-elliptic, mostly 1.5–2 cm. long, obtuse or acute and apiculate, acute or obtuse at the base, glabrous, inconspicuously reticulate-veined, entire; racemes subsessile, nutant, almost head-like, 6–8-flowered, puberulent; flowers short-pedicellate, white or pinkish; calyx lobes suborbicular, 2 mm. long, ciliate; corolla urceolate, 6–7 mm. long; fruit bright red, 5–7 mm. in diameter, smooth, glabrous.

Skutch reports that the fruit is insipid. The plant is abundant at many places in the region of Chémal in the Cuchumatanes, often forming large colonies among bushes of *Juniperus*. In general appearance it is much like *A. uva-ursi* (L.) Spreng. of the United States.

Arctostaphylos pyrifolia (Donn.-Sm.) Standl. & Steyerl. *Field Mus. Bot.* 23: 138. 1944. *A. arguta* var. *pyrifolia* Donn.-Sm. ex Loes. *Bull. Herb. Boiss.* II. 3: 219. 1903. *Comarostaphylis pyrifolia* Small, *No. Am. Fl.* 29: 91. 1914. *Madrón; shulup.*

Dry or moist, open or brushy rocky slopes, often or usually on limestone, frequently with *Juniperus standleyi*, *Abies*, or *Pinus ayacahuite*, 2,500–4,000 meters; San Marcos; Huehuetenango (type from the region of Todos Santos, *Seler 2633*); Quiché. Mexico (Chiapas).

A shrub or small tree 1–6 meters high, the branches glabrous; leaves subcoriaceous, on rather short, slender petioles, yellowish green when dried, oval to oblong or lance-oblong, mostly 4–8 cm. long, acute or short-acuminate, acute at the base, finely and evenly spinulose-serrate, glabrous throughout or nearly so, silvery beneath when fresh, the costa impressed above, salient beneath, the nerves and veins often rather prominent and reticulate beneath, the upper surfaces usually lustrous; panicles lax or dense, the branches tomentulose or glabrate; calyx 4.5–5.5 mm. broad, the lobes deltoid or ovate-deltoid, finely pubescent, ciliate, acute; corolla 5–6 mm. long, white or tinged with pink, minutely pubescent, or almost glabrous; fruit globose, 4–5 mm. in diameter, glabrous, densely granulate.

This species may be only a variation of *A. arbutoides*, with glabrous or nearly glabrous and spinose-serrate leaves (except in one specimen).

BEFARIA Mutis

References: R. Mansfeld and H. Sleumer, *Revision der Gattung Befaria Mutis*, *Notizbl. Bot. Gart. Berlin* 12: 235–276. 1935. W. H.

Camp, Studies in the Ericales. A discussion of the genus *Befaria* in North America, Bull. Torr. Bot. Club 68: 100-111. 1941.

Shrubs or small trees, glabrous or pubescent, the pubescence often glandular; leaves alternate, coriaceous, petiolate, entire or nearly so, flat or often with revolute margins; flowers large, purple, pink, or rarely white, in terminal or subterminal, few-many-flowered, bracteate or ebracteate racemes or corymbs; calyx campanulate, usually 7-parted, the segments persistent, ovate, short; petals usually 7, spatulate, thin, free, somewhat imbricate in bud, usually glabrous, much longer than the sepals, soon deciduous; stamens inserted on the receptacle, twice as many as the petals or more numerous, about equaling the petals, the filaments free, elongate, subulate, slightly declinate, generally pubescent below; anthers oblong, dorsifixed, mucicous, obliquely 2-pored at the apex; disk obsolete; ovary superior, depressed-globose, glabrous or nearly so, 7-sulcate, 6-7-celled; style filiform, elongate, exserted, glabrous, the stigma depressed-capitate; ovules numerous in each cell; capsule depressed-globose, 6-7-celled, many-seeded, septicidally 7-valvate from the apex, the valves thick-crustaceous, separating from the central axis; seeds flat, imbricate, elongate.

The genus contains some 25 species, mostly from Andean South America, and are often difficult to distinguish one from another. The two species here recognized are perhaps only variations of the South American *Befaria glauca* H. & B.

Plants glandular-pubescent on the branches and inflorescence. *B. mexicana*.

Plants glabrous or at least without glandular pubescence. *B. guatemalensis*.

Befaria guatemalensis Camp, Bull. Torr. Bot. Club 68: 110. 1941. *Azajarillo*.

Pine forest, 1,000-2,400 meters; Zacapa (type from Sierra de las Minas, *Steyermark 29783*). Mexico; Honduras.

Shrub or tree 3-9 m. tall, the branches glabrous; leaves oblong-lanceolate, coriaceous, glabrous, 5-9 cm. long, 1.5-2.5 cm. broad, short-petiolate, entire, acute or obtuse, acute at the base, green above, paler beneath but sparsely glaucous; inflorescence short-racemose or subcorymbose, 6-10-flowered, the rachis and pedicels glabrous, the pedicels stout, 1-3 cm. long; calyx glabrous, in anthesis 4 mm. broad, the lobes deltoid, ciliate; petals white, obovate-spatulate, attenuate below, 2-2.5 cm. long and 5 mm. broad, sparsely puberulent at the apex; style slender, 3 cm. long; capsule blackish, about 8 mm. high.

Befaria mexicana Benth. Pl. Hartw. 15. 1839.

At 1,500-1,800 meters; Zacapa (Río Sitio Nuevo, Sierra de las Minas). Southern and western Mexico; British Honduras; Honduras.

A shrub or a tree to about 7 m. high, the young branches pubescent with gland-tipped, spreading, grayish or ferruginous hairs, glabrate in age; leaves short-petiolate, chiefly oblong-lanceolate, 2.5-8 cm. long, 1-3.5 cm. broad, subacute to rounded at the apex, acute at the base, entire, more or less tomentose when young,



FIG. 25. *Befaria guatemalensis*. A, Flowering branch, natural size. B, Capsule from below and from above, $\times 2\frac{1}{2}$. C, Anthers from front and back, $\times 10$. D, Stigma, $\times 2\frac{1}{2}$.

often with glandular hairs on the mid-rib beneath, in age glabrous or nearly so, glaucous or green beneath; inflorescence subcorymbose, many-flowered, densely glandular-pilose; calyx and hypanthium glandular-pubescent or glabrate, the calyx lobes ovate-lanceolate, subacute, 4-5 mm. long; petals glabrous, white, 3.5-4 cm. long.

The single Guatemalan collection is an imperfect one, but if pubescence is dependable as a specific character, it is referable to *B. mexicana* rather than to *B. guatemalensis* of the same region.

CAVENDISHIA Lindley

Shrubs, usually epiphytic; leaves alternate, petiolate, 3-5-plinerved or penninerved, coriaceous; inflorescence axillary or terminal, subfasciculate or racemose, bracteate at the base and when young usually enveloped by large, submembranaceous, reddish or pinkish bracts; flowers pedicellate, few-many in each inflorescence, the pedicels bearing 2 deciduous bractlets; base of the flower articulate with the pedicel, the hypanthium short-cylindric or campanulate; calyx erect or spreading, 5-lobate, the lobes triangular or ovate; corolla subcylindric, 5-lobate, the lobes triangular or oblong; stamens 10, alternately unequal, almost as long as the corolla; filaments distinct or coherent at the base, alternately unequal, attached to the anther dorsally near its base; anthers firm or membranaceous, the cells smooth or slightly granular, the tubules somewhat longer than the cells, opening by elongate introrse clefts; style filiform, about equaling the corolla; fruits baccate, juicy.

More than seventy species, chiefly in the mountains of tropical America. Numerous other species occur in Central America and Panama. The plants are not very common in Guatemala, except about Cobán and in some parts of the mountains of the western highlands, where they are plentiful enough to be used for decorations. They are well suited to this purpose because the flowers last for a long time, in or out of water. The flowers and the bracts of most species are strikingly beautiful because of their abundance, their form, and their brilliant pink coloring. In Costa Rica, where the plants are abundant in the higher mountains, they are among the most beautiful and showy of all native plants. The fruits are juicy and edible, in most species at least, and they have an agreeable but rather strong acid flavor. Some of these plants evidently contain a substantial amount of essential oil, for when in process of drying in the press, which requires some time because of the leathery leaves, and especially when dried by artificial heat, they often give off a very intense, penetrating, and rather agreeable odor, slightly suggestive of wintergreen. The genus is near its northern limit in Guatemala, and but few species are found in the Mexican mountains. The species are most numerous from Costa Rica southward to Ecuador.

- Calyx longer than the hypanthium, the hypanthium slightly constricted at the apex; corolla hirsute with spreading hairs. *C. callista*.
- Calyx usually much shorter than the hypanthium, the hypanthium not constricted at the apex; corolla glabrous or pubescent.
- Racemes elongate, the rachis 3 cm. long or usually longer; bracts often shorter than the pedicels, not covering the inflorescence; corolla 15 mm. long or less.
- Corolla 9-10 mm. long. *C. laurifolia*.
- Corolla about 15 mm. long. *C. crassifolia*.
- Racemes short, the rachis less than 3 cm. long; bracts longer than the pedicels and usually enveloping the inflorescence; corolla often more than 15 mm. long.
- Flowers glabrous or nearly so. *C. guatemalensis* var. *chiapensis*.
- Flowers uniformly and usually densely pubescent throughout.
C. guatemalensis.

Cavendishia callista Donn.-Sm. Bot. Gaz. 20: 5, t. 2. 1895.
Jolonajtzó (Quecchí).

Epiphytic in wet mountain forest, 350-1,500 meters; endemic; Alta Verapaz (type collected between Cobán and Samac, *Tuerckheim 941*); Huehuetenango.

A large shrub, sometimes 1.5 meters tall, sparsely branched, the branches terete, brownish or cinereous, sparsely setose-pilose or glabrous; leaves on petioles 5-12 mm. long, coriaceous, oblong or ovate-oblong, long-acuminate, truncate or subcordate at the base, glabrous or nearly so, 5-7-plinerved; inflorescences terminal, racemose, 15-35-flowered, the racemes solitary or geminate, the bracts numerous, as much as 2 cm. long, rose-red, oblong or ovate; rachis 5-10 cm. long, glabrous, the glabrous pedicels 6-12 mm. long, each one subtended by a bract similar to the basal ones; hypanthium glabrous, 2-2.5 mm. long, slightly constricted at the apex; calyx erect, glabrous, 6 mm. long, the lobes oblong, subacute; corolla about 18 mm. long, densely pubescent with rather long, pale, spreading hairs; stamens subequal, 15 mm. long.

Perhaps the most handsome of the Guatemalan species. It was seen in cultivation in the finca at Samac, where it grew luxuriantly.

Cavendishia crassifolia (Benth.) Hemsl. Biol. Centr. Am. Bot. 2: 273. 1881. *Thibaudia crassifolia* Benth. Pl. Hartw. 65. 1840.

On trees in wet forest, 300-900 meters; Alta Verapaz; Quiché. Southern Mexico.

A small or large shrub, the branchlets terete, dark brown, glabrous; leaves on petioles 5-10 mm. long, oblong-ovate, 7-13 cm. long, 2.5-5 cm. broad, caudate-acuminate, cuneate or rounded at the base, glabrous or nearly so, 5-plinerved; inflorescences terminal or axillary, 10-20-flowered, the rachis glabrous, 2-5 cm. long; pedicels 6-11 mm. long, glabrous or minutely puberulent; hypanthium cylindrical or broadly campanulate, glabrous or minutely puberulent, 2 mm. long; calyx 2 mm. long, short-pilose or glabrate, the lobes triangular, acute, 1 mm. long; corolla

15 mm. long, glabrous; stamens 12 mm. long; young fruit 6 mm. in diameter, when mature and fresh doubtless much larger.

Cavendishia guatemalensis Loes. Bull. Herb. Boiss. II. 3: 221. 1903. *Clavel georgino*.

Usually epiphytic in dense wet forest, but often growing on cliffs or banks, sometimes erect on wet shaded soil, 300–3,000 meters; endemic, so far as known, but to be expected in Chiapas; Alta Verapaz; El Progreso; Guatemala; Sacatepéquez; Suchitepéquez; Quiché; Huehuetenango; Quezaltenango; San Marcos.

A shrub 1–4 meters long, when terrestrial usually erect, most often epiphytic and then pendent or ascending, the branches often angulate, brownish or grayish, glabrous or sometimes pubescent; leaves on petioles 5–10 mm. long, oblong or ovate-oblong, mostly 10–15 cm. long and 3.5–6.5 cm. broad, acuminate, rounded or truncate at the base, 5–7-plinerved; inflorescences axillary or terminal, short-racemose, 10–20-flowered, with numerous large, rose-colored, broadly ovate to oblong bracts at the base, the bracts densely pubescent on the outer surface; pedicels pubescent, 8–12 mm. long, each subtended by a large deciduous bract similar to the basal ones; calyx and hypanthium pilosulous, the hypanthium broadly campanulate, 2 mm. long, the calyx 3 mm. long, the lobes triangular, acute, 2 mm. long; corolla 15–16 mm. long, 4–5 mm. broad, densely to sparsely pilose with pale spreading hairs, white or coral red with a white apex; stamens 11 mm. long; young fruit subglobose, glabrate, 7 mm. or more in diameter, probably white at maturity.

This is the commonest *Cavendishia* of Guatemala and now in need of detailed study. The material we have placed here seems to be quite variable and perhaps not all one species. This species is occasionally used to decorate altars and homes on religious holidays. It has been "collected" from the shrine at Fuentes Georginas in Quezaltenango.

Cavendishia guatemalensis var. **chiapensis** (Brandege) L. Wms. Fieldiana, Bot. 31: 169. 1965. *C. chiapensis* Brandege, Univ. Cal. Publ. Bot. 6: 188. 1915 (type from Cerro El Boquerón, Chiapas).

Epiphyte on trees in mountain forests or occasionally a terrestrial shrub, 1,200–2,700 meters; Huehuetenango; San Marcos. Mexico (Chiapas); El Salvador; Honduras.

Similar to the species except glabrous in all parts.

Called "arrayán" in Chiapas; "flor del Niño" and "flor de montaña" in Honduras.

Cavendishia laurifolia (Klotzsch) Benth. & Hook. Gen. Pl. 2: 570. 1876. *Polyboea laurifolia* Klotzsch, Linnaea 24: 31. 1851. *Chup-*

alon laurifolium Kuntze, Rev. Gen. 383. 1891. *Cavendishia tuerckheimii* Hoerold, Bot. Jahrb. 42: 323. 1909 (type from Cobán, Alta Verapaz, *Tuerckheim* 64). *Pie de pájaro*; *rok'h-ik'h* (Cobán, Quecchí).

Usually on trees in dense wet mixed forest, sometimes terrestrial in wet shaded places, 250–2,000 meters; Alta Verapaz (type said to have been collected in Alta Verapaz by Warszewicz); Baja Verapaz; Guatemala; Quiché; Huehuetenango. Southern Mexico.

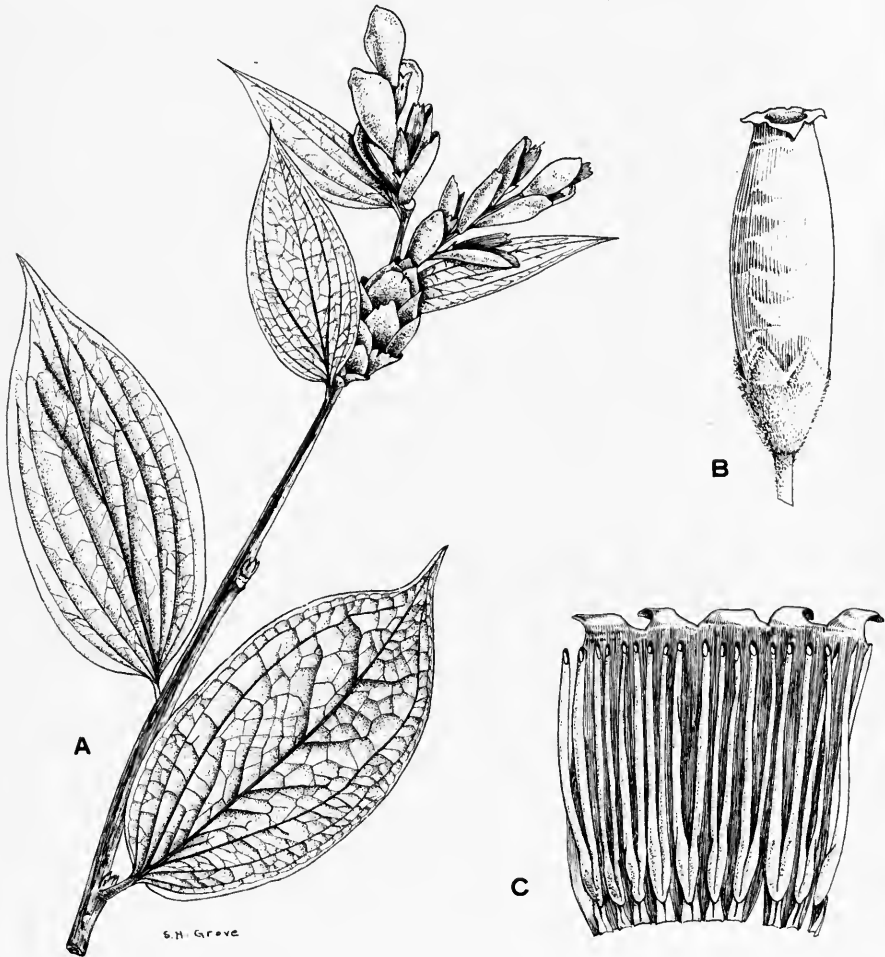


FIG. 26. *Cavendishia guatemalensis*. A, Flowering branch, $\times \frac{1}{2}$. B, Flower, $\times 2\frac{1}{2}$. C, Corolla opened to show stamens, $\times 2\frac{1}{2}$.

A small or rather large shrub, suberect or pendent, the branches slender, terete, brownish or grayish, sparsely puberulent when young; leaves on petioles 2-4 mm. long, oblong-ovate to lanceolate, mostly 5-9 cm. long and 2-3.5 cm. broad, long-acuminate, cuneate to truncate at the base, 5-plinerved; inflorescences terminal or axillary near the ends of the branches, 10-30-flowered, the rachis 3-14 cm. long, glabrous; pedicels glabrous, 1-2 cm. long, each subtended by an oblong or obovate bract 1 cm. long or shorter; hypanthium short-cylindric, 1-2 mm. long, puberulent or glabrate; calyx 2-2.5 mm. long, the lobes triangular, apiculate, 1 mm. long; corolla 9-10 mm. long, white with a pink apex or rose-pink with a white tip, 4 mm. broad, sparsely puberulent or glabrous; stamens 7-8 mm. long.

This is less showy than other local species. It is common in wet forests of the Cobán region, often growing with or near *C. guatemalensis*. The plant is more slender and has smaller leaves and flowers than the other Guatemalan Cavendishias.

Cavendishia warszewiczii (Klotzsch) Hemsl. Biol. Centr. Am. Bot. 2: 274. 1881. *Proclesia warszewiczii* Klotzsch, Linnaea 24: 35. 1851. *Chupalon warszewiczii* Kuntze, Rev. Gen. 383. 1891. The type is supposed to have been collected in the mountains of Guatemala by Warszewicz. According to Smith, the identification of the plant described is uncertain.

DISTERIGMA (Klotzsch) Niedenzu

Reference: Albert C. Smith, *Disterigma*, Brittonia 1: 216-232. 1933.

Low terrestrial shrubs, often dwarf and densely branched, the branches densely leafy; leaves alternate, coriaceous, small, short-petiolate, the nerves usually very obscure; flowers 1-6 in the leaf axils, often subsessile, subtended by a few minute subcoriaceous bracts; pedicels 2-bracteolate at the apex, the bractlets relatively large and embracing the hypanthium; hypanthium articulate with the pedicel, campanulate or short-cylindric; calyx suberect, 4-5-lobate; corolla subcylindric or campanulate-cylindric, 4-5-lobate; stamens twice as many as the corolla lobes, equal, the filaments liguliform, attached to the anthers dorsally near the base; anthers membranous, produced into 2 tubules, dehiscent by oval introrse slits; style filiform, about equaling the corolla, the stigma truncate; ovary 4-5-celled, the ovules numerous; disk annular, carnose; fruit a coriaceous berry.

Species about 15, ranging from Guatemala to Bolivia, mostly at very high elevations. One other North American species has been described from Panama.

Disterigma humboldtii (Klotzsch) Niedenzu, Bot. Jahrb. 11: 224. 1889. *Vaccinium humboldtii* Klotzsch, Linnaea 24: 57. 1851.

Epiphytic or terrestrial in dense, moist or wet forest, 900-2,600 meters or perhaps even higher; Alta Verapaz; El Progreso; Zacapa; Huehuetenango. Costa Rica and Panama; Colombia; British Guiana.

A dense shrub, erect or sometimes prostrate, usually 50 cm. high or less, the branches stiff, brownish or grayish, with shredded bark, hispidulous; leaves on petioles 1-2 mm. long, coriaceous, glabrous, broadly ovate to oval or broadly oblong, 7-15 mm. long, 4-7 mm. broad, rounded at each end, 3-5-nerved at the base but the nerves usually obscure, paler beneath; flowers glabrous, 1-3 in the leaf axils, on pedicels 2.5 mm. long or less, the bractlets ovate, rounded at the apex,

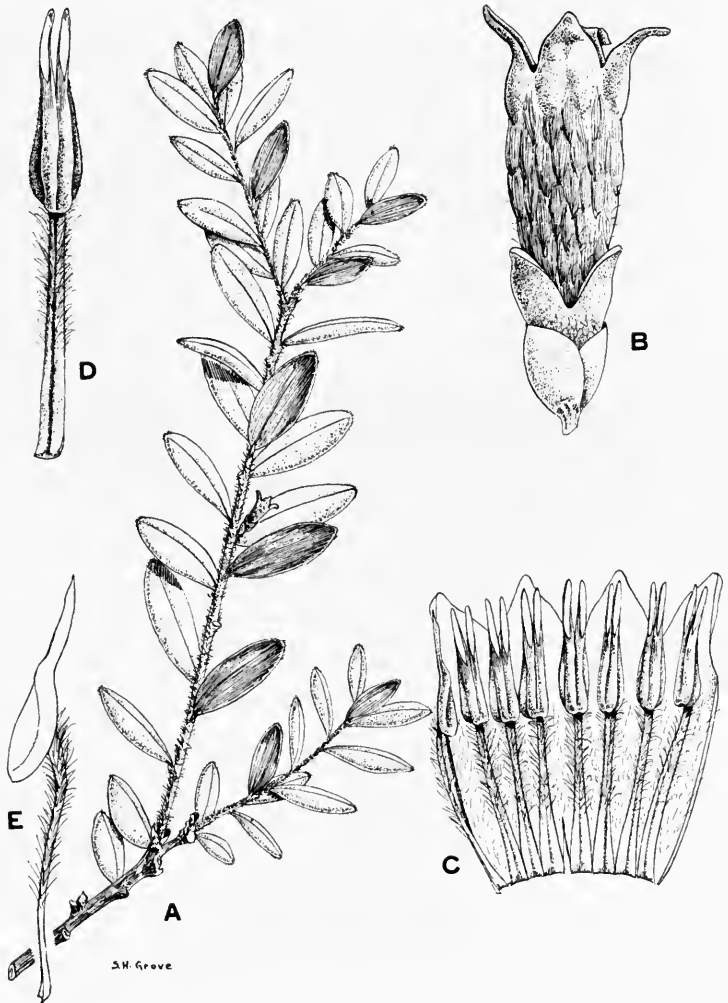


FIG. 27. *Disterigma humboldtii*. A, Flowering branch, $\times 1$. B, Flower, $\times 5$. C, Flower opened out to show placement of stamens, $\times 5$. D, Stamen from front, $\times 7\frac{1}{2}$. E, Stamen outline from side, $\times 7\frac{1}{2}$.

2-2.5 mm. long; hypanthium 1-2 mm. long; calyx 2-2.5 mm. long, the 4 lobes deltoid, acute; corolla white or pink, glabrous, 6-7 mm. long, the 4 short lobes deltoid; anthers 2.5-4 mm. long, the tubules longer than the sacs.

The plant appears to be very rare in Guatemala, only three collections of it having been made.

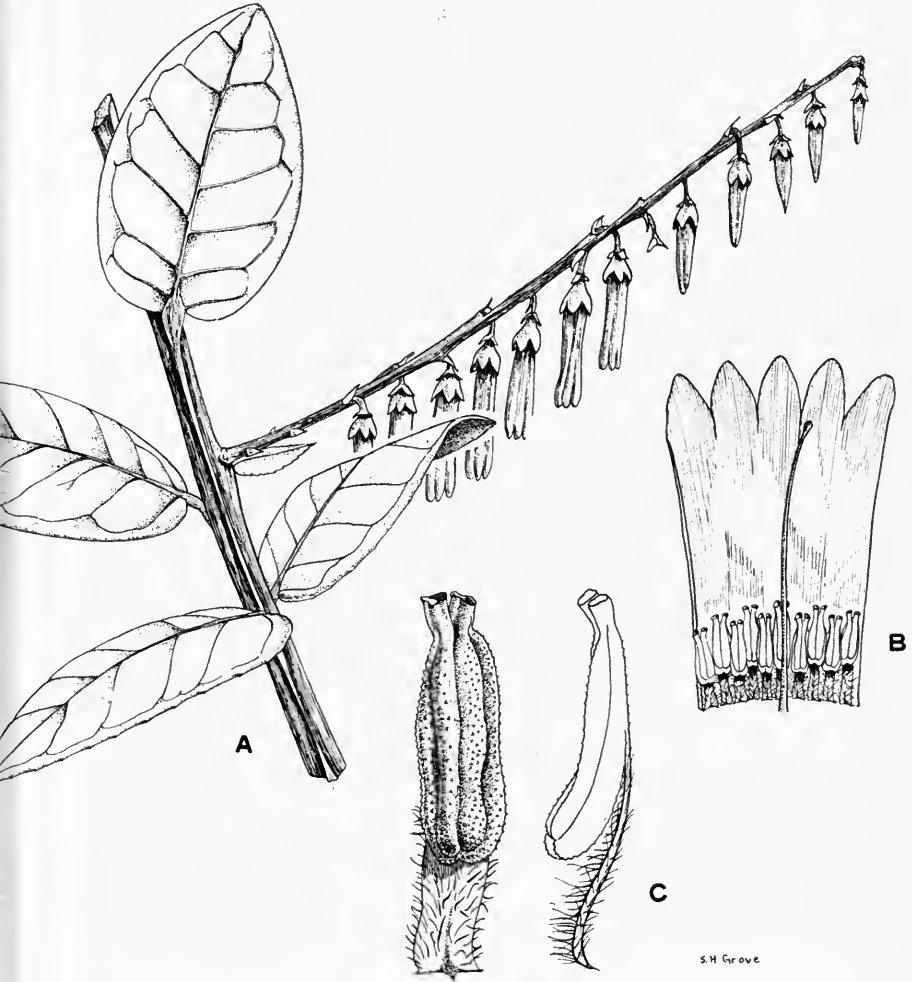


FIG. 28. *Empedoclesia brachysiphon*. A, Flowering branch, $\times \frac{1}{2}$. B, Corolla opened out to show placement of stamens and relative length of style, $\times 2$. C, Anthers, front and side, $\times 10$.

EMPEDOCLESIA Sleumer

Glabrous epiphytic shrubs with very stout branches; leaves ovate or oblong-ovate, very thick, lustrous, penninerved, on very short, thick petioles, minutely denticulate or almost entire; flowers rather large, red, in long axillary many-flowered secund racemes, the flowers articulate with the pedicels; hypanthium broadly obconic; calyx suberect, 5-lobate; corolla tubular, shallowly 5-lobate; stamens 10, much shorter than the corolla, alternately slightly unequal, hirsutulous; anthers granular, the tubules submembranaceous, very short, distinct, opening by round terminal pores; style filiform, shorter than the corolla.

The genus consists of a single species.

Empedoclesia brachysiphon Sleumer, Notizbl. Bot. Gart. Berlin 12: 124. 1934.

On trees in wet forest, 1,500–2,600 meters; Alta Verapaz (type from Cobán, *Tuerckheim 4196*); Zacapa (Sierra de las Minas); Huehuetenango (Maxbal).

A stout branched shrub, the branches 7–13 mm. thick, apparently obtuse-angulate; leaves rigid-coriaceous, thicker than in any other local plants of this family, oblong-ovate or broadly ovate, 6–14 cm. long, 4–8 cm. broad, on very short, thick petioles, slightly narrowed to the obtuse or very obtuse apex, broadly rounded or subcordate at the base, lustrous, subentire or with remote black glands along the margin and callous-mucronate, the venation not elevated on the upper surface, the costa prominent beneath, the lateral nerves 6–7 pairs, the veins obsolete; racemes stout, 10–20 cm. long, many-flowered, strongly secund, 20–25-flowered, the rachis thick, angulate; pedicels very stout, in anthesis 5–7 mm. long, subtended at the base by a thick elongate-deltoid bract 2.5 mm. long, bearing at the base of the calyx 2 similar bractlets; hypanthium and calyx together 9 mm. long, the lobes deltoid, 2–2.5 mm. long; corolla scarlet, fleshy, 18–25 mm. long, 3.5 mm. broad, the lobes obtuse, 3.5 mm. long; stamens one-third as long as the corolla, the anthers 4 mm. long, the tubules 1 mm. long.

An unusually showy and handsome plant, apparently rare since it has been collected but three times. In the Thibaudieae it is noteworthy for its very thick and rigid, practically sessile leaves, and for the much elongate, one-sided racemes of brightly colored flowers.

GAULTHERIA L.

References: Hermann Sleumer, Notizbl. Bot. Gart. Berlin 12: 285–287. 1935. W. H. Camp, *Gaultheria*, Bull. Torr. Bot. Club 66: 9–21. 1939. Louis O. Williams, *Fieldiana*, Bot. 31: 169–175. 1965.

Mostly low shrubs, terrestrial, often with horizontal rootstocks, pubescent or glabrous, often with gland-tipped hairs; leaves alternate, coriaceous, petiolate, broad, dentate or almost entire; flowers solitary in the leaf axils or usually in

racemes or panicles; calyx inferior, persistent, much longer than the hypanthium, usually accrescent; corolla campanulate, conic, ovoid, or urceolate, generally whitish or pink, the 5 short lobes spreading or recurved; stamens 10, included, the filaments adnate to the base of the corolla tube; anthers usually 2-awned, opening by terminal pores; disk 10-lobate; ovary superior, 5-celled, 5-lobate, glabrous; style columnar, the stigma entire; ovules numerous in each cell; fruit a capsule included in the fleshy or berry-like accrescent calyx and hypanthium.

Perhaps as many as 50 species, mostly in the mountains of tropical America, a few in temperate North America, and others in Asia, Australia, and New Zealand. Perhaps one or two others are found in southern Central America and Panama. As in other genera of the family, many of the species seem to be vaguely separable, and different authors are far from agreement as to how they should be treated. *Gaultheria procumbens* L. of northern North America furnishes by distillation the aromatic oil known as oil of wintergreen, much used for flavoring confectionery and other articles. Most of all commercial wintergreen oil is obtained actually from *Betula* rather than from *Gaultheria*. The North American species is a small plant, very different in general appearance from the Central American ones. They, however, exhale a similar odor, especially when drying. It is reported that in Mexico the branches often are spread on the floors of houses and churches to perfume them.

Leaves lanceolate-oblong, oblong-ovate to cordate with the bases truncate to cordate, mostly more than 5 cm. long.

Corolla pubescent outside.

Young branches, leaves, rachis and inflorescence (or some of them) provided with hirsute or hirsute-glandular hairs.....*G. odorata*.

Young branches, leaves, rachis and inflorescence puberulent or some of them glabrous.....*G. chiapensis*.

Corolla glabrous outside.....*G. sp.*

Leaves elliptic, oblong-ovate to ovate, mostly attenuate to the base and less than 3.5 cm. long.....*G. cumingii*.

Gaultheria chiapensis Camp, Bull. Torr. Bot. Club 66: 12. 1939.

Moist or wet, mixed forest, 2,000-2,500 meters; Chiquimula; Jalapa. Mexico; El Salvador.

A shrub, sometimes 6 meters high (?), the branches glabrous, brown or when old blackish; leaves ovate-oblong to ovate or lanceolate, on petioles 3-7 mm. long, obtuse and apiculate to subacuminate, rounded at the base, mostly 5-10 cm. long and 2-3.5 cm. broad, serrulate, coriaceous, glabrous above, black-punctate beneath; racemes lateral and subterminal, 20-30-flowered, 5-10 cm. long, the rachis densely puberulent with eglandular hairs, the pedicels puberulent, 5-9 mm. long; bracts glabrous; calyx lobes 2 mm. long, acute, puberulent; corolla white, 5-6 mm.

long, puberulent and thinly pilose; filaments dilated at the base, pilosulous, the anthers 2 mm. long; ovary densely whitish-pilose, the style glabrous or pilosulous; fruit 5 mm. broad.

Perhaps only a somewhat less pubescent phase of *G. odorata*.

Gaultheria cumingii Sleumer, Notizbl. Bot. Gart. Berlin 12: 125. 1934.

High mountain meadows or sparse forest, 1,800–3,000 meters; Guatemala; Sololá; Huehuetenango. Mexico.

An erect, often densely branched shrub 2 meters high or less, generally only 25–50 cm. high, the branches rather slender, sparsely glandular-hirsute with ascending hairs; leaves short-petiolate, coriaceous, elliptic, ovate-oblong to broadly ovate, mostly 2.5–3.5 cm. long and 0.6–2 cm. broad, acute or subobtuse and apiculate, rounded or very obtuse at the base, in age glabrous or more or less glandular-papillate beneath, serrulate, conspicuously reticulate-veined; racemes lateral and terminal, 5 cm. long or less, lax or dense, the rachis whitish-puberulent and sparsely glandular-hirsute, the bracts puberulent, glandular-ciliate; pedicels puberulent and usually glandular-pilose; calyx puberulent or glabrous, the lobes ovate, acute to abruptly acuminate, glandular-ciliate; corolla 5–6 mm. long, white to pink, wholly glabrous or somewhat puberulent.

This plant is plentiful in the beautiful high meadows of the Volcán de Pacaya. Six collections made there, all undoubtedly representing the same species, exhibit well the great amount of variation that may be found in a single species of this genus. The pubescence of the calyx also is highly variable, indicating that this character is of rather doubtful value in separating species of *Gaultheria*. Material from the volcanoes of Sololá is similarly variable.

Gaultheria odorata Willd. Ges. Naturf. Freunde Berlin Neue Schrift. 3: 425. 1801. *G. odorata* var. *mexicana* DC. Prodr. 7: 595. 1839. *G. hirtiflora* Benth. Pl. Hartw. 66. 1840. *G. hidalgensis* Loes. Bull. Herb. Boiss. 2: 552. 1894. *G. hartwegiana* Klotzsch ex Loes. Bull. Herb. Boiss. II. 3: 217. 1903 (*Hartweg 541*, type from mountains near Quezaltenango). *G. lancifolia* var. *dulcis* Camp, Bull. Torr. Bot. Club 66: 14. 1939. *G. tacanensis* Camp, l.c. 20.

Open or brushy banks or meadows, often in rocky places, common in oak, pine, or *Cupressus* forest, sometimes in rather dense, mixed forest, rarely on mossy hummocks in open swamps, 800–3,700 meters; Alta Verapaz; Baja Verapaz; El Progreso; Zacapa; Jalapa; Guatemala; Sacatepéquez; Chimaltenango; Sololá; Totonicapán; Quiché; Huehuetenango; Quezaltenango; San Marcos. Southern Mexico; El Salvador; Honduras; Costa Rica; northern South America.

Commonly a shrub of 0.3–2 meters, sometimes as much as 5 meters high, often only 30–50 cm. high, sometimes depressed and prostrate or nearly so and forming mats, the branches pubescent and usually sparsely or densely glandular-hirsute; leaves short-petiolate, coriaceous, ovate to oblong-ovate, oval-ovate or even cordate, mostly 3–6 cm. long, obtuse and apiculate or abruptly short-acuminate,

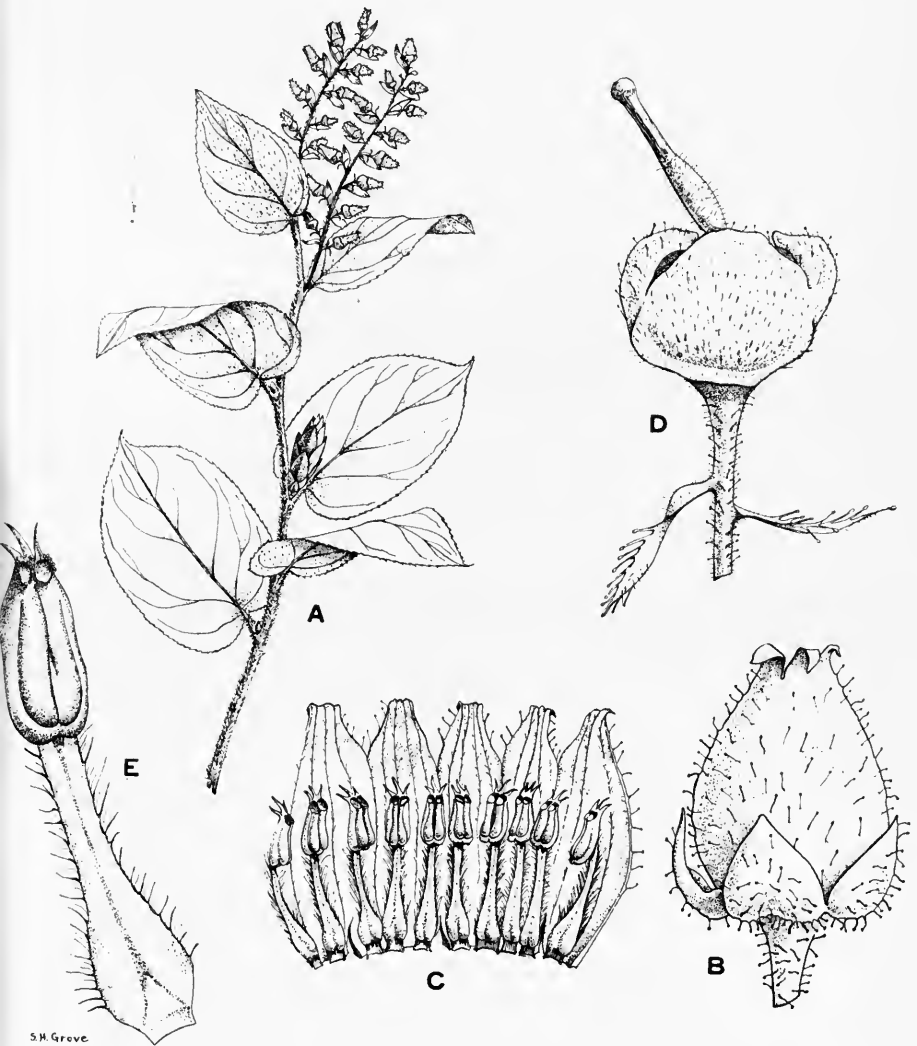


FIG. 29. *Gaultheria odorata*. A, Habit, $\times \frac{1}{2}$. B, Flower, $\times 2\frac{1}{2}$. C, Corolla dissected showing stamens, $\times 5$. D, Accrescent fruiting calyx, $\times 5$. Stamen, $\times 15$.

rounded, truncate or cordate at the base, serrulate, when young usually sparsely hirsute, soon glabrate; racemes 6 cm. long or shorter, dense or lax, many-flowered, the rachis puberulent and usually also pubescent and with numerous long spreading gland-tipped hairs, the pedicels similarly pubescent; calyx nearly glabrous or puberulent, also often pubescent with glandular-hirsute hairs, the lobes ovate, acute or short-acuminate; corolla white or pink, ovoid-urceolate, 5-7 mm. long, pilose or glandular-pilose, often nearly glabrous; filaments pubescent; capsule depressed-globose, 5 mm. broad.

A common, occasionally abundant and quite variable species in the Central American highlands. Dr. Camp who specialized in certain Ericaceae believed *G. hartwegiana* to be a valid species. However, we believe it to be only a minor variation of *G. odorata*. *G. hirtiflora* Benth. seems to be but only a more pubescent phase of *G. odorata*. *G. lancifolia* var. *dulcis* and *G. tacanensis* seem not to depart significantly from *G. odorata*. Sometimes called "pasas" in El Salvador.

Gaultheria sp.

A shrub about 1.5 m. tall with a few glandular hirsute hairs on the stem; the leaves small and lanceolate or elliptic-lanceolate, acute, attenuate to the base, mostly 3-5 cm. long; the corolla glabrous.

This specimen is not like any of the others that we have seen but may well be a further variation of *G. odorata*. The specimen is not entirely satisfactory. (*Steyermark 42815*).

LEUCOTHOE D. Don

Shrubs or small trees; leaves alternate, petiolate, coriaceous, entire or dentate; flowers small, perfect, in racemiform, spiciform, or corymbiform panicles, these often one-sided and spreading or curved, axillary; calyx stellately spreading, the lobes usually 5, short and broad, much longer than the tube; corolla white or tinted, urceolate, much longer than the calyx, the lobes much shorter than the tube; stamens 10, included, the filaments subulate or lanceolate, often pubescent; anthers oblong to oval or subglobose, the cells not awned but obscurely or conspicuously 2-mucronate and free nearly to base; ovary 5-celled, depressed, vertically lobate, the style columnar, straight or nearly so, the stigma slightly dilated, somewhat lobate; fruit capsular, depressed, thick-walled, somewhat 5-lobate, septicidally 5-valvate.

About 30 species, in temperate and tropical regions of America. Only two are known from Mexico and Central America.

Leaves glabrous beneath. *L. mexicana*.
 Leaves white pilosulose beneath. *L. pinetorum*.

Leucothoe mexicana (Hemsl.) Small, No. Am. Fl. 29: 57. 1914.
Andromeda mexicana Hemsl. Biol. Cent. Am. Bot. 2: 282. 1881.

Mostly in open pine-oak forest, 1,100–2,500 meters; Baja Vera-
 paz; El Progreso; Zacapa; Chiquimula; Santa Rosa. Southern Mex-
 ico; British Honduras (San Agustín); El Salvador; Honduras.

A shrub or small tree, usually about 6 meters high, sometimes as much as 13
 meters tall, the bark very rough, corky, broken into thick quadrangular plates, the
 branches ferruginous or fuscous, glabrous or puberulent; leaves on slender petioles
 8 mm. long or shorter, coriaceous, lanceolate or oblong-lanceolate, mostly 5–7 cm.
 long, narrowly long-acuminate, usually rounded at the base, entire, lustrous above,
 the venation not elevated, slightly paler beneath, the costa slender, prominent, the
 lateral nerves and veins very inconspicuous, scarcely if at all elevated; glabrous or
 when young somewhat pubescent; panicles corymbiform, axillary, 2–3 cm. long,
 few-flowered, puberulent or glabrous; calyx 4–4.5 mm. broad, the lobes deltoid-
 ovate or broadly ovate, acute or short-acuminate; corolla glabrous, cylindric-
 urceolate, 9–12 mm. long; capsules hard, blackish, 5–7 mm. broad.

Called “pellejo de lagarto” in El Salvador, in allusion to the thick
 checkered bark. The species has been reported from Guatemala as
Agarista multiflora G. Don.

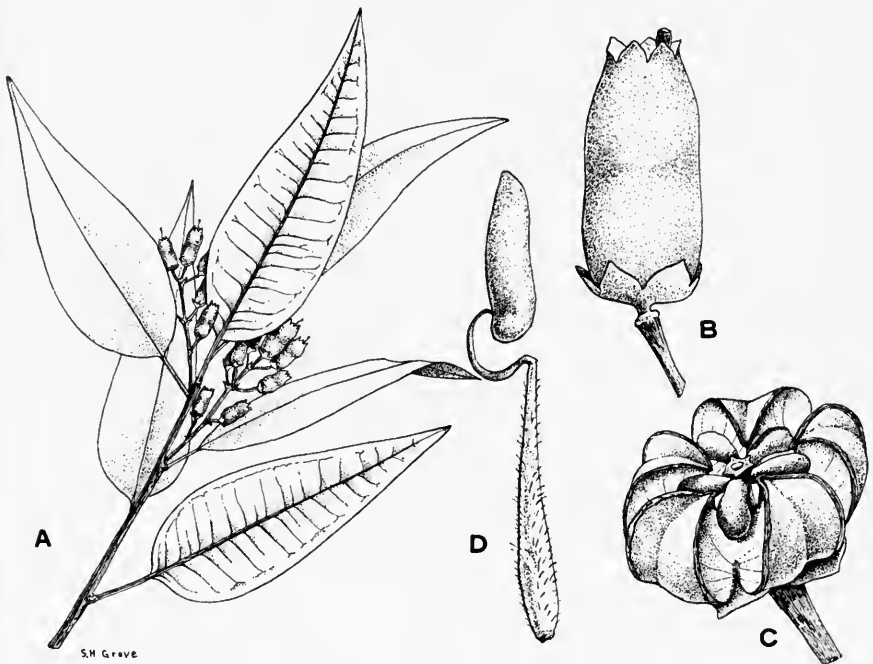


FIG. 30. *Leucothoe mexicana*. A, Flowering branch, $\times 1$. B, Flower, $\times 5$.
 C, Dehiscent capsule, $\times 5$. D, Stamen from side, $\times 15$.

Leucothoe pinetorum Standl. & L. Wms. Ceiba 3: 54. 1952.

Open pine-oak forests, 1,000–1,600 meters; British Honduras; Mexico; Honduras.

Shrubs or small trees to 6 meters tall, the bark thick, fissured, corky; branchlets slender, white pilosulose; leaves lanceolate or lance-ovate, apex acuminate, rounded or obtuse at the base, entire, green above, densely white pilosulose below, becoming glabrous, 4–6.5 cm. long and 1.5–2.5 cm. broad; inflorescence axillary, short pedunculate, few-flowered, racemose or subumbellate, pedicels about 8 mm. long, pilosulose, bracts small, ovate, spreading; calyx 5-lobed, 4 mm. broad and 2.5 mm. high, the lobes broadly ovate, short-acuminate; corolla white, about 9 mm. long and 3 mm. broad, contracted at the apex, the tube glabrous outside, the lobes erect, ovate, obtuse; capsule depressed globose, about 7 mm. broad.

Called “Cachimbo” in Honduras where it is often abundant in the oak-pine woods. The species is closely related to *L. mexicana* and perhaps only varietally distinct.

MACLEANIA Hooker

Shrubs, usually epiphytic; leaves alternate, coriaceous, penninerved or basिनerved; flowers rather large, usually red or orange-red, the inflorescence axillary or terminal, the flowers subfasciculate or racemose, pedicellate, few-many in each inflorescence, the pedicels bearing 2 deciduous bractlets; hypanthium articulate with the pedicel, short-cylindric or campanulate; calyx erect-spreading, generally 5-lobate, the lobes triangular, subacute; corolla subcylindric or elongate-urceolate, the 5 short lobes triangular, subacute; stamens 10, equal, usually half as long as the corolla, the filaments distinct or connate, attached to the anther dorsally near its base; anthers stout, the cells strongly granular, the tubules about equaling the sacs, laterally connate or fused into a single tubule, opening by elongate, distinct or fused clefts; style filiform, equaling or longer than the corolla; fruit baccate.

About 30 species, chiefly in the mountains of tropical western South America. Two others are known from southern Central America and one other from Mexico.

Leaves ovate or oblong-ovate, mostly about twice as long as broad. . . . *M. insignis*.
Leaves linear-lanceolate or oblong-lanceolate, mostly 4–5 times as long as broad.
M. insignis var. *linearifolia*.

Macleania insignis Mart. & Gal. Bull. Acad. Brux. 9: 531. 1842.
M. cordata Lem. Fl. Serres I. 4: 312. 1848.

Usually on trees in dense wet forest, sometimes on mossy hummocks in open swamps, or terrestrial on rocky shaded hillsides, 1,300–2,500 meters; Alta Verapaz; Baja Verapaz; El Progreso; Zacapa. Southern Mexico; British Honduras (Pine Peak, Cockscomb Mountains); Honduras; Nicaragua.

An erect or pendent shrub, sometimes 4 meters long, the branches stout, terete, dark brown, with exfoliating bark; leaves on stout petioles 2 mm. long, coriaceous, ovate to oblong-ovate, mostly 3-8 cm. long and 1.5-4 cm. broad, obtuse or subacute, subcordate at the base, entire, glabrous, 5-plinerved; inflorescences axillary, 2-3-flowered, the pedicels 8-15 mm. long, glabrous; hypanthium glabrous, 4 mm. long, somewhat winged; calyx 2.5 mm. long, the lobes apiculate, 1.5 mm. long; corolla elongate-urceolate, 20-25 mm. long, 5 mm. broad, contracted at the throat, glabrous or nearly so, usually bright red or orange-red; anther sacs 4-5 mm. long, the tubule 2-2.5 mm. long; style exerted.

When growing, this is a much more handsome and showy plant than one would suppose from examination of rather dreary herbarium specimens. The shrub is particularly abundant in the big open swamp above Tactic, where it grows on the huge mossy hummocks that fill much of the swamp. It is probable that during the wetter months the plants stand in water for long periods.

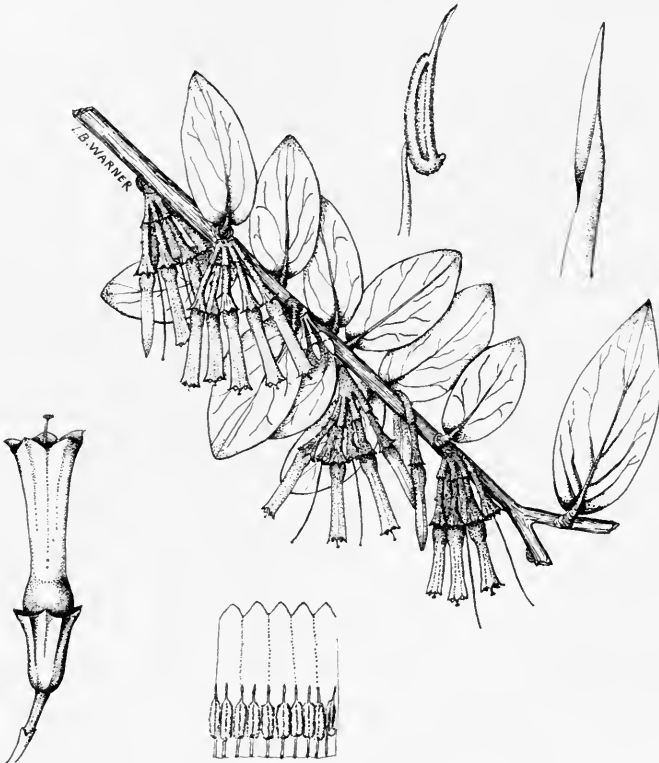


FIG. 31. *Macleania insignis*. A branch of the plant, $\times \frac{1}{2}$; a flower, $\times 1\frac{1}{4}$; a corolla opened out to show stamens, $\times 1$; an anther from the side, $\times 2\frac{1}{2}$; tip of the anther showing dehiscence, much enlarged.

Macleania insignis* var. *linearifolia (Donn.-Sm.) Standl. & L. Wms. *Fieldiana*, Bot. 31: 172. 1965. *M. cordifolia* var. *linearifolia* Donn.-Sm. Bot. Gaz. 16: 12. 1891. *M. linearifolia* A. C. Smith, Contr. U. S. Nat. Herb. 28: 368. 1932.

Epiphytic in dense wet forest or on mossy hummocks in open swamps, 900–1,300 meters; Alta Verapaz (type from Pansamalá, *Tuerckheim 1332*). Honduras.

Differs from the species in having leaves linear-lanceolate or oblong-lanceolate, mostly 5–12 cm. long and 1–2 cm. broad.

This variety is hardly more than an extreme variation of the above, as Captain Smith treated it.

PERNETTYA Gaudichaud

References: Hermann Sleumer, Revision der Gattung *Pernettya* Gaud. Notizbl. Bot. Gart. Berlin 12: 626–655. 1935. W. H. Camp, *Pernettya*, Bull. Torr. Bot. Club 66: 22–28. 1939.

Shrubs, usually small and terrestrial, erect or depressed; leaves very small, alternate, short-petiolate or sessile, coriaceous, dentate or subentire; flowers small, cernuous, in small few-flowered racemes at the ends of the branches, the inflorescences usually little if at all exceeding the leaves; calyx inferior, persistent, the 5 segments broad, often ciliate; corolla urceolate, ovoid, or subglobose, white or pink, its 5 lobes very short, recurved; stamens 10, included, the filaments dilated below; anthers oblong or oval, opening by terminal pores, appendaged at the apex; ovary 5-celled, generally globose, the style columnar, the stigma minute; fruit baccate, globose, black or purple-black at maturity.

Species 15 or more, a few in Tasmania and New Zealand, the others mostly in the mountains or cool lowland regions of South America, some of the species extending northward into central Mexico. One other is known from southern Central America (Costa Rica, Panama). Sleumer considered the Mexican material as representing a single species, while Camp recognized six from that country.

Leaves mostly 6–9 mm. long; plants prostrate; branches minutely puberulent.

P. saxicola.

Leaves mostly 1–2 cm. long; plants erect or ascending; branches more or less strigose or hirsute. *P. ciliata.*

Pernettya ciliata (Schlecht. & Cham.) Small, No. Am. Fl. 29: 82. 1914. *Gaultheria ciliata* Schlecht. & Cham. *Linnaea* 5: 126. 1830. *P. tomasii* Camp, Bull. Torr. Bot. Club 66: 25. 1939 (type from Volcán de Tacaná, *MacDougall*). *Cacalote* (San Marcos).

Open, moist or wet or even rather dry mountain savannas or meadows, rarely in the forest, mostly above 3,000 meters; Sacate-

péquez; Chimaltenango; Huehuetenango; Totonicapán; Quezaltenango; San Marcos. Mexico; Nicaragua.

A stout erect or ascending shrub, commonly 25–50 cm. high, usually densely branched, the bases of the plants sometimes prostrate and rooting, the branches sparsely or densely hirsute or strigose, sometimes glabrate, densely leafy; leaves on very short petioles, coriaceous, oblong to lance-oblong, ovate-oblong, or oval, acute or obtuse, rounded or usually obtuse at the base, crenate-serrate, glabrous and lustrous above, dull and paler beneath, sparsely setose along the costa or almost

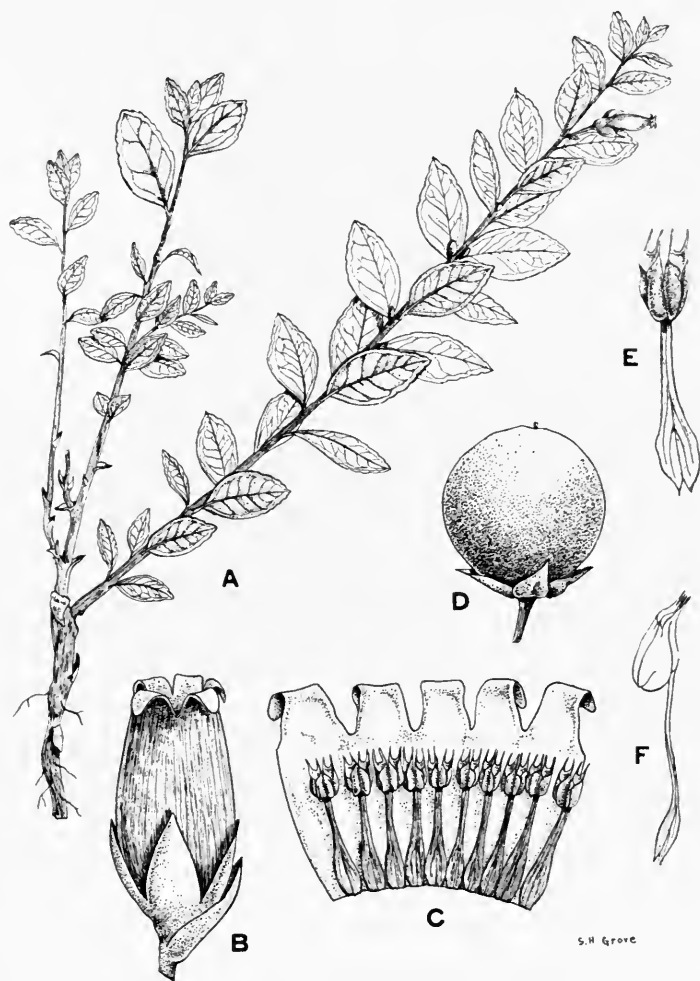


FIG. 32. *Pernettya ciliata*. A, Habit, $\times 1$. B, Flower, $\times 4$. C, Corolla opened out to show anthers, $\times 4$. D, Fruit, $\times 2$. E, Anther from front, $\times 10$. F, Anther outline from side, $\times 10$.

glabrous; flowers short-pedicellate; calyx lobes ovate or ovate-lanceolate, 3-3.5 mm. long; corolla 5-7 mm. long, white tinged with pink; berries globose, 6-8 mm. in diameter, black at maturity, very juicy.

Called "arrayán" in Chiapas. The species has been reported from Guatemala as *P. ciliaris* G. Don, *P. pilosa* G. Don, and *P. coriacea* Klotzsch, the last being a species of Costa Rica and Panama. Part of the Guatemalan specimens were examined by Camp who referred most of them to *P. coriacea*, a species he does not report from Mexico. We have referred these specimens to *P. ciliata*. There is no reason for supposing that that species refuses to cross the international boundary between Mexico and Guatemala and so far as we can determine, the Guatemalan collections and the Mexican ones of *P. ciliata* are exactly alike. Whether the ones from Costa Rica and Panama represent a different species is questionable, and according to Sleumer, the Costa Rican species is hardly different from the South American *P. prostrata* (Cav.) Sleumer, which may well be the proper name for the Central American plant. Dr. Camp's *P. tomasii* seems to have no distinguishing characters. It is from near the Guatemalan border. *P. ciliata* is an exceedingly abundant shrub in the high mountains of western Guatemala, and there are thousands of acres of it, almost continuous colonies, along the highways above Totonicapán and Quezaltenango. It densely covers large areas of moorland in the sheep regions, to the exclusion of most other vegetation. Rather strangely, it is rare in Huehuetenango, where similar soil and climate conditions prevail, and the one fruiting collection made there is atypical. It is reported to be poisonous to sheep, causing them to become "drunk." The fruits look like blueberries and are sweet, very juicy, and agreeable in flavor. The senior author has eaten them in Costa Rica, before being warned about their properties, and suffered no ill effects, but Pittier once told him that in the same country he had been made ill by what he believed were these same berries.

Pernettya saxicola Standl. & Steyerl. Field Mus. Bot. 23: 139. 1944.

Known only from the type, San Marcos, creeping among crevices of rocks on summit of the dome, Volcán de Tacaná, 4,400 meters, *Steyermark 36110*.

A prostrate and repent shrub, the very slender branches scarcely 1 mm. thick, when young very minutely and inconspicuously puberulent; leaves small, almost sessile, subcoriaceous, oblong-lanceolate or ovate-oblong, or the lowest ovate,

mostly 6–9 mm. long, 3 mm. broad or less, obtuse or subacute, obtuse or rounded at the base, crenate, glabrous, lustrous above, the costa plane or subimpressed, slightly paler beneath, the costa prominent, the nerves obsolete; flowers axillary, solitary, on short thick pedicels, the pedicels not concealed by the bracts; sepals lance-oblong, about 2.2 mm. long, acuminate, glabrous, not ciliate; corolla white, ovoid-urceolate, 3 mm. long, glabrous.

PERNETTYA SP.—There is a single specimen from the department of El Progreso (*Steyermark 43071*) which may represent another species. It is a much more robust plant than others known in Central America or Mexico with leaves much larger than the common *P. ciliata*, mostly 2–3.5 cm. long and elliptic. The specimen is in fruit but lacks flowers.

RHODODENDRON L.

Shrubs or trees, glabrous or variously pubescent, the branches often verticillate; leaves alternate, entire, membranaceous to coriaceous; flowers usually large and showy, mostly in terminal corymbs or racemes, these few-many-flowered; calyx of 5 sepals or 5-dentate, sometimes obsolete; corolla usually funnelform or campanulate, rarely subrotate, the limb more or less oblique, generally 5-lobate, the lobes imbricate in bud; stamens mostly 5–10, more or less unequal, usually declinate, the filaments subulate-filiform or short and thick, generally pilose below; anthers dorsifixed, short or elongate, erect, mucicous dorsally, dehiscent by terminal pores; disk usually thick and crenate; ovary 5–20-celled, the style short or elongate, declinate or incurved, the stigma capitate, 5–20-lobate; ovules numerous in each cell; fruit capsular.

Species more than 400, in temperate or rarely arctic regions, mostly in Asia, about 25 native in temperate and arctic North America. None are native in America below the southern border of the United States.

Rhododendron indicum (L.) Sweet, Hort. Brit. ed. 2. 343. 1833. *Azalea indica* L. Sp. Pl. 150. 1753.

Said to be a native of Japan; grown commonly for ornament in many regions of the earth; an occasional plant of gardens at middle elevations in Guatemala, sometimes planted in even the colder inhabited regions.

A densely branched shrub, usually 2 meters high or less; leaves membranaceous or thicker, short-petiolate, elliptic-lanceolate to lanceolate or oblanceolate, mostly 2.5–3.5 cm. long, acute or obtuse and mucronate, acute at the base, subentire, green above, paler beneath, ciliate, sparsely or rather densely appressed-pilose with long hairs; flowers few at the ends of the branches, pedicellate, white or rose-purple, 5–7 cm. broad; stamens 5.

Occasional in Central American gardens in the cooler highlands. Standley reports that it grows luxuriantly in Cobán.

SATYRIA Klotzsch

Rather large shrubs, usually epiphytic, glabrous or nearly so; leaves alternate, mostly 3-5-plinerved, short-petiolate, coriaceous, entire; inflorescences axillary or terminal, few-many-flowered, the flowers fasciculate or short-racemose; flowers pedicellate, the pedicels 2-bracteolate; hypanthium articulate with the pedicel; calyx spreading, 5-lobate, the lobes ovate or triangular; corolla subcylindric, shallowly 5-lobate, the lobes triangular; stamens 10, alternately unequal, shorter than the corolla, often only one-third as long, the filaments connate into a tube, attached to the anther dorsally near its base, equal; anthers subcoriaceous, alternately unequal, the sacs slightly granular, the tubules not clearly differentiated from the sacs, flaring, opening by broad lateral clefts; style filiform, about equaling the corolla; fruit baccate.

About 15 species, all American, ranging from southern Mexico to Bolivia. Two other species are known from Central America.

- Inflorescence elongate, the rachis usually 2-4 cm. long.....*S. elongata*.
 Inflorescence short, the flowers fasciculate or short-racemose, the rachis rarely more than 1 cm. long.
 Corolla 18-28 mm. long.....*S. warszewiczii*.
 Corolla 10-11 mm. long.....*S. meiantha*.

Satyria elongata A. C. Smith, Contr. U. S. Nat. Herb. 28: 521. 1932. *Arete de guacamaya* (Huehuetenango).

On trees in dense wet forest, 150-400 meters; Alta Verapaz (type from Cubilgüitz, *Tuerckheim 7633*); Huehuetenango (Ixcán). Mexico (Oaxaca); Honduras; Costa Rica.

A pendent shrub, rather coarse, with elongate branches, the branchlets glabrous or when young sparsely puberulent; leaves on petioles 4-5 mm. long, lanceolate or lance-oblong, 12-17 cm. long, 3-4 cm. broad, long-acuminate, cuneate at the base, thick-coriaceous, 3-5-plinerved; inflorescences axillary near the ends of the branches, racemose, 7-15-flowered; the rachis glabrous or practically so, 2.5-5 cm. long, the pedicels 12-22 mm. long, glabrous; hypanthium minutely puberulent, 2-2.5 mm. long; calyx thin-coriaceous, 1.5 mm. long, the lobes ovate, apiculate; corolla deep rose-red below, greenish above, 20-30 mm. long, minutely puberulent, 4 mm. broad, contracted at the throat; young fruit subglobose, 7 mm. in diameter, capped by the persistent calyx.

Satyria meiantha Donn.-Sm. Bot. Gaz. 47: 256. 1909.

Usually epiphytic in dense wet mixed forest, sometimes terrestrial, 850-1,700 meters; Petén; Alta Verapaz (type from Cobán, *Tuerckheim II. 2101*); Chiquimula; Huehuetenango. British Honduras (Camp 35, Petén boundary).

A coarse epiphytic shrub or sometimes a terrestrial shrub or small tree as much as 6 meters high, the branches thick, subterete, pale brown or grayish; leaves on thick petioles 8-12 mm. long, narrowly lance-oblong to ovate-oblong, 12-22 cm.

long, 4-9 cm. broad, acuminate or narrowly long-acuminate, acute or broadly cuneate at the base, thick-coriaceous, 5-plinerved, glabrous; inflorescences axillary, often at naked nodes below the leaves, short-racemose, 6-12-flowered, the rachis 5-10 mm. long or rarely longer, the slender pedicels 6-10 mm. long; hypanthium 2 mm. long, minutely puberulent or glabrate; calyx 1.5 mm. long, minutely puberulent

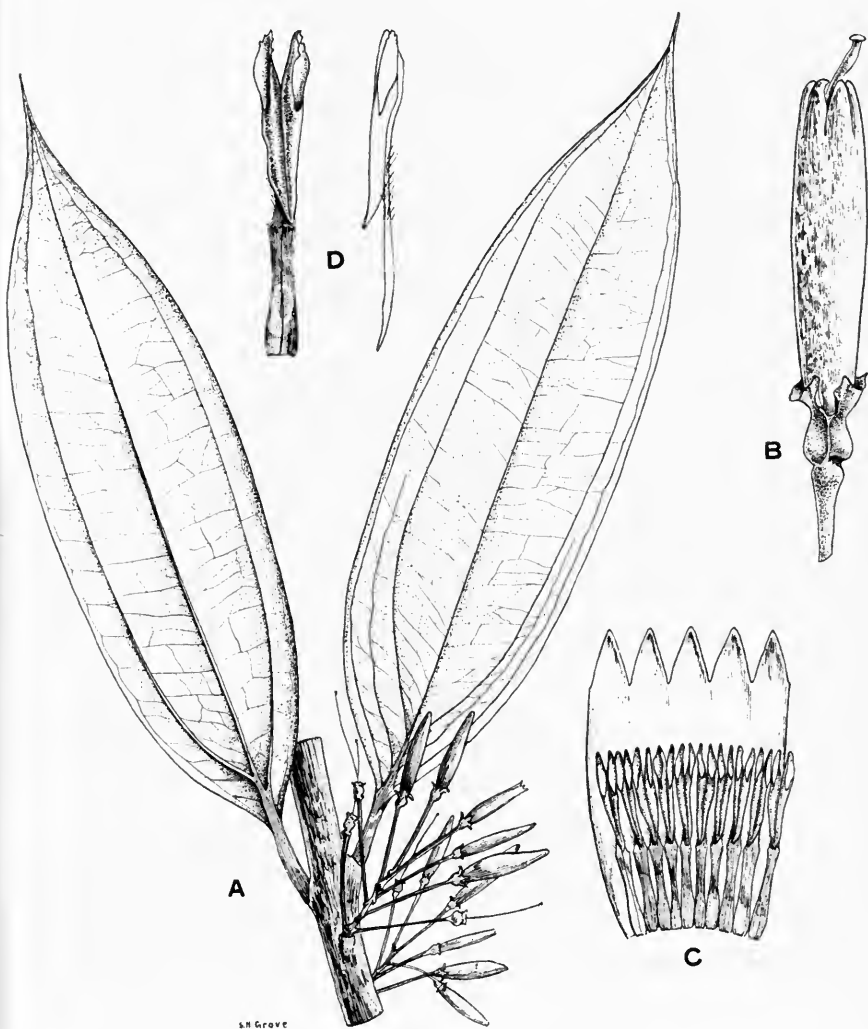


FIG. 33. *Satyria meiantha*. A, Flowering section of branch, $\times \frac{1}{2}$. B, Flower, $\times 2\frac{1}{2}$. C, Corolla opened out to show anthers, $\times 2\frac{1}{2}$. D, Anthers front and side, $\times 5$.

lent, the lobes triangular, apiculate; corolla dark rose or bright red, waxy, glabrous, 10–11 mm. long or sometimes somewhat longer, 2.5 mm. broad, the lobes 1 mm. long; anthers 3–3.5 mm. long; fruit subglobose, becoming white but at maturity bluish black.

SATYRIA OVATA A. C. Smith (Contr. U. S. Nat. Herb. 28: 524. 1932) is known from four collections, the type and one other from Nicaragua, one from Guanacaste, Costa Rica, and one collected in "Guatemala" by Friedrichsthal. It has not been found recently in Guatemala, and since some of Friedrichsthal's "Guatemala" collections are known to have been gathered farther south, some of them in Costa Rica, it seems likely that the species should be excluded from the Guatemalan flora.

Satyria warszewiczii Klotzsch, *Linnaea* 24: 22. 1851. *Huetilla de cuaresma*.

On trees in moist or wet forest, 500–2,000 meters; Alta Verapaz (Sepacuité); Chiquimula (Cerro Brujo); Suchitépéquez (Volcán de Zunil); Quezaltenango (Volcán de Santa María). Mexico (Chiapas); Honduras; Costa Rica; Panama.

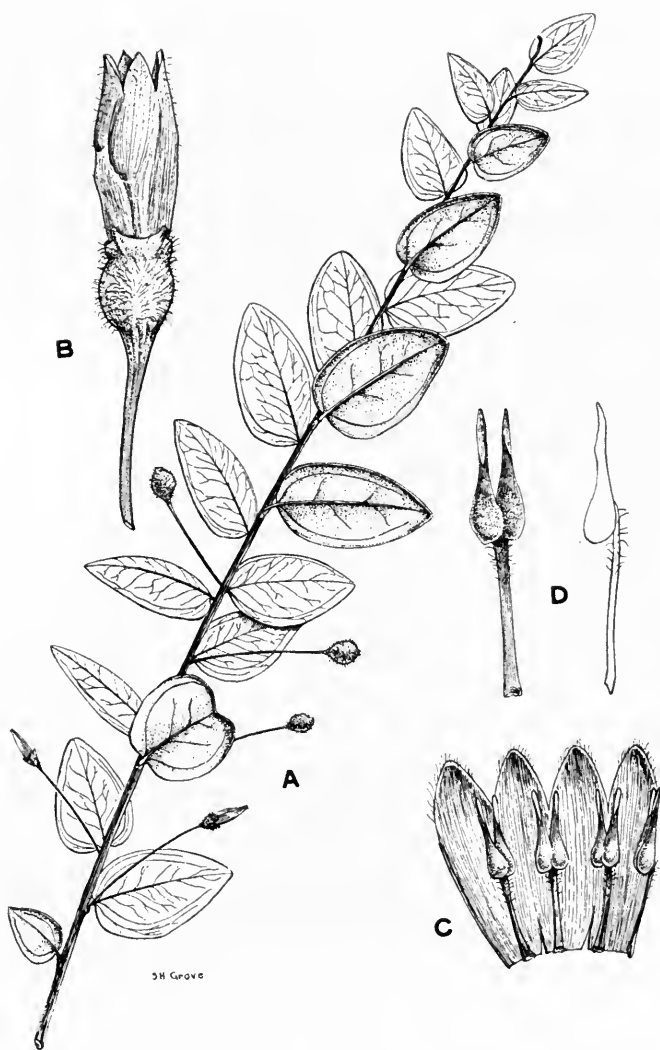
A large epiphytic shrub, or sometimes a terrestrial shrub or small tree as much as 6 meters high, the branches stout, subterete, glabrous, brownish or grayish; leaves on petioles 8–16 mm. long, lance-oblong to ovate-oblong, 10–23 cm. long, 2–9 cm. broad, acuminate, cuneate or rounded at the base, thick-coriaceous, glabrous, 3–5-plinerved; inflorescences often numerous, short-racemose, borne in the leaf axils or at naked nodes below the leaves, 8–30-flowered, the rachis glabrous, 5–10 mm. long; pedicels glabrous, 15–25 mm. long; hypanthium glabrous, broadly campanulate, 2 mm. long; calyx thin-coriaceous, 2–3 mm. long, the lobes triangular, apiculate; corolla glabrous, coral-red below, white above, 18–28 mm. long, 4–5 mm. broad, contracted at the throat, the lobes 1 mm. long; anthers 5–6 mm. long; young fruit globose, 6 mm. in diameter.

This is a very common shrub in the mountains of Costa Rica. The juicy, somewhat acid fruits, known there as "muelas," are very good to eat. In the same country the handsome flowers are called "colmillos."

SPHYROSPERMUM Poepig & Endlicher

Reference: Albert C. Smith, The genera *Sphyropermum* and *Dis-trigma*, *Brittonia* 1: 203–232. 1933.

Small slender shrubs, usually epiphytic, sometimes terrestrial, glabrous or pubescent, the branches often pendent; leaves alternate, short-petiolate, small, coriaceous, fleshy when growing, obscurely nerved, entire; flowers small, few, solitary in the leaf axils, the pedicels slender, cernuous, with 2 deciduous bractlets at



SH GROVE

FIG. 34. *Sphirospermum majus*. A, Flowering and fruiting branch, $\times 1$. B, Flower, $\times 5$. C, Corolla opened to show stamens, $\times 5$. D, Anthers from front and side, $\times 7\frac{1}{2}$.

the base; hypanthium continuous with the pedicel, subglobose, or obconic; calyx suberect, 4-5-lobate; corolla subcylindric, shortly 4-5-lobate; stamens as many or twice as many as the corolla lobes, equal or alternately slightly unequal, the filaments slender, attached to the anther dorsally near the base; anthers membranous, the 2 tubules equaling or longer than the cells, dehiscent by introrse oval clefts; style filiform, about equaling the corolla, the stigma truncate; fruit globose or ellipsoid, baccate, the pericarp smooth, brittle, the cells 4-5; ovules numerous.

About 10 species, mostly in the mountains of tropical America. Three others are known from southern Central America.

Sphyrospermum majus Griseb. Fl. Brit. W. Ind. 143. 1859.

On trees in wet mixed forest, or often terrestrial, sometimes on mossy banks or pendent from rocks or cliffs, 2,600 meters or less, most frequent in the mountains; Alta Verapaz; Izabal; Zacapa; Chiquimula; Huehuetenango; San Marcos. Southern Mexico; Honduras and El Salvador to Panama; West Indies; Colombia to the Guianas.

Plants usually epiphytic and with creeping or long and slender, pendent branches, frequently terrestrial and then usually prostrate or nearly so, the branches very slender, often flexuous, glabrous, puberulent, or short-pilose, grayish or brownish; leaves on petioles 1-2 mm. long, thin-coriaceous, lance-ovate to very broadly ovate, mostly 1.5-4.5 cm. long, very obtuse to acuminate, rounded or subcordate at the base, glabrous or nearly so, 3-5-nerved from the base, the nerves conspicuous or obsolete beneath; pedicels 1-2 cm. long, very slender, pilose or glabrate; calyx and hypanthium pilose with spreading hairs or glabrous, the hypanthium globose, 1.5-2 mm. long; calyx 1 mm. long, the 4 lobes deltoid or short and apiculate; corolla white, 5-7 mm. long, 1.5-2 mm. broad, short-pilose or glabrous; stamens 4, slightly shorter than the corolla, the filaments sparsely villous; anthers 2-3 mm. long; fruit subglobose, pilose or glabrous, 4-6 mm. in diameter, pale blue or purple.

The plant is very common in wet forest, especially in Alta Verapaz. The foliage is rather handsome but the few flowers are small and inconspicuous.

VACCINIUM L.

Reference: Hermann Sleumer, Die Arten der Gattung *Vaccinium* L. in Zentral- und Südamerika, Notizbl. Bot. Gart. Berlin 13: 111-140. 1936.

Shrubs or small trees, glabrous or pubescent, mostly terrestrial; leaves mostly small and persistent, rarely membranaceous, often coriaceous, entire or serrate; flowers small, white or pink, in axillary or terminal racemes or fascicles, rarely solitary, usually bracteate and minutely 2-bracteolate, the bractlets generally deciduous; hypanthium globose to turbinate, terete; calyx shallowly 4-5-(6-) lobate; corolla urceolate to campanulate, terete, the 4-5(-6) lobes short; stamens 8 or 10(-12), free or shortly adherent to the tube, the filaments free, short or elongate,

generally pubescent; anthers aristate dorsally or mucicous, produced into 2 straight or rarely curved tubules, these dehiscent by terminal pores; disk pulvinate or convex, glabrous or pilose, sometimes lobate or angulate; ovary 4-5-(6-) celled or partially 8- or 10-(12-) celled, the style straight, the stigma minute and simple or capitellate; ovules few or numerous in the cell; fruit baccate, subglobose; seeds small or minute, compressed, ovoid, or reniform, the testa coriaceous, the endosperm carnos.

Species about 140, widely distributed in the northern hemisphere, in temperate and arctic regions, and in the mountains of the tropics. Three other species are known from southern Central America. In the United States the fruits of several species of *Vaccinium*, known as "blueberries," are of commercial importance, and vast quantities of them are sold for food, often preserved in tins for use outside the normal season. In recent years improved varieties have been developed in cultivation, and have been planted on a large scale in northern parts of the United States. The cultivated blueberries represent a remarkable case of the development within a few recent years of a native plant as an important cultivated one, and is without a recent parallel. The Central American species have more or less edible fruits, much inferior to those of the United States, but the fruits are seldom eaten. Also important commercially in the United States is the cranberry, *V. macrocarpon* Ait., a creeping, very slender plant grown in bogs. Its large, brilliant red fruits are extremely acid. They are consumed in great amounts in the United States, especially in the form of jelly, as a relish for meats, particularly with roast turkey at Thanksgiving and Christmas. Cranberries often are imported into Guatemala from the United States, principally for sale to North Americans living there.

Leaf blades cordate at the base, mostly 2-5 cm. broad *V. matudae*.

Leaf blades acute to rounded at the base.

Leaves densely pilose *V. lundellianum*.

Leaves glabrous or essentially so.

Leaves entire; tubules of anther about half or more the length of the anther.

Tubules $\frac{2}{3}$ or more of the anther length; corollas about 1 cm. long.

V. poasanum.

Tubules about half the anther length; corolla 5-6 mm. long . . . *V. breedlovei*.

Leaves serrate or crenate, sometimes inconspicuously so; tubules if present less than half the length of the anther.

Flowers in elongate slender racemes, most of these much longer than the leaves.

Racemes bearing numerous persistent leaflike bracts; leaf blades acute at the base *V. stenophyllum*.

Racemes with small deciduous bracts, these not leaflike; leaf blades usually very obtuse at the base *V. leucanthum*.

Flowers fasciculate in the leaf axils or in very short racemes little longer than the petioles.

Plants mostly tall shrubs 3–4.5 meters high; leaves large, mostly 2–5.5 cm. long.

Flowers glabrous. *V. haematinum*.

Flowers densely pubescent. *V. minarum*.

Plants low shrubs, 25–50 cm. high; leaves mostly less than 1.5 cm. long.

Branches glabrous or nearly so; leaves rather thin, broadest above the middle, acute at the base. *V. geminiflorum*.

Branches pubescent, usually conspicuously and densely so; leaves coriaceous, broadest below the middle, rounded at the base.

V. confertum.

Vaccinium breedlovei L. Wms. *Fieldiana*, Bot. 31: 173. 1965.

In pine-oak forests, at about 3,000 m., the type from near Sta. Eulalia, Huehuetenango, *Breedlove 8594*.

Shrubs or possibly epiphytic shrubs of unknown size; branches terete or obscurely angled, completely glabrous; leaves coriaceous ovate-lanceolate, acuminate, glabrous, 8–10 cm. long and 4–5 cm. broad. The reticulate venation prominulous on both surfaces, especially so below, petioles fleshy, 7–10 mm. long; inflorescences axillary or on defoliated nodes, racemose, few-flowered, 3–4 cm. long; flowers greenish, borne on pedicels to about 7 mm. long, articulate with the ovary, these subtended by cucullate triangular bracts about 1 mm. long and usually provided above the middle with two bracteoles; ovary about 2 mm. in diameter, constricted near the summit; calyx about 2 mm. long, 5-lobate, the lobes triangular, acute, about 1 mm. long; corolla narrowly campanulate, 5–6 mm. long, the lobes triangular, acute, about 2 mm. long; stamens 10, lightly adnate to the base of the corolla, the filaments free from one another and about 3 mm. long, glabrous, the anthers almost 2 mm. long, obscurely papillate, the tubules about 1 mm. long and 0.2 mm. in diameter, the pores completely terminal; style about 5 mm. long, the slender apex stigmatic.

Related to *V. poasanum* and like it an inhabitant of the high mountain forests.

Vaccinium confertum HBK. *Nov. Gen. & Sp.* 3: 265, *t.* 250. 1818. *Pernetia ovata* Fernald, *Proc. Am. Acad.* 36: 496. 1901. *Cacalate* (San Marcos); *Sco* (Quezaltenango).

Moist open banks or slopes or in open or dense forest, often with pine or *Cupressus*, 2,600–4,000 meters; Chimaltenango; Sololá; Huehuetenango; Totonicapán; Quezaltenango; San Marcos. Mountains of Mexico.

A densely branched shrub, commonly 25–50 cm. high, rarely as much as a meter tall, the branches densely puberulent or short-hirsute, rarely glabrous; leaves often crowded, on very short, thick petioles, thick-coriaceous, oval to oblong-ovate, 6–15 mm. long, very obtuse or subacute, rounded at the base, deep green and lustrous above, pale beneath and often papillate (sometimes due to a fungus infection),

finely and regularly crenate-serrate, the costa and nerves usually evident and impressed on the upper surface, obsolete beneath, glabrous or nearly so; racemes very short and few-flowered, or the flowers subfasciculate, the inflorescences usually much shorter than the leaves; hypanthium and calyx together 3 mm. long, glabrous or nearly so, the calyx lobes broadly deltoid, acute; corolla 4–5 mm. long, commonly deep pink; fruit 5–6 mm. in diameter, blue with a bloom or black.

The fruit is sweet and edible, but little or no use is made of it. The plant often forms dense low thickets of considerable extent. Some variation is found in regard to the amount of pubescence on branches, leaves and even on flowers.

Vaccinium geminiflorum HBK. Nov. Gen. & Sp. 3: 267, t. 252. 1818.

Moist or wet meadows or dry grassy hillsides, often among trees of *Pinus* or *Juniperus*, or among rocks on or near mountain summits, 3,000–4,500 meters; Huehuetenango; Quezaltenango; San Marcos. Mountains of central and southern Mexico.

A small erect shrub, usually 10–25 cm. high, densely branched, glabrous throughout or nearly so, the slender branches erect, sometimes minutely puberulent; leaves on very short petioles, oblanceolate or narrowly oblong-obovate, mostly 6–15 mm. long, obtuse or acute, narrowed to the acute base, finely crenate-serrate, thin, glabrous, smooth and usually lustrous above, slightly paler beneath and coarsely and prominently reticulate-veined; flowers axillary, solitary or geminate, on recurved pedicels; hypanthium broadly campanulate, the calyx limb very short, truncate; corolla broadly urceolate, 4–5 mm. long, deep pink or reddish.

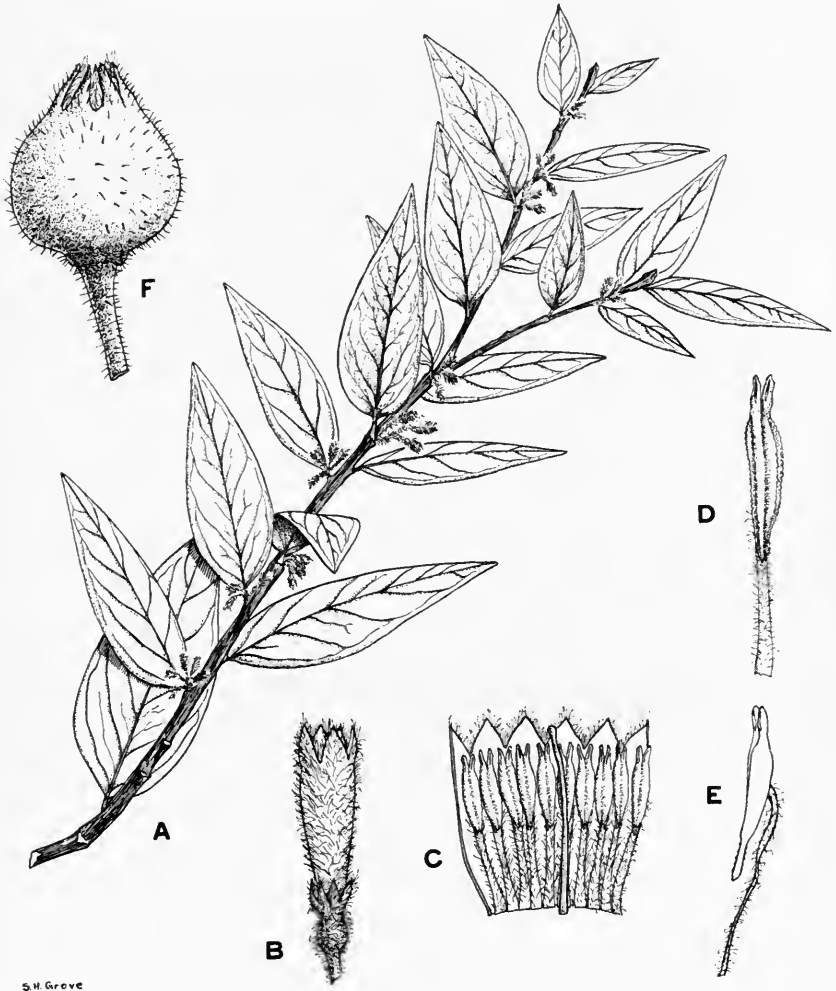
This is one of the typically alpine plants of Guatemala, ascending to the summits of the highest volcanoes. The leaves are found upon the plants throughout the year, but the old ones are inclined to fall at the end of the dry season, when new leaves are unfolding.

Vaccinium haematinum Standl. & Steyerl. Field Mus. Bot. 23: 139. 1944.

Type from Huehuetenango, Cerro Huitz, between Mimanhuitz and Yulhuitz, Sierra de los Cuchumatanes, 1,500–2,600 meters, *Steyermark 48572*. Honduras.

A shrub of 4.5 meters, or sometimes procumbent, the branches subterete, blackish brown, puberulent when young or glabrous, with short internodes; leaves rigid-coriaceous, short-petiolate, lustrous, brownish when dried, on stout petioles 4–5 mm. long, elliptic or oblong-elliptic to rounded-ovate, 2–6.5 cm. long, 1.5–4 cm. broad, obtuse, rounded to broadly cuneate at the base, obsolete and remotely appressed-crenate or subentire, glabrous, the costa plane above or shallowly and broadly impressed, the nerves and veins obsolete, slightly paler beneath, epunctate, the costa rather stout and prominent, the lateral nerves about 7 pairs, prominulous, ascending at an acute angle, almost straight or irregular, the veins prominulous

and laxly reticulate; inflorescences axillary, short-racemose, few-flowered, scarcely more than 1 cm. long, sparsely puberulent, the rachis very short, the pedicels stout, 4 mm. long, the 2 bractlets inserted slightly below the middle of the pedicel, lanceolate, appressed; hypanthium sparsely and minutely puberulent or glabrate; corolla white, 6 mm. long, almost 3 mm. broad; calyx lobes deltoid, acute, 1 mm. long; fruit cranberry-red, 5 mm. long, glabrous.



S. H. Grove

FIG. 35. *Vaccinium lundellianum*. A, Flowering branch, $\times 1$. B, Flower, $\times 2\frac{1}{2}$. C, Corolla opened to show stamens and relative length of style, $\times 2\frac{1}{2}$. D, Stamen from front, $\times 7\frac{1}{2}$. E, Stamen from side, $\times 7\frac{1}{2}$. F, Mature fruit, $\times 7\frac{1}{2}$.

Vaccinium leucanthum Cham. & Schlecht. *Linnaea* 8: 524. 1833. *Cacj* (Huehuetenango).

Moist or wet forest or thickets, or open wet banks, sometimes in pine-oak forest, 1,700–3,300 meters; El Progreso; Zacapa; Chiquimula; Huehuetenango. Mexico.

A shrub 1–4.5 meters high, the branches slender or rather stout, brown, terete or when young somewhat angulate, puberulent or glabrate; leaves lance-oblong to broadly ovate, very variable in size and shape, mostly 2–4.5 cm. long, acute to obtuse or rounded and apiculate, rounded at the base, short-petiolate, coriaceous, crenate-serrate, glabrous or nearly so, green above, often lustrous, pale beneath, sometimes black-punctate; racemes many-flowered, 3–6 cm. long, dense or usually lax, puberulent, the bracts small, usually early deciduous, the flowers on long slender pedicels; calyx and hypanthium usually pubescent, the calyx lobes broadly deltoid, acute; corolla urceolate or subglobose, 3 mm. long, white; fruit black, 5 mm. in diameter.

Guatemalan material referred here is variable and may represent more than one species. This group of the genus is highly variable and critical, and the nomenclature and specific limits cannot be decided until all the various entities have been considered together.

Vaccinium lundellianum L. Wms. *Fieldiana*, Bot. 31: 173. 1965. *Malea pilosa* Lundell, *Am. Midl. Nat.* 29: 484. 1943, *non Vaccinium pilosum* A. Chev. 1930.

Epiphyte in moist or wet forest, at about 3,000 meters; Huehuetenango. Mexico (the type from Mt. Malé, near Porvenir, Chiapas).

An epiphytic shrub, pilose throughout with short spreading whitish hairs, sometimes subsucculent, the branches terete, often blackish; leaves on petioles 3–6 mm. long, lanceolate or lance-oblong, 3–5.5 cm. long, 1–2 cm. broad, sometimes slightly larger, narrowed to an obtuse apex, rounded or obtuse at the base, densely short-pilose on both surfaces; inflorescences numerous, the rachis usually less than 5 mm. long, the pedicels 8 mm. long or less, bearing 2 narrow bractlets near the middle; calyx 5-lobate, the lobes narrowly triangular, 1.3 mm. long; corolla white, 8–10 mm. long, densely short-pilose, the 5 lobes erect or suberect, obtuse, as much as 3 mm. long; filaments pilose, the anthers attached dorsally at the middle, the tubules opening by elongate introrse clefts; cells of the ovary usually 2-ovulate; disk annular; style slender, equaling the corolla; immature fruit globose, 4 mm. in diameter, densely short-pilose.

This species is the basis of the monotypic genus *Malea* of Lundell, but would seem to have no satisfactory characters by which it may be distinguished from *Vaccinium*.

Vaccinium matudae Lundell, *Phytologia* 2: 4. 1941, as *V. matudai* (type from Chiapas, Mexico).

Epiphytic shrubs in cloud forest at about 3,000 meters; Quiché; Huehuetenango. Mexico (Chiapas).

An epiphytic or terrestrial shrub with stout, somewhat angulate branches, these sparsely hirtellous when young, soon glabrate; leaves practically sessile, rigid-coriaceous, lustrous, glabrous, broadly ovate or rounded-ovate, 3–8 cm. long, mostly 2.5–5 cm. broad, almost rounded to subacute at the apex, shallowly and narrowly cordate at the base, obscurely and remotely crenate-serrate or subentire, the venation scarcely prominulous above, prominent beneath and closely reticulate; inflorescences racemose, many-flowered, as much as 10 cm. long but mostly shorter, glabrous or nearly so, the pedicels and rachis deep rose; calyx lobes 5, deep rose, deltoid, acute or subacuminate; corolla whitish suffused with deep pink, 7–8 mm. long, glabrous outside, the 5 lobes short, obtuse; filaments pilose, the anthers 3 mm. long, mucous; fruit 5 mm. in diameter.

Because of its large, broad, cordate, very thick and lustrous leaves, this is very unlike other North American species of the genus. Lundell compared *V. matudae* with *V. selerianum* (Loes.) Sleumer, a plant to which it is not closely related.

Vaccinium minarum Standl. & Steyerl. Field Mus. Bot. 23: 219. 1947.

At 2,000–3,200 meters; endemic; Zacapa (type from middle and upper slopes of Volcán Gemelos, Sierra de las Minas, *Steyermark 43295*; also collected between Loma Pichaco and Cerro de los Monos).

A shrub or small tree 3–4.5 meters high, the branches slender, subterete, fuscous or brownish, the young ones often reddish, puberulent, soon glabrate, densely leafy; leaves rather small, coriaceous, on petioles 3–5 mm. long, somewhat lustrous, elliptic-oblong, obovate-oblong, or lanceolate, 2.5–3.5 cm. long, 8–15 mm. broad, obtuse or narrowed to an obtuse apex, acute or cuneate at the base, remotely and rather inconspicuously appressed-crenate, glabrous, the costa sometimes impressed above, prominulous beneath, epunctate beneath, the lateral nerves obsolete or prominulous, the veins obsolete; racemes axillary, few-flowered, less than half as long as the leaves, the pedicels red, 3–7 mm. long, puberulent, bracteate below the middle; hypanthium 1.5 mm. long, puberulent, the 5 sepals triangular-acuminate, 1 mm. long, puberulent outside; corolla deep rose, 6 mm. long, 2 mm. broad or slightly broader, whitish-hispidulous, the 5 lobes ovate, subacute, 1.3 mm. long, erect.

Vaccinium poasanum Donn.-Sm. Bot. Gaz. 24: 395. 1897.

Wet mixed mountains forest, 1,500–2,400 meters; Zacapa (Sierra de las Minas). El Salvador; Honduras; Costa Rica; Panama.

A shrub or tree 4.5–10 meters high, glabrous throughout, the bark thin, deep cinnamon-brown; leaves short-petiolate, coriaceous, mostly oblong-elliptic and 5–9 cm. long, acuminate or long-acuminate, acute at the base, entire, the veins and nerves conspicuous beneath, the leaves somewhat paler on the lower surface;

racemes axillary, umbelliform, several-many-flowered, the pedicels about 1.5 cm. long, often pendent; calyx very short, repand-dentate; corolla narrowly campanulate, pale greenish yellow or sometimes tinged with pink, about 1 cm. long; fruit subglobose, 6-7 mm. in diameter or larger, pale yellow.

Vaccinium stenophyllum Steud. Nom. Bot. ed. 2. 2: 740. 1841.
V. angustifolium Benth. Pl. Hartw. 45. 1840, not *V. angustifolium* Ait. 1789.

Oak forest, 1,900 meters; Quiché (Nebaj, *A. F. Skutch 1733*).
Western and southern Mexico.

A shrub or small tree as much as 6 meters high, the branches slender, puberulent or glabrate; leaves short-petiolate, elliptic-lanceolate to linear-oblong, coriaceous, lustrous, 2-4.5 cm. long, acute or acuminate, acute at the base, serrulate or entire, paler beneath; racemes terminal or lateral, usually much elongate, bearing numerous small leaves or more reduced, leaf-like bracts, the rachis and slender pedicels puberulent or glabrate; calyx puberulent, the lobes deltoid, puberulent, acuminate; corolla white or pinkish, 5 mm. long, lobate to about the middle, the lobes triangular, acute, glabrous outside; fruit black, globose, 6 mm. in diameter.

PRIMULALES

The Primulales consist of three families: Theophrastaceae, Myrsinaceae and Primulaceae, all of which are represented in Guatemala. Dr. C. L. Lundell has prepared the treatment of the Myrsinaceae for this flora. It is the largest and most important family of the order in Guatemala.

Plants of this order vary from small herbaceous annuals to, more commonly, trees and shrubs ranging from dry coastal plains to high mountain forests.

The Primulales have sympetalous corollas, the flowers are normally pentamerous; the ovary is superior, unilocular and has free central placentation; the leaves are usually alternate or sometimes subverticillate or whorled, simple.

THEOPHRASTACEAE

Reference: Carl Mez, Theophrastaceae, Pflanzenreich IV. 236a: 1-48. 1903.

Trees or shrubs; leaves alternate, often crowded and subverticillate at the ends of the branches, simple, entire or spinose-serrate, often tipped with a rigid spine; stipules none; flowers mostly perfect and 5-parted, regular, large or small, mostly white, yellow, or red, the inflorescences generally terminal, racemose or abbreviated or even reduced to a single flower; calyx inferior, the segments free or very shortly connate, crenate or ciliate, imbricate, generally rounded at the apex, per-

sistent; corolla gamopetalous, rotate, urceolate, or funnellform, carnosous or coriaceous, the lobes imbricate; staminodia usually 5, inserted on the corolla tube, sometimes petaloid; stamens 5, opposite the petals, free or connate, the filaments united wholly or partly with the corolla, the anthers dorsifixed, dehiscent extrorsely by 2 longitudinal slits; ovary ovoid or clavate, 1-celled, the style stout or almost obsolete; stigma discoid or rarely conic, entire or irregularly lobate; placenta central, short-stipitate, the ovules numerous, multiseriate, anatropous; fruit baccate or drupaceous, sometimes almost dry; seeds numerous or few, surrounded by mucilaginous pulp, the testa thin; endosperm abundant, smooth, corneous; embryo straight.

Four genera, confined to tropical America. One other, *Clavija*, is represented in southern Central America.

Staminodia minute, gland-like; leaves hirsute beneath; corolla green; flowers solitary or fasciculate. *Deherainia*.

Staminodia petal-like, conspicuous; leaves glabrous; corolla yellow or red, rarely white; flowers usually racemose. *Jacquinia*.

DEHERAINIA Decaisne

Shrubs or small trees, usually hirsute; leaves short-petiolate, often lepidote, entire (in Central American species) or spinose-dentate; flowers rather large, perfect, usually green, inserted at the ends of the branches; sepals short-connate at the base, rounded or ovate, ciliate; corolla short-campanulate, lobate to the middle, the lobes broad, rounded; staminodia minute, liguliform or triangular, inserted at the apex of the corolla tube; stamens 5, inserted on the base of the corolla, the filaments connate with the corolla; anthers free, dorsifixed slightly above the base, truncate or caudate at the apex; ovary ovoid, glabrous, contracted into a style of equal or greater length; stigma broad, disk-like; fruit ellipsoid or ovate-oblong, large, many-seeded.

Three species are known: the following, one in Cuba, and one from Chiapas, *D. matudae* Lundell, which is to be expected in western Guatemala. It differs from *D. smaragdina* in having glabrous leaves in addition to flower characters.

Deherainia smaragdina (Planch.) Dcne. Ann. Sci. Nat. VI. 3: 139, t. 12. 1876. *Jacquinia smaragdina* Planch. ex Linden, Pl. Nouv. 8. 1859.

Mostly in wet limestone forest, 1,100 meters or less; Petén; Alta Verapaz; Huehuetenango. Mexico; British Honduras; Honduras.

A branched shrub, mostly 2-4.5 meters high, sometimes a small tree, the branches stiff, rufous-hirsute; leaves coriaceous, short-petiolate, elliptic to oblong-ob lanceolate, 8-16 cm. long, 2-5 cm. broad, acute or acuminate, not spine-tipped, attenuate to the base, glabrous above, or nearly so, rufous-hirsute beneath; flowers solitary or binate at the ends of the branches, the pedicels rufous-hirsute; flowers 16-20 mm. long; sepals suborbicular, broadly rounded at the apex, ciliate; corolla lobes

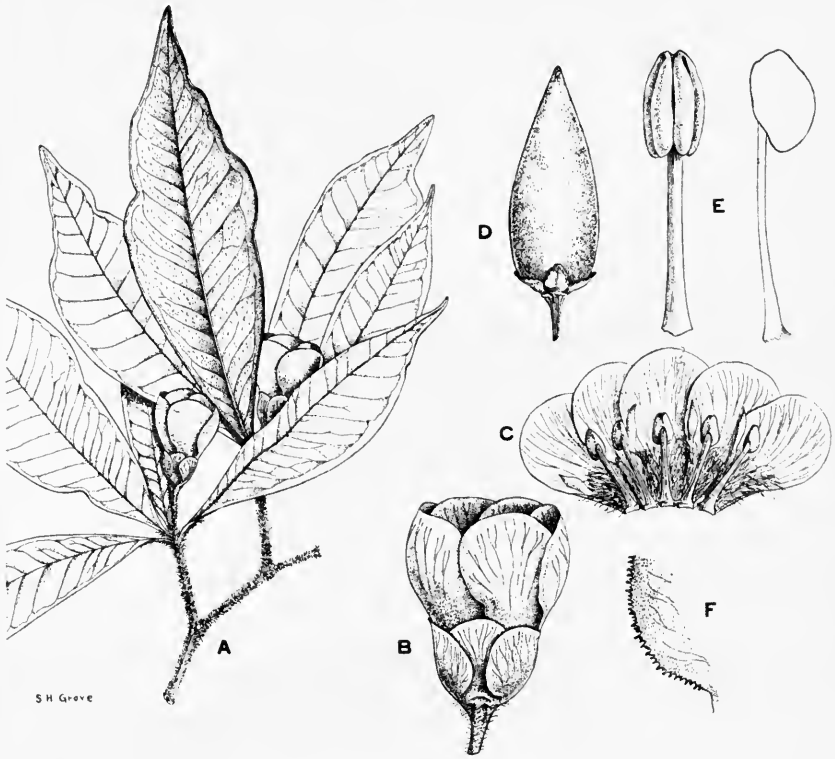


FIG. 36. *Deherainia smaragdina*. A, Flowering branch, $\times \frac{1}{2}$. B, Flower, $\times 2$. C, Corolla opened out, $\times 2$. D, Fruit, $\times \frac{1}{2}$. E, Stamens, front and side, $\times 4$. F, G, Sepal margin, $\times 8$.

suborbicular, minutely ciliolate; anthers emarginate at each end; ovary glabrous, ovoid, the style longer than the ovary, slender, the stigma large, capitulate-pulvinate; fruit green, lustrous, ovoid-oblong, about 7.5 cm. long and 3 cm. broad, attenuate-acute, narrowly rounded at the base, glabrous.

The shrub is common in the characteristic thickets on almost bare limestone in the lower portions of Alta Verapaz. It is unusual in its large, deep green corollas, which are attractive because of their strange coloring.

JACQUINIA L.

Shrubs or trees, usually glabrous; leaves alternate or pseudo-verticillate, coriaceous, often rigid-coriaceous and armed at the apex with a spinelike cusp or mucro, sometimes mucous; flowers rather small, perfect, 5-parted, in terminal

or pseudo-axillary racemes, rarely solitary, mostly yellow or orange-red, sometimes white; sepals free or very shortly connate at the base, imbricate, ovate or orbicular, ciliate or crenate; petals connate to form a short or elongate tube, the lobes imbricate, spreading in anthesis, rounded, somewhat coriaceous; staminodia 5, inserted at the apex of the tube and resembling corolla lobes, but smaller, generally crenate and emarginate at the apex; stamens 5, inserted near the base of the corolla, more or less exerted, the filaments dilated below; anthers dehiscent by extrorse longitudinal slits, elongate-ovate or subsagittate, dorsifixed slightly above the base, emarginate, rounded, or rarely acuminate at the apex; ovary glabrous, attenuate to the usually short style, the stigma obtuse or discoid-capitulate; fruit ovoid or globose, generally cuspidate, coriaceous or crustaceous; seeds few, ovoid immersed, in pulp; endosperm cartilaginous; cotyledons ovate, the radicle slender, elongate, inferior.

About 40 species, in tropical America. A few additional species are known from Central America and Mexico.

The taxonomy of the genus is not well understood. Mez saw only a few more than 125 specimens when he revised the genus in 1903 and credited to it 33 species—about two-thirds of these North American. Eleven additional species have been described from North America since Mez' revision. Mez maintained numerous species on the basis of anther characters which, at best, seem to be vague and inconstant. A revision based on the more ample material now available would seem to be in order.

Leaves not spine-tipped *J. schippii*.

Leaves spine-tipped, the spine small or large.

Flowers yellow or white, about 7 mm. long; leaves thin, the apical spine short and weak *J. paludicola*.

Flowers orange-red, 8–10 mm. long or larger; leaves usually thick and rigid, the apical spine generally long and stiff.

Leaves rather conspicuously triplinerved; connective of the anther acuminately produced beyond the cells *J. donnell-smithii*.

Leaves not triplinerved, 1-nerved or penninerved, often obscurely so.

Leaves very narrowly lanceolate, 1-nerved; connective of the anther acuminately produced beyond the cells *J. pungens*.

Leaves oblong-elliptic to elliptic or obovate, penninerved, the nerves often obscure; connective of the anther not acuminately produced.

J. aurantiaca.

Jacquinia aurantiaca Ait. Hort. Kew. ed. 2. 2: 6. 1811. *J. aurantiaca* var. *latifolia* Mez in Urban, Symb. Antill. 2: 451. 1901. *J. albiflora* Lundell, Wrightia 2: 60. 1960 (type from Petén, Contreras 45); *J. lepidota* Lundell, l.c. 61 (type from Petén, Lundell 15997). *Chicajám* (reported from the Atlantic coast); *tzic* or *chacsic* (Petén, Maya); *naranjillo*; *zincin* (Petén, Maya); *mata-pescado* (Zacapa); the name *ducuche* also reported.

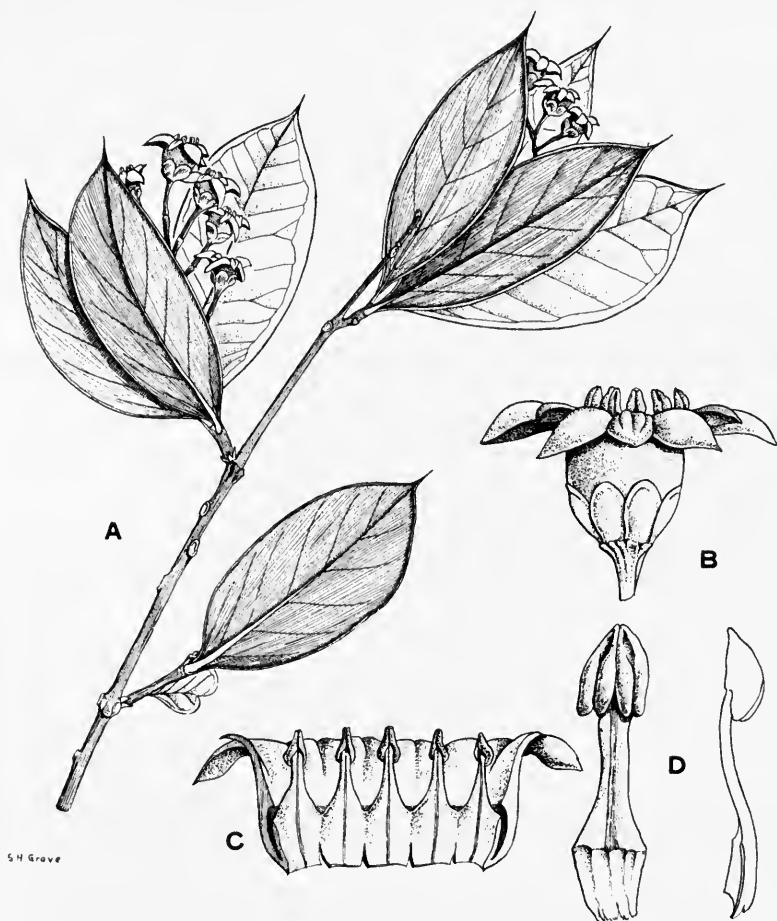


FIG. 37. *Jaquinia aurantiaca*. A, Flowering branch, $\times 1$. B, Flower, $\times 2\frac{1}{2}$. C, Corolla opened out, $\times 2\frac{1}{2}$. D, Stamens, front and side, $\times 5$.

Dry and moist, brushy plains and hillsides, sometimes in moist lowland forest or on saline flats, 1,100 meters or lower; Petén; Baja Verapaz; El Progreso; Zacapa; Chiquimula; Jutiapa; Escuintla; Retalhuleu; Huehuetenango. Mexico; British Honduras to Panama.

A shrub or tree, sometimes 9 meters high with a trunk 15 cm. in diameter, often very densely branched, the young branchlets sometimes puberulent or tomentulose; leaves sessile, usually rigid-coriaceous, oblanceolate to obovate-oblong or obovate, mostly 3.5–8 cm. long, acute or obtuse at the apex and tipped with a long rigid spine, lineolate beneath when dried, evidently penninerved, the lateral nerves

very slender, often prominulous beneath, the upper surface usually lustrous; racemes terminal, few-several-flowered, racemose, the pedicels about 6 mm. long, often thickened; bracts ovate, acute; flowers bright orange-red, 8-10 mm. long; sepals serrulate; fruit globose, yellow or orange, 1.5-2 cm. in diameter or even larger, with a very hard but somewhat fragile shell.

Called "knock-me-back" in British Honduras; "cansic" (British Honduras, Maya); "muyche" (Yucatan, Maya); "siche," "flor de San Antonio" (Tabasco); "naranjillo" (Chiapas); "barbasco," "limoncillo," "escorpioncillo," "mirra," "espinuco," "carambolillo," "crucillo" (El Salvador). This has been reported from Guatemala as *J. axillaris* Oerst. This shrub or tree is particularly plentiful in the dry lower Motagua Valley, where it occurs in great abundance. The plants are well protected against large animals, since the spiny tips of the leaves penetrate the fleshlike needles. The flowers, when orange-red, are showy and pretty. They often are strung on cords to make garlands, and preserve their shape and color for a long time. They are said to have been used by the Mayas for decorating their temples. The pulverized seeds are said to be administered in Petén to expel or destroy intestinal parasites. Almost throughout the range of the genus the species of *Jacquinia* are employed as a *barbasco* or fish poison, the crushed roots or fruits being used. In Guatemala the roots are macerated in water with fresh lime. The latter produces a foam which aids in spreading the *barbasco* more thoroughly. *J. albiflora* Lundell seems, at most, to be a variety with light colored flowers and puberulent branches.

***Jacquinia donnell-smithii* Mez**, Pflanzenreich IV. 236a: 39. 1903.

Moist or dry thickets of the Pacific plains, 300 meters or less; endemic; Petén; Zacapa; Santa Rosa; Escuintla (type from Santa Lucía, *Heyde & Lux 6343*); Retalhuleu.

A glabrous shrub 1-3 meters high; leaves sessile, rigid-coriaceous or subcoriaceous, narrowly elliptic to oblong-lanceolate, 4-10.5 cm. long, 1.5-2.5 cm. broad, acute or obtuse and tipped with a long slender stiff spine, attenuate to the base, more or less obviously triplinerved beneath and also penninerved above the basal nerves; inflorescences terminal, mostly 5-9-flowered, racemose or subcorymbose, the stout pedicels about 6 mm. long; bracts minute, ovate, acute; flowers orange-red, 8-9 mm. long, the sepals minutely crenulate.

This has been reported from Guatemala as *J. pungens* Gray. Its validity as a species is questionable. It is probably only a minor form of *J. aurantiaca*.

Jacquinia paludicola Standl. Field Mus. Bot. 11: 138. 1932.

Wet mixed forest, at or little above sea level; Izabal; Petén. British Honduras (type from Forest Home, *W. A. Schipp 1028*).

A shrub or tree 3–7 meters tall, glabrous, the trunk as much as 8 cm. in diameter; leaves thin, on petioles 3–5 mm. long, pseudo-verticillate at the ends of the branches, oblong-oblongate to ovate-elliptic, mostly 8–12 cm. long and 2.5–4.5 cm. broad, acute or acuminate, tipped with a short weak spine, attenuate to the base, penninerved; racemes few–several-flowered, often umbelliform, the slender pedicels 5–14 mm. long; sepals orbicular, 2 mm. long, broadly rounded at the apex; corolla white or pale yellow, 6 mm. long, the rounded lobes shorter than the tube; fruit globose, about 2 cm. in diameter.

Jacquinia pungens Gray, Mem. Am. Acad. Sci. n. ser. 5: 325. 1855. *Matapeje; luruche*.

Dry rocky plains and hillsides, 200–700 meters; Zacapa; Chiquimula; El Progreso. Western and southern Mexico.

A shrub or small tree, glabrous, the trunk sometimes 12 cm. in diameter; leaves subsessile, rigid, linear-lanceolate, 3–6 cm. long, 1 cm. broad or narrower, acute and tipped with a long stiff yellowish spine, attenuate to the base, 1-nerved; inflorescences racemiform, terminal, few-flowered, the pedicels about 7 mm. long, the bracts small, ovate-acuminate; flowers 7–8 mm. long, orange-red, the sepals crenulate only at the apex if at all; fruit subglobose, 2 cm. in diameter, several-seeded, the endocarp woody and thick.

It is doubtful whether the Guatemalan material represents more than a narrow-leaved variety of *J. aurantiaca*. The bark is ashy gray, rough and thin, the inner bark greenish; wood pale brown.

Jacquinia schippii Standl. Carnegie Inst. Wash. Publ. 461: 78. 1935.

Known only from the type, Jacinto Hills, British Honduras, in forest, 270 meters, *W. A. Schipp 1233*.

A tree of 10 meters, the trunk 20 cm. in diameter, glabrous; leaves on petioles 2–4 mm. long, subcoriaceous, oblong or narrowly oblanceolate-oblong, 3–5 cm. long, 1–2 cm. broad, narrowly rounded or very obtuse and muticous at the apex, attenuate to the base, somewhat lustrous, the costa obsolete above, the whole lower surfaces closely and conspicuously longitudinally striate, the margins corneous; flowers short-racemose, the slender pedicels 1 cm. long; calyx in fruit 5 mm. broad, appressed, the sepals broadly rounded at the apex, broader than long, minutely erose; fruit subglobose, 1 cm. long, smooth, apiculate.

MYRSINACEAE

by CYRUS LONGWORTH LUNDELL¹

*Director and Chief Research Scientist
Texas Research Foundation*

Reference: Carl Mez, Myrsinaceae, Pflanzenreich IV. 236. 1902.

Trees or shrubs, glabrous or pubescent; leaves alternate, often clustered at the ends of the branches, entire, crenulate or serrate, glandular-punctate; stipules none; flowers perfect, or dioecious, usually 5-parted, regular, in terminal or axillary inflorescences, small, white, pink or green; calyx inferior, the segments free or more or less connate, mostly ciliate and glandular-punctate, valvate, imbricate, or sinistrorsely contorted, persistent; corolla regular, usually gamopetalous, rotate to tubular, petals valvate or dextrorsely, or rarely sinistrorsely, imbricate or contorted, often quincuncial; stamens as many as the petals and opposite them, the filaments usually short, sometimes equaling or longer than petals, connate with the corolla tube or almost wholly free; anthers mostly dorsifixed, sagittate, ovate, elliptic or linear, dehiscent by introrse slits or by apical pores; ovary globose, ovoid, or clavate, free, sessile, 1-celled; style long or short, the stigma punctiform, capitate, discoid, or conic; placenta central, usually globose, the ovules numerous or few, uniseriate or pluriseriate; fruit drupaceous, 1-seeded; seeds with a thin testa, the endosperm copious, smooth or rarely ruminant; embryo cylindrical or curved, the cotyledons small, the radicle elongate.

Genera about 40, widely dispersed in tropical regions.

The classification of the tribes and genera of the Myrsinaceae is based primarily on the number of ovules and their arrangement in the placenta. Most generic characters are weak and those separating species are often weaker. Fine distinctions are necessary for an understanding of natural groups.

Flowering material is essential for the identification of genera and species. In Guatemala, *Stylogyne* A. DC. and *Rapanea* Aubl. are dioecious. In *Stylogyne*, which has been poorly understood, the pistillate flowers with long slender style and well developed stamens appear perfect, and superficially resemble those of *Ardisia* Swartz, but the

¹ Assisted by a grant from the Dodge Jones Foundation.

staminate flowers have a short style subequalling the abortive ovary. The ovules are few and uniseriate, which places *Stylogyne* in the Tribe Myrsineae. *Rapanea* with its fasciculate axillary flowers and large sessile stigma is easy of recognition.

Parathesis Hook. f., which has valvate sepals and petals, is a large natural genus with Guatemala the center of its highest development. *Yunckeria* Lundell cannot be placed without dissection of the placenta, yet the few erect uniseriate ovules mark it as one of the most distinctive in the family.

Synardisia (Mez) Lundell, a monotypic genus, is notable for its campanulate or suburceolate corolla. It has glabrous branchlets and leaves, but the large inflorescences are pubescent with conspicuous gland-tipped hairs, which aid in identification.

Gentlea Lundell is notable for the slender exerted stamens, and greenish or white flowers. The greenish hue is unusual in the Myrsinaceae.

Ardisia contains a series of natural groups which probably deserve generic recognition. Most of its species are well-marked in our area.

Inflorescences small, axillary, shorter than the petioles; flowers dioecious, fasciculate; style none, the stigma of pistillate flowers large and morchelliform.

Rapanea.

Inflorescences usually large, axillary or terminal, much longer than the petioles, pedunculate; style evident, short or much elongate, the stigma small, usually punctiform.

Flowers dioecious; the style of staminate flowers short, subequalling abortive ovary; the style of pistillate flowers elongate, much exceeding ovary; ovules few, uniseriate; sepals and petals convolute in bud. *Stylogyne.*

Flowers perfect, the style long and slender.

Sepals and petals valvate; petals pubescent. *Parathesis.*

Sepals and petals imbricate or convolute in bud; petals usually glabrous.

Ovules uniseriate, erect from base of placenta; petals imbricate, about 1 cm. long. *Yunckeria.*

Ovules pluriseriate, immersed in placenta.

Stamens exerted; filaments long and slender; anthers small, cordate; corolla greenish or white; flowers corymbose. *Gentlea.*

Stamens included; filaments usually short, if elongate, the flowers either racemose or spicate; corolla pink or white.

Corolla campanulate or suburceolate, the petals connate up to three-fourths their length; inflorescences large, densely pubescent with gland-tipped hairs. *Synardisia.*

Corolla with petals connate at base, nearly free. *Ardisia.*

ARDISIA Swartz

Shrubs or trees; leaves alternate, petiolate or rarely sessile, entire, dentate, crenate or serrate; inflorescences varied in form, the racemes, umbels and corymbs paniculate; flowers pedicellate or subsessile, perfect, usually 5-parted, often 4- or

6-parted, small, white, pink or lilac, dextrorsely, or rarely sinistrorsely, imbricate or contorted, often quincuncial; sepals short-connate or nearly free; petals united at base, sometimes connate almost to middle, recurved or spreading, rarely erect; stamens free, inserted at or slightly above base of corolla, the filaments usually short; anthers dorsifixed, mostly elongate and subsagittate, concolor or glandular-punctate, dehiscent by longitudinal slits or sometimes by apical or subapical pores; ovary ovoid or subglobose, the style long and slender, often exerted, the stigma minute, punctiform; ovules few to numerous, pluriserial; fruit globose or subglobose, bearing at the apex the persistent style base, 1-seeded, the endocarp crustaceous or osseous; seed globose.

Species numerous, mostly in tropical America and Asia. In North America, the genus is most abundantly represented in Costa Rica. One exotic species, perhaps the Asiatic *A. crenulata* Lodd., has been observed in cultivation in Guatemala as an ornamental plant.

Flowers in paniculate racemes or spikes; leaves entire.

Sepals and petals sinistrorsely imbricate or quincuncial *A. escallonioides*.

Sepals and petals dextrorsely imbricate or quincuncial.

Sepals and petals epunctate *A. escuinlensis*.

Sepals and petals conspicuously punctate.

Corolla tube glandular-lepidote or papillose within, the petals otherwise glabrous; flowers sessile or with pedicels usually less than 6 mm. long.

Flowers spicate, usually sessile, rarely with pedicels up to 6 mm. long at base of spike; sepals coriaceous and thickened medially, rugose. *A. densiflora*.

Flowers racemose, pedicels usually 4-6 mm. long, sometimes up to 1 cm. long; sepals thin *A. revoluta*.

Corolla with conspicuous glandular, yellow or orange, star-shaped eye within; pedicels elongated toward base of raceme, 1-2.5 cm. long, rarely reduced *A. paschalis*.

Flowers in paniculate umbels, corymbs, or corymbiform racemes.

Flowers in corymbiform racemes (see also *A. paschalis*); pedicels elongated, rigid, usually 1-3 cm. long; inflorescences glabrous.

Sepals entire, with conspicuous round plate-like glands on dorsal surface.

A. verapazensis.

Sepals ciliate, without glands on dorsal surface.

Corolla 9-12 mm. long; corolla tube 3.5-5 mm. high, glabrous on outer surface; leaves subtire, coriaceous or subcoriaceous *A. sexpartita*.

Corolla 7-9 mm. long; corolla tube about 2.5 mm. high, pubescent at base on outer surface with gland-tipped hairs; leaves entire, thin, chartaceous *A. cucullata*.

Flowers in umbels or corymbs, the corymbs sometimes elongated after anthesis.

Inflorescences furfuraceous, at least at base.

Leaves sessile or nearly so, the petioles broadly marginate to the attenuate narrowly rounded base; inflorescences narrowly paniculate, with primary branches less than 2 cm. long *A. apoda*.

Leaves petiolate; inflorescences broadly paniculate, usually pyramidal.

Leaf blades thin, large, with abundant black glands beneath; anthers 2.3-2.6 mm. long, black-lineate dorsally, longitudinally dehiscent.

A. nigropunctata.

- Leaf blades usually chartaceous, sometimes coriaceous, inconspicuously punctate; anthers 2.5-4 mm. long, concolor, dehiscent by apical pores.
A. compressa.
- Inflorescences not furfuraceous, either glabrous or puberulent, often glandular-puberulent.
- Leaves pectinate-dentate with very close, spreading, subulate teeth.
A. pellucida.
- Leaves entire, crenulate, dentate, or appressed-serrulate, the teeth not subulate.
- Pedicels of flowers rigid, 3-10 mm. long; leaves acute or subacuminate; flowers usually corymbose.
- Leaf blades thin, broad, mostly elliptic, 5.5-9.5 cm. wide, the margin usually dentate or appressed-serrulate. *A. Schippii.*
- Leaf blades subcoriaceous, narrow, mostly oblanceolate-oblong, 2.5-5 cm. wide, the margin entire or subentire. *A. rarescens.*
- Pedicels of flowers filiform, weak, usually 1-2.5 cm. long, rarely shorter; leaves acuminate, mostly caudate-acuminate; flowers often umbellate.
- Filaments glabrous; branchlets rufous-hirtellous (see also *A. nigrescens*).
A. hirtella.
- Filaments glandular-puberulent.
- Branchlets hirsute-tomentose with short red hairs. *A. nigrescens.*
- Branchlets glabrous or minutely puberulent.
- Anthers cuspidate, up to 9 mm. long. *A. Mitchellae.*
- Anthers merely apiculate, 3-5.5 mm. long.
- Leaves glabrous; branchlets usually glabrous. *A. Tuerckheimii.*
- Leaves with petioles and costa puberulent beneath; branchlets ferruginous-puberulent.
- Petals ovate, 5.5-6 mm. wide. *A. Carlsoanae.*
- Petals lanceolate-oblong, 3-4 mm. wide. *A. erythrocarpa.*

***Ardisia apoda* Standl. & Steyermark., Field Mus. Bot. 23: 219. 1947.**

Wet forest, 900 meters or less; Izabal (endemic, type from Cerro San Gil, *J. A. Steyermark* 41923).

A tree 6 meters tall, with thick branches, densely ferruginous-furfuraceous, glabrescent, densely leafy at the ends; leaves very large, sessile or nearly so, sub-chartaceous, entire, oblanceolate, up to 40 cm. long, 9.5 cm. wide, acuminate, narrowly attenuate to the base, the base narrowly rounded, densely ferruginous-furfuraceous beneath at first and at base above, rather sparsely so at maturity, densely punctate, paler on lower surface, the costa elevated below, the primary lateral veins very slender, inconspicuous, obscurely reticulate; inflorescences terminal, very slender, 1- or 2-branched, narrowly paniculate, up to 12.5 cm. long, the primary branches short, up to 2 cm. long, ferruginous-furfuraceous; flowers corymbose, the fruiting pedicels up to 1 cm. long; sepals free, ovate-orbicular, 1.5 mm. long, ciliolate, black-punctate; fruit subglobose, glabrous, black and shiny at maturity, 8 mm. in diameter.

A. apoda closely resembles *A. Wedelii* Lundell, a species described from Panama and found also in Costa Rica and Nicaragua. The narrowly paniculate slender inflorescences, longer pedicels and the inconspicuous venation of the leaves are minor features which appear

to distinguish the Guatemalan tree. Flowers of *A. apoda* are unknown. Entirely unlike any other of the genus in Guatemala, the species is easy of recognition because of its large sessile leaves.

Ardisia Carlsonae Steyermark, *Ceiba* 4: 301. 1955.

Known only from the type; Mexico, around Los Arcos, Los Lagos, 3 miles northwest of Rancho San José and 34 miles southeast of Comitán, Chiapas, 1,600 meters, *Margery C. Carlson* 1744.

A shrub up to 2 meters high, the branchlets slender, at first ferruginous-puberulent; leaves with petioles 3–5 mm. long, nearly glabrous; leaf blades narrowly elliptic, 4–6.5 cm. long, 1.5–2.3 cm. wide, apex abruptly acuminate, base acute, the margin crenulate above, conspicuously black-punctate, the costa prominent and minutely puberulent beneath, otherwise glabrous; inflorescences terminal, laxly subcorymbose, about 12-flowered, much shorter than the leaves, up to 5 cm. in diameter; pedicels 1.2–2.3 cm. long, sparsely puberulent, almost glabrous; flowers 5-parted; sepals short-connate at base, ovate, 2.8–3 mm. long, 1.5 mm. wide, subobtusely ciliate, conspicuously punctate; petals almost free, connate only at base, ovate, 10 mm. long, 5.5–6 mm. wide, subobtusely, densely punctate; filaments 2 mm. long, glandular-puberulent; anthers narrowly linear, 5.5 mm. long, with apex obtusely apiculate; ovary ovoid, glabrous; style slender, 6.5 mm. long; dry fruit 7 mm. in diameter.

The type at Chicago has been misplaced, or lost, and I know the species only from description. Steyermark (l.c.) notes its affinity: "From *A. Mitchellae* Johnston, to which it is probably most closely related, it differs in the obtusely short-apiculate, not cuspidate, anthers, white petals, with finer and relatively fewer dark punctations of the leaves, and sparsely puberulous to nearly glabrous pedicels." Possibly its wider petals, described as 5.5–6 mm. in width, are its chief distinctive feature, for the petals of both *A. Mitchellae* and *A. erythrocarpa* Lundell are oblong and usually about 3 mm. wide, rarely up to 4 mm. wide. Both *A. Carlsonae* and *A. Mitchellae* have larger flowers than *A. erythrocarpa*.

Ardisia compressa H.B.K. *Nov. Gen. & Sp.* 3: 245: 1818. *A. belizensis* Lundell, *Contr. Univ. Mich. Herb.* 7: 38. 1942 (type from Stann Creek Valley, British Honduras, *Percy H. Gentle* 3500). *Sirasil de montaña*; *ixbambul*; *hueso blanco*; *cerezo morado*; *capulín* (Guatemala); *male blossom-berry grape*; *bird berries* (British Honduras).

Moist or wet forest, often in second growth, frequently in pine-oak forest, 2,500 meters or less; Petén; Alta Verapaz; Bajo Verapaz; Izabal; Zacapa; Chiquimula; Jalapa; Santa Rosa; Escuintla; Guatemala; Sacatepéquez; Chimaltenango; Suchitépéquez; Quezaltenango;

San Marcos. Mexico; British Honduras to El Salvador and Panama; northern South America (type from Venezuela).

A shrub or small tree up to 7 meters tall, 15 cm. in diameter, the branchlets slender, at first furfuraceous-lepidote; the leaf buds furfuraceous-lepidote; leaves variable, with short usually stout narrowly marginate petioles rarely over 1 cm. long, often much shorter, the petioles furfuraceous-lepidote beneath at first; leaf blades variable, lanceolate, oblong, elliptic-oblong, elliptic, oblanceolate or obovate, 6-20 cm. long, 3-9 cm. wide, acuminate or subabruptly acuminate, the acumen acute to obtuse, base acutish and decurrent, usually entire, sometimes inconspicuously crenulate or denticulate, usually chartaceous, sometimes coriaceous, glabrous, costa elevated beneath, the primary lateral veins slender, the veins obscure to conspicuously reticulate; inflorescences terminal, reddish, furfuraceous at base, very sparingly furfuraceous above at first, glabrous early, paniculate, 2- or 3-pinnate, the panicles very variable in size, 5-15 cm. long, usually many-flowered, open; pedicels slender, 4-9 mm. long, rarely shorter; flowers corymbose or subumbellate, glabrous; calyx pink, sepals dextrorsely imbricate, almost free, ovate-elliptic, ovate or oval, 1-2 mm. long, apex rounded, minutely erose or ciliolate, conspicuously orange-red punctate; petals dextrorsely contorted, oblong, oblong-elliptic or oblanceolate-oblong, 5-7 mm. long, united 1-1.5 mm. at base, rather sparsely orange-red punctate; stamens 3-5.5 mm. long; filaments 1-2 mm. long, sometimes longer; anthers linear or lanceolate-linear, 2.5-4 mm. long, erect, dorsifixed about 0.5 mm. above base, dehiscent by apical pores, concolor; ovary ovoid; style slender, subequaling petals; placenta ovoid; ovules pluriseriate, numerous, immersed; fruits (immature) shallowly pitted; mature fruits subglobose, 6-8 mm. in diameter, purple-black.

One of the commonest shrubs of forest at low and middle elevations, *A. compressa* is quite variable over its wide range. A diagnostic characteristic, present in all the variable populations, is the furfuraceous internode at the base of the inflorescence. The indument persists through fruiting.

The ripe fruit is eaten by children as well as by birds.

***Ardisia cucullata* Lundell, *Wrightia* 3: 26. 1962.**

In wet forest, 2,540 meters or less; Mexico (type from Fraylesca, near Siltepec, Chiapas, *E. Matuda* 5201).

A tree, up to 7 meters tall, the branchlets rather slender, minutely papillate-puberulent in leaf axils, otherwise glabrous; the leaf buds ciliate; leaves with rather stout narrowly marginate petioles 8-15 mm. long, the petioles inconspicuously lepidote above; leaf blades oblong-elliptic or oblanceolate-oblong, 12-20 cm. long, 4-7.5 cm. wide, base acutish and decurrent, apex acute or subabruptly acuminate, chartaceous, glabrous, entire, the young leaves conspicuously black-punctate mostly with small rounded glands, costa elevated beneath, nearly plane above, reticulate-veined on both surfaces; inflorescences terminal, broadly pyramidal, up to 12 cm. high, 15 cm. wide, the racemes corymbiform, paniculate, glabrous; pedicels slender but rigid, 1-3 cm. long, the longest at base of racemes; flowers 5-merous, 7-8 mm.

long at anthesis; calyx 4–4.5 mm. long, the sepals quincuncial or imbricate, united at base, ovate-elliptic or ovate-oblong, narrowed and rounded at apex, ciliate, lepidote-papillose at base within, conspicuously black-punctate, the medial glands linear; corolla 7–9 mm. long, the petals united at base into tube about 2.5 mm. long, the tube pubescent outside at base with gland-tipped hairs, lepidote-papillose within, the petals symmetrical, black-punctate, multilinate medially, the two outer petals larger, elliptic-lanceolate, obtuse at apex, the three inner petals cucullate apically; stamens 4–6 mm. long, attached about 1.5 mm. above base of tube; filaments stout, enlarged below, 2–2.5 mm. long, densely pubescent with short gland-tipped hairs; anthers oblong-triangular, 3–4.5 mm. long, epunctate, dorsifixed about 1 mm. above base, apex rounded and mucronate; ovary ovoid, black-punctate, glabrous, tapering into the slender style 6–7 mm. long; placenta acicular at apex; ovules pluriseriate, numerous.

The long very slender pedicels, the elongated subcorymbiform racemes, smaller flowers and thinner leaves are features by which *A. cucullata* differs markedly from *A. verapazensis* Donn.-Sm. and *A. sexpartita* Lundell, the species with apparent affinity.

Ardisia densiflora Krug & Urb. Notizbl. Bot. Gart. Berl. 1: 79. 1895 (type from Blue Mountains, Jamaica, *W. Harris* 5227). *A. spicigera* Donn.-Sm. Bot. Gaz. 27: 434. 1899 (type from Comitán, Chiapas, *E. Seler* 2678). *A. Gentlei* Lundell, Field & Lab. 13: 11. 1945 (type from Toledo District, British Honduras, *Percy H. Gentle* 4561). *Caraso berries; wild spice* (British Honduras).

Mostly in wet forest, sometimes in swampy places or pine-oak forest, 1,800 meters or less, usually at low elevations; Petén; Zacapa. Mexico (Veracruz, Oaxaca, Chiapas); British Honduras; Honduras.

A shrub or tree, sometimes up to 25 cm. in diameter and 12 meters high, the branches stout; the short terminal internodes at first minutely ferruginous-tomentose with closely appressed tomentum, glabrescent early; the leaf buds finely ferruginous-tomentose; leaves with stout marginate petioles usually less than 1 cm. long, sometimes up to 1.5 cm. long; leaf blades obovate-elliptic, oblanceolate or oblong-elliptic, 7–20 cm. long, 2.5–8 cm. wide, apex usually obtuse, sometimes acutish, base acutish and decurrent, entire, glabrous, coriaceous or subcoriaceous, drying pallid, costa impressed above, elevated beneath, the veins slender and obscure; inflorescences terminal, spicate-paniculate, up to 15 cm. long, 2–3-pinnate, sparingly ferruginous-tomentulose at first, glabrescent; flowers sessile or subsessile, the pedicels rarely up to 6 mm. long at base of spikes; flowers 5–6 (7) mm. long at anthesis; sepals quincuncial, free almost to base, broadly ovate or suborbicular, 1.7–2.4 mm. long, rounded apically, ciliate, coriaceous and thickened medially, rugose, punctate, the margin scarious, glandular-lepidote within at base, otherwise glabrous; petals dextrorsely imbricate or quincuncial, oblong, 5–5.5 mm. long, united at base, the tube about 2 mm. long, apex rounded, black-punctate medially, lineate, glandular-lepidote within tube, glabrous otherwise; stamens usually subequaling petals, rarely exerted or included, up to 6 mm. long; filaments slender, up to 4.5 mm. long, coalescing at base, attached medially in corolla tube; anthers

ovate-triangular, rather thick, epunctate, 1.5–2 mm. long, acute or apiculate, dorsifixed about one-third above base; ovary glabrous; style up to 6 mm. long; ovules numerous, pluriseriate, immersed; fruit subglobose, drying 6–7 mm. in diameter, black and shining at maturity.

The fruits are reported to be acid-sweetish and edible (*Steyermark* 42899). In both continental and Jamaican collections, fruits are often malformed and enlarged from disease. Since the species appears to be rather rare, possibly this has contributed to the sparse population.

A. densiflora is closely related to *A. revoluta* H.B.K. but a very distinctive species. Flowers in some specimens are pedicellate, and this has led to confusion. The thick rugose calyx helps to distinguish even fruiting material of *A. densiflora*.

***Ardisia erythrocarpa* Lundell, *Wrightia* 2: 59. 1960. *Chalche* (Petén); *Chilich* (Huehuetenango).**

Wet forest, 300 meters or less; Petén (type from San Luis, *C. L. Lundell* 16267); Huehuetenango. British Honduras.

A slender shrub or small tree up to 3 meters high, the branchlets slender, rather sparsely puberulent with minute red hairs, glabrescent; leaves with slender, minutely puberulent petioles 3–8 mm. long; leaf blades lanceolate-elliptic, elliptic or oblanceolate, 3–10 cm. long, 1.3–4.3 cm. wide, apex acuminate, the acumen obtusish, base acute, membranaceous, decurrent, the margin crenulate above or subentire, at first puberulent above and along costa beneath, the veins slender; inflorescences lateral and terminal, minutely puberulent, subcorymbose, few-flowered, rarely reduced to 1 flower; pedicels slender, 8–15 mm. long, usually less than 12 mm. long; flowers 5-merous, white; sepals free, lanceolate, ovate or lanceolate-oblong, 2–4 mm. long, acutish, ciliate, punctate; petals connate at base, lanceolate-oblong, 6–9 mm. long, 3–4 mm. wide, obtuse and laterally emarginate at apex, conspicuously punctate, glandular-puberulent within above base of filaments; stamens up to 5 mm. long; filaments stout, 1.5–2 mm. long, glandular-puberulent, inserted at base of corolla; anthers linear, only slightly enlarged at base, 3–4 mm. long, apiculate, dorsifixed about 0.5 mm. above base; ovary glabrous; style slender, about 5 mm. long; placenta ovoid; ovules 8 or more, pluriseriate, immersed; fruit bright red, depressed globose, drying 6–8 mm. in diameter.

***Ardisia escallonioides* Schlecht. & Cham. *Linnaea* 6: 393. 1831. *Cyrilla paniculata* Nutt. *Amer. Journ. Sci.* 5: 290. 1822, not *Ardisia paniculata* Roxb. 1814. *A. Pickeringia* Torr. & Gray, in DC. *Prodr.* 8: 124. 1844. *Icacorea paniculata* (Nutt.) Sudw. *Gard. & For.* 6: 324. 1893. *Uva* (Huehuetenango); *hullaba* (British Honduras).**

Usually in low wet or dry forest, 900 meters or less, often near sea level; Petén; Huehuetenango. Southern Florida; Mexico (Tamauli-

pas, San Luis Potosi, Veracruz, Oaxaca, Chiapas, Campeche, Yucatan); British Honduras; West Indies (Bahamas, Cuba, Hispaniola).

A shrub or small tree, sometimes up to 12 meters high, the bark thin, scaly, light gray or white, the young branchlets rather slender, finely pubescent with minute appressed ferruginous tomentum; leaves with petioles usually about 5 mm. long, but ranging from 3–10 mm. long, pubescent with minute ferruginous tomentum; leaf blades oblanceolate, obovate, elliptic or oblong, 5–10 (18) cm. long, 2–4 (6.5) cm. wide, apex obtuse or acute, base acute, chartaceous or subcoriaceous, entire, glabrous or nearly so, minutely pitted, usually drying pallid and paler beneath, costa elevated beneath, the veins very slender and inconspicuous; inflorescences terminal, paniculate, 2–3-pinnate, 5–12 cm. long, very minutely puberulent or finely ferruginous-tomentulose; pedicels (2) 4–6 (9) mm. long; flowers racemose-paniculate, fragrant, white or pink, at anthesis up to 8 mm. long including exerted style; sepals quincuncial or sinistrorsely imbricate, ovate-elliptic, 2 mm. long or less, rounded at apex, ciliate, conspicuously black-punctate with lines and small round glands; petals up to 6 mm. long, usually sinistrorsely imbricate, rarely quincuncial, connate up to one-third at base, oblong-elliptic, conspicuously lineate, papillose-puberulent within at base; stamens up to 4 mm. long; filaments slender, up to 2.5 mm. long; anthers erect, lanceolate-triangular or rarely ovate, 1.2–2 mm. long, dorsifixed 0.3–0.5 mm. above base, eglandular, acute or apiculate, rarely cuspidate; ovary glabrous, ovoid; style rather stout, up to 6 mm. long, conspicuously exerted; ovules numerous, pluriseriate, immersed; fruit globose, usually 4–5 mm. in diameter, rarely larger.

In our area the species is quite uniform, but some Petén collections have leaves approaching those of *A. revoluta* H.B.K. in size. The sinistrorse sepals and petals, along with the stout exerted style, make this racemose-flowered species easy to recognize.

In its northeastern Mexican range, the species has small flowers with cuspidate anthers scarcely 1.2 mm. long, differences possibly of varietal importance. The pedicels vary considerably in length throughout the range of *A. escallonoides*, but they are possibly shortest in collections from San Luis Potosi and Tamaulipas. In the Bahamas, specimens with fruits up to 1 cm. in diameter may represent another variety.

***Ardisia escuintlensis* Lundell, Wrightia 3: 98. 1964.**

Known only from the type, Dept. Escuintla, 1942, *José Ignacio Aguilar* 1679.

Branchlets slender, terete, glabrous; leaves with slender petioles 1 cm. long; leaf blades oblanceolate or narrowly oblanceolate-elliptic, 7.5–10 cm. long, 2.8–3.5 cm. wide, apex obtusely subacuminate, base acute, glabrous, entire, chartaceous, slightly paler beneath, the costa slightly impressed above, nearly plane, elevated beneath, the veins very slender, inconspicuous; inflorescences terminal, bipinnately paniculate, shorter than leaves, glabrous, the flowers racemose at ends of branches; bracts thin, deciduous, the basal up to 1.5 cm. long, conspicuously

punctate with very small elevated reddish glands; pedicels 3–5 mm. long; sepals 5, free or essentially so, ovate-lanceolate, about 2 mm. long, glabrous, obtusish, subentire, membranaceous, epunctate or sometimes with one or more small glands; petals dextrorsely imbricate, short connate at base, ovate-lanceolate, 4 mm. long (in buds), membranaceous, epunctate, glabrous; stamens (in buds) 3 mm. long, attached at base of corolla; filaments rather stout, about 1.5 mm. long; anthers dorsifixed about two-fifths above base, sagittate, narrowly triangular and caudate-acuminate, about 2.75 mm. long (in buds), epunctate, longitudinally dehiscent; ovary ovoid, glabrous; style slender, short, about 1.5 mm. long, the stigma punctiform; ovules numerous, pluriseriate.

The only specimen available is a single flowering twig with flower buds, but the species is very well marked. *A. escuintlensis* has membranaceous sepals and petals, long caudate-acuminate anthers dehiscent longitudinally, and inflorescences paniculate with flowers in short racemes. Although entirely different in appearance, it is probably related to *A. revoluta* H.B.K.

***Ardisia hirtella* Lundell, Wrightia 3: 98. 1964.**

Wet cohune ridge, about 750 meters (type from British Honduras, Retiro in El Cayo District, *C. L. Lundell* 6302).

Arborescent shrub, 3 cm. diameter, 3.5 m. high, branchlets slender, hirtellous with red hairs; leaves petiolate, the petioles red puberulent, 7–15 mm. long, the acute base of blade decurrent on petiole; leaf blades membranaceous, lanceolate, 8.5–14 cm. long, 3–4.7 cm. wide, apex obtusely acuminate, base acute, margin obscurely crenulate above, puberulent on both surfaces at first, glabrescent above; inflorescences terminal, corymbose or corymbose-umbellate, multi-flowered, up to 7 cm. in diameter, red puberulent; pedicels slender, 1–1.5 cm. long, red puberulent; flowers 5-merous; calyx red puberulent, 3–3.5 mm. long, the sepals lanceolate, conspicuously ciliate, obtusish; corolla 7–10 mm. long, pinkish, the petals dextrorsely imbricate, asymmetrical, laterally emarginate at apex, lanceolate-oblong, 3–4 mm. wide, minutely ciliate, rather sparsely glandular puberulent within at base, otherwise glabrous, united at base; filaments stout, up to 2 mm. long, glabrous; anthers linear-lanceolate, up to 4 mm. long, obtuse and apiculate at apex, opening by apical pores, attached to filaments above the subsagittate base; ovary glabrous; style slender, about 6 mm. long.

***Ardisia Mitchellae* I. M. Johnston, Contr. Gray Herb. 81: 96. 1928.**

Wet forest, 600 meters or less, usually near sea level (type from Honduras, vicinity of Tela, *Elizabeth R. Mitchell* 66).

A shrub or small tree up to 5 meters high, the branchlets slender, minutely puberulent; leaves with slender puberulent petioles 3–10 mm. long; leaf blades elliptic, obovate-elliptic or oblanceolate-elliptic, 6–13 cm. long, 2.5–5.5 cm. wide, apex abruptly and broadly acuminate, base acute and decurrent, margin crenulate from about the middle, chartaceous, paler beneath, at first puberulent along the

midvein on both surfaces, the midvein elevated beneath, nearly plane above, the veins slender, obscure on upper surface; inflorescences strictly terminal, laxly subcorymbose, few-flowered, up to 6 cm. long, densely puberulent with minute red glandular hairs; pedicels very slender, up to 2 cm. long, puberulent, flowers 5-merous, up to 1.2 cm. long at anthesis; sepals short-connate at base, broadly ovate or ovate-orbicular, up to 3 mm. long, acute, puberulent, ciliate, densely punctate; petals (only mature buds available) dextrorsely contorted, oblong, up to 11 mm. long, 4 mm. wide, united about 1 mm. at base, minutely ciliolate, glandular-puberulent within above base of filaments, otherwise glabrous, conspicuously punctate; stamens up to 9.3 mm. long (in buds of type), inserted near base of corolla; filaments thick, about 2 mm. long, glandular-puberulent; anthers linear, up to 9 mm. long (in buds of type), apex cuspidulate, the cusp shallowly bifid, not punctate; ovary ovoid, glabrous; style slender, placenta ovoid, apically acicular; ovules 10 or more, pluriseriate, immersed; fruit bright red, globose, drying 8-10 mm. in diameter.

In the type, which has only mature flower buds, the petals exceed a centimeter in length and these are subequaled by the stamens. The large anthers, up to 9 mm. long, are distinctly cuspidulate and the cusp is bifid. Apparently the abnormally large flowers and anthers of the type represent an extreme development of the species. No collections from British Honduras and Guatemala are definitely referable to *A. Mitchellae*, but the species should be found in the Atlantic lowlands.

Ardisia nigrescens Oerst. Vid. Medd. Kjoebenhavn 130. 1861. *A. Donnell-Smithii* Mez, Bull. Herb. Boiss. II. 3: 235. 1903 (type from Cubilquitz, Alta Verapaz, *H. von Tuerckheim* 7766). *A. multilineata* Mez, Repert. Sp. Nov. 16: 311. 1920 (based on same type as *A. Donnell-Smithii* Mez). *A. nigrescens* Oerst. var. *Donnell-Smithii* (Mez) Lundell, Wrightia 3: 99. 1964. "*Coc-ishilil*" (Kekchi in Quiché). *Uva de paloma; blossomberry* (British Honduras).

Wet forest, 350 meters or less; Petén; Alta Verapaz; Huehuetenango. Mexico (San Luis Potosi, Veracruz, Oaxaca); British Honduras.

A shrub or small tree up to 8 meters high, the trunk 10 cm. or less in diameter, the young branchlets slender, densely hirsute-tomentose with matted dark red hairs; leaves with canaliculate petioles (3) 5-10 (15) mm. long; leaf blades oblong, lanceolate, oblong-elliptic, elliptic, oblanceolate or obovate-elliptic, 5-18 cm. long, 2-7.5 cm. wide, apex subabruptly acuminate or acuminate, base acute to obtuse or rounded, decurrent, subentire, serrulate or crenulate-dentate, chartaceous, glabrescent above except at base and along the midvein, pilosulous beneath, glabrescent, the costa elevated beneath, shallowly impressed above and often subbullate, the veins slender, obscure or rather conspicuous; inflorescences terminal, usually small, broadly paniculate, 1- or 2-branched, 3-7 cm. long, densely ferruginous-hirtellous; pedicels slender, 6-18 mm. long; flowers subcorymbose, 7.5-10.5 mm.

long at anthesis; sepals short connate at base, ovate, ovate-oblong or lanceolate-oblong, 2.3–2.8 mm. long, slightly keeled, hirtellous, long-ciliate, densely punctate; petals dextrorsely contorted, oblong-elliptic, up to 10 mm. long, connate about 2 mm. at base, glandular-puberulent above filaments at base, minutely ciliate, glabrous otherwise, densely punctate, lineate, obliquely emarginate at apex; stamens inserted below middle of corolla tube, 5–5.5 mm. long; filaments stout, about 1.5 mm. long, humped above, pubescent with short glandular hairs; anthers erect, linear, subsagittate, up to 4.5 mm. long, dorsifixed about 0.75 mm. above base, epunctate, apiculate; ovary ovoid, glabrous; style slender, 5–5.5 mm. long; ovules 10 or more, pluriseriate, immersed in placenta; fruits subglobose, drying up to 8 mm. in diameter.

With the reduction to varietal status of *A. Donnell-Smithii* Mez, the enigma of *A. nigrescens* Oerst. is resolved. The small-leaved shrubs of San Luis Potosi, Veracruz and Oaxaca have their counterpart in British Honduras (*W. A. Schipp* 287 from Middlesex). The plants with large mostly subentire or obovate leaves, usually rather obtuse or rounded at base and with venation rather conspicuous are typical of *A. Donnell-Smithii*, but these intergrade into the smaller leaved types.

With extremes of variability in the foliage of the species, it does not seem that the large-leaved *A. Donnell-Smithii* should be accorded specific rank, but varietal status can be justified. The entire *A. nigrescens* complex has flowers very much alike. The uniformity of the stamens is particularly remarkable. The pubescence of *A. nigrescens* and its variety consists of rather stiff dark red hairs and these are usually dense on the younger growth. The undersurface of the leaves is pilosulous.

The leaves vary considerably in size with the greatest reduction shown in *Sessé, Mociño, Castillo & Maldonado* 679 (F). The largest leaves are represented by the type collection of *A. Donnell-Smithii*. A collection from Quiché (*Harry Johnson* 228) has large leaves with crenate-dentate margin typical of the small-leaved plants of Mexico.

This shrub is very ornamental, its attractive flowers ranging from white or pink to lilac, and its bright red berries are shiny.

Ardisia nigropunctata Oerst. Vid. Medd. Kjoebenhavn 127. t. 2. 1861. *A. pulverulenta* Mez, Pflanzenreich IV. 236: 88. 1902 (type, *Friedrichstahl* 613). *A. chontalensis* Mez, Pflanzenreich IV. 236: 90. 1902 (type from Laguna de Chiriqui, Panama, *John Hart* 136). *Sirasil* (Izabal); *blossomberry*, *high ridge blossom berry*, *blossomberry grape*, *asib* (British Honduras).

Wet forest, 1,600 meters or lower, mostly at low elevations; Alta Verapaz; Izabal. British Honduras; Honduras; Nicaragua; Costa Rica; Panama.

Shrub, or small tree up to 8 meters high, the branchlets minutely and densely ferruginous-lepidote at first; leaves with short marginate petioles up to 1 cm. long; leaf blades oblong-elliptic, obovate-elliptic or oblanceolate, 15–30 cm. long, 5–12 cm. wide, rarely larger, usually acuminate, base acute and decurrent, thin, margin usually entire, sometimes denticulate, minutely and sparsely lepidote, dotted beneath with abundant black glands, the costa and primary lateral veins elevated beneath, often slightly impressed above; inflorescences terminal, many-flowered, open, large and pyramidal, often longer than the leaves, 2–4-pinnate, minutely lepidote or furfuraceous-lepidote; pedicels sparsely lepidote, 3–5 mm. long; flowers 5 mm. long, the calyx lepidote at base, otherwise glabrous, conspicuously black-punctate with elevated glands; sepals dextrorsely imbricate, broadly ovate, 1.6–2 mm. long, acutish, minutely erose-ciliate, sparsely lepidote at base, glabrous otherwise; petals dextrorsely imbricate, united about 1 mm. at the lepidote base, ovate-lanceolate, slightly asymmetrical, often erose; stamens shorter than petals, 3.75 mm. long; filaments slender, 1.5–1.75 mm. long; anthers dorsifixed one-fifth above base, lanceolate-oblong, 2.3–2.6 mm. long, with black line dorsally, apex apiculate or subulate, longitudinally dehiscent; ovary ovoid, glabrous; style slender, up to 4.5 mm. long; placenta ovoid, apiculate, the ovules pluriseriate, 14–17; fruit globose, 5–6 mm. in diameter.

Ardisia paschalis Donn.-Sm. Bot. Gaz. 19: 5, t. 1. 1894 (type from Cuyotenango, Suchitepéquez, *J. Donnell Smith* 2465). *Icacorea paschalis* (Donn.-Sm.) Standl. in Standl. & Cald. Lista Salvador 168. 1925. *A. dichropetala* Standl. Trop. Woods 37: 29. 1934 (type from La Libertad, Dept. Comayagua, Honduras, *J. P. Edwards* P-621). *A. Matudai* Lundell, Lloydia 4: 55. 1941 (type from La Palma, Tabasco, Mexico, *E. Matuda* 3295). *Xilil* (Petén); *Chilil*; *Capulin*; *sirasil de pava*; *morríto*.

Moist or wet forest, 2,500 meters or lower; Petén; Alta Verapaz, El Progreso; Izabal; Jutiapa; Santa Rosa; Escuintla; Guatemala; Sacatepéquez; Suchitepéquez; Quezaltenango. Mexico (Chiapas, Tabasco); British Honduras; Honduras; El Salvador.

A shrub or small tree, sometimes 9 meters high, the branchlets rather stout, glabrous; leaves with short, narrowly marginate petioles up to 1.5 cm. long; leaf blades obovate, oblanceolate, elliptic or oblong-elliptic, 7–25 cm. long, 4.5–10 cm. wide, obtuse, rounded, acute or broadly acuminate at apex, acute and decurrent at base, chartaceous to subcoriaceous, glabrous, drying pallid, densely punctate along the margin, entire, costa elevated beneath, nearly plane above, the veins very slender; inflorescences terminal, usually lax and open, up to 20 cm. long, 25 cm. wide, rarely congested, many-flowered, the racemes bipinnate-paniculate, corymbiform with the lower pedicels usually elongated; pedicels rather slender, straight or reflexed, mostly 1–1.5 cm. long, rarely only 0.5 cm. long, sometimes up to 2.5 cm. long at base of racemes; flowers 8–12 mm. long at anthesis; sepals sub-

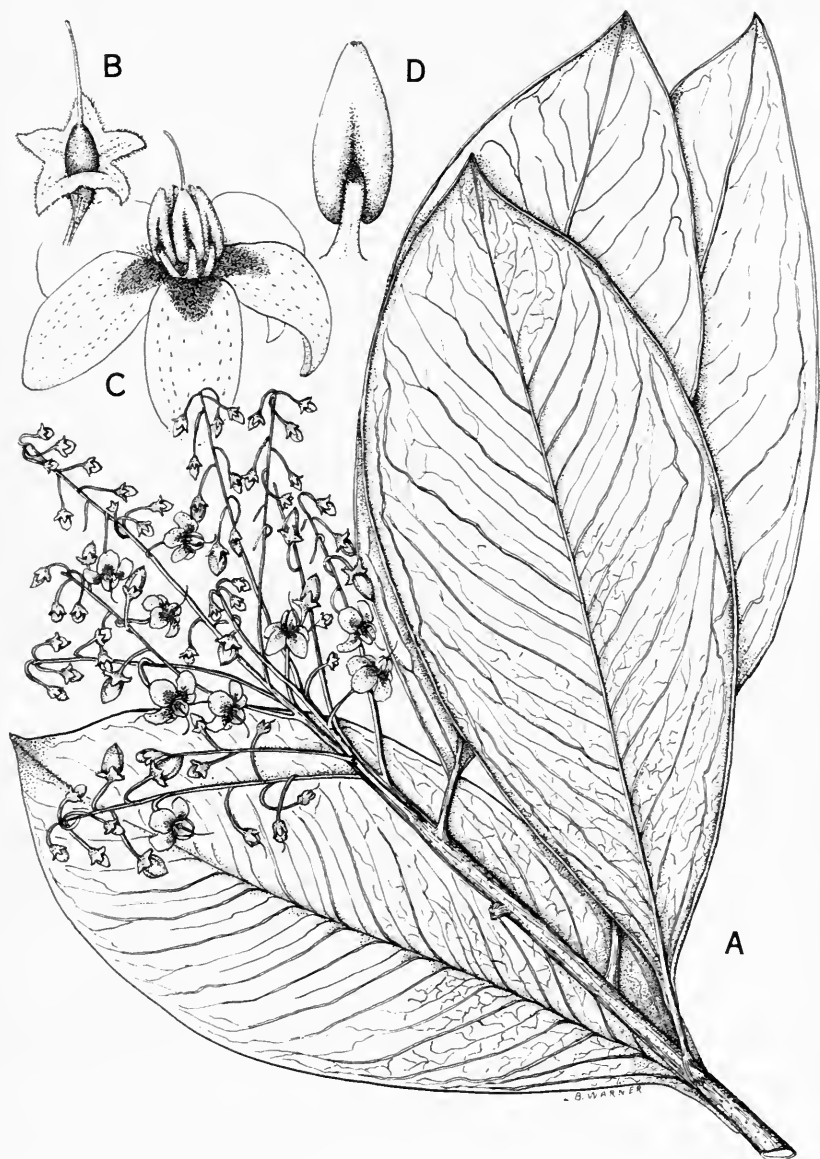


FIG. 38. *Ardisia paschalis*. A, Branch with inflorescence; $\times \frac{1}{2}$. B, Calyx opened out, and pistil; $\times 2\frac{1}{2}$. C, Open flower, showing star-shaped eye at base of corolla; $\times 2\frac{1}{2}$. D, Stamen, dorsal view; $\times 5$.

orbicular, broadly ovate or oblong-ovate, 2-3.5 mm. long, rounded at apex, ciliate, sparingly to densely punctate, rarely epunctate, glabrous; corolla white or yellowish with glandular, yellow or orange, star-shaped eye within, otherwise glabrous, the petals elliptic or oblong-elliptic, up to 1.1 cm. long, sparingly to conspicuously punctate, sometimes epunctate or nearly so, united at base into a short tube; stamens large, 5-7.5 mm. long, attached about 1 mm. above base of tube; filaments stout, usually short, sometimes up to 3 mm. long; anthers large, thick, narrowly triangular, 3-6 mm. long, dorsifixed near base, apiculate, the apex usually punctate with several small glands, dorsally sparingly punctate or epunctate, before anthesis cohering in cone, longitudinally dehiscent; ovary glabrous, style slender, 6-7.5 mm. long; ovules numerous, pluriseriate, immersed; fruit subglobose, 8-10 mm. in diameter when dry, usually purple-black at maturity.

A. Lindenii Mez and *A. Karwinskyana* Mez, described from Mexico, appear to be referable here, but I have not seen type material of either. Both are separated from *A. paschalis* largely on the degree of punctuation of the calyx and corolla. *A. dichropetala* Standl. and *A. Matudai* Lundell are in the same category.

There appears to be some correlation between punctuation and elevation, those plants growing at lower altitudes having less punctate or epunctate flowers. Other differences are of the same minor degree.

E. Matuda 16724 from Escuintla, Chiapas has fruits which are reported by the collector to be milky-white.

The flowers of this species are singularly large and showy for the genus, and they are reported to be very fragrant. They are used for decorating the altars of churches during Easter week. Both flowers and leaves are used for wreaths. The leaves dry pallid, a distinctive characteristic of the plant.

Ardisia pellucida Oerst. Vid. Medd. Kjoebenhavn 130, t. 2. 1861. *A. pectinata* Donn.-Sm. Bot. Gaz. 12: 132. 1887 (type from Pansamala, Alta Verapaz, *H. von Tuerckheim* 942). *A. myriodonta* Standl. Journ. Wash. Acad. Sci. 17: 13. 1927 (type from Barro Colorado Island, Panama, *P. C. Standley* 40848). *A. pellucida* Oerst. var. *pectinata* (Donn. Sm.) Lundell, *Wrightia* 3: 99. 1964. *Tapacajete* (Veracruz).

Wet forest, 1,650 meters or less, mostly at low elevations; Petén; Alta Verapaz; Izabal; Escuintla; Suchitepéquez; Huehuetenango. Mexico (San Luis Potosi; Veracruz, type from Pital, *F. M. Liebmann* 29.C); British Honduras; Honduras; Panama; Colombia.

Usually a simple shrub up to 2.5 meters, sometimes a tree of 7 meters, the branchlets thick, apically densely glandular-puberulent and usually villous, the glandular hairs reddish; leaves large with petioles 0.5-2.5 cm. long; leaf blades

oblanceolate or oblong-elliptic, mostly 20–40 cm. long, 6–12 cm. wide, sometimes larger, apex short-acuminate, base attenuate and decurrent, very thin, membranaceous, at first minutely puberulent beneath, especially along the veins and very sparsely lepidote, glabrous otherwise, minutely and densely punctulate, the margins closely and finely pectinate-dentate with short subulate teeth, the costa large and elevated beneath, the primary lateral veins slender but conspicuous; inflorescences terminal, very variable in size, 3.5–20 cm. long, paniculate, 2–3-pinnate, densely and minutely glandular-puberulent, and with interspersed villous hairs, mostly at base; flowers corymbose, rose-purple, about 5 mm. long, the pedicels; 4–11 mm. long, papillose; sepals almost free, dextrorsely imbricate, ovate or lanceolate, 2–3 mm. long, apex acute, acuminate or subulate, usually densely orange-red punctate, sometimes obscurely and sparsely punctate, papillose-puberulent, margin erose and ciliolate; petals dextrorsely contorted, united about 1.5 mm. at base, 5–6 mm. long, lanceolate, acuminate, minutely puberulent on outer surface, sparsely punctate or epunctate, minutely glandular-puberulent within at base, margin obscurely ciliolate; stamens 2–4 mm. long; filaments short, 0.3–0.75 mm. long; anthers erect, narrowly lanceolate-triangular, 2–3.75 mm. long, attenuate-acuminate, dorsifixed 0.1–0.2 mm. above base, not punctate; ovary ellipsoid, usually black-punctate; style 2–2.5 mm. long; placenta ovoid, ovules pluriseriate, 10 or more, immersed; fruits depressed-ovoid, about 6 mm. in diameter, purple-black when ripe.

The flowers are unusually variable in size, but uniform in their characteristics except for punctation. The typical *A. pellucida* plant has leaves, sepals and ovary densely black-punctate with small rounded elevated glands. *A. pellucida* var. *pectinata* is sparingly punctate, and in this feature quite distinctive. An intermediate form is represented by *W. A. Schipp* S-559 from British Honduras which has the sparingly punctate leaves of *A. pectinata* but the cuspidate densely punctate sepals of *A. pellucida*. *A. myriodonta* differs only in its marginally punctate leaves, having the sepals and ovary of *A. pellucida*.

Ardisia rarescens Standl., Field Mus. Bot. 4: 248. 1929. *Cerezo morado* (Quezaltenango).

Wet, mixed forest, 1,300–2,700 meters; San Marcos; Quezaltenango. Mexico (Chiapas, type from Cerro del Boqueron, *C. A. Purpus* 7032).

A shrub or small tree, up to 10 meters tall, the branchlets rather slender, very minutely glandular-puberulent, glabrescent, with leaves usually crowded at apex; leaves with narrowly marginate stout petioles 5–11 mm. long; leaf blades oblanceolate or oblanceolate-oblong, 7–15 cm. long, 2.5–5 cm. wide, apex short acuminate, the acumen obtuse, base subcuneate and decurrent, margin entire or subentire, subrevolute, subcoriaceous, slightly paler beneath, glabrous, punctate, costa elevated beneath, prominent, nearly plane and paler above, primary lateral veins very slender; inflorescences terminal, panicles broadly subpyramidal, up to 18 cm. long,

3-4-pinnate, laxly multiflowered, the branches spreading, slender, minutely glandular-puberulent, glabrescent with age; pedicels slender, 5-10 mm. long, finely glandular-puberulent; flowers subumbellate, 5-5.5 mm. long at anthesis; sepals free, dextrorsely imbricate, ovate-lanceolate, 2 mm. long, acutish, punctate, finely and sparsely glandular-puberulent, ciliate with gland-tipped hairs; petals dextrorsely contorted, elliptic, 5 mm. long, united 1 mm. at base, minutely glandular-puberulent at base on outer surface, otherwise glabrous, sparsely punctate, the glands mostly small and round, apex obtuse-rounded, laterally notched; stamens 3 mm. long; filaments 1-1.2 mm. long, rather stout, sparsely glandular-puberulent at base, glabrous above; anthers erect, oblong or ovate-oblong, 2-2.4 mm. long, subtruncate and apiculate at apex, dorsifixed about 0.6 mm. above base, not punctate, dehiscent apically; ovary ovoid, glabrous; style 4 mm. long; placenta ovoid, apiculate; ovules 12, pluriseriate, immersed, enclosed; fruits depressed-globose, about 7 mm. in diameter, dark purple.

The wide, paler, nearly plane midvein of the upper leaf surface is distinctive. In leaf form and pubescence of inflorescences, the species in fruit can be readily confused with *Gentlea micrantha* (Donn.-Sm.) Lundell.

Ardisia revoluta H.B.K. Nov. Gen. & Sp. 3: 246. 1818. *A. scoparia* Mez, Pflanzenreich IV. 236: 82. 1902. *A. scopulina* Brandegee, Zoe 5: 215. 1905 (type from vicinity of Culiacan, Sinaloa, Mexico, *T. S. Brandegee*). *Silacil*; *cerecilla*; *mora*; *morita*; *ciracil*.

Wet to rather dry forest or thickets, often along streams, sometimes in pine-oak forest, 250-1,700 meters; Baja Verapaz; Guatemala; Jalapa; Chimaltenango; Escuintla; Santa Rosa; Chiquimula. Mexico; Honduras; El Salvador to Panama and Colombia.

A shrub or small tree, sometimes 8 meters high, the branchlets stout, glabrous; leaf buds ciliate and minutely ferruginous-tomentose; leaves with marginate petioles, usually short, sometimes up to 1.2 cm. long; leaf blades oblanceolate, obovate-oblong, elliptic or obovate-elliptic, mostly 9-19 cm. long, 3.5-8 cm. wide, obtuse or often rounded at apex, attenuate to the decurrent base, glabrous, subcoriaceous or chartaceous, entire, drying pallid, the costa prominent beneath, the veins slender and obscure; inflorescences terminal, punctate, minutely ferruginous-tomentulose in bud, sparsely puberulent at anthesis, glabrescent, the racemes in sessile or subsessile panicles, the panicles usually less than 15 cm. long; pedicels usually 4-6 mm. long, sometimes shorter, sometimes up to 1 cm. long; flowers white, 6-9 mm. long at anthesis; sepals ovate-oblong or elliptic, 1.5-2.8 mm. long, rounded at apex, ciliate, the margin scarious, black-punctate medially with lineate or oblong glands, papillose within at base, otherwise glabrous; petals dextrorsely imbricate, oblong or oblong-elliptic, up to 8 mm. long, rounded and laterally notched at apex, united at base into tube about 2 mm. long, glandular-papillose within at base, the petals otherwise glabrous, black-punctate with conspicuous lineate glands; stamens 4-6.5 mm. long, attached near base of tube; filaments glabrous, slender, sometimes up to 4.8 mm. long; anthers dorsifixed 0.5-0.8 mm. above base, narrowly triangular, 2-3.2 mm. long, apiculate, epunctate; ovary glabrous; style slender, 5-6 mm.

long; ovules numerous, pluriseriate, immersed; fruit coarsely punctate, subglobose, 4-5 mm. in diameter when dry, turning purple-black at maturity.

I have not seen the type of *A. revoluta*, and this species is presumed to be the common one of Mexico and Central America. The photograph of the type in the Willdenow Herbarium, F. M. Neg. 4881, is my basis for this conclusion.

A. scoparia Mez, known to me from a fragment of the type (F) and the type photograph (F. M. Neg. 31992), does not appear to differ from *A. revoluta*. Mez lists *A. revoluta* in his key (l.c., p. 60) under the species with petals glabrous within, and separates *A. scoparia* by the presence of lepidote-papillose indument at base within. The common species of Mexico and Central America has petals lepidote-papillose within.

Described from Mexico, where it is found from Durango and Sinaloa south to Oaxaca, it is curiously unknown from eastern Mexico, Chiapas and the Yucatan Peninsula. It is abundantly represented from all countries of Central America.

***Ardisia Schippii* Standl., Field Mus. Bot. 12: 412. 1936.**

Wet forest, at low altitudes; Petén. British Honduras (type, *W. A. Schipp* 1365).

Small tree, up to 11 meters high, 25 cm. in diameter; branchlets minutely glandular-puberulent; leaves with marginate petioles 1.5-2.5 cm. long; leaf blades elliptic or oblong-elliptic, 12.5-20 cm. long, 5.5-9.5 cm. wide, apex acutish or obtuse-rounded and apiculate, acute or subobtuse at base and decurrent, chartaceous, entire below and at apex, elsewhere finely denticulate or serrulate-denticulate, at first minutely puberulent along costa beneath, glabrous otherwise, costa prominent and elevated beneath, nearly plane above, primary lateral veins slender; inflorescences paniculate, the panicles 2-4-pinnate, large and broad, sometimes longer than leaves, open, minutely glandular-puberulent; flowers numerous, 6-7 mm. long, corymbose or in racemiform corymbs past anthesis; pedicels 3-7 mm. long; sepals dextrorsely imbricate, oblong-ovate, 2-2.2 mm. long, scarious-marginate, short ciliate with gland-tipped hairs, coarsely black-punctate; petals dextrorsely imbricate, united about 1 mm. at base, oblong-lanceolate, 5.5-6 mm. long, black-punctate medially, glandular pubescent within at base, otherwise glabrous; stamens 3.75 mm. long; filaments slender, about 2 mm. long, densely glandular-pubescent; anthers dorsifixed one-third above base, narrowly lanceolate, 2.7 mm. long, attenuate apically and conspicuously caudate, with several small pellucid glands dorsally above point of attachment, longitudinally dehiscent; ovary globose, glabrous; style slender, 5 mm. long; placenta subglobose; ovules pluriseriate, numerous.

***Ardisia sexpartita* Lundell, Wrightia 3: 29. 1962.** *Huesa de montaña* (Quezaltenango); *palo cruz* (San Marcos).

Forested slopes, mostly of volcanoes, 3,000 meters or lower, mostly at middle elevations; Quezaltenango (type from San Juan Patzulín, Volcán Santa María, *J. A. Steyermark* 33608); San Marcos; Suchi-tepéquez; Huehuetenango. Mexico (Chiapas).

A tree, sometimes 16 meters high, the branches thick, glabrous; leaves with stout marginate petioles 0.5–2 cm. long; leaf blades oblanceolate or oblanceolate-elliptic, 13–38 cm. long, 4.5–11 cm. wide, base attenuate, decurrent, apex broadly acuminate, glabrous, coriaceous or subcoriaceous, obscurely crenulate or subentire, costa stout and elevated beneath, the veins slender; inflorescences terminal, glabrous, broadly paniculate, 2–3-pinnate, sometimes up to 17 cm. long, usually small, the primary axis and branches stout; pedicels stout, variable in length, up to 22 mm. long, the lower longest; flowers 5- or 6-parted, 8–12 mm. long at anthesis, subcorymbose or in racemiform corymbs; sepals quincuncial or imbricate, coriaceous, with scarious ciliolate or ciliate margin, ovate-orbicular, 4–5 mm. long, rounded at apex, conspicuously black-punctate with lines and dots, minutely glandular-lepidote within at base, otherwise glabrous; corolla 9–12 mm. long, black-punctate, the medial lines slender, the petals oblong-elliptic, obtuse-rounded at apex, united at base into cylindrical tube 3.5–5 mm. high, the tube glandular-papillose within above middle; stamens attached about middle of tube, 7.5–8 mm. long; filaments slender above, expanded and united at base, 3–4 mm. long, pubescent with gland-tipped hairs; anthers thick, narrowly-triangular, dorsifixed about 1 mm. above base, 3–5 mm. long, acute or apiculate, epunctate; ovary glabrous; style slender, 7.5–9 mm. long; ovules numerous, pluriseriate; fruits globose, about 8 mm. in diameter.

Although closely resembling *A. verapazensis*, the species may be readily separated by its smaller, ciliolate or ciliate, suborbicular sepals which do not have plate-like glands on the outer surface.

***Ardisia Tuerckheimii* Donn.-Sm. Bot. Gaz. 13: 74. 1888.**

Wet, mountain forest, 800–1,500 meters; Alta Verapaz (type from Pansamalá, *H. von Tuerckheim* 1035); Baja Verapaz.

A shrub up to 3 m. high, the branchlets very slender, glabrous or sometimes very minutely and sparsely puberulent; leaves with slender narrowly marginate petioles 4–8 mm. long; leaf blades lanceolate-elliptic or lanceolate-oblong, 5–11.5 cm. long, 1.6–4 cm. wide, apex subabruptly caudate-acuminate, acute or obtusish at base, chartaceous, glabrous, entire or obscurely crenulate, slightly paler beneath, the midvein elevated beneath, narrowly sulcate above, the veins very slender, black-punctate; inflorescences terminal, lax, slender with few branches, usually glabrous; pedicels very long and slender, up to 2 cm. long; flowers white, subcorymbose-umbellate, 7–9 mm. long at anthesis; sepals free, quincuncial, oblong-lanceolate or ovate, 2–3 mm. long, rounded or acutish, ciliolate, densely punctate; petals up to 8 mm. long, connate about 2 mm. at base, oblong-elliptic, sparsely glandular-puberulent within around base of filaments, glabrous otherwise, conspicuously punctate; stamens 6–6.5 mm. long; filaments stout, glandular-puberulent, 2–2.5 mm. long, inserted about middle of corolla tube; anthers linear, dorsifixed about

0.5 mm. above base, about 4 mm. long, apiculate; ovary ellipsoid, glabrous, style slender, up to 5.5 mm. long; placenta ellipsoid; ovules 10 or more, pluriseriate, immersed.

***Ardisia verapazensis* Donn.-Sm. Bot. Gaz. 46: 113. 1908.**

In high forest, 1,000–1,600 meters; Alta Verapaz (type from Coban, *H. von Tuerckheim* II. 2093).

A tree, sometimes 15 meters high, glabrous, the branches thick and stout, often densely leafy at the tips; leaves with stout broadly marginate petioles about 1 cm.

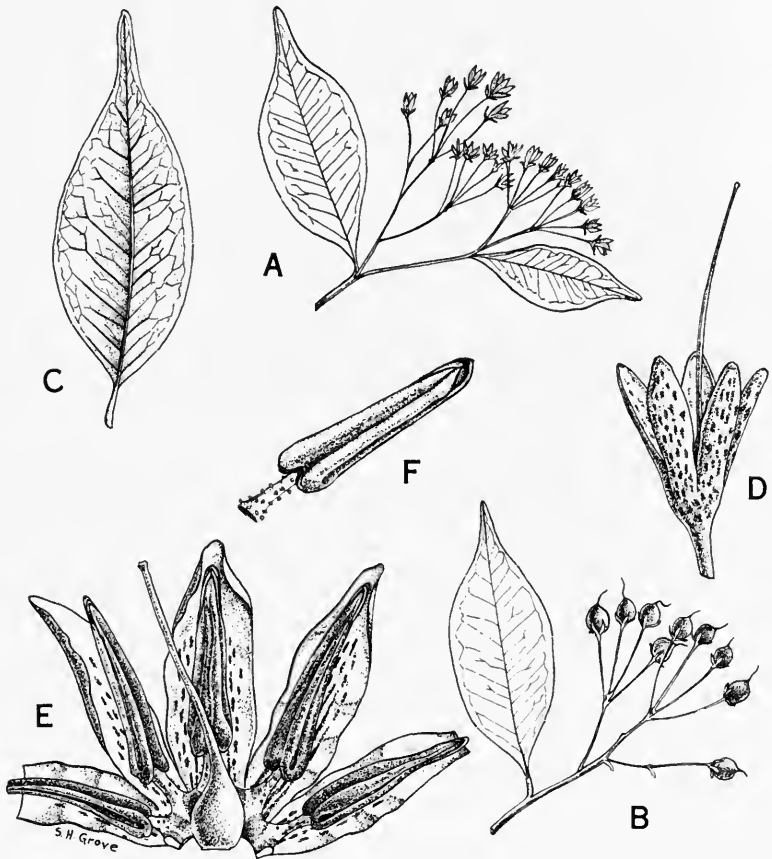


FIG. 39. *Ardisia Tuerckheimii*. A, Flowering branchlet; $\times \frac{1}{2}$. B, Branchlet with fruits; $\times \frac{1}{2}$. C, Undersurface of leaf; $\times \frac{1}{2}$. D, Calyx; $\times 5$. E, Flower, dissected; $\times 5$. F, Stamen; $\times 5$. Flowers illustrated from isotype, *Tuerckheim* 1035 (F).

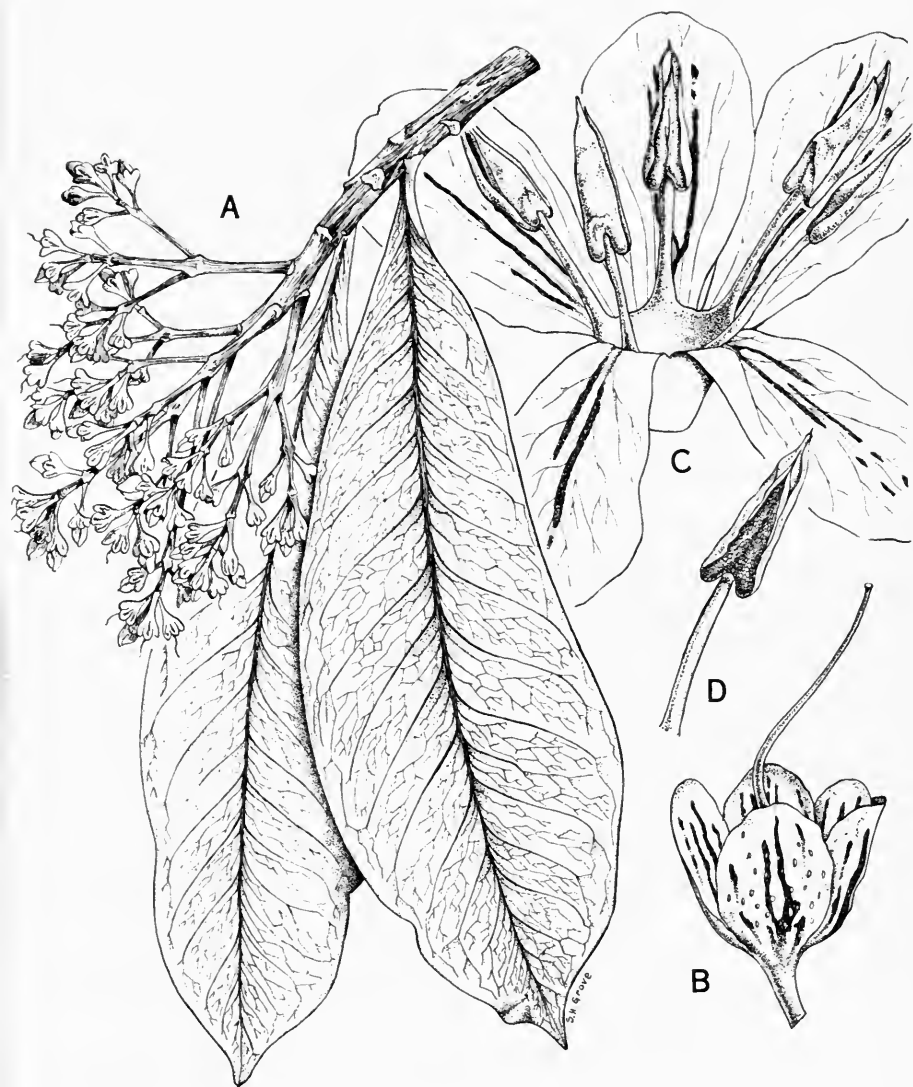


FIG. 40. *Ardisia verapazensis*. A, Flowering branchlet; $\times \frac{1}{2}$. B, Calyx and style; $\times 5$. C, Flower, showing petals and stamens; $\times 5$. D, Stamen; $\times 5$. Illustrated from type, *Tuerckheim* II 2093 (US).

long; leaf blades oblanceolate-oblong or oblanceolate, mostly 18–25 cm. long, 6.5–9 cm. wide, short-acuminate to subobtusate, attenuate to the decurrent base, chartaceous to subcoriaceous, entire, glabrous, the costa stout and elevated beneath, nearly plane above, the veins slender, obscurely reticulate on both surfaces; inflorescences terminal, glabrous, large and many-flowered but shorter than the leaves, up to 15 cm. long, 25 cm. wide, paniculate, 2-pinnate, the primary axis and branches stout; pedicels stout and thick, 0.7–3 cm. long; flowers corymbose or in corymbiform racemes with lower pedicels elongated, the flowers 5-merous, about 1.1 cm. long at anthesis; calyx coriaceous, the sepals nearly free, quincuncial, ovate-elliptic or ovate-oblong, 5–6 mm. long, rounded at apex, the margin entire, scariosus, medially black-punctate in two lines, the dots scattered and few, dorsally with conspicuous small round plate-like glands, glandular-lepidote within at base; corolla pink, firm, the petals connate into tube 4–5 mm. high, the tube constricted medially where stamens attached, the apical half of tube densely and minutely glandular-lepidote within, the lobes broadly ovate-elliptic, usually cucullate, rounded apically, glabrous, medially linear-punctate in two lines, with few other black glands; stamens 7–8 mm. long; filaments slender above, wider below, 4–5 mm. long, sparingly glandular-pubescent below with short gland-tipped hairs; anthers dorsifixed about 1 mm. above base, narrowly triangular, about 4 mm. long, epunctate, apiculate; ovary ovoid, glabrous; style rather slender, 8.5–9 mm. long; ovules numerous, pluriseriate, immersed.

GENTLEA Lundell

Reference: Lundell, *Wrightia* 3: 100–108. 1964.

Shrubs or trees with alternate leaves, petiolate; inflorescences terminal, paniculate, broader than long, short pedunculate or sessile; bracts and bractlets thin, caducous; flowers corymbose, perfect, usually 5-merous, sometimes 4- or 6-merous, greenish or white; sepals inconspicuously imbricate, united at base or nearly free; petals connate one-fourth to one-half into tube, the lobes imbricate in bud, spreading and sometimes appearing valvate at anthesis; stamens exerted, exceeding the petals; filaments long and slender; anthers very small, cordate, dorsifixed, epunctate or inconspicuously glandular-punctate; ovary ovoid or subglobose; style slender, sometimes subequaling corolla; stigma punctiform, minute; placenta few to multiovulate, the ovules in two or more series; fruits subglobose.

There are six species, ranging from Mexico (Jalisco) south to Venezuela and Peru. All except *Gentlea venosissima* (Ruiz & Pavon) Lundell, the type species, are of local distribution.

Branchlets furfuraceous; leaves small, mostly obovate, 2–4 cm. long, coarsely crenate-dentate above the middle or subentire. *G. Vatteri*.

Branchlets glabrous, ferruginous-puberulent at first, or minutely and densely rufous-tomentose.

Sepals incrassate, concave, scarcely 1 mm. long; branchlets minutely rufous-tomentose. *G. venosissima*.

Sepals thin, 1.5–3 mm. long; branchlets glabrous or ferruginous-puberulent at first.

- Inflorescences glabrous; corolla glabrous on outer surface. . . . *G. tacanensis*.
 Inflorescences glandular-puberulent; corolla glandular-lepidote on outer surface. . . . *G. micrantha*.

Gentlea micrantha (Donn.-Sm.) Lundell, *Wrightia* 3: 107. 1964.
Ardisia micrantha Donn.-Sm. Bot. Gaz. 14: 27. 1889, not H.B.K., 1818. *Parathesis micranthera* Donn.-Sm. Bot. Gaz. 18: 205. 1893, not *Ardisia micranthera* Pitard, 1930. *Ardisia staminosa* Lundell, *Wrightia* 3: 78. 1964.

Wet, mountain forest, 3,000 meters or less; Alta Verapaz (type from Coban, *H. von Tuerckheim* 1365); Quiché; Huehuetenango; El Progreso; Zacapa. Honduras.

A shrub or tree of 6-9 meters, the branchlets stout, minutely ferruginous-puberulent when young, sometimes apparently glabrous; leaves with conspicuously marginate petioles usually less than 1 cm. long; leaf blades oblanceolate, oblanceolate-elliptic or oblong-elliptic, 7.5-23 cm. long, 2.5-6.5 cm. wide, acuminate or subabruptly acuminate, base acutish and decurrent, entire or subentire, subcoriaceous, glabrous, the midvein elevated and conspicuous beneath, impressed above, the veins slender and obscure; inflorescences terminal, broadly paniculate, 1-3-pinnate, 3-8 cm. long, glandular-puberulent, glabrescent; pedicels 3-12 mm. long; flowers greenish-white, corymbose, up to 9 mm. long including exerted stamens; sepals almost free, lanceolate-elliptic or ovate, 2-3 mm. long, thin, sparsely orange-red punctate, ciliolate, glabrous otherwise; petals lanceolate-oblong or oblong-elliptic, 5-6 mm. long, united 1.5-2 mm. at base, glandular-lepidote or nearly glabrous on outer surface, minutely glandular-puberulent within at base, epunctate or with occasional small glands; stamens inserted near base of tube, 6.5-8.5 mm. long; filaments slender, glabrous, up to 8 mm. long; anthers cordate or ovate, 0.6-1 mm. long, punctate dorsally with several minute glands, versatile; ovary ovoid, sometimes sparingly glandular-puberulent; style 3-5 mm. long; placenta globose, apiculate; ovules numerous, pluriseriate, immersed; fruits subglobose, up to 8 mm. in diameter when ripe, coarsely punctate.

Gentlea tacanensis (Lundell) Lundell, *Wrightia* 3: 105. 1964.
Ardisia tacanensis Lundell, *Contr. Univ. Mich. Herb.* 4: 21. 1940.

Wet mixed forest, 1,300-3,000 meters; San Marcos (Volcán Tacaná and Volcán Tajumulco). Mexico (Chiapas, type from Volcán Tacaná, *E. Matuda* S-226).

A shrub, 1.5-4.5 meters high, the branchlets rather slender, glabrous; leaves small, on short marginate petioles up to 7 mm. long; leaf blades narrowly oblanceolate or oblong-oblanceolate, 6-13 cm. long, 1.5-3.5 cm. wide, apex long-acuminate, attenuate to the decurrent base, inconspicuously crenate-serrate, chartaceous, glabrous, the midvein elevated beneath, slightly impressed above, the primary lateral veins slender and inconspicuous on both surfaces; inflorescences terminal, paniculate, 1-branched, 5 cm. long or less, rather congested, few-many-flowered, sessile or nearly so, glabrous; pedicels slender, 4-8 mm. long; flowers corymbose, up to 7 mm. long including exerted stamens; sepals 5, nearly free, dextrorsely im-

bricate, glabrous, broadly ovate, up to 2 mm. long, minutely erose, glandular-ciliolate at first, punctate with small round orange glands; corolla greenish-white, glabrous on outer surface, the petals united almost to middle, the tube up to 2 mm. long, glandular-puberulent within, the corolla lobes dextrorsely imbricate, broadly ovate, up to 2.5 mm. long, rounded at apex, sparsely and minutely punctate; stamens 5, free, opposite the petals and borne at base of tube, up to 6.5 mm. long; filaments glabrous, 4.5–6 mm. long, rather stout; anthers exserted, versatile, ovate and shallowly cordate, 0.8–1.3 mm. long, apiculate; ovary ovoid, glabrous; style 4–5 mm. long; placenta ovoid; ovules pluriseriate, numerous, immersed; fruits globose, black at maturity, drying 4 mm. in diameter.

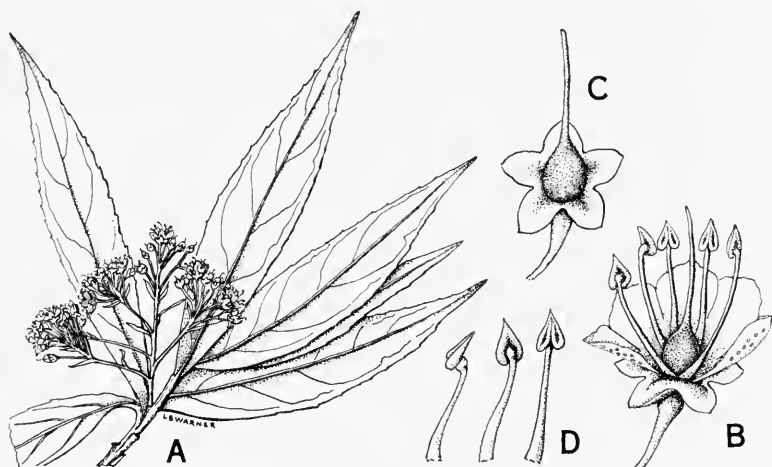


FIG. 41. *Gentlea tacanensis*. A, Branchlet with inflorescence; $\times \frac{1}{2}$. B, Flower, opened out; $\times 5$. C, Calyx and pistil; $\times 5$. D, Stamens; $\times 5$. Illustrated from isotype, *Matuda S-226* (F).

Gentlea Vatteri (Standl. & Steyerl.) Lundell, *Wrightia* 3: 102. 1964. *Ardisia Vatteri* Standl. & Steyerl. *Field Mus. Bot.* 23: 220. 1947.

Wet, mountain forest, 1,500–3,000 meters; El Progreso; Zacapa; Chiquimula; Huehuetenango (type from Cerro Huitz, Sierra de los Cuchumatanes, between Mimanhuitz and Yulhuitz, *J. A. Steyerl.* 48558). El Salvador.

A shrub of 1–3 meters, densely branched, the branchlets densely brown-furfuraceous, glabrate in age, densely leafy; leaves very small, the marginate petioles 3–5 mm. long; leaf blades oblanceolate, obovate-elliptic or elliptic, 2–4 cm. long, 0.8–1.8 cm. wide, apex obtuse or acute, base cuneate, coarsely crenate-dentate above the middle or sometimes subentire, glabrous above, sparsely and minutely brownish-lepidote beneath or almost glabrous, the costa slender and prominent beneath, subimpressed above, the lateral nerves inconspicuous beneath, obscure

above; inflorescences terminal, small, few-flowered, corymbiform, simply branched, scarcely more than 2.5 cm. long, leafy-bracted at the base, the upper bracts oblong, obtuse, 4 mm. long or shorter; pedicels slender, erect, 3-9 mm. long, glandular-puberulent; flowers about 6 mm. long, including exerted stamens; sepals 5, almost free, oblong-lanceolate, 1.8 mm. long, acutish or obtuse, punctate, glandular-ciliate; corolla greenish-white, 3.2-4 mm. long, the petals united one-third at base, minutely glandular-puberulent within the tube, the 5 lobes dextrorsely imbricate, oblong-lanceolate, obtuse at apex, obscurely punctate and minutely papillose, the margin glandular-ciliate; stamens 5, free, up to 6 mm. long, borne about middle of corolla tube; filaments slender, glabrous, 4-5.5 mm. long; anthers minute, ovate-cordate, about 1 mm. long, black-punctate dorsally with several minute glands; ovary ovoid, glabrous; style slender, 4.5-5.5 mm. long; placenta small, ovoid, apiculate; ovules 7, large, pluriseriate, immersed; fruit globose, drying 4 mm. in diameter.

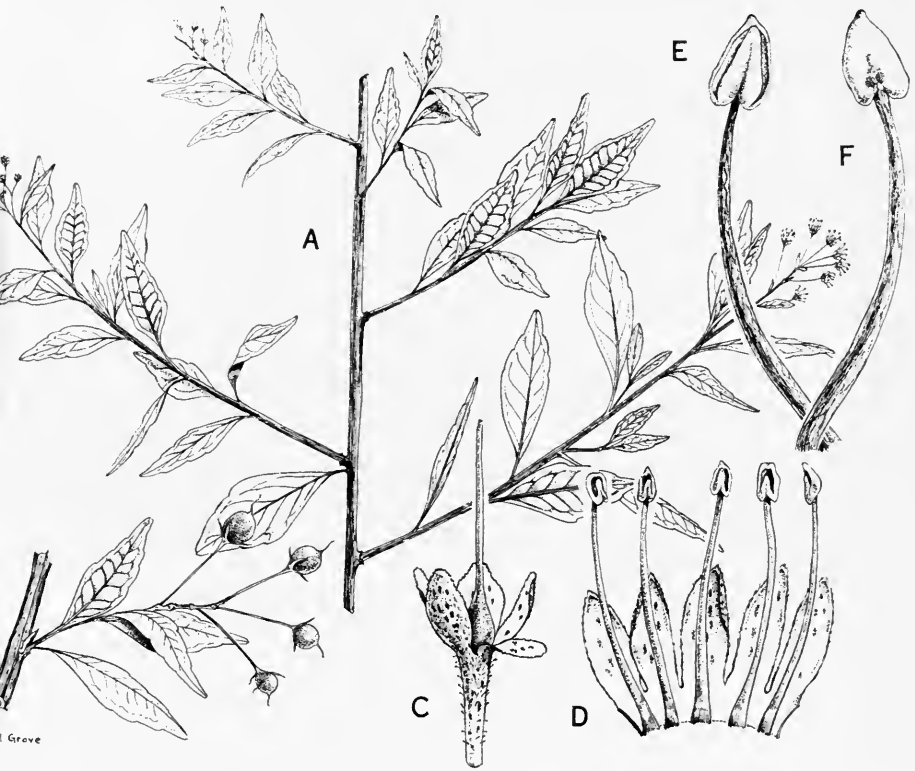


FIG. 42. *Gentlea Vatteri*. A, Portion of stem and flowering branchlets; $\times 1$. B, Branchlet with fruits; $\times 1$. C, Calyx, opened out, and pistil; $\times 5$. D, Corolla, dissected; $\times 5$. E, Stamen, showing anther dehiscent by introrse slits; $\times 10$. F, Stamen, showing dorsal side of anther; $\times 10$. Flowers illustrated from type, *Steyermark* 48558 (F).

Gentlea venosissima (Ruiz & Pavon) Lundell, *Wrightia* 3: 103. 1964. *Caballeria venosissima* Ruiz & Pavon, *Syst.* 281. 1798. *Myrsine venosissima* (Ruiz & Pavon) Spreng. *Syst.* 1: 664. 1825. *Ardisia breviflora* A.DC. *Prodr.* 8: 122. 1844. *Ardisia Robinsonii* Mez, *Pflanzenreich* IV. 236: 77. 1902. *Ardisia meiantha* Donn.-Sm. *Bot. Gaz.* 44: 115. 1907. *Stylogyne phaenostemona* Donn.-Sm. *Bot. Gaz.* 46: 113. 1908. *Ardisia venosissima* (Ruiz & Pavon) Macbride, *Field Mus. Bot.* 13: pt. 5, 186. 1959. *Ardisia phaenostemona* (Donn.-Sm.) Lundell, *Wrightia* 3: 78. 1964.

Wet, mountain forest, 1,350 meters or more; Alta Verapaz (type of *Stylogyne phaenostemona* Donn.-Sm. from Coban, *H. von Tuerckheim* II. 1814); Quiché. Costa Rica; Venezuela; Peru.

A tree, the young branchlets slender, very minutely rufous-tomentose at first; leaves with marginate petioles 3-6 mm. long, at first minutely ferruginous-tomentose beneath; leaf blades lanceolate or lanceolate-elliptic, 7.5-10 cm. long, 2.5-4.5 cm. wide, apex obtusely acuminate, base acutish and decurrent, the margin entire, coriaceous, glabrous, the midvein elevated beneath, plane above, the primary veins very slender, obscurely areolate on both surfaces; inflorescences terminal, paniculate, 2- or 3-pinnate, sessile or nearly so, 4-6.5 cm. long, minutely ferruginous-tomentose, many-flowered, compact; pedicels slender, 2-5 mm. long; flowers small, subcorymbose, about 4 mm. long including exerted stamens; sepals united about one-third at base, quincuncial, broadly ovate, about 1 mm. long, with scarious minutely erose-ciliolate margin, densely punctate with small orange-red glands; corolla 2 mm. long, the petals united to the middle, ovate-oval, rounded at the apex, ciliolate, punctate with small orange-red glands; stamens inserted at the middle of corolla tube, about 3 mm. long, exerted; filaments slender, glabrous, up to 2.75 mm. long; anthers minute, ovate-cordate, about 0.6 mm. long, apiculate, versatile, not punctate dorsally; ovary ovoid, glabrous; style slender, 2-2.4 mm. long; placenta oval, apiculate; ovules 6-8, pluriseriate, immersed.

PARATHESIS Hooker f.

Trees or shrubs, young branchlets commonly ferruginous-tomentose with stellate or dendroid hairs, sometimes tawny, often glabrescent; leaves petiolate, usually pubescent on lower surface, the hairs stellate or dendroid, often appressed and bizonal, the margins entire, crenulate or dentate; inflorescences paniculate, axillary or terminal; flowers perfect, usually 5-parted, sometimes 4-parted, rarely 6-parted, mostly pink or white, umbellate, corymbose or subcorymbose-racemose; sepals small, open in bud, connate at base, commonly tomentulose and papillose; corolla rotate, usually tomentulose outside, papillose-tomentose inside at least apically and along edges, the petals united at base, valvate, narrow, acutish; stamens usually 5, sometimes 4 or 6, inserted near the base of corolla tube, the filaments well developed, slender to stout; anthers subsagittate, ovate-lanceolate or oblongish and slender, acute or mucronate or obtuse at the apex, dehiscent by introrse slits or apical introrse pores, dorsifixed above the base, erect or versatile; ovary ovoid or

subglobose, the style long and slender, the stigma punctiform; ovules few to numerous, usually 1-seriate, sometimes partially 2-seriate, or rarely pluriseriate, enclosed or exposed apically; fruit 1-seeded, the endocarp crustaceous; embryo cylindric, transverse.

About 70 species, in tropical America, chiefly in mountainous regions of Central America with Guatemala the center of greatest diversity. *Parathesis serrulata* (Swartz) Mez is the type of the genus.

Inflorescences usually axillary, sometimes terminal in *P. subcoriacea*; leaf bud present at apex of the branches bearing strictly axillary inflorescences; anthers dorsifixed, strictly erect, usually orange- or black-punctate dorsally, often with minute glands, sometimes epunctate and concolorous.

Pubescence of branchlets and undersurface of leaves usually coarse, hairs either stellate with erect and spreading rays or dendroid, then either stipitate and bearing apical or lateral branches, or the trunk of hairs branched to base.

Margin of leaves dentate with sharp regular teeth; hairs of branchlets and undersurface of leaves simple or long stipitate and bifid or stellate apically.....*P. vestita*.

Margin of leaves entire to crenulate.

Hairs of branchlets and undersurface of leaves stellate with erect and spreading rays, usually short stipitate.....*P. pleurobotryosa*.

Hairs of branchlets and undersurface of leaves dendroid, the trunk of hairs with lateral branches usually to base.

Leaves loosely floccose-tomentose beneath; petals up to 5 mm. long; filaments 1.5-2 mm. long.....*P. reflexa*.

Leaves densely tomentose beneath, not with loose floccose hairs; petals up to 7 mm. long; filaments 2.5-4 mm. long.....*P. calophylla*.

Pubescence of branchlets and undersurface of leaves consisting of fine sessile stellate hairs with appressed rays (the hairs sometimes dendroid but small in *P. leptopa*).

Anthers usually large, broad and thick, ovate-lanceolate (sometimes abnormal and small in *P. leptopa*).

Anthers with dorsal area conspicuously black-punctate, usually with large glands; filaments stout, much shorter than anthers.

Leaves linear-lanceolate, up to 30 cm. long, 5 cm. wide, apex attenuate-acuminate.....*P. stenophylla*.

Leaves oblanceolate, oblanceolate-elliptic or oblong, up to 19 cm. long, 6.5 cm. wide, subabruptly acuminate.....*P. vulgata*.

Anthers with dorsal area orange-punctate, or punctate with a few small blackish glands; filaments sometimes subequaling anthers; leaves not long linear-lanceolate.

Flowers pale orange-punctate; ovary glabrous except for sparse hairs apically and at base of style.....*P. aurantiaca*.

Flowers red-punctate, the glands drying red-black; ovary finely tomentose almost to base, base of style short villous with branched hairs.
P. leptopa.

Anthers slender, usually lanceolate and small, sometimes less than 1.5 mm. long, epunctate and concolorous dorsally, or orange-punctate, or with scattered minute reddish or black glands; filaments slender, often subequaling anthers, sometimes longer than anthers.

Branchlets conspicuously scaly, the epidermis peeling transversely and irregularly.....*P. tartarea*.

Branchlets not scaly.

Ovary and basal half of style tomentose, the hairs dense and thickly matted (see *P. leptota*, also).

Panicles branched to base, the branches very slender; pedicels filiform, 5-9 mm. long; leaves less than 10 cm. long, 5 cm. wide.

P. tomentosa.

Panicles pedunculate, the branches sharply angled, thick, the terminal ones often reduced; pedicels stout, 3-6 mm. long; leaves large, up to 25 cm. long, 9 cm. wide.

Flowers 3-4 mm. long at anthesis; sepals 0.5-0.75 mm. long; petals densely papillose-tomentose over entire inner surface; anthers up to 1.75 mm. long, concolorous or with one to several small black glands dorsally; leaves oblong-lanceolate or oblanceolate, the acumen acute. *P. Skutchii.*

Flowers 5 mm. long at anthesis; sepals 1-1.5 mm. long; petals with glabrous area above base on inner surface, papillose at base; anthers up to 2.5 mm. long, conspicuously punctate dorsally and in lobes with small red-black glands; leaves obovate-elliptic, the acumen obtuse. *P. latifolia.*

Ovary glabrous, puberulent or tomentulose apically and at base of style, or finely tomentulose over the entire surface, the hairs never dense and thickly matted.

Leaves subcoriaceous, drying pallid; inflorescences stout, congested, with short terminal branches; pedicels of flowers up to 3 mm. long; ovary glabrous. *P. subcoriacea.*

Leaves thin, not drying pallid; inflorescences slender, with elongated branches; pedicels mostly 5-17 mm. long, sometimes only 3 mm. long.

Inflorescences simple or 1-branched, small, slender, 3-6 cm. long; apex of leaf caudate-acuminate; ovary tomentulose. . . *P. subulata.*

Inflorescences usually branched two or more times, sometimes 1-branched, mostly over 10 cm. long, usually much larger; apex of leaf obtuse or obtusely acuminate; ovary glabrous.

P. macronema.

Inflorescences usually terminal, sometimes axillary in *P. cubana* and *P. subcoriacea*; leaf bud absent at apex of the branches when inflorescences strictly terminal; anthers dorsifixed, versatile or erect, black-punctate dorsally.

Anthers versatile, dorsifixed, attached medially; filaments longer than anthers.

Flowers 4- or 5-parted; anthers with several minute black glands dorsally; inflorescences strictly papillose; ovary sparsely papillose at apex.

P. papillosa.

Flowers 5- rarely 6-parted; anthers conspicuously black-punctate dorsally; inflorescences minutely rufous-tomentose and papillose; ovary tomentose, the hairs erect. *P. chrysophylla.*

Anthers erect, dorsifixed, never versatile; filaments shorter than anthers, commonly one-half as long.

Pubescence of young branchlets and undersurface of leaves coarse and of distinct reddish hairs, the hairs dendroid and sessile or stipitate, or the hairs stellate with erect and spreading rays, the stellate hairs either sessile, subsessile or stipitate; pubescence beneath leaves uniform or sometimes obscurely bizonal.

Sepals and pedicels papillose-puberulent; the tomentum of branchlets appearing to be waxy; anthers slender, linear-oblong, often adnate and forming a column. *P. columnaris.*

Sepals and pedicels short hirsute with stellate or branched hairs, these often stiff and bristly; the tomentum of branchlets not appearing waxy; anthers ovate or lanceolate.

Flowers 5-7 mm. long; sepals usually large, commonly 2-3 mm. long, rarely smaller, stamens 3-4 mm. long.

Branchlets conspicuously villous, dendroid hairs long-stipitate, shaggy; hairs of costa on lower leaf surface long-stipitate, coarse and dendroid. *P. sessilifolia*.

Branchlets not villous, dendroid hairs short-stipitate or sessile and branched to base; hairs of costa and lower surface of leaf stellate, stipitate, subsessile or sessile, sometimes appressed.

Pedicels 4-12 mm. long, sometimes up to 17 mm. long in fruit, often reflexed; hairs of lower leaf surface stipitate. *P. chiapensis*.

Pedicels 3-5 mm. long; hairs of lower leaf surface sessile. *P. rufa*.

Flowers less than 5 mm. long; sepals small, 1-1.5 mm. long; stamens 2-2.75 mm. long. *P. belizensis*.

Pubescence of young branchlets and undersurface of leaves fine, mostly stellate and usually closely appressed, sometimes subappressed and rather loose, the lower surface often glabrescent; pubescence beneath leaves usually bizonal, areolate.

Ovary tomentose, at least apically, ridged, the pubescence persistent.

Young branchlets tawny, minutely appressed-pubescent with fine stellate tawny hairs, glabrescent early; anthers 1.5-2.5 mm. long.

. *P. Donnell-Smithii*.

Young branchlets dull red, densely ferruginous-tomentose with fine stellate appressed red hairs; anthers 2.7-3 mm. long, sparsely barbate apically. *P. guatemalensis*.

Ovary glabrous, or with scattered hairs apically, the hairs usually erect and stiff, rarely sparsely short pilose or villous apically.

Apex of leaves acutish or obtuse; petals densely papillose-tomentose over entire inner surface; ovules 12-16, partially biseriata. *P. cubana*.

Apex of leaves acuminate or subabruptly acuminate; petals glabrous at base on inner surface; ovules 4-12, strictly uniseriate.

Flowers 5- rarely 4-parted, less than 4 mm. long at anthesis; stamens about 2.5 mm. long. *P. lanceolata*.

Flowers 5-parted, 4-6.5 mm. long at anthesis; stamens 2.5-4.5 mm. long.

Leaf blades entire or nearly so, chartaceous; pubescence comparatively coarse, subappressed. *P. oblanceolata*.

Leaf blades conspicuously dentate, membranaceous; pubescence minute, very fine and closely appressed. *P. membranacea*.

Parathesis aurantiaca Lundell, *Wrightia* 3: 79, fig. 49. 1963.

A cloud forest endemic of El Salvador, known only from the type locality; Chalatenango, Los Esesmites, east of La Palma, 2,430 meters, *Paul H. Allen & Mario Lewy van Severen* 7310 (type).

Shrub or tree up to 7 m. high, branchlets closely appressed tomentose with very fine hairs, glabrescent; leaves with petioles 1-2.5 cm. long; leaf blades lanceolate, lanceolate-elliptic or oblanceolate, 7-20 cm. long, 2.5-6 cm. wide, membranaceous, crenulate-serrulate, apex slightly contracted and acuminate, base acuminate, decurrent, at first pubescent beneath with fine small pale appressed stellate hairs, glabrescent early, pellucid-punctate, midvein slender, elevated beneath, nearly plane above, primary lateral veins slender; inflorescences axillary, long-pedunculate, 5-17 cm. long, lax, 1- or 2-branched, minutely tomentulose with appressed hairs; pedicels slender, 7-11 mm. long, puberulent; flowers umbellate or

corymbose, 5- or 6-parted, orange-punctate, up to 7 mm. long at anthesis, the calyx puberulent, corolla minutely tomentulose; sepals triangular, up to 1.5 mm. long, obtusish; petals linear-lanceolate, up to 8 mm. long, orange-punctate in lines, papillose-tomentose inside except at base, with ring of minute glands at base; stamens 3-4 mm. long; filaments stout, glabrous, 1.5-2 mm. long, eglandular; anthers erect, ovate-lanceolate, thick, dorsifixed two-fifths above base, lanceolate, 2.2-2.7 mm. long, sometimes with a few short red hairs dorsally at apex, grooved and rather sparingly orange-punctate dorsally, the glands extending into lobes; ovary ovoid, glabrous except for a few scattered hairs apically and at base of style; style 5-6 mm. long; placenta subglobose, apiculate; ovules 7-10, ellipsoid, exposed apically, uniseriate.

To be expected in Guatemala, *P. aurantiaca* is notable for having all flower parts punctate with very pale orange glands.

Parathesis belizensis Lundell, *Wrightia* 3: 61. 1963.

Wet forest, 500 meters or less; Izabal. British Honduras (Stann Creek District, type from Middlesex, *Percy H. Gentle* 2779).

A small tree, branchlets rather stout, tomentose with rather coarse dark red short stipitate dendroid and stellate hairs; leaves with stout marginate petioles up to 1 cm. long; leaf blades oblong-elliptic or lanceolate-elliptic, 10-20 cm. long, 4-6.5 cm. wide, apex subabruptly acuminate, base narrow and acute, decurrent, thinly chartaceous, rather obscurely denticulate, glabrescent early above, uniformly stellate pubescent over entire surface beneath with red short stipitate or subsessile hairs, the costa prominent beneath, slightly impressed above, the primary lateral veins slender and elevated beneath, plane above; inflorescences shorter than leaves, paniculate, 12 cm. long, red-tomentose with subsessile rather coarse multibranching dendroid hairs; pedicels short, 2-4 mm. long, papillose and sparingly stellate-hirtellous; flowers corymbose, crowded, bristly tomentose with short red stellate hairs and papillose, up to 4.5 mm. long at anthesis; sepals narrowly triangular, up to 1.5 mm. long, acuminate, black-punctate; petals linear-lanceolate, 4.5 mm. long, black-punctate in lines, papillose-tomentose within except at base; stamens less than 3 mm. long; filaments about 1.5 mm. long; anthers erect, dorsifixed one-third above base, elliptic-lanceolate, about 2.2 mm. long, acutish, with a few short reddish hairs apically, prominently black-punctate, with glands extending down into lobes; ovary ovoid, tapering into style, with scattered short erect hairs apically; style about 3 mm. long; ovules 6, uniseriate, enclosed; fruits globose, borne on stout pedicels about 5 mm. long.

This species closely resembles *P. sessilifolia* Donn.-Sm., but differs at once in not having the conspicuous long shaggy villous hairs which are so characteristic of the latter.

Parathesis calophylla Donn.-Sm. Bot. Gaz. 18: 205. 1893. *Uva; cinco negritos* (Huehuetenango).

Moist or wet, mountain forest, 2,000-3,500 meters; Quiché (type from San Miguel Uspantán, *Heyde & Lux* 2909); Huehuetenango; El Progreso. Mexico (Chiapas).

Tree, up to 15 m. high; branchlets stout, densely and persistently ferruginous-tomentose, the hairs multibranched to base; leaves with rather stout to slender petioles up to 3.5 cm. long; leaf blades lanceolate or elliptic-lanceolate, up to 18 cm. long, 7 cm. wide, apex acuminate or subabruptly acuminate, base acute or acuminate, subcoriaceous, entire or obscurely crenulate, glabrous above except along midvein and petiole, shiny, persistently ferruginous-tomentose beneath with fine matted multibranched hairs, costa stout and elevated beneath, impressed above, the primary lateral veins slender, slightly impressed above, the surface sometimes slightly bullate; inflorescences axillary, pyramidal, the terminal leaves usually reduced, ferruginous-tomentose with multibranched hairs, paniculate, 1- or 2-branched, 6-15 cm. long, multiflored; pedicels 3-6 mm. long; flowers umbellate or subcorymbose, tomentose, 6-7 mm. long at anthesis; sepals narrowly triangular, 2-2.5 mm. long, acuminate, orange-punctate in lines; petals linear-lanceolate, up to 7 mm. long, papillose-tomentulose on outer surface and on inner surface except at base, punctate in lines; stamens 3.75-5.5 mm. long; filaments slender, 2.5-4 mm. long, glabrous, punctate; anthers narrowly lanceolate, 2-3 mm. long, apiculate, dorsifixed one-fourth above base, with several small glands dorsally in a narrow area above point of attachment; ovary ovoid, glabrous at base, villous above middle and at base of style; style punctate in lines, 5-6.5 mm. long, rather stout; placenta subglobose, small, apiculate; ovules 7 or 8, erect, uniseriate, tardily exposed apically; fruits depressed-globose, black and shiny when ripe, drying up to 9 mm. in diameter.

Parathesis chiapensis Fernald, Proc. Amer. Acad. 36: 497. 1901. *Uva*; *pish-match* (Huehuetenango).

Wet mountain forest, often along rivers, 2,000 meters or less; Huehuetenango. Mexico (Chiapas, type from mountain forest between San Martin and Ococingo, C. & E. Seler 2226).

Arborescent shrub or small tree up to 10 m. high, branchlets rather stout, densely red tomentose with rather fine stipitate or sessile dendroid hairs; leaves with petioles 5-18 mm. long, the petioles canaliculate, tomentose; leaf blades oblanceolate, elliptic or lanceolate, 6-20 cm. long, 2.5-7 cm. wide, apex subabruptly acuminate, base narrowed and decurrent on the petiole, chartaceous, at first stellate pubescent above, glabrescent, densely and uniformly pubescent on undersurface with fine red, stipitate, stellate hairs, the rays of hairs comparatively short in typical collections, margin closely denticulate, sometimes inconspicuously so or entire at base, the costa elevated beneath, nearly plane above, the lateral veins conspicuous on undersurface, slightly impressed above; inflorescences terminal, paniculate, sometimes small and congested, shorter than leaves, sometimes broadly pyramidal and up to 15 cm. long, puberulent and hirtellous or hirtellous-tomentose with sessile or short-stipitate red, stellate hairs; flowers corymbose or subracemose-corymbose; pedicels rather slender or sometimes clavate, 4-12 mm. long, sometimes up to 17 mm. long, often reflexed; flowers at anthesis 5-7 mm. long, the calyx and corolla densely black-punctate, the corolla in lines; sepals lanceolate, (1.2) 1.8-3 mm. long, acuminate; petals narrowly lanceolate, 5-8 mm. long, papillose-tomentose within apically and along margins; stamens 3-4 mm. long; filaments glabrous, stout, 1.4-1.8 mm. long; anthers erect, ovate-lanceolate, (1.5) 2.2-2.8 mm. long, apiculate, dorsifixed below middle, with conspicuous black-punctate

area above attachment and extending down into lobes; ovary glabrous, or with a few scattered erect hairs at apex and base of style; style slender, up to 5.5 mm. long; placenta subglobose, apiculate; ovules 9, uniseriate, enclosed.

The species ranges north to the State of Mexico where it was collected at Nanchititla (*Matuda* 30865). The flowers are sometimes abnormal and small, possibly due to either disease or insect infestation.

Parathesis chrysophylla Lundell, *Wrightia* 3: 82, *fig. 50*. 1963. *Camaco* (Guatemala); *uva* (British Honduras); *cuya* (Honduras).

Wet forest, 600 meters or less; type from Santa Ines, Guatemala, *C. Galusser* 3. British Honduras; Honduras.

Tree, branchlets stout, closely tomentose with appressed matted hairs; leaves large, with long marginate petioles 1-4 cm. long; leaf blades lanceolate, oblong-elliptic or oblanceolate, usually 12.5-25 cm. long, sometimes up to 45 cm. long, 4.5-9 cm. wide, sometimes up to 14 cm. wide, apex acuminate, or subabruptly short acuminate, base subacuminate and decurrent, entire but undulate, thinly chartaceous, finely pubescent beneath with golden-brown fine closely appressed stellate hairs, bizonal, the marginal zone glabrescent early, the midvein sulcate above, prominently elevated beneath, the lateral veins very slender; inflorescences terminal, pyramidal, paniculate, up to 30 cm. long, minutely rufous-tomentose, the tomentum consisting of a densely papillose lower layer and an upper layer of branched hairs, the glands conspicuous; pedicels up to 7 mm. long; flowers corymbose, finely rufous-tomentose and papillose, up to 6 mm. long at anthesis; sepals triangular, spreading, 1-1.4 mm. long, acute or acuminate, often almost as wide at base as long, punctate; petals lanceolate, about 6 mm. long, black-punctate in lines, papillose-tomentose along edges, otherwise glabrous within; stamens up to 4.5 mm. long; filaments slender, black-punctate, up to 3.5 mm. long; anthers small, versatile, dorsifixed medially, lanceolate-oblong, about 2 mm. long, conspicuously black-punctate dorsally, the glands occasional in lobes; ovary tomentose, the hairs erect; style slender, up to 5 mm. long, glabrous; placenta depressed-globose; ovules small, 11-14, partly biseriate, partially exposed.

The tree is reported to reach a height of 60 feet and a diameter of 16 inches near Progreso in Honduras (fide Hottle). Leaves of vigorous shoots reach a length of 18 inches and a width of about 6 inches, the largest in the genus. The numerous partially biseriate ovules suggest a linkage with *Ardisia*.

P. acuminata Lundell (*Wrightia* 3: 125. 1965), described from El Salvador, is closely related to *P. chrysophylla*. It should occur in Guatemala.

Parathesis columnaris Lundell, *Wrightia* 3: 62. 1963. *Capulín* (Suchitepequez); *cerezo silvestre* (Retalhuleu); *cinco negritos* (Chiapas); *cerezin*, *cerecita* (El Salvador).

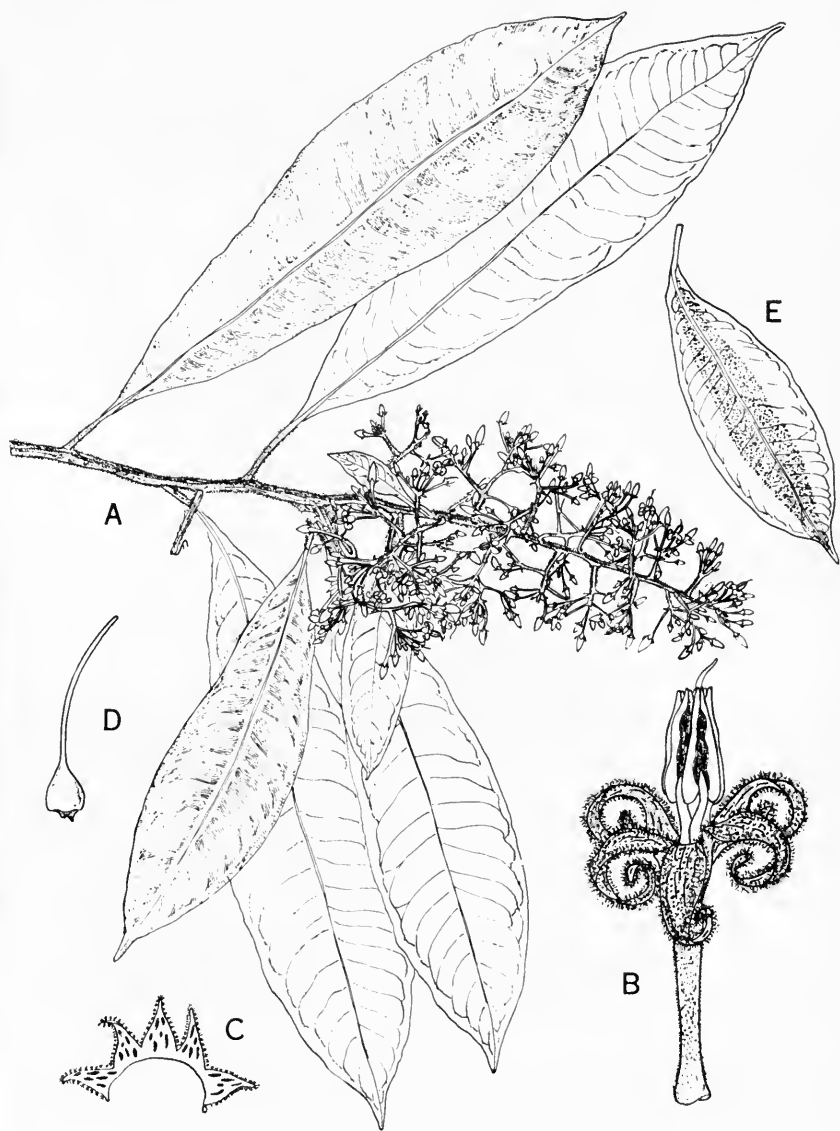


FIG. 43. *Parathesis columnaris*. A, Branch with inflorescence; $\times \frac{1}{2}$. B, Flower; $\times 5$. C, Calyx, spread out; $\times 5$. D, Pistil; $\times 5$. E, Leaf, undersurface showing bizonal pubescence; $\times \frac{1}{2}$. Illustrated from type, Steyermark 33205 (F).

Wet forest or thickets, usually in lowlands, 1,500 meters or less; Amatitlán; Escuintla; Quezaltenango (type from lower slopes of Volcan Santa Maria, Finca Pirineos, *J. A. Steyermark* 33205); Retalhuleu; San Marcos; Santa Rosa; Suchitepequez. Mexico (Chiapas); El Salvador.

Shrub or small tree, twigs sordidly tomentose with red stalked multibranching dendroid hairs, often branched to base, glandular, appearing waxy; leaves with slender canaliculate petioles up to 2 cm. long, glabrous above, tomentose beneath; leaf blades oblanceolate, 10–18 cm. long, 2.5–5 cm. wide, apex subabruptly acuminate, base attenuate and acuminate, decurrent on petiole, thin, chartaceous, pellucid-punctate, entire or irregularly and obscurely crenulate, glabrous above, bizonal beneath and pubescent with fine red appressed stellate hairs, densely so at first along costa and in costal zone, glabrescent, the lateral veins fine but evident on undersurface, obscure above; inflorescences terminal, paniculate, up to 20 cm. long, equaling or exceeding leaves, red tomentose with short branched hairs, sparingly so on branches; flowers corymbose, densely papillose; pedicels very slender, 4–9 mm. long, papillose; flower buds slender, up to 7 mm. long at anthesis; sepals papillose-puberulent, narrowly triangular, 1–1.4 mm. long, acuminate, black-punctate in lines; petals linear-lanceolate, united at base, up to 7 mm. long, attenuate-acuminate, black-punctate in lines, short papillose-tomentose inside over entire surface; stamens 3–4.5 mm. long; filaments slender, 1.3–1.7 mm. long, punctate; anthers erect, linear-lanceolate, 2.3–3.5 mm. long, dorsifixed about one-fourth above base, acutish, black-punctate in narrow band almost to apex and with glands extending into lobes; ovary with a few scattered apical hairs, sometimes glabrous, the style slender; placenta broadly ovoid, rounded; ovules 7 or 8, uniseriate, enclosed.

Parathesis cubana (A.DC.) Molinet & Gomez Maza, *Dicc. Bot.* 11. 1889. *Ardisia cubana* A.DC. *Trans. Linn. Soc.* 17: 124. 1834; *Prodr.* 8: 120. 1844. *P. corymbosa* Hemsl. *Biol. Centr.-Amer. Bot.* 2: 291. 1882 (Mexico, type from Sierra San Pedro Nolasco, Talea, & c., *C. Juergensen* 611). *Tinus cubana* (A.DC.) O. Ktze, *Rev. Gen.* 2: 974. 1891. *P. obovata* Standl. *Field Mus. Bot.* 4: 250. 1929 (British Honduras, type from Tower Hill, *J. S. Karling* 29). *Ixpanol, ixpanpanjul* (Petén).

Wet thickets, savannas, pinelands, and swamps, common in second growth, 200 meters or lower; Petén; Alta Verapaz; Izabal. Mexico (Veracruz, Oaxaca, Tabasco, Campeche); British Honduras; Cuba.

Shrub or small tree up to 5 m. high, branchlets slender, at first ferruginous-tomentulose with fine sessile appressed stellate hairs; leaves with slender petioles 0.5–2.2 cm. long; leaf blades elliptic, obovate-elliptic or obovate, 3.5–16 cm. long, 2–7 cm. wide, apex obtuse to acutish, base acute, chartaceous or sometimes thinner, slightly paler beneath, at first pubescent on undersurface with fine appressed sessile stellate ferruginous hairs, glabrescent early, entire, the midvein elevated beneath, the primary lateral veins slender; inflorescences usually terminal and leafy below, rarely terminal and axillary on some branches, pyramidal, paniculate, 1- or

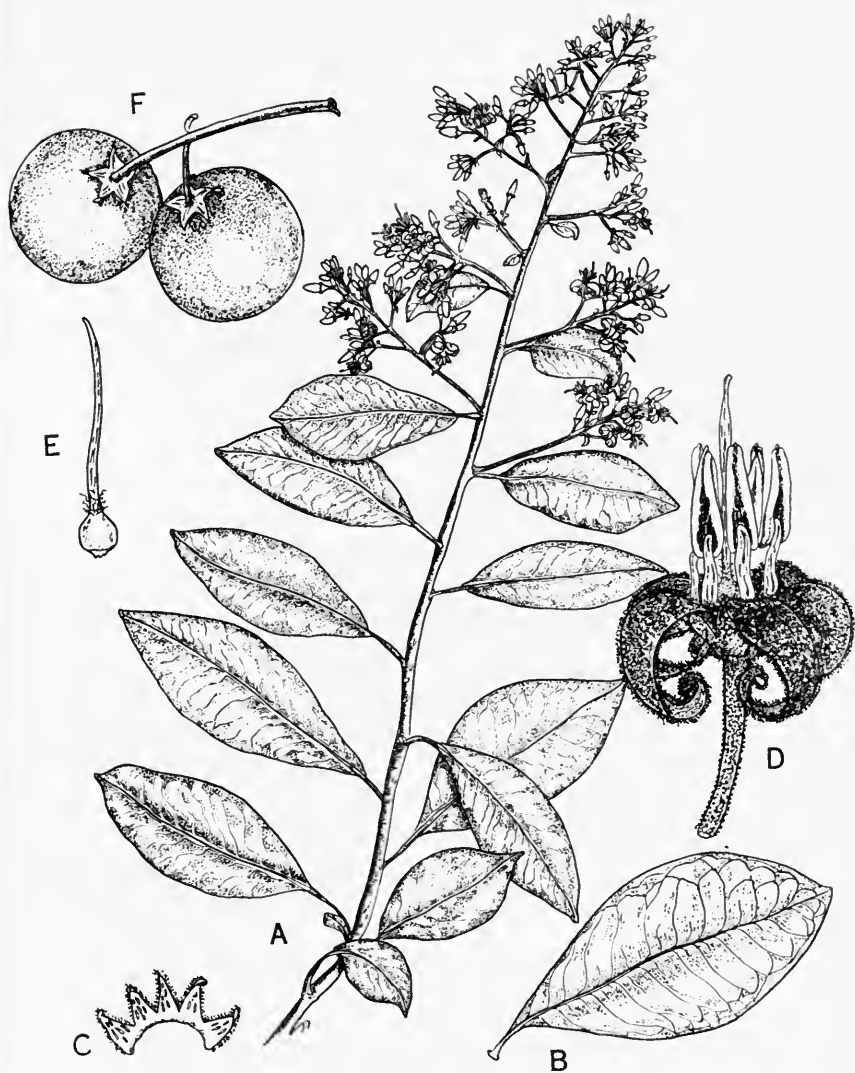


FIG. 44. *Parathesis cubana*. A, Flowering branch; $\times \frac{1}{2}$. B, Typical obovate leaf; $\times \frac{1}{2}$. C, Calyx, spread out; $\times 5$. D, Flower; $\times 5$. E, Pistil, pubescent as illustrated or glabrous; $\times 5$. F, Fruits; $\times 3$.

2-branched, up to 20 cm. long, ferruginous-tomentulose with fine sessile stellate hairs; pedicels slender, 2-7, sometimes 10 mm. long; flowers corymbose, 5- or sometimes 6-merous, up to 7 mm. long at anthesis, the corolla pinkish, densely and minutely papillose-tomentulose on outer surface; sepals ovate-triangular, 0.7-1 mm. long, acutish, pellucid-punctate with orange glands; petals narrow, lanceolate-linear, 5-7 mm. long, densely papillose-tomentose over entire inner surface, orange-red punctate in lines; stamens 3-5 mm. long; filaments thick, 1-2 mm. long, orange-red punctate in lines; anthers erect, lanceolate-linear, 2-3.4 mm. long, attached almost basally to filaments, the lobes small, sometimes vestigial, punctate dorsally with orange-red glands which sometimes dry blackish, dehiscent with apical pores; ovary ovoid, glabrous, or short villous apically; style glabrous, or short villous at base, 3.5-5.5 mm. long; placenta depressed-ovoid, apiculate; ovules small, numerous, 12-16, partially biseriolate, tardily exposed apically; fruits depressed-globose, up to 1 cm. diameter.

In cleared wet lowlands, this is one of the first invaders to appear. If such a shrub can be called weedy, the species belongs in that category.

The anthers of *P. cubana* are atypical, but similar to those in many species of *Ardisia*, and this characteristic together with the numerous partially biseriolate ovules indicate the affinity of *Parathesis* to *Ardisia* through this species and several others in the genus.

Parathesis Donnell-Smithii Mez, Pflanzenreich IV. 236: 176. 1902. *P. platyphylla* Lundell, Wrightia 1: 160. 1946 (type from Vaca, El Cayo District, British Honduras, Percy H. Gentle 2615). *Palo de uva* (Huehuetenango).

Wet forest, sometimes in second growth, 500 meters or less; Alta Verapaz (type from Cubilquitz, H. von Tuerckheim 7919); Huehuetenango; Chiquimula; Suchitupéquez; Quiché. Mexico (Chiapas, Oaxaca); British Honduras.

Arborescent shrub, branchlets stout, turgid and brittle when fresh, drying subangular, very minutely appressed pubescent with stellate tawny hairs, glabrescent and blackish-gray early; leaves with marginate petioles up to 2.5 cm. long; leaf blades oblanceolate or elliptic, 10-25 cm. long, 3.5-9 cm. wide, apex subabruptly long acuminate or acuminate, base acuminate, membranaceous or chartaceous, bullate, obscurely crenulate and sometimes coarsely undulate-dentate, appearing glabrous but at first with very fine closely appressed stellate hairs on undersurface, completely glabrous very early, costa elevated beneath, plane or slightly impressed above, the primary lateral veins slender, plane or slightly impressed above, inconspicuously reticulate; inflorescences fleshy and brittle, terminal, large, many-flowered, tripinnately paniculate, oblongish or pyramidal, usually exceeding the leaves, up to 30 cm. long, rather sparsely but minutely appressed pubescent with minute stellate indument; floriferous rachis corymbose-racemose, accrescent, the racemes at length up to 3.5 cm. long; pedicels pink, up to 8 mm. long; flowers 4-6 mm. long at anthesis, the smaller flowers terminal, minutely ferruginous-tomentose; sepals

0.8–1.7 mm. long, narrowly triangular, acuminate, black-punctate; petals pink, linear-lanceolate, 4–6 mm. long, short papillose-tomentose within except at base, black-punctate in lines; stamens 2–3.8 mm. long; filaments stout, 1–1.5 mm. long; anthers erect, lanceolate-oblong, 1.5–2.5 mm. long, acutish, dorsifixed one-third above base, with conspicuous acutely triangular elevated black-punctate dorsal area, the glands large; ovary ovoid, ridged, finely tomentose apically; style 3–4.5 mm. long, pubescent at base; placenta minute; ovules 4–6, uniseriate, enclosed; fruits depressed-globose, costate, punctate with small glands, acid at maturity, red-black, drying 8 mm. in diameter.

The minute fine stellate tawny pubescence and corymbose-racemose flowers of the late flowering stage serve to distinguish *P. Donnell-Smithii*. Some plants have branchlets and leaves essentially glabrous, even the young growth.

***Parathesis guatemalensis* Lundell, Wrightia 3: 65. 1963.**

In pine-oak forest, 1,350 meters; Alta Verapaz (type from Coban, *H. von Tuerckheim* 1202). Honduras.

Shrub, branchlets dull red, rather stout, at first densely ferruginous-tomentose with fine appressed hairs, glabrescent at length and appearing lepidote; leaves with marginate petioles up to 1.3 cm. long; leaf blades lanceolate or lanceolate-elliptic, 9–16 cm. long, 3–6.5 cm. wide, apex subabruptly acuminate, base cuneate and decurrent, firm and subcoriaceous, repand and denticulate or subentire, midvein prominent beneath, the primary lateral veins conspicuous on undersurface, slightly impressed above, upper surface somewhat rugulose, and at first stellate pubescent, glabrescent very early except along costa, bizonal, the ferruginous pubescence of fine short-rayed appressed stellate hairs, glabrescent, the marginal zone early; inflorescences terminal, tripinnately paniculate, up to 12.5 cm. long, narrow, only slightly wider at base, finely tomentose at first with ferruginous stellate hairs and papillose-puberulent, glabrescent; pedicels 4–7 mm. long; flowers minutely ferruginous-tomentose, subcorymbose, up to 5 mm. long at anthesis; sepals lanceolate, about 1.5 mm. long, acuminate, black-punctate; petals linear-lanceolate, 5 mm. long, black-punctate with lines, villous within except at base; stamens 3.5–4 mm. long; filaments about 1.4 mm. long; anthers erect, lanceolate, 2.7–3 mm. long, acutish and bearing a few reddish hairs apically, dorsifixed one-third above base, with conspicuous acutely triangular black-punctate area dorsally, the glands extending into lobes; ovary ovoid, attenuate apically into the style, conspicuously hirtellous-tomentose along ridges; style slender, about 4 mm. long, with a few hairs basally; ovules 5 or 6, uniseriate, enclosed; fruits subglobose, black, up to 8 mm. diameter (dry).

***Parathesis lanceolata* Brandeg. Univ. Calf. Publ. Bot. 6: 188. 1915.**

Damp barrancas; Mexico (Chiapas, type from Finca Irlanda, *C. A. Purpus* 7371); doubtless extending into mountains of San Marcos.

Shrub or tree, twigs rather slender, minutely ferruginous-tomentose; leaves with slender petioles up to 1 cm. long, ferruginous-tomentose beneath, canalicu-

late; leaf blades lanceolate or oblanceolate, 8–15 cm. long, 2–4.5 cm. wide, apex and base acuminate, the apex subcaudate, the base decurrent on the petiole, thin, paler beneath, entire or essentially so, pubescent beneath with small fine stellate appressed reddish hairs, bizonal, glabrescent, pellucid-punctate, costa elevated beneath, the veins obscure; inflorescences terminal, laxly paniculate, the branches very slender, pyramidal, up to 18 cm. long, exceeding the leaves, minutely ferruginous-tomentose; flowers small, corymbose or subracemose-corymbose, the floriferous rachis accrescent; pedicels slender, 2.5–4 (6) mm. long; flower buds ovoid, very minutely ferruginous-tomentose, about 4 mm. long before anthesis, the calyx and corolla black-punctate in lines; sepals narrowly triangular, 0.8–1 mm. long; petals narrowly lanceolate, up to 4 mm. long, united at base, short papillose-tomentose within except at base; stamens about 2.5 mm. long; filaments glabrous, black-punctate, up to 1.4 mm. long; anthers erect, lanceolate-oblong, 1.5–1.8 mm. long, dorsifixed one-third above base, with a conspicuous orange- or black-punctate area dorsally, with glands sometimes extending into lobes, apex obtuse and minutely apiculate; ovary glabrous, but style with a few scattered hairs at base, the style up to 3.5 mm. long; placenta minute, subglobose; ovules 4 or 5, uniseriate, enclosed.

Parathesis latifolia Lundell, *Wrightia* 3: 83, *fig. 51*. 1963.

Cloud forest, at 1,500 meters; Mexico (Chiapas, type from Colonia Tizcao, on the Guatemalan border, *L. Irby Davis & Edgar Kincaid* 55–50).

Shrub, branchlets stout, the indument of terminal buds and apical internodes smooth and tightly appressed, tan in color; leaves with short thick petioles up to 1.5 cm. long, at first sparsely papillose above at base and along petiole, otherwise glabrous; leaf blades obovate-elliptic, 15–25 cm. long, 7.5–9 cm. wide, apex abruptly short acuminate, the acumen obtuse, base cuneate, decurrent, chartaceous, irregularly crenate, costa plane above, prominent beneath, primary lateral veins very slender; inflorescences axillary, paniculate, up to 10 cm. long including peduncle 3 cm. long, angled, 1- or 2-branched, compact, the secondary branches reduced, sometimes only 1 mm. long, the indument minute, very closely appressed; pedicels papillose-puberulent, 4–6 mm. long; flowers subcorymbose, 5 mm. long at anthesis, finely papillose-tomentulose; sepals triangular, 1–1.5 mm. long, acute, red-punctate; petals lanceolate, about 6 mm. long, papillose-tomentose on inner surface except for glabrous area above base, papillose at base, punctate in lines; stamens 3–3.4 mm. long; filaments stout, glabrous, 1.5–1.7 mm. long; anthers erect, lanceolate, up to 2.5 mm. long, acute, punctate dorsally and in lobes with small red-black glands, dorsifixed one-third above base; ovary ovoid, ribbed, finely tomentose over entire surface and almost to middle of style, the apical hairs short villous and longer; style 4 mm. long; placenta depressed-globose, apiculate, ovules 8 or 9, subglobose, uniseriate, enclosed.

Parathesis leptopa Lundell, *Contr. Univ. Mich. Herb.* 7: 41. 1942.

Mountain forest, 3,000 meters or less; Alta Verapaz; Chimaltenango; Santa Rosa. Mexico (Chiapas, type from Saxchanal, *E. Matuda* 4297).

Shrub or small tree; branchlets rather stout, angled, ferruginous-tomentose with sessile stellate appressed hairs often with some short dendroid hairs present; leaves with petioles 1-3 cm. long; leaf blades lanceolate-elliptic or oblanceolate, 10-22 cm. long, 3-7 cm. wide, apex subabruptly acuminate, base acuminate and decurrent, membranaceous to chartaceous, entire to obscurely crenulate, at first sparsely papillose-puberulent above at base and along petiole, the young leaves ferruginous-tomentose beneath with fine stellate subappressed stellate hairs, sparse subappressed indument persisting to maturity, especially along midvein, glabrescent, costa slightly impressed above, elevated beneath, the primary lateral veins 9-26 on each side, slender, slightly impressed above; inflorescences axillary, sometimes appearing to be terminal with greatly reduced leaves in axils, panicles long-pedunculate, 1- or 2-branched, many-flowered, 5-20 cm. long, ferruginous-tomentulose, the small sessile hairs stellate, subappressed but often with erect or spreading rays, sometimes papillose-puberulent; pedicels 3-7 mm. long; flowers 5- or 6-parted, umbellate, densely papillose-puberulent, up to 7 mm. long at anthesis; sepals triangular, 1.3-1.75 mm. long, acuminate, orange-red punctate; petals linear-lanceolate, 5-7 mm. long, orange-red punctate in lines, papillose-tomentose on inner surface; stamens 3-4.5 mm. long; filaments 1.75-3 mm. long, equaling or slightly longer than anthers, punctate, united at base into a shallow ring; anthers erect or sometimes appearing versatile, ovate-lanceolate or lanceolate, 1.75-2.7 mm. long, dorsifixed one-third above base, dorsally punctate with few small reddish-black glands, sometimes appearing eglandular; ovary finely tomentose almost to base, the indument minute and appressed below, short villous above and at base of style mostly with branched hairs, the ovary tapering into style, often slightly ribbed; style about 5 mm. long; placenta subglobose, apiculate; ovules 5-9, rather large, uniseriate, enclosed.

Parathesis macronema Bullock, Hooker's Ic. Plant. 34, t. 3397. 1939. *Ardisia chiapensis* Brandeg. Univ. Calif. Publ. Bot. 10: 413. 1924 (Chiapas, type from Hacienda Monserrate, C. A. *Purpus* 9273), not *Parathesis chiapensis* Fernald, 1901.

Along streams, 1,000 meters or less. Mexico (Guerrero, type from Banco, District of Montes de Oca, *Geo. B. Hinton* 10803; Chiapas).

Shrub or small tree, up to 4 m. tall, branchlets rather slender, at first ferruginous-tomentose with closely appressed hairs, glabrescent; leaves very variable in size and shape, with slender petioles 5-20 mm. long; leaf blades oblong-elliptic, lanceolate or oblanceolate, 5-15 cm. long, 1.2-5 cm. wide, apex obtuse to obtusely acuminate, base cuneate, subentire to finely crenulate-serrulate, membranaceous to subchartaceous, at first rather sparsely pubescent on lower surface with small appressed stellate hairs, glabrous at maturity, costa elevated beneath, the primary lateral veins very slender; inflorescences axillary, slender, lax, paniculate, 5-18 cm. long, 1- or 2-branched, bracteate, with long slender tomentulose peduncles, the branches sparsely puberulent; pedicels filiform, 5-17 mm. long, accrescent; flowers corymbose or racemose-corymbose, minutely granular-puberulent, 4.5-6 mm. long at anthesis; sepals ligulate, 0.6-1 mm. long, orange-punctate; petals triangular-linear, 4.5-6.5 mm. long, densely papillose-tomentose over entire inner surface, orange-punctate in lines; stamens 3.75-4.5 mm. long; filaments rather slender, 2.75-3.5 mm. long, papillose-puberulent below middle; anthers erect, linear-lanceo-

late, 1-1.3 mm. long, base sagittate, apex acuminate to cuspidate, usually with several orange-colored glands dorsally, sometimes eglandular; ovary ovoid, glabrous; style slender, 3.5-5 mm. long, rather sparsely puberulent basally; placenta subglobose, apiculate; ovules (6) 7 or 8 (10), uniseriate, enclosed or tardily exposed apically; fruits globose or depressed-globose, up to 7 mm. in diameter.

The species is doubtfully distinct from *Parathesis Rekoii* Standl. of Oaxaca. It should be found in the mountains of San Marcos.

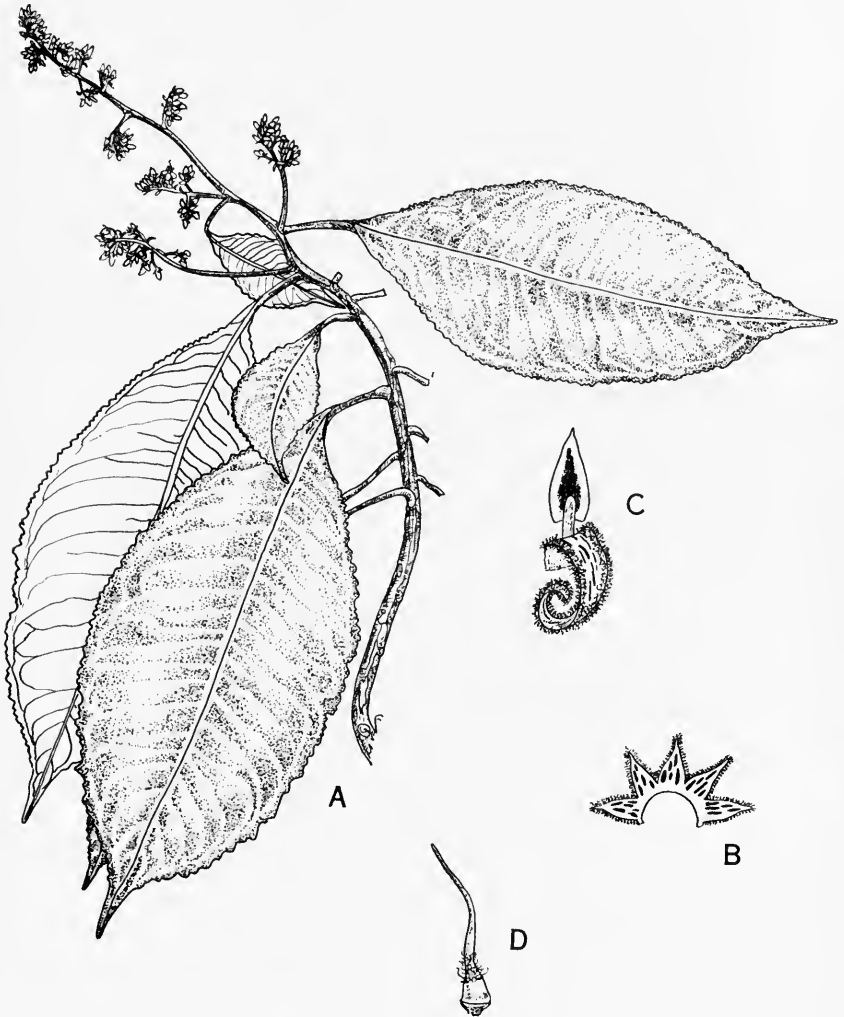


FIG. 45. *Parathesis membranacea*. A, Branch with inflorescence; $\times \frac{1}{2}$. B, Calyx, spread out; $\times 5$. C, Petal, showing inner surface; and stamen, dorsal view; $\times 5$. D, Pistil; $\times 5$. Illustrated from isotype, *Barilleti* 13140 (MICH).

Parathesis membranacea Lundell, *Wrightia* 1: 58. 1945.

Lowland forest; British Honduras (type from Tea Kettle, El Cayo District, *H. H. Bartlett* 13140).

Branchlets rather stout, persistently brown tomentose, the hairs minute; leaves with petioles 1–2 cm. long, canaliculate; leaf blades membranaceous, elliptic or obovate-elliptic, 8.5–15 cm. long, 4.5–7.5 cm. wide, apex abruptly acuminate, base decurrent on the petiole, stellate-pubescent on the undersurface at first, the fine hairs appressed, essentially glabrous with age, glabrous on upper surface, black-punctate, finely reticulate-veined, primary veins 12–15 on each side, conspicuous on undersurface, plane or slightly impressed on upper surface, margin conspicuously dentate almost to base; inflorescences leafy, terminal, narrowly paniculate, finely tomentose, 8–10 cm. long; flowers corymbose, finely tomentose, borne on pedicels up to 4 mm. long; buds 4 mm. long at anthesis; sepals narrowly triangular, 1.3–1.5 mm. long, acute; petals about 5.5 mm. long, narrowly lanceolate, attenuate to the apex, punctate; filaments stout, about 1.3 mm. long; anthers ovate-lanceolate, 2.2 mm. long, apiculate, conspicuously black-punctate; ovary with a few hairs at apex, glabrous otherwise; style 3.5 mm. long, glabrous.

P. oblanceolata closely resembles this species.

Parathesis oblanceolata Lundell, *Wrightia* 3: 67. 1963.

In wet forest, and along streams, mostly in lowlands, 300 meters or less; Petén; Alta Verapaz (type collected along Río Santa Isabel, between mouth of Río Sebol and El Porvenir, *J. A. Steyermark* 45853).

Shrub, branchlets slender and short to rather stout and elongated, ferruginous-tomentose with fine sessile stellate hairs; leaves with rather slender petioles 5–15 mm. long; leaf blades oblanceolate, 7.5–20 cm. long, 2–5.5 cm. wide, apex caudate-acuminate or acuminate, base acuminate and decurrent, entire, or inconspicuously crenulate, chartaceous, punctate with small black glands, at first uniformly pubescent beneath with fine sessile stellate ferruginous hairs, the rays spreading and sub-appressed, glabrescent, midvein prominent beneath, slightly impressed above, primary lateral veins elevated beneath, obscurely impressed above; inflorescences terminal, tripinnately paniculate, the branches slender, sparsely pubescent, the stellate spreading hairs with slender rays, and papillose-puberulent; pedicels rather slender, 3–5 (7) mm. long; flowers corymbose, sparingly ferruginous-tomentose, the buds very slender, about 4.5 mm. long at anthesis; sepals narrowly triangular, 1–1.4 mm. long, acuminate, black-punctate; petals linear-lanceolate, up to 5 mm. long, papillose-tomentose within along margins and apically, black-punctate in lines; stamens about 3 mm. long; filaments stout, epunctate, 1.5–1.8 mm. long; anthers erect, narrowly lanceolate, about 2.2 mm. long, acutish, attached one-third above base, with conspicuous black-punctate dorsal area extending into lobes; ovary tapering into style, pubescent apically, usually with scattered short rather stiff hairs; style about 4.5 mm. long, with a few hairs at base; ovules 6 or 7, uniseriate.

A fruiting specimen, *Paul C. Standley* 88357 (F) from Dept. Retalhuleu, may be referable here.

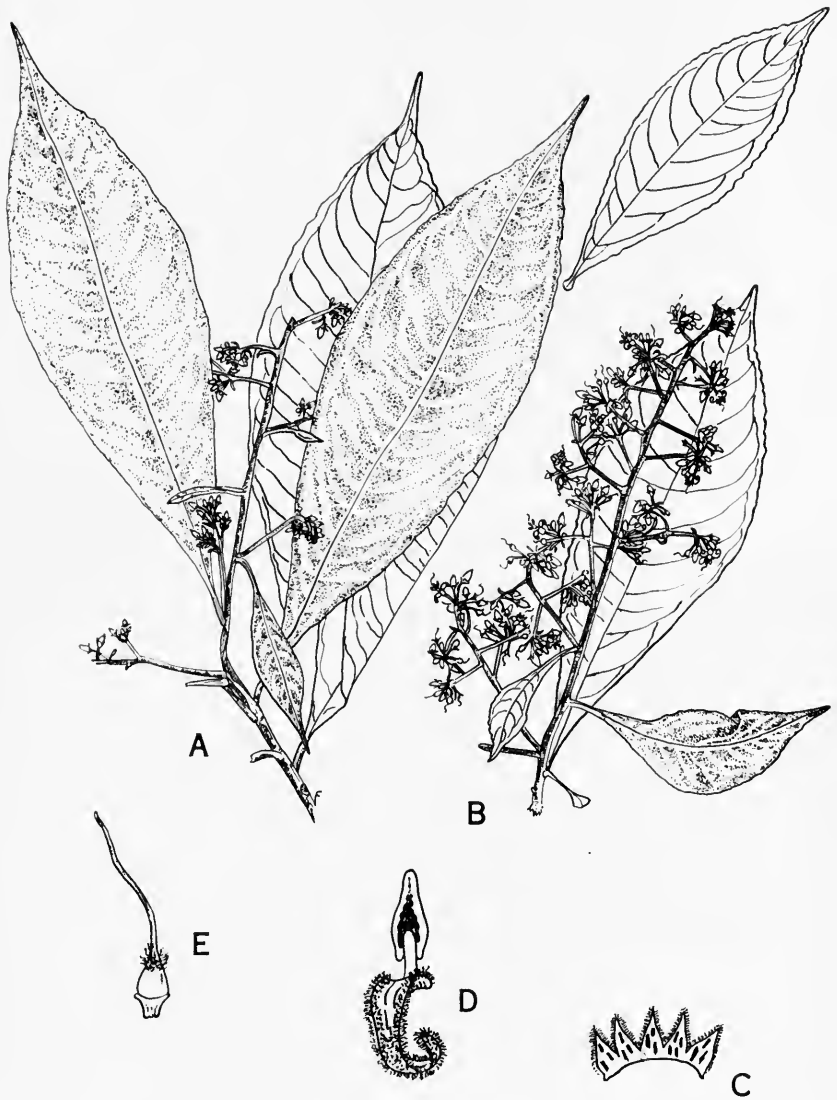


FIG. 46. *Parathesis oblanceolata*. A, Flowering branch with typical caudate-acuminate leaves; $\times \frac{1}{2}$. B, Inflorescence; $\times \frac{1}{2}$. C, Calyx, spread out; $\times 5$. D, Petal, showing inner surface; and stamen, dorsal view; $\times 5$. E, Pistil; $\times 5$. Illustrated from type, *Steyermark* 45853 (F), and isotype (LL).

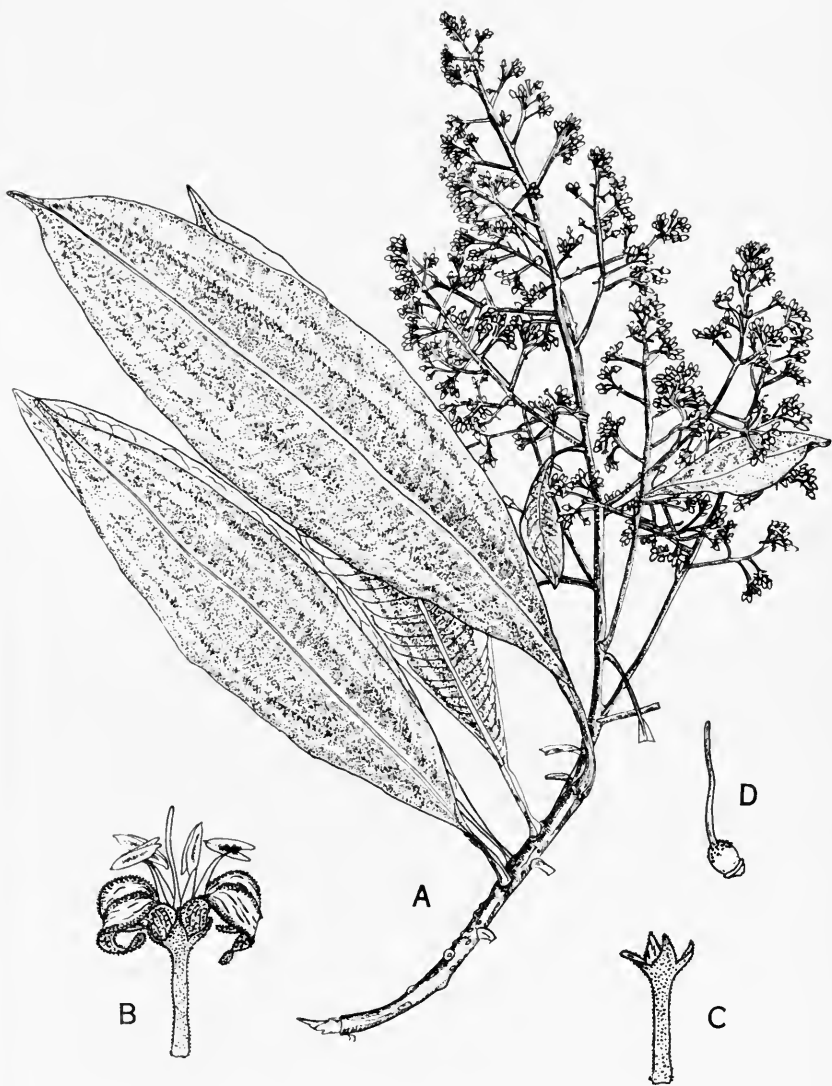


FIG. 47. *Parathesis papillosa*. A, Branch with inflorescence; $\times \frac{1}{2}$. B, Flower; 4-parted; anthers versatile; $\times 5$. C, Pedicel and calyx; $\times 5$. D, Pistil; $\times 5$. Illustrated from isotype, Tuerckheim 921 (US).

Parathesis papillosa Lundell, *Wrightia* 2: 69. 1963.

At 1,500 meters or less; Alta Verapaz (type from Pansamala, *H. von Tuerckheim* 92); Huehuetenango.

Shrub or tree, branchlets rather stout, minutely lepidote; leaves large, long petiolate, the petioles stout, up to 3 cm. long; leaf blades oblanceolate or oblanceolate-oblong, 12–25 cm. long, 3.5–6.5 cm. wide, apex subabruptly acuminate, base acute, decurrent on petiole, entire, obscurely pellucid-punctate, subcoriaceous, minutely pubescent with fine sessile, stellate, appressed hairs on undersurface, bizonal, glabrescent, costa elevated beneath, the lateral veins fine, evident but not conspicuous; inflorescences terminal, large, paniculate, up to 30 cm. long, 25 cm. wide at base, densely papillose; flowers 4- or 5-parted, densely papillose, umbellate or subcorymbose, the buds at anthesis pyriform, about 4 mm. long; pedicels 3–5 mm. long; calyx small, densely black-punctate; sepals ovate-triangular, about 1 mm. long, acuminate; petals lanceolate-linear, about 4 mm. long, united at base, black-punctate in lines, papillose-tomentose within apically and along margins; stamens up to 2.5 mm. long; anthers small, versatile, dorsifixed medially, lanceolate-oblong, 1.2–1.4 mm. long, minutely and sparingly black-punctate above point of attachment of filaments, rarely eglandular; filaments slender, 2 mm. long, usually orange-punctate; ovary minutely papillose at apex, the style glabrous; placenta obovoid; ovules 9–13, uniseriate or partly biseriate, partially exposed.

Parathesis pleurobotryosa Donn.-Sm. *Bot. Gaz.* 16: 195. 1891.

At 1,650 meters; Baja Verapaz (type from Santa Rosa, *H. von Tuerckheim* 1442).

Branchlets thick, densely villous with coarse ferruginous stellate stipitate hairs; leaves with marginate petioles 1–1.5 cm. long; leaf blades lanceolate or lanceolate-elliptic, 7–13.5 cm. long, 2.5–4.5 cm. wide, apex acuminate, base acutish and decurrent, rather obscurely crenulate, subchartaceous, at first sparsely hirtellous on upper surface, persistently pubescent on lower surface with red stipitate short-rayed stellate hairs, the costa villous and elevated beneath, nearly plane above, the primary lateral veins 12–15 on each side, rather conspicuous beneath, slightly impressed above; inflorescences axillary, villous-tomentose with coarse red hairs, the hairs of secondary branches shorter and less dense, panicles 1- or 2-branched, 5–15 cm. long, long-pedunculate; pedicels slender, 5–12 mm. long, villous-hirtellous; flowers umbellate, papillose-tomentose, about 5 mm. long at anthesis; sepals lanceolate-triangular, 1.2–1.8 mm. long, acuminate or cuspidate, punctate, papillose-hirtellous; petals narrowly lanceolate, 5.5–6.5 mm. long, punctate in lines, papillose-tomentose on inner surface along edges and above middle, glabrous below; stamens about 3 mm. long; filaments thick, glabrous, 1.2–1.4 mm. long; anthers ovate, 1.6–2 mm. long, thick, dorsifixed about one-third above base, apiculate, sparingly black-punctate dorsally, the area grooved and narrowly triangular, sometimes apically barbate dorsally, the basal lobes rounded; ovary ovoid, glabrous below, short villous-hirtellous apically; style slender, 4.5–6 mm. long, glabrous; placenta subglobose, apiculate; ovules 5–7, uniseriate, enclosed.

Parathesis reflexa Brandeg. *Univ. Calif. Publ. Bot.* 6: 189. 1915.
Lichui (Chimaltenango).

Wet forests of barrancas and mountain sides, 3,000 meters or lower; Santa Rosa; Chimaltenango; San Marcos. Mexico (Chiapas, type from barranca near Finca Irlanda, *C. A. Purpus* 7334).

Shrub or small tree, branchlets rather stout, loosely ferruginous-tomentose with dendroid hairs; leaves with petioles 1–2.5 cm. long; leaf blades narrowly elliptic, lanceolate or oblanceolate, 10–23 cm. long, 3–7.5 cm. wide, apex subabruptly acuminate, base acuminate and decurrent, membranaceous to chartaceous, paler beneath, entire to crenulate, at first pubescent on upper surface at base and along petiole, at first floccose-tomentose beneath with dendroid ferruginous hairs, these sometimes somewhat appressed marginally, glabrescent except along the prominent midvein, the primary lateral veins slender, slightly impressed above; inflorescences axillary, the terminal leaves sometimes reduced and bract-like, 2- or 3-paniculate, long-pedunculate, minutely floccose-tomentulose, with ferruginous dendroid hairs, pyramidal, 8–25 cm. long; pedicels slender, 5–12 mm. long; flowers 5- or rarely 6-merous, umbellate, minutely papillose-tomentulose, up to 5 mm. long at anthesis; sepals narrowly triangular, up to 1.5 mm. long, acuminate, densely punctate, papillose-puberulent; petals lanceolate, 5 mm. long, papillose-tomentose over entire inner surface, black-punctate in lines; stamens 2.75–3 mm. long; filaments glabrous, sometimes black-punctate, 1.5–2 mm. long; anthers erect, slender, lanceolate, about 2 mm. long, acutish, dorsifixed one-third above base, inconspicuously punctate dorsally with minute orange-black glands, these usually dispersed, occasionally in lobes; ovary ovoid, tomentose over entire surface to base, the hairs above and at base of style multibranched or simple; style about 4.5 mm. long; placenta subglobose, apiculate; ovules small, 8–10, uniseriate, enclosed; fruits subglobose, up to 1 cm. in diameter when ripe.

Parathesis rufa Lundell, *Wrightia* 3: 73. 1963.

Wet forests and riverbanks, sea level to 1,200 meters; British Honduras (type from Río Grande, Botan Creek, Toledo District, *Percy H. Gentle* 4649). Mexico (Chiapas).

Arborescent shrub or small tree up to 17 cm. in diameter, branchlets stout, tomentose, with fine rather loose red multibranched dendroid hairs; leaves with stout marginate petioles up to 2 cm. long, the petioles tomentose beneath, stellate pubescent above at first with appressed hairs; leaf blades oblong-elliptic, oblanceolate or obovate, 12–27 cm. long, 5–9 cm. wide, apex subabruptly acuminate or caudate-acuminate, base acute and decurrent, thin at first, becoming subcoriaceous and rugose at maturity, obscurely bizonal, at first pubescent above with stellate hairs, especially along midvein, densely pubescent on undersurface with small fine sessile stellate hairs, the hairs spreading or subappressed in costal zone, usually appressed in marginal zone, glabrescent, the margin usually conspicuously crenulate, costa and lateral veins prominent beneath, slightly impressed above; inflorescences red, terminal, pyramidal, tripinnately paniculate, up to 22 cm. long, papillose-puberulent and tomentulose with red loose or multibranched dendroid hairs; pedicels 3–5 mm. long; flowers subcorymbose, about 5 mm. long at anthesis, papillose-puberulent and finely stellate tomentulose; sepals narrowly triangular, 1.75–2.2 mm. long, subulate; petals narrowly lanceolate, about 5.5 mm. long, papillose-tomentose within except at base, punctate in lines; stamens about 3 mm. long;

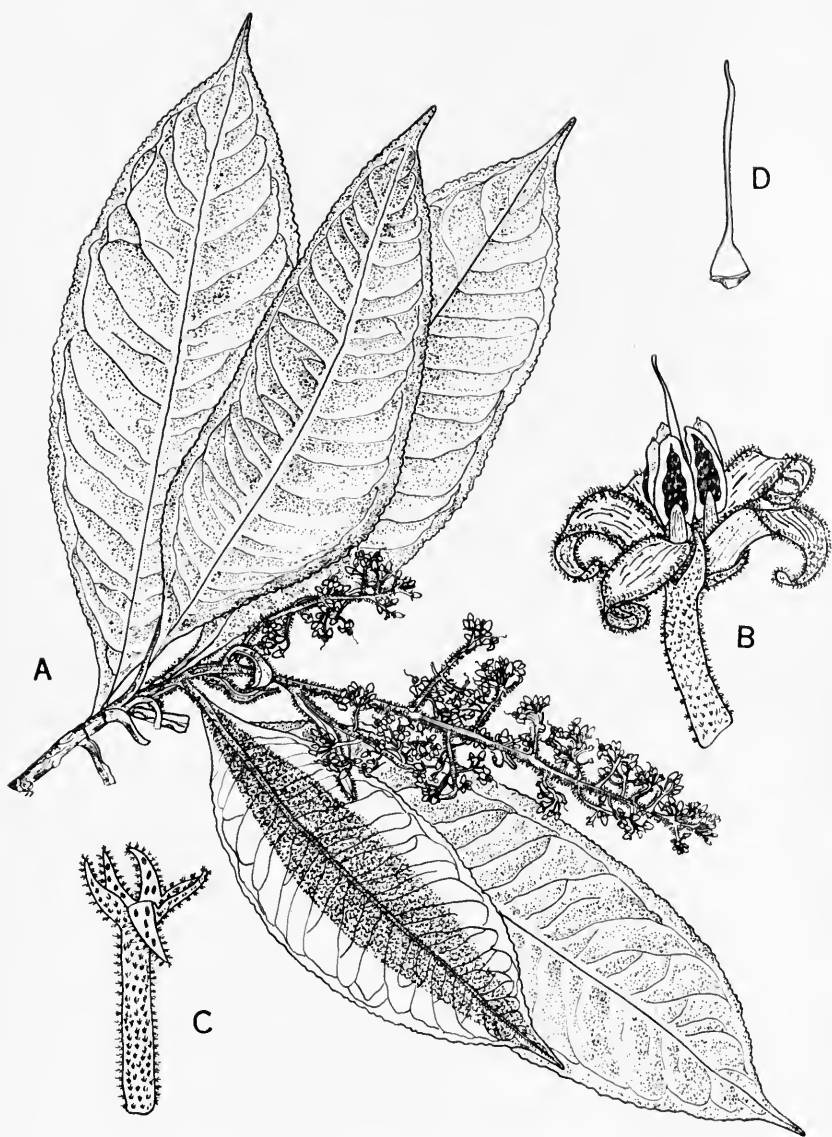


FIG. 48. *Parathesis rufa*. A, Branch with inflorescence; $\times \frac{1}{2}$. B, Flower; $\times 5$. C, Calyx, opened out; $\times 5$. D, Pistil; $\times 5$. Illustrated from type, Gentle 4649 (LL).

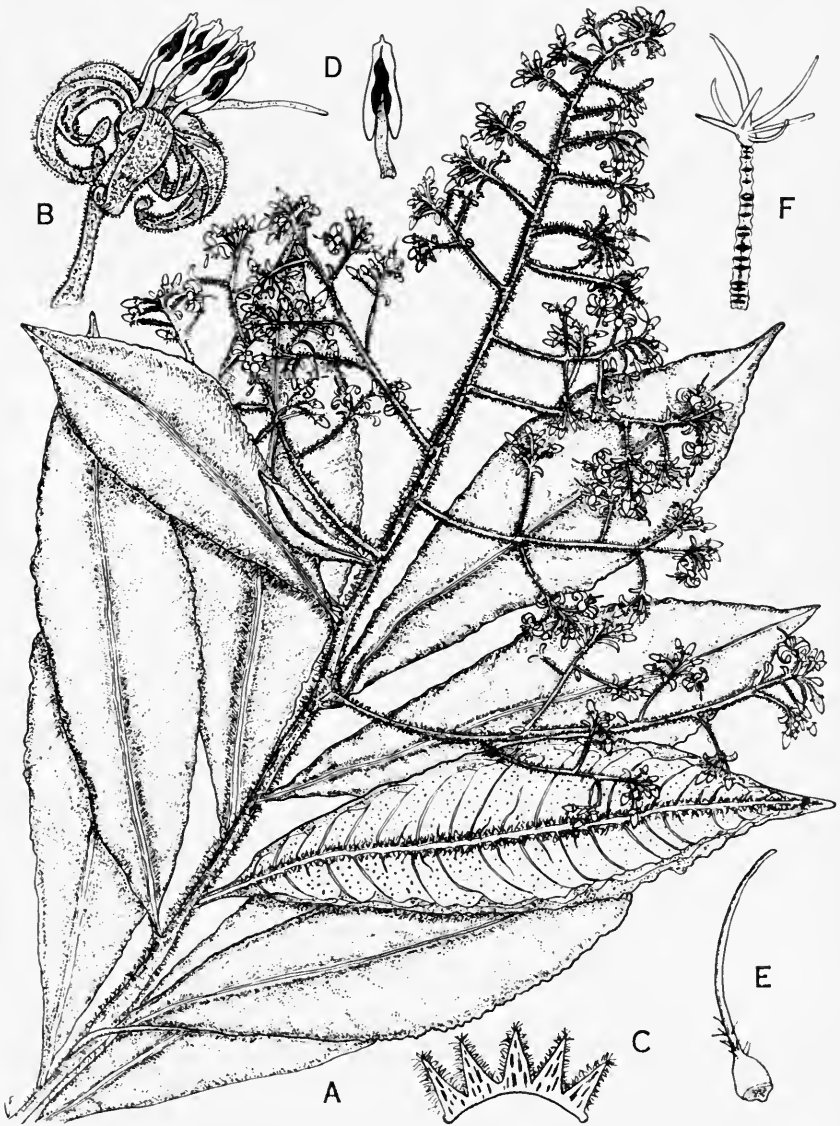


FIG. 49. *Parathesis sessilifolia*. A, Flowering branch; $\times \frac{1}{2}$. B, Flower; $\times 5$. C, Calyx, spread out; $\times 5$. D, Stamen, dorsal view; $\times 5$. E, Pistil; $\times 5$. F, Hair from stem, greatly enlarged. Illustrated from type, Tuerckheim 1443 (US).

filaments stout, glabrous, about 1.3 mm. long; anthers erect, dorsifixed one-third above base, lanceolate-oblong, about 2.4 mm. long, with conspicuous triangular black-punctate area above attachment, the large glands extending into lobes; anthers conspicuously acute-apiculate; ovary ovoid, glabrous, or sparsely hirtellous and papillose apically and at base of style; style 4.5 mm. long; placenta columnar or obovoid; ovules 6 or 7, elliptic-oblong, uniseriate, enclosed; fruits black, depressed-globose, up to 8 mm. in diameter when dry.

Parathesis sessilifolia Donn.-Sm. Bot. Gaz. 16: 195. 1891.

Wet forests, sea level to 1,500 meters; Petén; Alta Verapaz (type from Coban, *H. von Tuerckheim* 1443); Izabal. Mexico (Tabasco); British Honduras.

Arborescent shrub or tree up to 17.5 cm. in diameter, 12 m. high, branchlets rather stout, densely villous-tomentose with long stipitate, dark red, shaggy dendroid hairs, with lower layer of stellate hairs, papillose; leaves with thick petioles up to 1.5 cm. long, sometimes appearing sessile due to decurrent and marginate leaf blades, the petioles villous-tomentose, glabrescent above; leaf blades oblanceolate, elliptic or obovate-elliptic, 10–25 cm. long, 3.5–7.5 cm. wide, apex acuminate, the acumens often caudate and falcate, base cuneate and decurrent on petiole, chartaceous, nigro-punctate, glabrous above, uniformly pubescent over undersurface with red stipitate dendroid hairs, the margin subcrenulate, costa prominent beneath, nearly plane above, the lateral veins slender but conspicuous on undersurface, slightly impressed above; inflorescences terminal, paniculate, usually large and broadly pyramidal, up to 22 cm. long, sometimes small and shorter than leaves, red villous with shaggy stipitate stellate hairs and papillose-puberulent; pedicels slender, 3–7 mm. long; flowers corymbose or subracemose-corymbose, 5–7 mm. long at anthesis; the calyx and corolla bristly tomentose with stellate hairs and papillose-puberulent; sepals narrowly triangular-linear, 1.5–2 mm. long, attenuate-acuminate, black-punctate; petals black-punctate in lines, united at base, linear-lanceolate, up to 7 mm. long, acutish, short papillose-tomentose along margins and inside above middle, otherwise glabrous; stamens up to 3.5 mm. long; filaments glabrous, up to 1.8 mm. long; anthers erect, dorsifixed slightly below middle, lanceolate-oblong, 2.2–2.8 mm. long, acutish, with a narrowly triangular conspicuous black-punctate area above point of attachment and extending into lobes; ovary at apex and base of style with a few scattered erect hairs; style up to 5 mm. long; placenta with 5 or 6 ovules; ovules uniseriate, enclosed; fruits globose, about 7 mm. in diameter, densely black-punctate.

Parathesis Skutchii Lundell, Contr. Univ. Mich. Herb. 6: 54. 1941.

Cloud forest, 2,500 meters or less; Quiché (type from Nebaj, *A. F. Skutch* 1681); Alta Verapaz; Huehuetenango.

Shrub or tree, up to 10 m. high, branchlets angled, stout, the indument of terminal buds and apical internodes smooth and closely appressed, tan in color, the branchlets at length minutely appressed-lepidote; leaves with petioles 1.5–2.5 cm. long; leaf blades papillose above at base and along petiole, oblong-lanceolate or



FIG. 50. *Parathesis Skutchii*. A, Flowering branch; $\times \frac{1}{2}$. B, Flower, showing epunctate anthers, and petals papillose-tomentose over entire inner surface; $\times 5$. C, Calyx, spread out; $\times 5$. D, Pistil; $\times 5$. Illustrated from type, *Skutch* 1681 (F).

oblanceolate, 12–25 cm. long, 2.5–7 cm. wide, apex acuminate, base cuneate and decurrent, thinly chartaceous, finely crenulate to subentire, thinly stellate pubescent beneath or glabrous, costa slightly impressed above, prominent beneath, the primary lateral veins up to 25 on each side, slender; inflorescences axillary, paniculate, up to 20 cm. long, angled, short pedunculate, divaricately 2- or 3-branched, compact, the secondary branches reduced, the indument minute, very closely appressed; pedicels minutely papillose, appearing pruinose, 3–5 mm. long; flowers umbellate to short racemose-corymbose, minutely papillose-puberulent, 3–4 mm. long at anthesis, the buds conspicuously angled; sepals minute, triangular, 0.5–0.75 mm. long, obtuse, punctate; petals lanceolate, 3–4 mm. long, densely papillose-tomentose over entire inner surface, punctate in lines; stamens 2–2.5 mm. long; filaments stout, up to 1.4 mm. long, epunctate; anthers erect, ovate-lanceolate, up to 1.75 mm. long, dorsifixed about one-third above base, acute, concolorous or with 1 to several small black glands dorsally; ovary depressed-ovoid, minutely tomentose over entire surface, apically the hairs slightly longer, basal third of style minutely tomentose; style short, about 2.5 mm. long, punctate in lines; placenta subglobose or strongly depressed-globose, small, minutely apiculate; ovules 7–11, rather small, crowded, uniseriate, enclosed.

Parathesis stenophylla Lundell, *Wrightia* 3: 86, *fig. 53*. 1963.

Wet forest; Quiché (known only from the type, *José Ignacio Aguilar* 793).

Branchlets rather slender, ferruginous-tomentose with fine closely appressed stellate hairs, the rusty tomentum persistent; leaves with petioles up to 2 cm. long; leaf blades linear-lanceolate, 10–30 cm. long, 2.5–5 cm. wide, apex acuminate, base acuminate and decurrent, chartaceous, crenulate-denticulate, at first ferruginous-pubescent on lower surface with closely appressed fine stellate hairs, glabrescent, papillose above at base and along petiole, the costa prominent beneath, plane above, the primary lateral veins slender; inflorescences axillary, with the apical leaves reduced, long-pedunculate, lax and few-flowered, 1- or 2-branched, up to 23 cm. long, finely tomentulose with rufous stellate hairs; pedicels 4–8 mm. long; flowers corymbose, 5 mm. long at anthesis, finely tomentulose; sepals narrowly triangular, about 1.5 mm. long, acuminate, black-punctate; petals linear-lanceolate, 5–6 mm. long, black-punctate in lines, papillose-tomentose on inner surface except for area above base; stamens 3–3.4 mm. long; filaments glabrous, up to 2 mm. long, punctate; anthers erect, lanceolate, up to 2.7 mm. long, dorsifixed one-third above base, black-punctate dorsally, the glands extending into lobes; ovary ovoid, black-punctate, glabrous below, short villous-pubescent apically and at base of style, glabrescent; style about 5 mm. long; placenta obovoid, acicular-apiculate; ovules 8, obovoid or ellipsoid, uniseriate, enclosed.

Parathesis subcoriacea Lundell, *Wrightia* 2: 73. 1963.

In forest, 1,950 meters; Mexico (Chiapas, type from Escuintla, *E. Matuda* 5985).

Small tree, 3–4 m. high, the twigs rather stout, minutely lepidote, drying brownish; leaves long petiolate, the petioles up to 2 cm. long, obscurely and minutely lepidote beneath, canaliculate; leaf blades lanceolate, 8–15 cm. long, 2.5–



FIG. 51. *Parathesis subcoriacea*. A, Flowering branch; $\times \frac{1}{2}$. B, Flower; $\times 5$. C, Calyx, spread out; $\times 5$. D, Pistil; $\times 5$. Illustrated from type, *Matuda* 5985 (LL).

5 cm. wide, apex acuminate, the acumen obtusish, base cuneate and decurrent on petiole, subcoriaceous, paler beneath, obscurely pellucid-punctate with orange hairs, essentially entire, the young leaves with minute closely appressed stellate hairs, glabrescent early, mature leaves entirely glabrous, costa elevated beneath, the lateral veins fine but evident on lower surface, obscure above; inflorescences axillary or terminal, subequaling the leaves, obscurely and sparingly lepidote-papillose, congested; flowers minutely papillose, in few-flowered umbels, the umbels congested; pedicels slender, 2.5-3 mm. long, minutely papillose; flower buds at anthesis ovoid, 3 mm. long, the calyx and corolla black-punctate in lines; sepals minute, narrowly triangular, 0.8-1 mm. long, acuminate; petals narrowly triangular, 3 mm. long, short papillose-tomentose within except at base; stamens 2 mm. long, filaments slender, glabrous, epuncate, about 1 mm. long; anthers erect, epuncate, dorsifixed basally, lanceolate, acutish, 1.2-1.4 mm. long; ovary glabrous; style about 3 mm. long, glabrous; placenta depressed-ovoid, apiculate, ovules 10-12, very small, uniseriate.

Parathesis subulata Lundell, *Wrightia* 3: 74. 1963.

In forest, 1,500-2,000 meters; Huehuetenango (type from Cerro Victoria near Barillas, Sierra de los Cuchumatanes, *J. A. Steyermark* 49714).

Shrub, up to 3 m. high, branchlets slender, at first sparsely appressed tomentulose, glabrescent; leaves with slender petioles 5-15 mm. long; leaf blades lanceolate-oblong, 5-9.5 cm. long, 1.2-2.3 cm. wide, apex caudate-acuminate, base acuminate, glabrous, membranaceous, slightly paler beneath, obscurely and minutely crenulate, pellucid-punctate, costa slender and elevated beneath, plane above, primary lateral veins slender, 12-15 on each side; inflorescences axillary, few-flowered, paniculate, 3-6 cm. long, usually 1-branched, glabrous or essentially so, the peduncles slender but firmly erect; bractlets foliaceous, up to 7 mm. long; pedicels slender, 3-6 mm. long; flowers corymbose; sepals subulate, about 0.75 mm. long, sparsely and minutely puberulent, orange-punctate; corolla and stamens unknown; ovary ovoid, minutely appressed tomentulose; style slender, 3-4 mm. long, puberulent basally; placenta depressed-globose; ovules 7 or 8, uniseriate, exposed apically; young fruits globose.

Parathesis tartarea Lundell, *Wrightia* 3: 86, *fig. 54*. 1963. *Sapotilla* (San Marcos).

Wet mountain forest of upper slopes, 3,900 meters or less; Quiché; San Marcos (type from Volcan Tacaná, *J. A. Steyermark* 36023); Sololá; Suchitepéquez. Mexico (Chiapas).

Tree, up to 16 m. high, branchlets thick, scaly with epidermis peeling transversely and irregularly, the terminal buds and apical internodes densely ferruginous-tomentose with minute appressed sessile stellate hairs; leaves with rather stout marginate petioles 2-5 cm. long; leaf blades lanceolate to oblong-elliptic, 10-20 cm. long, 2.5-7 cm. wide, apex acuminate or subabruptly acuminate, base rounded and acutish or acute, coriaceous, paler beneath, denticulate, the teeth usually conspicuous but small, rarely obscure, glabrescent above, persistently and minutely pubescent on lower surface with very fine small closely appressed stellate

hairs, the midvein prominent beneath, slightly impressed above, the primary lateral veins very slender; inflorescences axillary, paniculate, 5–15 cm. long, 1- or 2-branched, the peduncle and branches thick and angled, minutely ferruginous-tomentose with minute appressed hairs; pedicels rather stout, drying wrinkled, 5–10 mm. long; flowers corymbose, minutely ferruginous-tomentose, 5–6 mm. long at anthesis; sepals thick, triangular, 1.2–1.6 mm. long, acute, inconspicuously and sparsely orange-punctate; petals thick, linear-lanceolate, about 6 mm. long, papillose-tomentose over entire inner surface, inconspicuously orange-punctate in lines; stamens up to 3.75 mm. long; filaments thick, united at base, about 1.4 mm. long, orange-punctate; anthers erect, lanceolate, up to 2.75 mm. long, inconspicuously punctate with small pale orange colored glands; ovary ovoid, glabrous except for minute tomentum apically and at base of style, tapering into the thick style; style 5–6 mm. long; placenta obovoid, apiculate; ovules 9, uniseriate, enclosed; fruits subglobose.

Parathesis tomentosa Lundell, *Wrightia* 3: 74. 1963. *Chimiche*.

Endemic; known only from the type; Los Andes to Entre Rios, Izabal, *S. J. Record* G.44.

Small tree, branchlets slender, minutely appressed tomentulose at first, glabrescent; leaves with slender petioles 5–14 mm. long; leaf blades obovate or obovate-elliptic, 5–9.5 cm. long, 3.5–4.5 cm. wide, apex rounded and abruptly short acuminate, base cuneate, membranaceous, very sparsely and minutely stellate-lepidote on lower surface at first, essentially glabrous, pellucid-punctate, finely crenulate above, costa elevated beneath, plane above, primary lateral veins slender, 8 or 9 on each side, prominent beneath; inflorescences terminal, paniculate, up to 5 cm. long, 1- or 2-branched to base, the branches very slender, few-flowered, sparsely puberulent; pedicels filiform, 5–9 mm. long, sparsely and minutely puberulent; flowers corymbose; sepals narrowly triangular, 1–1.2 mm. long, subulate, pellucid-punctate, puberulent; petals linear-lanceolate, 3.5 mm. long, sparingly and minutely puberulent on outer surface, densely papillose-tomentose over entire inner surface, orange-punctate; ovary ovoid, tapering into style, densely tomentose over entire surface; style about 2.75 mm. long, tomentose to middle; placenta depressed-globose, short apiculate; ovules 8 or 9, uniseriate, apparently enclosed.

Parathesis vestita Lundell, *Wrightia* 3: 75. 1963. *Hueso blanco*, *huesito blanco* (Quezaltenango).

Wet forest, mostly upper mountain slopes, 1,200–3,800 meters; Chimaltenango; Quezaltenango (type from Finca Pirineos, *P. C. Standley* 68219); San Marcos; Sololá; Suchitupéquez.

Shrub or tree, up to 10 m. high; branchlets rather stout, densely villous-tomentose with long red mostly simple hairs; leaves with petioles 5–15 mm. long; leaf blades oblanceolate, oblanceolate-elliptic or obovate-elliptic, 10–30 cm. long, 3–10 cm. wide, apex subabruptly acuminate, base acutish to acuminate, decurrent, membranaceous, conspicuously dentate with numerous small sharp regular teeth or sometimes bidentate with larger irregular teeth, persistently hirtellous on upper surface, long villous along midvein beneath, the lower surface rather thinly and

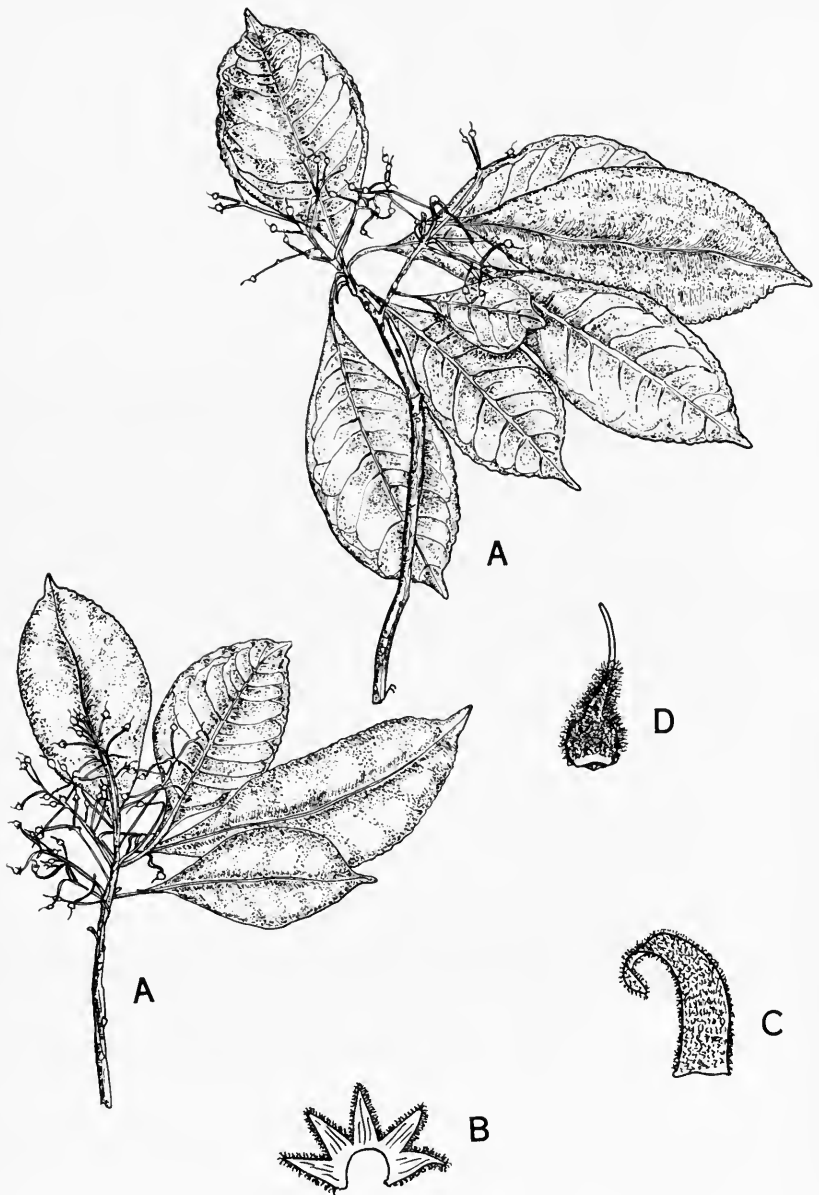


FIG. 52. *Parathesis tomentosa*. A, Flowering branchlets; $\times \frac{1}{2}$. B, Calyx spread out; $\times 5$. C, Petal, inner surface; $\times 5$. D, Pistil, showing densely tomentose ovary and base of style; $\times 5$. Illustrated from type, Record G.44 (US).

persistently villous with simple hairs, or long stipitate hairs, these bifid or stellate tipped, the small terminal rays of hairs small and inconspicuous, the midvein prominent beneath, impressed above, the primary lateral veins slender on undersurface, plane to slightly impressed above; inflorescences axillary, long-pedunculate, pyramidal and lax, 10–25 cm. long, villous to short villous, dull red; pedicels slender, hirtellous-villous, 6–12 mm. long; flowers white, corymbose or racemose-corymbose, up to 7 mm. long at anthesis, papillose-tomentose; sepals lanceolate-triangular or triangular, 1.4–2 mm. long, acuminate or cuspidate, punctate; petals linear-lanceolate, 6–7 mm. long, papillose-tomentose on inner surface except at base, punctate in lines; stamens up to 3.5 mm. long; filaments stout, glabrous, 1.4–1.5 mm. long, punctate; anthers erect, dorsifixed about one-fourth above base, ovate or ovate-lanceolate, 2–2.5 mm. long, thick, obtusish, with grooved black-punctate dorsal area; ovary ovoid, short villous-tomentose almost to base; style slender, 5.5–6.5 mm. long, short villous basally; placenta subglobose, apiculate; ovules 6 or 7, erect, uniseriate, enclosed; fruits black at maturity, depressed-globose, drying 7–9 mm. in diameter.

Parathesis vulgata Lundell, *Wrightia* 3: 88. 1963. *Mora pava* (Jalapa), *Cerecil de montaña*, *sirasil de montaña* (Chiquimula).

Wet or mixed forest, mostly middle and upper mountain slopes, often in cloud forest, 1,200–2,500 meters; Baja Verapaz; Chiquimula; Jalapa; Jutiapa; Zacapa. Honduras (type from Mt. Uyuca, *S. F. Glassman* 1616).

Shrub or small tree up to 8 m. high, branchlets rather stout, closely appressed tomentose with fine sessile stellate hairs; leaves with petioles mostly less than 1 cm. long, sometimes up to 1.5 cm. long; leaf blades oblanceolate, oblanceolate-elliptic or oblong, 7–19 cm. long, 3–6.5 cm. wide, apex subabruptly acuminate, base acuminate and decurrent, membranaceous, paler beneath, subentire or crenulate, at first pubescent on lower surface with fine closely appressed stellate hairs, glabrescent early, appearing glabrous, densely black-punctate, costa nearly plane above, elevated beneath, the primary lateral veins slender; inflorescences axillary, long pedunculate, paniculate, the panicles 1- or 2-branched, 6–18 cm. long, minutely papillose-puberulent with some longer hairs intermixed; pedicels usually 5–8, rarely 10 mm. long; flowers corymbose, densely papillose-puberulent, 5–6 mm. long at anthesis; sepals ovate-triangular, 1.4–2 mm. long, acuminate, red-black punctate; petals narrowly lanceolate, 5–7 mm. long, punctate with red-black lines, papillose-tomentose on inner surface except at base, with a papillose ring at base; stamens 3–3.5 cm. long; filaments stout, up to 1.5 mm. long, punctate; anthers thick, ovate-lanceolate, 2–2.5 mm. long, apiculate, with conspicuous black-punctate area dorsally, the glands often extending almost to apex, dorsifixed one-third above base; ovary ovoid, short villous apically to villous-tomentose, short villous at base of style; style 5–7 mm. long, punctate in lines; placenta subglobose, apiculate; ovules 6–9, erect, uniseriate, enclosed; ripe fruits wine-red, depressed-globose, about 1 cm. in diameter.

The collections from Guatemala are unsatisfactory, either sterile, in flower bud or fruit, but they appear to be referable to *P. vulgata*. Evidently the species is common in cloud forest.

RAPANEA Aublet

Shrubs or trees, glabrous or pubescent; leaves petiolate, entire or nearly so; flowers small, dioecious, 4-5-merous, lateral or axillary, appearing fasciculate by reduction of inflorescence, bracteolate; sepals small, usually connate at base, imbricate or valvate, ovate or triangular, often ciliate, usually punctate or puncticulate; petals connate below, spreading or recurved, usually lineate, often papillose on the margins; stamens inserted in throat of corolla, the filaments obsolete; an-

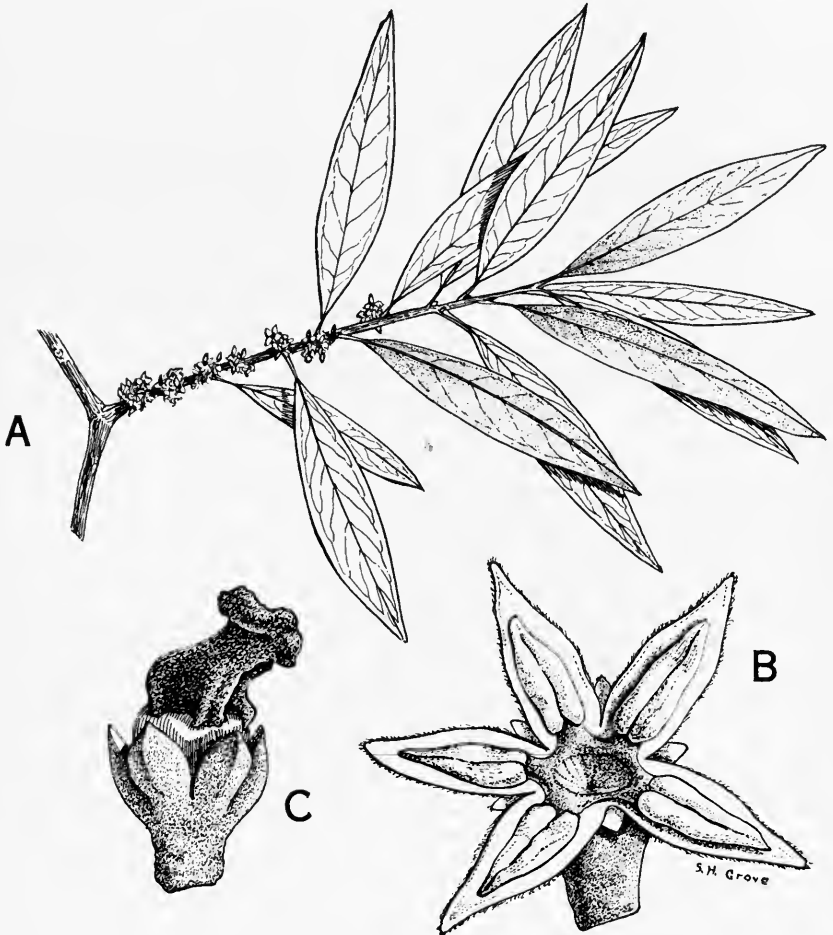


FIG. 53. *Rapanea myricoides*. A, Flowering branchlet; $\times \frac{1}{2}$. B, Pistillate flower, opened out showing abortive anthers; $\times 10$. C, Incrassate sepals, and ovary of pistillate flower, showing large, sessile, morchelliform stigma; $\times 10$.

thers sessile, dehiscent by introrse slits, abortive in pistillate flowers; ovary globose or ellipsoid; stigma sessile in pistillate flowers, large, subcapitate, morchelliform or lobed; ovules few, uniseriate; fruit 1-seeded, dry or fleshy, the endocarp crustaceous to ligneous; seed globose, smooth, intruded at the base, the endosperm corneous, sometimes slightly ruminant; embryo elongate, transverse, usually curved.

About 140 species, in the tropics of both hemispheres. Other species are found in southern Central America.

Young branchlets and petioles sparsely villous with reddish hairs; leaves narrowly lanceolate..... *R. myricoides*.

Young branchlets glabrous; leaves mostly obovate-elliptic or elliptic.

Leaves rounded at apex; stigma of pistillate flowers subcapitate and shallowly lobed, less than 1 mm. long; in lowland forests..... *R. guianensis*.

Leaves narrowed above and broadly obtuse at apex; stigma of pistillate flowers deeply sinuate-lobed, up to 2.5 mm. long; in wet forest of high mountains. *R. Juergensenii*.

Rapanea myricoides (Schlecht.) Lundell, *Wrightia* 3: 109. 1964. *Myrsine myricoides* Schlecht. *Linnaea* 8: 525. 1833. *Myrsine guatemalensis* Gandoger, *Bull. Soc. Bot. Fr.* 65: 57. 1918 (type from Cobán, Alta Verapaz, *H. von Tuerckheim* 1001). *Arrayán* (Alta Verapaz); *palná* (Huehuetenango).

Moist to wet or dry thickets or mixed forest, often in pine-oak or *Liquidambar* forest, sometimes in swamps, often in second growth, 1,000-2,700 meters; Alta Verapaz; Bajo Verapaz; Chimaltenango; Chiquimula; Guatemala; Jalapa; Jutiapa; Huehuetenango; El Progreso; Quezaltenango; Quiché; Sacatepéquez; San Marcos; Santa Rosa; Sololá; Zacapa. Mexico; El Salvador and Honduras to Panama.

Usually a shrub of 2-3 meters, sometimes a small tree up to 10 meters, branchlets sparsely villous to densely villous-tomentose with reddish hairs, rarely glabrous, often densely leafy; leaves usually short-petiolate, the petioles sometimes up to 12 mm. long, rarely longer; leaf blades lanceolate or oblong-lanceolate, mostly 6-13 cm. long, 1-2.5 cm. wide, acute, acuminate or obtuse, attenuate to the base, chartaceous or subcoriaceous, paler and usually silver-green beneath, usually villous at first, especially along the midvein on both surfaces, glabrescent, entire; inflorescences 3-9-flowered, glomerate, arising in the leaf axils or from defoliate nodes; pedicels 1-1.5 mm. long; flowers dioecious, 2-3.5 mm. long, glabrous or nearly so; calyx lobes triangular-ovate, less than 1 mm. long, acute or subacute, more or less black-punctate; petals connate one-third at base, subacute to rounded at apex, black-punctate; anthers sessile, those of pistillate flowers abortive, less than 1 mm. long; anthers in staminate flowers shorter than petals, 1.5-1.8 mm. long, attached at apex of corolla tube; ovary abortive in staminate flowers; ovary subglobose in pistillate flowers, with large conical morchelliform stigma; ovules 3, uniseriate, imbedded in fleshy placenta; fruit blackish at maturity, glabrous, 2.5-3.5 mm. in diameter.

This shrub, long known from our area as *R. ferruginea* (Ruiz & Pavón) Mez, a species of South America, much resembles *Myrica* in habit and general appearance, and frequently is associated with it. Abundant in some regions, especially in the mountains of Alta Verapaz, it is a characteristic element of the vegetation.

Rapanea guianensis Aubl. Pl. Guian. 121. t. 46. 1775.

Usually in or near mangrove swamps, common in *tintal*, 200 meters or less; Izabal; Petén. Southern Florida; southern Mexico; British Honduras south to South America; West Indies.

A glabrous shrub or small tree, 9 meters high or less, the trunk 15 cm. or less in diameter; leaves with short petioles up to 7 mm. long; leaf blades oblong-obovate, oblong-elliptic, or oblanceolate, 4–10 cm. long, 2.5–4 cm. wide, apex rounded or obtuse-rounded, cuneately narrowed to the base, lustrous above, somewhat paler beneath, entire, coriaceous; inflorescences shorter than petioles, 3–7-flowered, the flowers glomerate mostly on very short lateral spur-like branches; pedicels 1.5 mm. long or less; flowers dioecious, glabrous, 2–2.5 mm. long, greenish, punctate; sepals connate at base, ovate or ovate-lanceolate, less than 1 mm. long, punctulate; petals short-connate, elliptic, up to 2.5 mm. long, punctulate; anthers included, sessile, attached at apex of corolla tube, up to 1.5 mm. long in staminate flowers, apiculate, epunctate, abortive in pistillate flowers; ovary subglobose; stigma in pistillate flowers thick, and subcapitate, irregularly short-lobed; ovules 2 or 3; immature fruit pellucid-punctate, black and globose at maturity, about 4 mm. in diameter, smooth.

Rapanea Juergensenii Mez, Pflanzenreich IV. 236: 388. 1902.

Wet mixed mountain forest, 1,300–3,000 meters; El Progreso; Guatemala; Zacapa; Chiquimula; Jalapa; Sololá; Huehuetenango; Quezaltenango; San Marcos. Western Mexico; Honduras.

A large shrub or a tree of 6–12 meters, glabrous throughout, the branches thick; leaves with marginate petioles up to 1 cm. long; leaf blades narrowly elliptic, oblanceolate or oblong-elliptic, 6–12 cm. long, mostly 3–4 cm. wide, subacute to obtuse at apex, cuneately narrowed to base, subcoriaceous, paler beneath; inflorescences 5–9-flowered, shorter than petioles; flowers dioecious, glabrous, greenish, 2–2.75 mm. long, punctulate; sepals connate at base, ovate, about 1 mm. long, thin; petals short-connate, elliptic, about 2.75 mm. long in pistillate flowers; anthers included; ovary subglobose; stigma large, capitate, sinuate-lobed, up to 2 mm. long; immature fruit punctate with large pellucid glands.

STYLOGYNE A. DeCandolle

Shrubs or trees, glabrous or nearly so; leaves alternate, petiolate; inflorescences paniculate, terminal or axillary; flowers dioecious (in Guatemala), small, umbellate or subcorymbose, pedicellate, usually white, usually 5-parted, rarely 4-parted; sepals dextrorsely contorted in bud, free or short-connate at base, punctate or line-

ate; petals short-connate at base, dextrorsely contorted in bud, commonly lineate; stamens usually shorter than petals, the filaments slender; anthers elongate, subsagittate at base, dorsifixed or basifixed, usually dehiscent by introrse slits; ovary in pistillate flowers ovoid, with slender style subequaling or exceeding the stamens; ovary in staminate flowers abortive, with short style less than 1 mm. long; placenta with 3-5 uniseriate ovules; fruit drupaceous, 1-seeded, the endocarp crustaceous or osseous; seed globose or depressed, the endosperm corneous, excavate, not ruminate; embryo transverse, elongate.

About 50 species in tropical America. Several additional ones are represented in Central America, all of which appear to be dioecious.

Inflorescences axillary, 3.5 cm. long or less. *S. laevis*.

Inflorescences terminal, usually 5-10 cm. long. *S. guatemalensis*.

Stylogyne guatemalensis Blake, Contr. U. S. Nat. Herb. 24: 16. 1922 (type from Quebradas, Izabal, *H. Pittier* 8624). *S. perpunctata* Lundell, Bull. Torrey Club 69: 398. 1942 (British Honduras, the type from Silk Grass Reserve, Stann Creek District, *Percy H. Gentle* 2990). *Pigeon berries* (British Honduras).

Moist or wet forest, 300 meters or lower; Izabal. Mexico (Oaxaca, Chiapas); British Honduras; Honduras.

A shrub or small tree, entirely glabrous; branchlets rather stout, terete; leaves with canaliculate petioles mostly 1-1.5 cm. long, sometimes up to 3 cm. long; leaf blades elliptic or obovate-elliptic, 6-15 cm. long, 3-8 cm. wide, apex rounded and rather abruptly short-acuminate or acutish, base cuneate or acute and decurrent on the petiole, entire, membranaceous to subcoriaceous, coarsely punctate, finely and closely veined, the costa plane or nearly so above, elevated beneath; inflorescences terminal, pinnately paniculate, sessile or nearly so, usually less than 6 cm. high and wide, sometimes up to 10 cm. high, 12 cm. wide; flowers dioecious, 5-parted, small, umbellate or subcorymbose; pedicels mostly 3-6 mm. long, sometimes 2-11 mm. long; *pistillate flowers*: about 5 mm. long at anthesis, rather conspicuously punctate; sepals oval-oblong to lanceolate-oblong, 1.4-2 mm. long, rounded, dorsally punctate with elevated glands, rather thick, the margin thin and paler; petals oblong-elliptic, 4.5-4.8 mm. long, connate about 1.5 mm. at base, obtuse, rounded or obliquely emarginate, lineate; stamens about 2.2 mm. long; filaments about 1 mm. long; anthers 1.2-1.7 mm. long, basifixed, epunctate; ovary ovoid, 1.2 mm. long; style slender, about 2.5 mm. long; ovules 3 or 4, uniseriate, erect; *staminate flowers*: sepals ovate-elliptic, 1.3-1.75 mm. long, punctate; petals elliptic, up to 5.5 mm. long, connate 1.5 mm. at base, lineate; stamens 3.5 mm. long; filaments 2 mm. long; anthers 1.8-2 mm. long, dorsifixed above base; pistil abortive, with style about 0.75 mm. long; ripe fruits subglobose, about 6 mm. in diameter when dry.

The vernacular name "*pigeon berries*" is applied in British Honduras to various plants with small edible berries.

More than one species may be represented in the Guatemalan collections referred here. *S. perpunctata* represents the plants which have large obovate thin leaves and petioles often 2 to 3 cm. long. In the type of *S. guatemalensis*, a pistillate specimen, the leaves are subcoriaceous, small and elliptic. Most collections have been identified as *S. laevis* (Oerst.) Mez, which is often difficult to separate.

Stylogyne laevis (Oerst.) Mez, Pflanzenreich IV. 236: 268. 1902. *Ardisia laevis* Oerst. Vid. Medd. Kjoebenhavn 125. 1861. *Stylogyne ramiflora* (Oerst.) Mez, Pflanzenreich IV. 236: 272. 1902. *Ardisia ramiflora* Oerst. Vid. Medd. Kjoebenhavn 132. 1861.

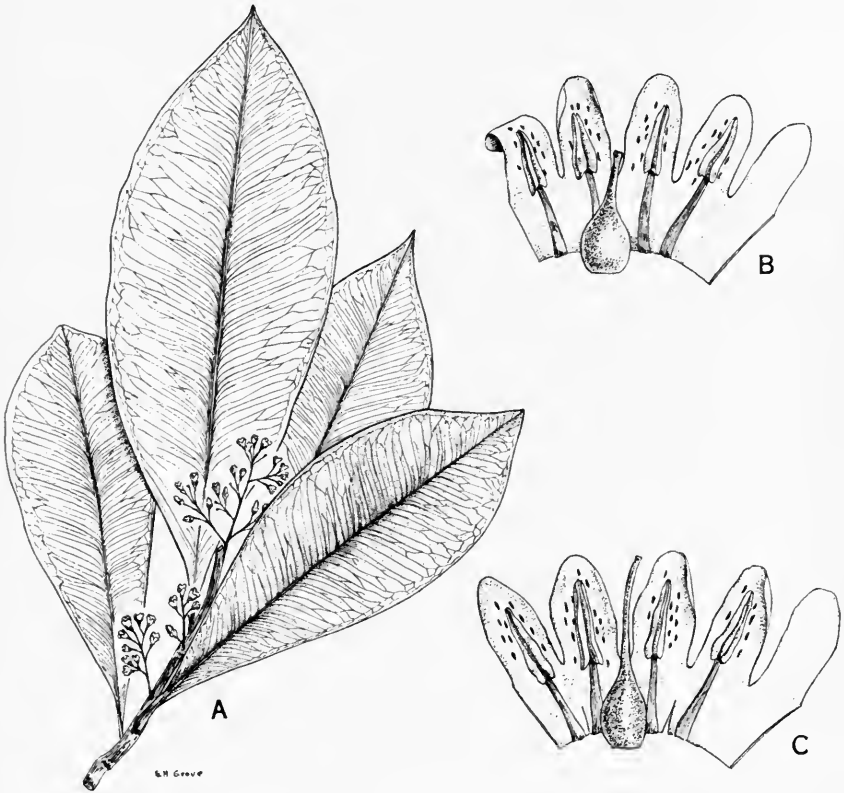


FIG. 54. *Stylogyne laevis*. A, Flowering branch, pistillate plant; $\times \frac{1}{2}$. B, Staminate flower, opened out showing stamens, and abortive pistil with short style; $\times 5$. C, Pistillate flower, dissected; $\times 5$.

Mixed lowland forest, 300 meters or less; Escuintla; Retalhuleu; Suchetepéquez. Mexico (Chiapas); Nicaragua to Panama.

A glabrous shrub, or small tree, commonly 1-3 meters high; leaves with stout marginate petioles usually less than 1 cm. long, sometimes up to 2 cm. long; leaf blades oblong-elliptic to elliptic or oblanceolate-oblong, up to 22 cm. long, 8.5 cm. wide, apex rounded to obtuse and abruptly short-acuminate, base acute and decurrent, chartaceous, entire, finely veined on both surfaces, the costa shallowly sulcate above; inflorescences axillary, sessile, small, pinnately paniculate, mostly 3.5 cm. long or less, the branches carmine, glabrous; flowers dioecious, small, 5-parted, white, umbellate or subcorymbose; pedicels 2-6.5 mm. long, up to 1 cm. long in fruit; bracts small, ovate, deciduous; *pistillate flowers*: glabrous, about 4.5 mm. long at anthesis, orange-punctate with dots and lines; sepals membranaceous, short-connate at base, oblong, ovate-elliptic or ovate, rounded at the apex, 2 mm. long or less, orange-punctate; petals contorted in bud, connate about 1.5 mm. at base, elliptic, up to 5 mm. long, reflexed at anthesis, orange-lineate; stamens 3 mm. long; filaments slender, 1.8-2 mm. long; anthers basifixed, 1.5-1.8 mm. long; ovary glabrous, the style slender, 2.5-3.2 mm. long; ovules 2-4 erect, uniseriate; *staminate flowers*: about 4 mm. long at anthesis, orange-punctate; sepals oblong, 1.2 mm. long or less; petals 4 mm. long, connate about 1.4 mm. at base, oblong-elliptic; stamens 3 mm. long; filaments about 2 mm. long; anthers slender, about 1.3 mm. long, basifixed; ovary abortive, the style about 0.6 mm. long; fruit globose, 5 mm. in diameter when dry, black, juicy.

Excellent Guatemalan specimens of this dioecious species were collected by W. A. Kellerman at Retalhuleu. His number 6627 (F) is from a staminate plant, while 6701 (F) has both pistillate flowers and fruits. A study of the types of *S. laevis* (Oerst.) Mez and *S. ramiflora* (Oerst.) Mez, both from Costa Rica, shows that these two are based on staminate and pistillate collections, respectively, of the same species.

Of *Ardisia guatemalensis* Mez, which was based on *Friedrichsthal* 857, I have seen only the type photograph. This is evidently a species of *Stylogyne*, and probably is referable to *S. laevis*.

SYNARDISIA (Mez) Lundell

Shrub or tree, rarely epiphytic; leaves alternate, large, petiolate; inflorescences large, terminal, densely pubescent with gland-tipped hairs; flowers perfect, 5-merous, corymbose, borne on long pedicels; sepals dextrorsely imbricate, almost free, spreading early, punctate; corolla campanulate or suburceolate, the petals dextrorsely convolute in bud, connate up to three-fourths their length; stamens included, attached at base of corolla tube; filaments slender, longer than anthers, united at base into shallow ring; anthers small, ovate, dorsifixed near base, caudate-acuminate, epunctate, longitudinally dehiscent; ovary subglobose, punctate, glabrous; style slender, included; ovules 8 or more, pluriseriate; fruits depressed-globose.

A monotypic genus, known only from Mexico and northern Central America.

Synardisia venosa (Mast.) Lundell, *Wrightia* 3: 90. 1963. *Ardisia venosa* Mast. in *Donn.-Sm. Bot. Gaz.* 18: 205. 1893; Mez, *Pflanzenreich* IV. 236: 77, t. 10. 1902. *Pish-match* (Huehuetenango); *flor de lima* (Quezaltenango).

Wet cloud forest and cool barrancas, 1,300–3,200 meters; Chimaltenango; Sololá; Huehuetenango; Quezaltenango; San Marcos; Zacapa; Jalapa; El Progreso; Santa Rosa; Zacatepequez (type from Volcan Acatenango, *J. Donnell Smith* 2485). Mexico (Jalisco, Guerrero, Mexico, Chiapas); El Salvador; Honduras.

A shrub or tree, sometimes 20 meters high, rarely epiphytic, the branchlets thick, glabrous; leaves glabrous with short broadly marginate petioles up to 2 cm. long; leaf blades large, oblanceolate or oblanceolate-oblong, mostly 15–25 cm. long, 5–9 cm. wide, sometimes larger, apex acute or broadly acuminate with obtuse acumen, attenuate to the decurrent base, entire, punctate, the costa elevated be-

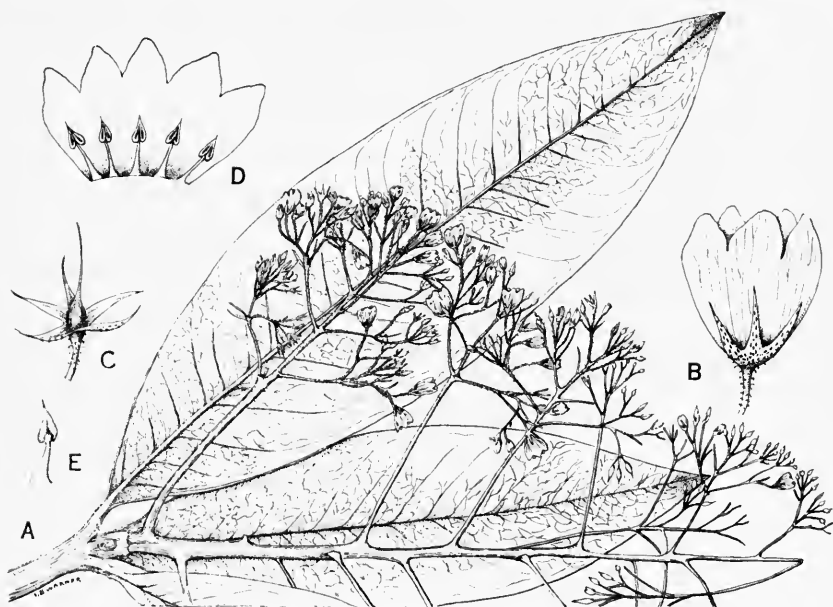


FIG. 55. *Synardisia venosa*. A, Flowering branch; $\times \frac{1}{2}$. B, Flower; $\times 2\frac{1}{2}$. C, Calyx and pistil; $\times 2\frac{1}{2}$. D, Corolla, dissected; $\times 2\frac{1}{2}$. E, Stamen, dorsal view; $\times 5$.

neath, the veins slender, reticulate on both surfaces; inflorescences terminal, many-flowered, subpyramidal, 3-4-pinnate-paniculate, often exceeding the leaves, up to 45 cm. long, the branches densely glandular-pubescent with gland-tipped hairs; basal bracts leafy, oblanceolate, up to 10 cm. long, glabrous; pedicels slender, up to 2 cm. long, usually shorter, densely pubescent with gland-tipped hairs; flowers corymbose, 6-12 mm. long; sepals almost free, dextrorsely imbricate in young buds, spreading early, very thin and slender, narrowly lanceolate, 2.5-5 mm. long, caudate-acuminate, punctate, pubescent with gland-tipped hairs; corolla campanulate or suburceolate, thin, semi-transparent, pink, 5-11 mm. long, the petals dextrorsely convolute in bud, connate up to three-fourths their length, subovate, obtuse-rounded apically, sparsely punctate, glandular-puberulent at base within, otherwise glabrous; stamens small, included, about two-thirds length of tube, attached at base of corolla, up to 3.5 mm. long; filaments very slender, 1-2.5 mm. long, glabrous, broadened at base and united into a shallow ring; anthers small, ovate, 1-1.8 mm. long, dorsifixed near base, caudate-acuminate or acuminate, epunctate, longitudinally dehiscent; ovary subglobose, punctate, glabrous; style very slender, included, 2.5-4 mm. long; ovules 8 or more, pluriseriate; fruit depressed-globose, up to 1 cm. in diameter, wine-purple when ripe.

Among the Myrsinaceae of Mexico and Central America, *S. venosa* may be recognized by its ample, terminal, densely glandular-pubescent inflorescences, petals connate up to three-fourths forming a campanulate or suburceolate tube, and small included stamens and style. The flowers, quite variable in size, are reported to be very fragrant.

Collectors report that both the young shoots and the berries are edible.

YUNCKERIA Lundell

Reference: Lundell, *Wrightia* 3: 111-114. 1964.

Shrubs or small trees, glabrous or nearly so; branches terete; leaves mostly large and stoutly petiolate, punctate, entire, finely veined; flowers perfect, in terminal panicles, usually 5-merous, rarely 4-merous, umbellate or corymbose; pedicels long, thickened above; calyx lobed to or below middle, tapering at base into pedicel; sepals dextrorsely imbricate, rounded, thick and punctate medially; petals dextrorsely imbricate, connate into basal tube, linear-oblong, widest at or near middle, punctate medially; stamens subequaling petals, attached near base of corolla tube; filaments free, shorter than anthers; anthers large, linear-lanceolate, attenuate to apex, erect, rigid, reddish, epunctate, dehiscent through apical pores; ovary ovoid, glabrous; style slender, subequaling petals, the stigma minute, punctiform; placenta obovoid, with 6-8 large, erect, uniseriate ovules; fruits drupaceous, black at maturity; seed globose, with basal depression extending into center of endosperm; embryo transverse, elongate.

Three species in southern Mexico and Central America of which two are known only from Chiapas, and one from British Honduras, Honduras and Nicaragua. *Yunckeria*, named for the late T. G.

Yuncker, is a distinctive genus, referable to the Tribe Myrsineae. With erect uniseriate ovules, it has possible affinity to *Tapeinosperma* Hook. f. of Australia, New Caledonia and the South Pacific islands.

Leaves elliptic, apex short-acuminate. *Y. Purpusii*.

Leaves obovate or oblanceolate, apex obtuse or rounded and apiculate.

Leaves pallid, subcoriaceous; pedicels sparsely papillate; sepals about 1.5 mm. long. *Y. ovandensis*.

Leaves reddish-brown, conspicuously so on undersurface, thin; pedicels glabrous; sepals 2-2.5 mm. long. *Y. amplifolia*.

Yunckeria amplifolia (Standl.) Lundell, *Wrightia* 3: 113. 1964.

Ardisia amplifolia Standl., *Field Mus. Bot.* 4: 249. 1929. *Uva de montaña, uva de monte* (Honduras).

Wet forest and river banks, 200 meters or lower. British Honduras; Honduras; Nicaragua (type from region of Braggman's Bluff, *F. C. Englesing* 230).

Shrub or small tree up to 5 m. tall, entirely glabrous, branchlets stout; leaves with marginate petioles 1-1.5 cm. long; leaf blades oblong-obovate or obovate, 18-30 cm. long, 8-13 cm. wide, apex obtuse, base cuneate and decurrent, entire, subchartaceous, the lower surface drying paler and reddish-brown, densely punctate but sometimes obscurely so, the costa prominent and elevated beneath, the lateral veins slender; inflorescences bright red, terminal, bipinnate, paniculate, 4-15 cm. long, the apical umbels of central axis often sessile; pedicels slender, up to 1 cm. long, accrescent and up to 1.5 cm. long in fruit; flowers usually 5-, rarely 4-parted, subcorymbose-umbellate, the buds up to 1 cm. long, slender, glabrous; sepals dextrorsely imbricate, broadly ovate or elliptic, 2-2.5 mm. long, rounded at apex, entire, rather thick, punctate; petals (in buds) linear-lanceolate, dextrorsely imbricate, about 2.5 mm. wide, connate about 1.5 mm. at base, conspicuously punctate; stamens (in buds) 7.5 mm. long; filaments slender, 2 mm. long; anthers erect, dorsifixed about 0.75 mm. above base, linear-lanceolate, 5.5-6 mm. long, attenuate to the apex, dehiscent through apical pores, epunctate; ovary small, ovoid, glabrous; style very slender, up to 9 mm. long; placenta obovoid; ovules 6-8, uniseriate, erect; fruits globose at maturity, about 1 cm. in diameter, black, apiculate; endocarp crustaceous; seed globose, with basal depression extending into center of endosperm; embryo transverse, elongate.

The species is easily recognized among Central American Myrsinaceae by its reddish-brown twigs and leaves.

Yunckeria ovandensis (Lundell) Lundell, *Wrightia* 3: 112. 1964.

Ardisia ovandensis Lundell, *Contr. Univ. Mich. Herb.* 4: 21. 1940.

Wet forest, 2,370 meters or less. Mexico (Chiapas, type from Mt. Ovando, *E. Matuda* 2549).

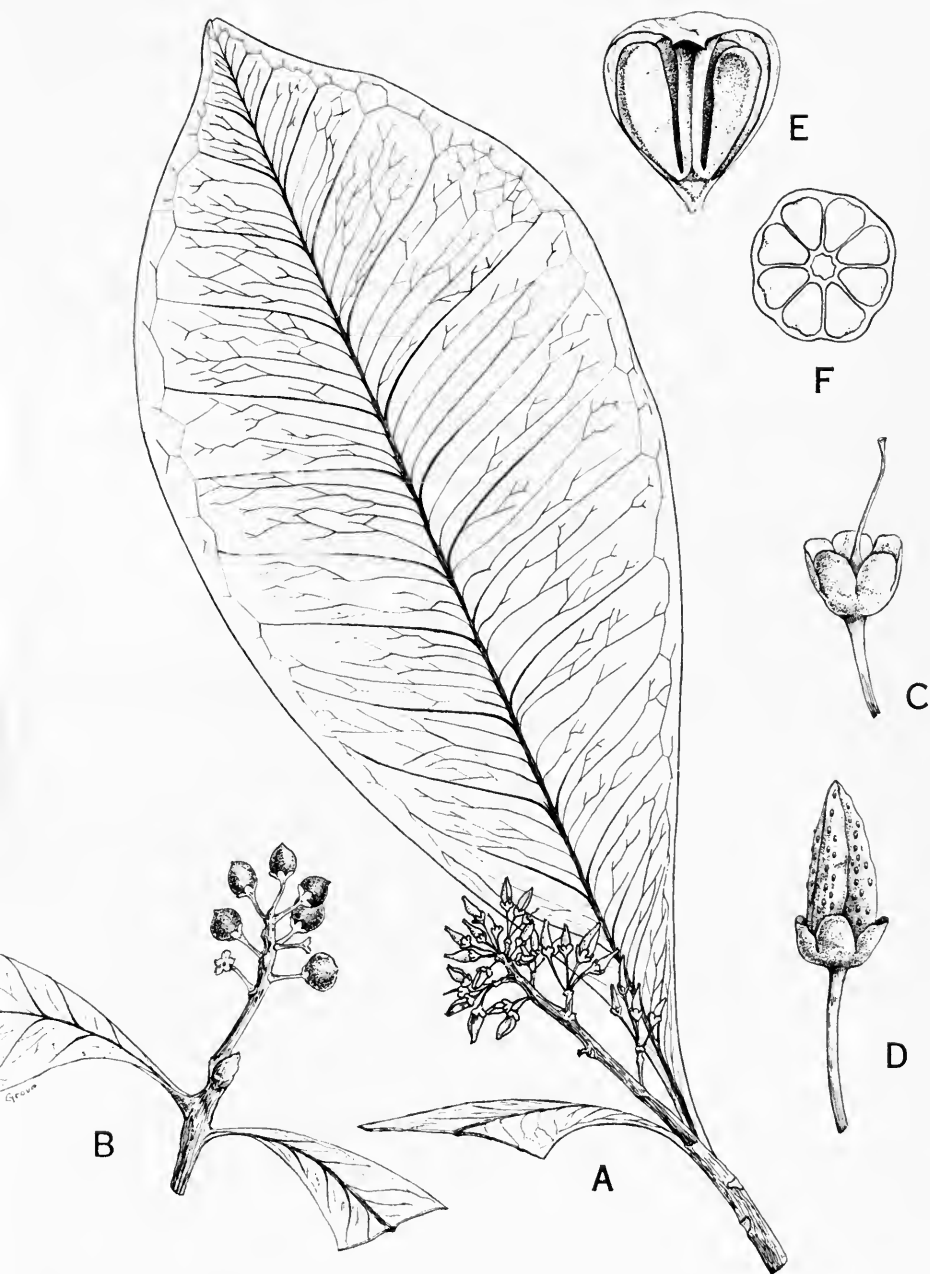


FIG. 56. *Yunceria amplifolia*. A, Flowering branchlet; $\times \frac{1}{2}$. B, Branchlet with fruits; $\times \frac{1}{2}$. C, Calyx and style; $\times 2\frac{1}{2}$. D, Flower bud, showing imbricate petals; $\times 2\frac{1}{2}$. E, Placenta, showing erect ovules; $\times 10$. F, Placenta cross section; $\times 10$. Flowers illustrated from type, Englesing 230 (F).

A small tree, up to 9 meters high, 25 cm. in diameter, the branchlets stout, glabrous; leaves with stout marginate petioles 1-1.3 cm. long; leaf blades obovate or oblanceolate, 12.5-22 cm. long, 5.5-8.3 cm. wide, apex rounded and obtusely apiculate, base cuneate and decurrent, entire, punctate, subcoriaceous, costa prominent and elevated beneath, the primary lateral veins very slender; inflorescences terminal, 2-3-pinnate, paniculate, up to 12.5 cm. long, glabrous, many-flowered; pedicels slender, up to 1 cm. long at base of corymb, sparsely and minutely papillate at first; flowers in racemiform corymbs, about 1 cm. long at anthesis; calyx lobed to about middle, tapering below into pedicel, minutely and sparsely papillate below in bud; sepals dextrorsely imbricate, broadly rounded, 1.5 mm. long, punctate, the margin scarios, entire; petals oblanceolate-oblong, 8-9 mm. long, 2.5 mm. wide, connate about 2 mm. at base, glabrous, dextrorsely imbricate, conspicuously punctate; stamens 8 mm. long; filaments slender, 3-4 mm. long; anthers erect, linear-lanceolate, 4-5.5 mm. long, dorsifixed about 0.75 mm. above base, not punctate, dehiscent through apical pores; ovary small, elongate, ovoid-oblong; style slender, 9 mm. long; placenta obovoid, small; ovules 6 or 7, uniseriate, erect.

Yunckeria Purpusii (Brandege) Lundell, *Wrightia* 3: 112. 1964.
Ardisia Purpusii Brandege, *Univ. Calif. Publ. Bot.* 6: 189. 1915.

Known only from the type, collected in damp barrancas near Finca Irlanda, Chiapas, Mexico, *C. A. Purpus* 7119.

Branchlets stout, terete, the plant entirely glabrous; leaves large with stout marginate petioles 1-2 cm. long; leaf blades elliptic, 17-27 cm. long, 7.5-10 cm. wide, apex short-acuminate, base cuneate or acute and decurrent, entire, thin, subchartaceous, costa shallowly sulcate above, elevated beneath, the veins slender and inconspicuous; inflorescences terminal, tripinnately paniculate, about 8 cm. long; pedicels slender, 8-14 mm. long, thickened above; flowers perfect, corymbose, about 9 mm. long at anthesis; sepals dextrorsely imbricate, ovate, 2 mm. long, obtuse or rounded, rather thick, punctate with a few small black glands, drying with few scattered plate-like glands on dorsal surface; petals dextrorsely imbricate, connate about 3 mm. at base, linear-oblong, 8-9 mm. long, obscurely lineate medially; stamens about 7 mm. long, attached about 1 mm. above base of corolla; filaments about 3 mm. long; anthers dorsifixed about 0.8 mm. above base, linear-lanceolate, 4-5 mm. long, attenuate to the apex, dehiscent through apical pores, epunctate, rigid; ovary ovoid; style slender, 6.5 mm. long; placenta obovoid; ovules 6 or 7, erect, uniseriate.

PRIMULACEAE. Primrose Family

Reference: F. Pax & R. Knuth, *Primulaceae*, *Pflanzenreich* IV. 237: 1-386. 1905.

Annual or perennial herbs, or rarely suffrutescent; leaves alternate, opposite, or verticillate, sometimes all basal, usually simple, sometimes dentate or lobate; flowers axillary and solitary, usually racemose, paniculate, spicate, or umbellate

at the apex of a scape, small or rather large and showy, regular, often dimorphous or heterostylous, commonly 5-parted; calyx more or less persistent, often somewhat foliaceous, gamosepalous; corolla gamopetalous, the tube short or elongate, the lobes imbricate in bud, entire or emarginate; stamens epipetalous, opposite the lobes; ovary superior, or half inferior in *Samolus*, 1-celled, the placenta central; ovules numerous; fruit capsular or a pyxis in *Anagallis* and *Centunculus*, variously dehiscent, few-many-seeded; seeds angulate or angulate-compressed; embryo small, immersed in the carnose or corneous endosperm.

Genera about 28, some of them with many species, the plants mostly in temperate and arctic regions. Very few are found in tropical regions, and only the following genera and species are known in Central America.

The common Cyclamen, *Cyclamen persicum* Mill., native of the eastern Mediterranean regions, is grown in pots in Guatemala, particularly in Quezaltenango and San Marcos, but is rare. The plants sometimes are sold at what would be in the United States fantastically high prices.

One or more species of *Primula* are sometimes grown in Guatemala in pots for ornament, but they are rare in cultivation in Central America.

Flowers in terminal leafless racemes; leaves large, mostly 10-20 cm. long. .*Samolus*.
Flowers axillary; leaves often very small.

Capsule longitudinally dehiscent; leaves mostly 3-6 cm. long.*Lysimachia*.

Capsule circumscissile; leaves small, less than 2 cm. long, often very small.

Corolla longer than the calyx; stamens inserted on the base of the corolla.

Anagallis.

Corolla shorter than the calyx; stamens inserted in the throat of the corolla.

Centunculus.

ANAGALLIS L.

Small herbs, simple or branched, with leafy stems, repent or erect, the stems terete or tetragonous; leaves opposite or alternate, small, sessile or short-petiolate, entire; flowers axillary, pedicellate, red, blue, or white; calyx 5-parted almost to the base, the segments lanceolate or subulate, spreading; corolla hypogynous, parted almost to the base, rotate or rotate-campanulate, the lobes obovate or linear, entire or erose-denticulate, contorted; stamens 5, inserted on the base of the corolla, united at the base to form a short tube, usually pilose, the anthers ellipsoid, obtuse; ovary globose, the style filiform, the stigma obtuse; ovules numerous, immersed in the globose placenta; capsule (pyxis) globose, circumscissile, many-seeded; seeds small, flat dorsally, conic-umbilicate ventrally, the embryo transverse.

About 24 species, widely distributed in both hemispheres. Only the following are known from tropical America.

- Leaves opposite, mostly 8-15 mm. long.*A. arvensis*.
- Leaves alternate, mostly 5-6 mm. long.*A. pumila*.

Anagallis arvensis L. Sp. Pl. 148. 1753.

Native of Europe and other parts of the Old World; introduced and naturalized in many temperate and tropical regions of America; well established in Guatemala in many places, especially in Chimaltenango, mostly as a weed in cultivated or waste ground, 1,500–2,500 meters; Guatemala; Sacatepéquez; Chimaltenango; Quezaltenango.

Plants annual, procumbent, usually much branched, the stems mostly 30 cm. long or less, 4-angulate, subulate; leaves opposite or ternate, usually broadly ovate, commonly 8–15 mm. long, very obtuse to subacute, pale green; pedicels axillary, often twice as long as the leaves, slender, recurved in fruit; calyx lobes 5 mm. long, lance-linear; corolla salmon-red or blue, rotate, about equalling the calyx lobes, parted almost to the base, the lobes broadly obovate, obtuse; stamens half as long as the corolla lobes.

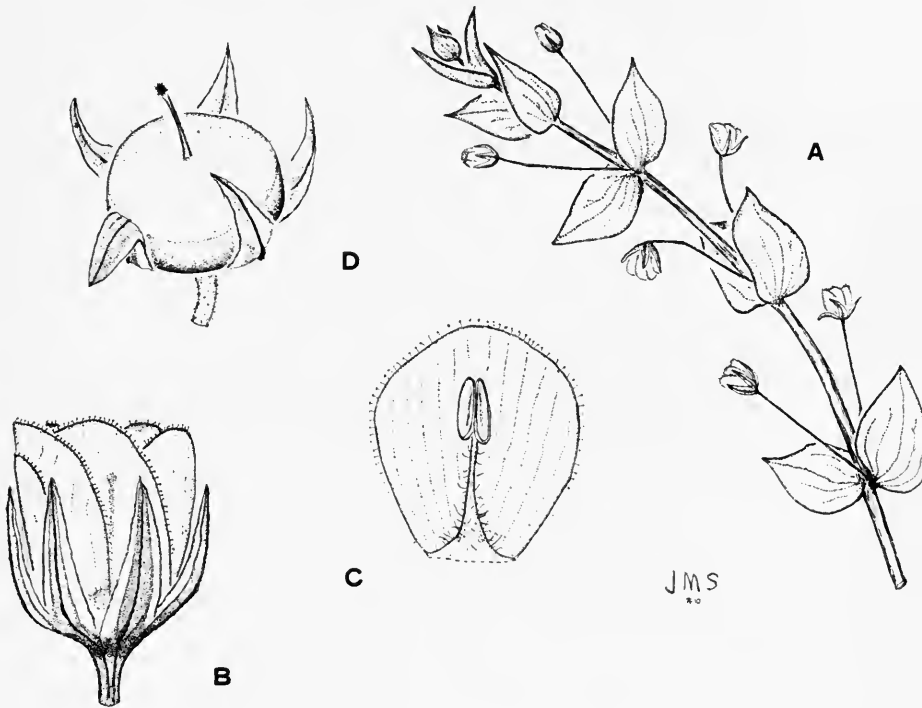


FIG. 57. *Anagallis arvensis*. A, Terminal portion of a branch, $\times 1$. B, Flower, $\times 6$. C, Portion of corolla showing attachment of stamen, $\times 6$. D, Capsule, nearly mature, the line of rupture of dehiscence shown, $\times 5$.

The Guatemalan material is referable to var. *phoenicia* (Scop.) Gren. & Godr. The plant is extensively naturalized in Mexico and the United States. It has been found in Honduras also, where the flowers are usually blue—while those in Guatemalan material are usually salmon red.

Anagallis pumila Swartz, Prodr. Veg. Ind. Occ. 1: 40. 1788.
Centunculus pentandrus R. Br. Prodr. 427. 1810.

Wet meadows or moist banks, sometimes in pine forest or bogs, 1,900 meters or less; Petén; Alta Verapaz; Baja Verapaz; Jalapa; Jutiapa; Santa Rosa; Guatemala; Chimaltenango; Quiché; Huehuetenango. Florida; Mexico; British Honduras to Panama; West Indies; South America; Asia; Africa; and Australia.

Plants annual, often much branched, erect or procumbent, the stems mostly 10 cm. long or shorter, glabrous throughout; leaves sessile or nearly so, alternate, ovate or lance-ovate, mostly 5-6 mm. long, acute, the lower leaves usually opposite; pedicels axillary, spreading or reflexed, equaling or twice as long as the leaves; calyx lobes scarcely 2 mm. long, linear-lanceolate; corolla white, funnelform, scarcely equaling the calyx lobes, deeply 4-5-parted, the lobes ovate-lanceolate, obtuse, the tube short; stamens much shorter than the corolla lobes.

Most of the rather numerous Guatemalan collections belong to var. *longipedunculata* Chod. & Hassl., in which the pedicels equal or exceed the leaves. One collection from Quezaltenango (Volcán de Zunil, 2,500-3,800 meters, *Steyermark 34614*) is referable to var. *ovalis* (Ruiz & Pavón) R. Knuth, in which the flowers are sessile or nearly so. *A. pumila* is a small and very inconspicuous plant, usually hidden by the grasses and other larger herbs among which it grows.

CENTUNCULUS L.

Plants very small, annual, glabrous, branched or simple, the stems leafy; leaves alternate or the lowest opposite, sessile or on very short petioles, entire; flowers minute, axillary, sessile or pedicellate; calyx 4-5-parted almost to the base, the lobes lanceolate, acute, longer than the corolla; corolla hypogynous, deeply 4-5-parted, the lobes erect-spreading, entire, the tube subglobose; stamens 4-5, inserted in the throat of the corolla, not exceeding the corolla lobes, the anthers ellipsoid, obtuse at each end; style filiform, the stigma obtuse; ovary globose, the ovules numerous, inserted on a globose placenta; capsule (pyxis) globose, circumscissile, many-seeded; seeds flat dorsally, convex ventrally, the embryo transverse.

The genus consists of a single species.

Centunculus minimus L. Sp. Pl. 116. 1753.

Wet, marshy meadows or wet open banks, 2,200-3,500 meters; Chimaltenango (Cerro de Tecpám); Totonicapán; San Marcos (volcanoes of Tajumulco and Tacaná); Huehuetenango (Sierra de los Cuchumatanes). United States; Mexico; Honduras; South America. Old World.

Stems prostrate, mostly 5 cm. long or shorter, very slender, densely leafy; leaves ovate, mucronate, sessile, generally 3-5 mm. long; flowers sessile or on very short petioles, white; calyx parted almost to the base, 2.5 mm. long, the lobes subulate-linear, acuminate; corolla urceolate-rotate, shorter than the calyx, 4-parted to the middle, the lobes lanceolate, acute, the throat slightly constricted; capsule globose, membranaceous; seeds numerous, angulate, minute.

Pax and Knuth speak of this plant as introduced in America, but there seems to be no good reason for doubting that it is native, like *Anagallis pumila*.

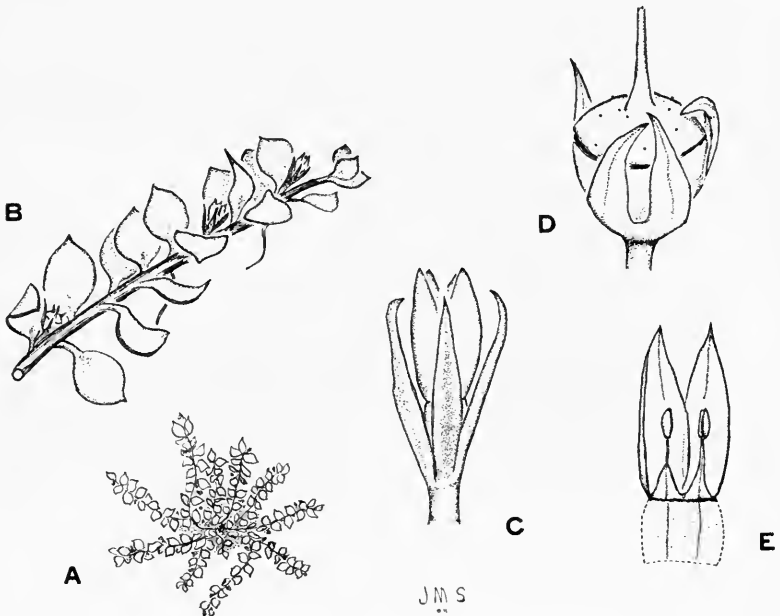


FIG. 58. *Centunculus minimus*. A, Habit of plant, $\times 1$. B, Branch of plant, $\times 5$. C, Flower, $\times 10$. D, Capsule nearly mature, $\times 10$. E, Corolla dissected to show anthers, $\times 15$.

LYSIMACHIA L.

Reference: Ray, James Davis. The Genus *Lysimachia* in the New World. Ill. Biol. Monog. 24: 1-160, *tt.* 1-20. 1956.

Erect or procumbent, usually perennial herbs; leaves alternate, opposite, or verticillate, membranaceous, entire; flowers rather large, axillary, racemose, or corymbose-paniculate, sometimes umbellate, white or yellow; calyx 5-6-parted; corolla hypogynous, subrotate or campanulate, 5-6-parted, the lobes contorted, entire or dentate; stamens 5-6, inserted on the tube of the corolla, sometimes with interposed staminodia, the anthers oblong, obtuse; ovary globose or ovoid, the style filiform, the stigma obtuse; ovules few or numerous, inserted on a globose placenta; capsule ovoid or globose, usually 5-valvate at the apex, few-many-seeded; seeds oblong, orbicular, or angulate, sometimes winged, the embryo transverse.

More than 100 species, in both hemispheres, mostly in temperate regions. Only the following is known from Central America.

Lysimachia steyermarkii Standl. Field Mus. Bot. 22: 369. 1940.

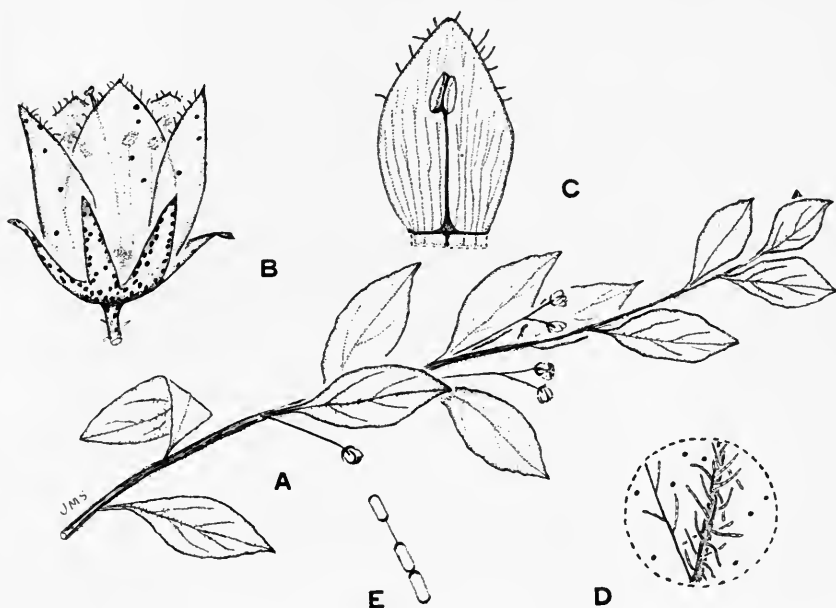
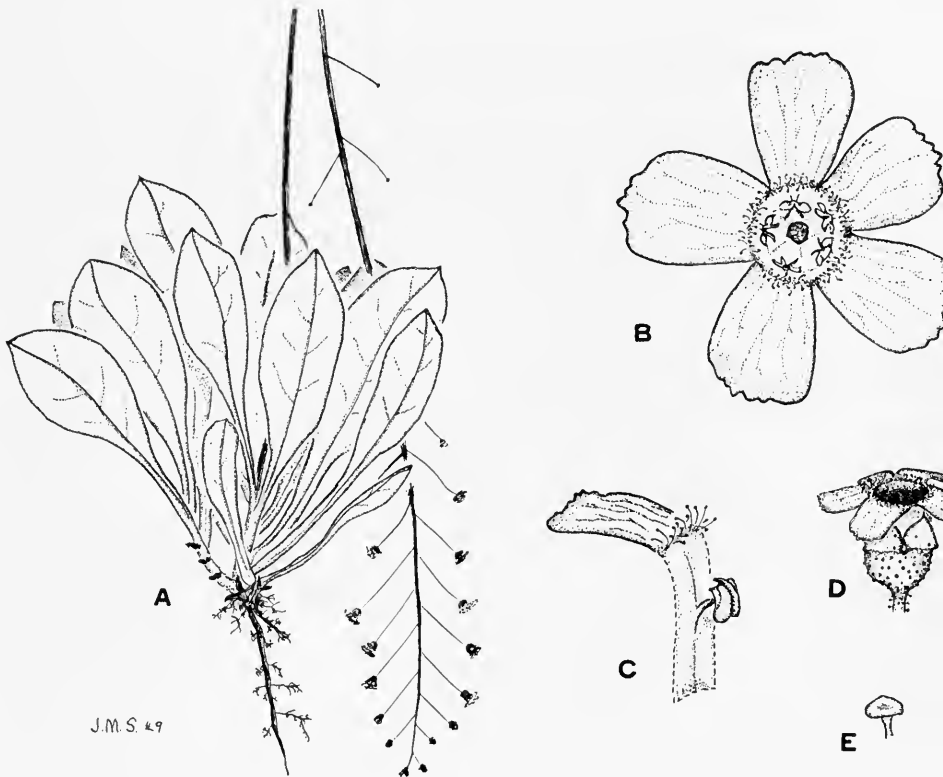


FIG. 59. *Lysimachia steyermarkii*. A, Branch, $\times \frac{1}{2}$. B, Flower, $\times 6$. C, Stamen showing attachment to portion of corolla, $\times \pm 7$. D, Underside of leaf to show pubescence along nerves, $\times \pm 7$. E, Portion of multicellular hair, ± 18 .

Moist shaded banks at base of cliffs, sometimes along streams in *Abies* forest, 2,500–3,800 meters; endemic; Huehuetenango; Quezaltenango (type from Volcán de Zunil, *Steiermark* 34772).

An ascending or decumbent herb, primary stems very thick, rooting at the nodes, the ultimate branches erect, 16–19 cm. long, simple, glabrous or sparsely villous above with long spreading hairs; leaves alternate, on petioles 4–15 mm. long, broadly ovate or elliptic, 3–6 cm. long, 1.5–2.5 cm. broad, acute or subacuminate, narrowed to the base, sometimes contracted and decurrent, green above, sparsely villous or glabrate, paler beneath, sparsely villous or almost glabrous, densely punctate; flowers fasciculate in the upper leaf axils, the slender pedicels 1.5–2 cm. long, sparsely villous; sepals in fruit 5 mm. long, oblong-lanceolate, acute or acuminate, densely punctate, 1-costate; capsule equaling the sepals, glabrous.



J.M.S. 49

FIG. 60. *Samolus ebracteatus*. A, Habit of relatively small plant, $\times \frac{1}{2}$. B, Corolla from above, $\times 20$. C, Portion of corolla showing attachment of stamen and stipitate glands at throat, $\times 10$. D, Flower, $\times 5$. E, Stipitate gland from pedicel of flower, $\times \pm 50$.

SAMOLUS L.

Annual or perennial herbs; leaves alternate, often succulent, usually scattered along the stems, entire; flowers small, white, racemose or corymbose, the inflorescences terminal, the pedicels bracteate at the base; calyx tube adnate below to the ovary, the limb 5-fid, persistent; corolla perigynous, subcampanulate, the limb 5-parted; stamens inserted on the tube or throat of the corolla, alternating with the same number of staminodia, these subulate or ligulate; connective of the stamens sometimes elongate; ovary globose, the style short, the stigma obtuse or capitellate; ovules numerous; capsule ovoid or globose, 5-valvate at the apex; seeds very numerous.

About 9 species, occurring in both hemispheres. Only one is known from Central America.

Samolus ebracteatus HBK. Nov. Gen. & Sp. 2: 181, *t.* 129. 1817.

Moist, or wet, open places, 300 meters or lower; Huehuetenango (Ciénaga de Lagartero, below Miramar, *Steyermark 51518*). South-western United States; Mexico; British Honduras.

Plants stout, perennial, glabrous throughout, usually 70 cm. high or less, the stems mostly simple; leaves fleshy, spatulate or rounded-spatulate, most of them 10–20 cm. long, rounded or very obtuse at the apex, somewhat abruptly narrowed below the middle into a long, broadly winged petiole, this dilated and clasping at the base, green above, pale beneath; racemes long and many-flowered, the pedicels widely spaced, 1–2.5 cm. long, very slender, glabrous or nearly so, not bracteate at the base; calyx green, 2 mm. long, lobate to the middle, puberulent, the lobes ovate-deltoid, acute; corolla white, little longer than the calyx, the lobes rounded-cuneate, obtuse or truncate, denticulate at the apex; staminodia none; capsule ovoid-globose, about equaling the calyx.

PLUMBAGINALES

The order contains a single family, the Plumbaginaceae. The family is presumed to be related to the Primulaceae and perhaps to some Caryophyllaceae. It is distinguished by having five styles, or stigmas, a one-celled ovary with a single pendulous ovule. The characters of the order are those of the single family which it contains.

PLUMBAGINACEAE, Plumbago Family

Perennial herbs or suffrutescent plants with short or sometimes vine-like stems; leaves alternate, sometimes rosulate, estipulate; inflorescence spicate to usually racemose or paniculate, sometimes reduced to a single flower (in *Armeria* capitate); flowers perfect, regular, small to large and showy, sessile or short-pedicellate; calyx 5-lobed, gamosepalous, the tube 5–15-costate, sometimes membranaceous or hya-

line; corolla sympetalous or the petals often nearly separate, the lobes imbricate in bud; stamens 5, opposite the corolla segments, the filaments adnate to base of the segments or united for most of their length with the corolla tube; anthers ovate or oblong, dorsifixed, the two cells parallel and contiguous, dehiscent by longitudinal slits; ovary superior, 1-celled, with a single anatropous ovule; styles 5, distinct or connate at the base, the stigmas terminal and capitate or sometimes decurrent on the styles; fruit an utricle, indehiscent or circumscissile, often included in the calyx; seed filling the cell; endosperm farinaceous, from copious to scant or none; embryo straight, cotyledons linear or oblong.

A predominately Old World family of about eight genera and some 300 species. Three genera are native in America, but only *Plumbago* is indigenous in Central America.

Calyx glandular, tubular, the teeth erect; style simple below, branched above.

Plumbago.

Calyx not glandular; the teeth spreading; styles distinct *Limonium*.

LIMONIUM Adanson

Perennial or annual herbs, usually erect and branched, sometimes acaulescent; leaves cauline or basal, narrow or broad, entire, or often sinuate or pinnatifid; stems often winged; flowers rather small, in bracteate spikelets; calyx usually funnelform, the tube commonly 10-costate or 5-costate, the limb scarious, plicate, spreading in anthesis, the 5 costae excurrent as teeth or bristles; petals united only near the base, usually obovate or obcordate; styles distinct, the stigmas oblong, capitate, or minute; utricle included in the calyx, oblong, fusiform, or linear, indehiscent or variously dehiscent at the apex.

About 150 species, mostly in the northern hemisphere of the Old World, a few species native in temperate North America. None is native in tropical America.

Limonium sinuatum (L.) Mill. Gard. Dict. ed. 8. no. 6. 1768.
Statice sinuata L. Sp. Pl. 276. 1753. *Estatice*.

Native of the Mediterranean region; cultivated occasionally for ornament in Guatemalan gardens.

Plants biennial or annual, erect, 30-60 cm. high, sparsely branched, sparsely hispid-scabrous with broad-based hairs; lower leaves sinuate-pinnatifid, the lobes broad, mostly rounded at the apex; branches broadly 3-winged; spikelets 3-5-flowered, in short secund spikes at the ends of the branches; calyx corolla-like, 1 cm. broad, broadly funnelform, blue or purple, glabrous, truncate, crenulate; corolla small, yellowish white.

This is an occasional garden plant in the Guatemalan highlands and in other places in Central America. The flowers are sometimes used like "everlasting" flowers and remain for a long time in homes, often on altars. Flower color, actually the calyx, is blue or purple

but forms (Bailey in Man. Cult. Pl. 787. 1949 says hybrids) with white and yellow "flowers" are known in Guatemala. Standley thought *L. bonduellii* (Lest.) Kuntze was cultivated in Guatemala but the form he saw may have been a yellow "flowered" *L. sinuatum*.

PLUMBAGO L. Plumbago

Plants perennial, herbaceous or suffrutescent, the stems usually weak and often reclining or somewhat scandent; leaves alternate, sometimes clasping, entire, membranaceous; flowers rather large, purple, blue, or white, in bracteate spikes; calyx tubular, 5-costate, glandular, with 4-5 erect teeth; petals 4-5, their claws united into a slender tube, the limb spreading, the corolla salverform; stamens 5, distinct, the filaments dilated at the base, the anthers linear; styles filiform, partly united, stigmatose on the inner side; fruit capsular.

About 10 species, in the Mediterranean region, western Asia, and tropical America. Two native species occur in Mexico, but only one of them extends to Central America.

Petioles conspicuously dilated and auriculate at the base; cultivated plants.

P. capensis.

Petioles not auriculate-dilated at the base; native plants *P. scandens*.

Plumbago capensis Thunb. Prodr. Pl. Cap. 33. 1794-1800.
Plumbago.

Native of South Africa; grown for ornament in gardens and parks of Guatemala, from sea level to 2,200 meters or higher.

A slender sub-shrub, 1-2 meters long, the stems weak, often reclining or sub-scandent; leaves oblong to spatulate, 3-7 cm. long, narrowed to the obtuse apex, attenuate to the base, auriculate-dilated at the base of the petiole, sparsely lepidote or glabrate; flowers large and showy, sky-blue, in short dense spikes; calyx tube 12 mm. long, covered over most of its surface with long-stipitate glands; corolla tube as much as 4 cm. long, the limb 2.5 cm. broad.

A rather handsome plant, well known in cultivation in the United States, where it usually is grown in hothouses. Known in El Salvador as "umbela" and "lumbela"; "embeleso," "jazmín azul" (Yucatan).

Plumbago scandens L. Sp. Pl. ed. 2. 215. 1762. *Hierba del pájaro; zapatilla*.

Moist or dry thickets, sometimes in hedges or waste ground, 1,000-1,800 meters; Zacapa; Guatemala; Chimaltenango; Quiché. Southern Florida; Mexico to Costa Rica. West Indies; South America.

Plants suffrutescent or herbaceous almost throughout, a meter high or less, erect or reclining, minutely lepidote or almost glabrous; leaves pale, ovate to ob-

long-lanceolate, 3–10 cm. long, acute or acuminate, acute and petiolate at the base, the petioles 1 cm. long or shorter, not dilated at the base; spikes slender and interrupted, several-many-flowered, 5–12 cm. long, the bracts lanceolate, acuminate, persistent; calyx 1 cm. long, covered with long-stipitate glands, very viscid to the touch; corolla white, the tube filiform, 2 cm. long, the lobes of the limb obovate, mucronate, 5–7 mm. long.

Known in El Salvador as “guacochile”; “chabac,” “chapac” (Maya); “hierba de alacrán” (Yucatan).

If the crushed leaves of this and other species are applied to the skin they cause almost instantaneous rubefaction, and in a very short time blisters. Taken internally, the plant is poisonous. In tropical America the leaves sometimes are applied externally as a remedy for itch and other cutaneous diseases, and an infusion of the leaves sometimes is administered as an emetic or purgative, although such use must be rather dangerous.

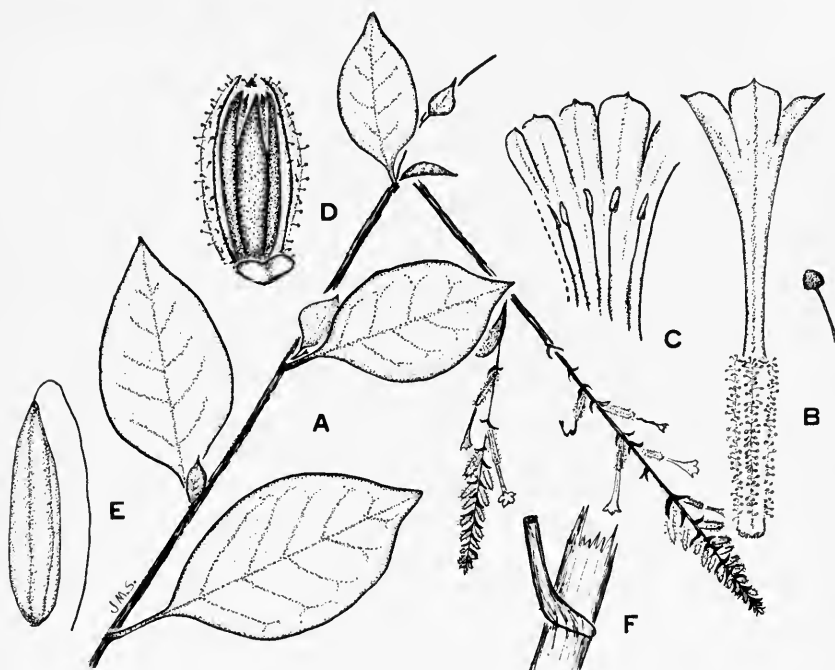
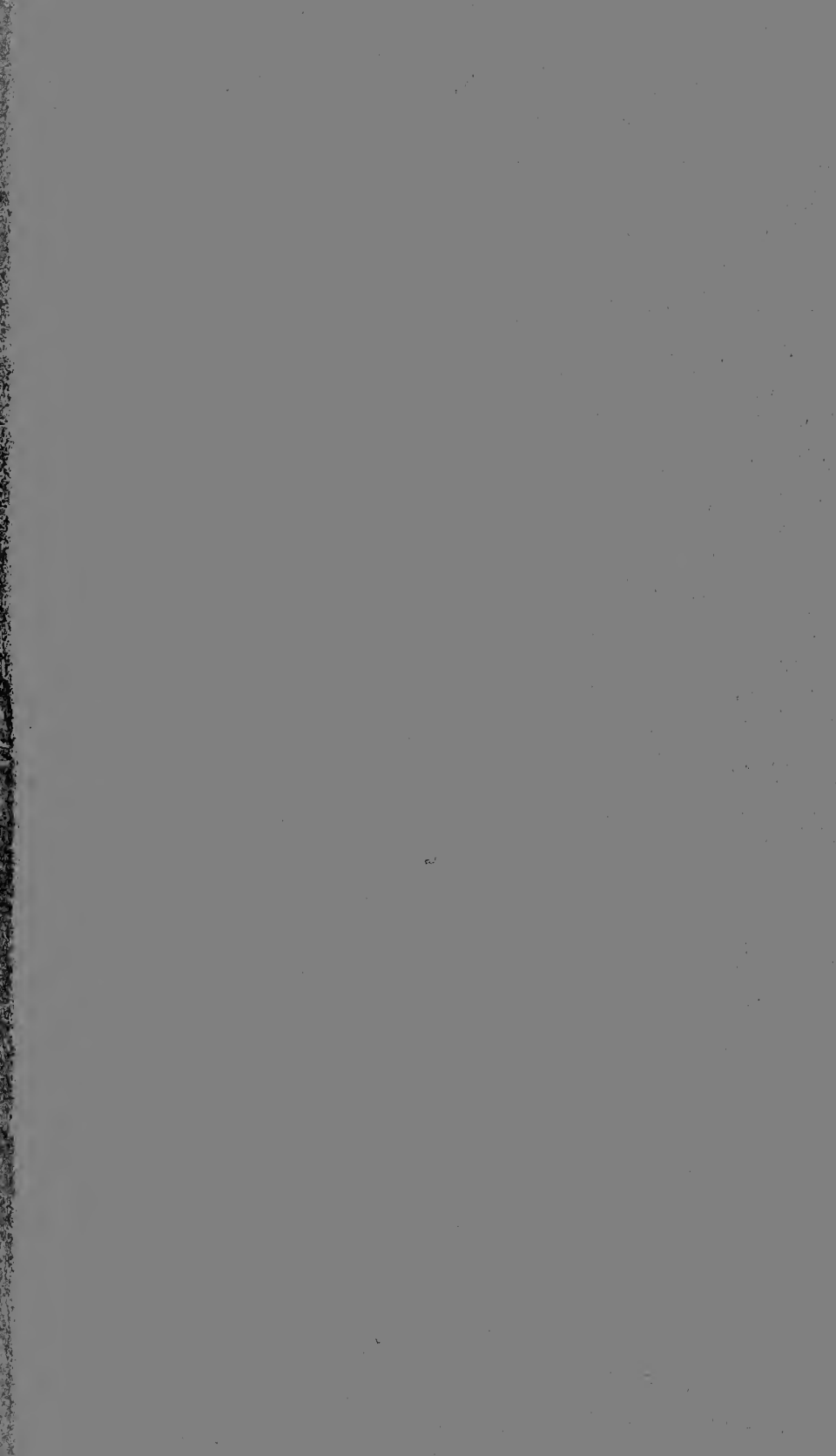


FIG. 61 *Plumbago scandens*. A, Habit, $\times \frac{1}{2}$. B, Flower, $\times 3$. C, Corolla, opened to show attachment of anthers, $\times 3$. D, Mature capsule within calyx, $\times 2\frac{1}{2}$. E, Single ovule showing attachment of petiole to stem, $\times \pm 2$. G, Stipitate gland from calyx, $\times 10$.



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