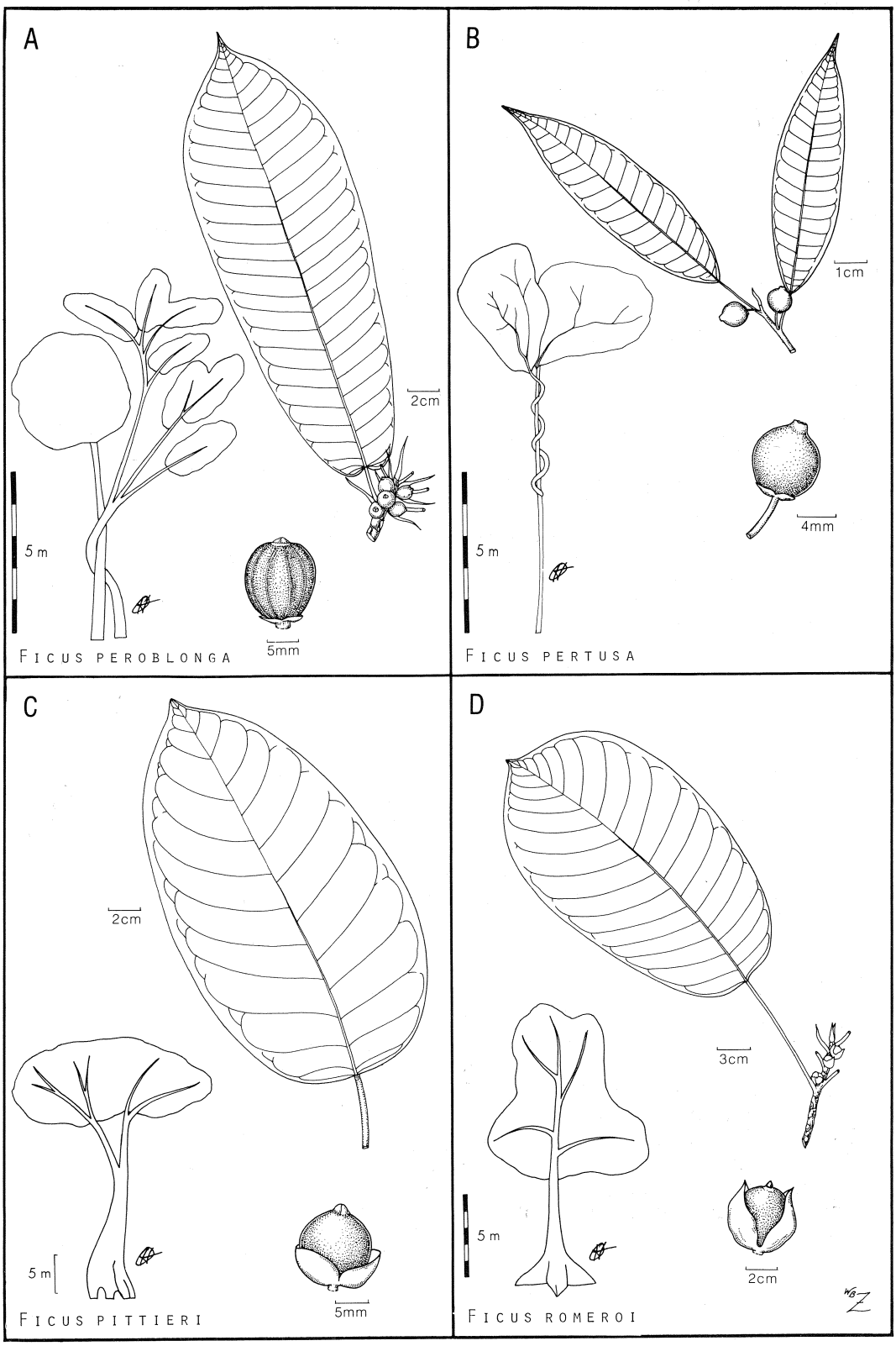
A
2cm
5 m
5mm
FICUS PEROBLONGA
B
1cm
4mm
5 m
FICUS PERTUSA
C
2cm
5 m
5mm
FICUS PITTIERI
D
3cm
5 m
2cm
FICUS ROMEROI

Plate 211

Ficus romeroi Dug. Plate 211-D

Strangler to 20 m tall. Leaves obovate-oblong, rounded to apiculate at the apex, the base obtuse, glabrous, 24-34 × 13-19 cm. Petiole 4-6 cm long. Figs ca. 1 cm in diameter, sessile, appressed pubescent, subtended by enclosing acute bracts almost as long as the figs. Uncommon, in the forest along the river. Pacific Ecuador and adjacent Colombia; this is the first record for Ecuador.

Ficus schippii Standl. Plate 212-A

Vine-like strangler. Terminal stipules 1.5-2.5 cm long. Leaves elliptic-oblong, obtuse to acuminate at the apex, truncate at the base, to 17 × 8 cm. Figs tiny, sessile, 3-4 mm in diameter. Rare, in mature forest. Previously known from Belize to Panama, but *F. krukovii* Standl. of Amazonia is very closely related.

Ficus tonduzii Standl. Plate 212-B

Canopy tree to 30 m tall in mature forest; not a strangler. Leaves coriaceous, broadly elliptic, rounded at the base and the apex; secondary veins at right angles to the midvein and separated by 1.5-2.5 cm; petiole rather thick. Figs globose, 2-2.5 cm in diameter, scabrous. Infrequent, in mature forest. Previously known from Costa Rica to Colombia. The fruits are somewhat more scabrous than in most Panamanian material of this species but the leaves appear identical.
Common name: "Cholmate"

Ficus cf. **turrialbana** W. Burger Plate 212-C

Midcanopy tree. Leaves elliptic, apiculate, rounded at the base, 17-25 × 9-13 cm, somewhat 3-veined from the base, pilose beneath especially along the main veins; petiole 5.5-8 cm long. Figs sessile, almost 1 cm in diameter, scattered-pilose. Rare, in mature forest. This matches some material determined as *F. trigonata* by DeWolf but is very different from that species in Central America; C. Berg suggests that it is closest to *F. velutina*, otherwise known at least from Colombia and Venezuela (identification of Central American material as *F. velutina* HBK is suspect), although the long narrow petioles are quite different from most material assigned to that species.

Ficus cf. **yoponensis** Desv. Plate 212-D

Canopy tree to 30 m tall; not a strangler. Buttresses large and sweeping. Leaves elliptic, acute to subacute at the base and the apex, 7-8 × 3-4 cm, secondary veins close together and almost at right angles to the midvein. Figs 2 cm in diameter, somewhat puberulous. Rare, in mature forest at junction of perimeter road and Dodson Road. Otherwise known from Venezuela to Panama. Our material would be lumped by Berg with *F. maxima* Mill. but differs in smaller leaves, closer secondary venation, and non-asperous fruits and is clearly not conspecific with the other Río Palenque *F. maxima*. Differs from Panamanian material of *F. yoponensis* in lacking an elongated osteole.

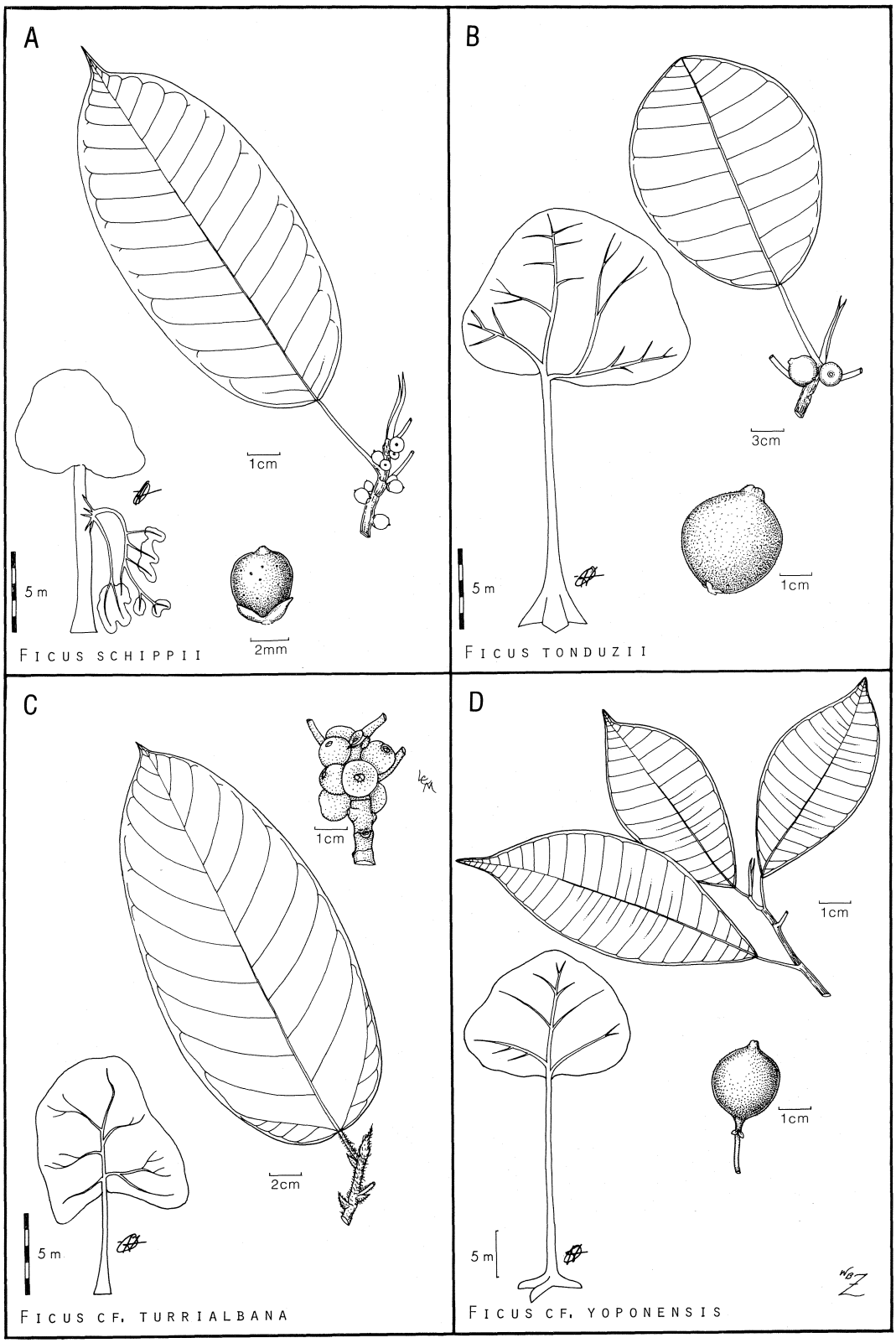
A
1cm
5 m
2mm
FICUS SCHIPPII
B
3cm
5 m
1cm
FICUS TONDUZII
C
1cm
2cm
5 m
FICUS CF. TURRIALBANA
D
1cm
1cm
5 m
FICUS CF. YOPONENSIS

Plate 212

Ficus sp. (6547, 12049) Plate 213-A

At Río Palenque known only from sterile juvenile plants. Young branchlets sparsely pilose. Petiole 0.6-2 cm long, conspicuously pilose; leaves 10-18 × 2.5-6 cm, long-acuminate, acute to rounded at the base, entire. Rare, in mature forest.

Maquira costaricana (Standl.) Berg Plate 213-B

Dioecious middle story tree to 15 m tall; latex very slow-running, tan. Leaves oblong to obovate-oblong, acuminate, rounded to acute at the base, 10-23 × 4-8 cm, the secondary veins widely separated and approaching a right angle in divergence from the midvein; petiole ca. 1 cm long. Male inflorescence globose, the peduncule 2-3 mm long, ca. 6 mm in diameter; pistillate inflorescence sessile, several-flowered. Fruits ellipsoid, 1.5 cm long, ca. 1 cm wide, glabrous, red, several per infrutescence, usually of different sizes. Infrequent, in mature forest. Nicaragua to Peru; this is the first record of the genus for Ecuador.

Maquira guianensis Aubl. Plate 213-C

Dioecious canopy tree 30 m tall; latex very slow-running, tan. Leaves obovate, acuminate, acute at the base, 11-17 × 5-7 cm, the secondary veins slightly less divergent on the average than in *M. costaricana;* petiole 1.5-2 cm long, rather thick and greyish when fresh. Male inflorescence hemispheric, ca. 8 mm across, peduncle ca. 6 mm long; female inflorescence sessile, several-flowered. Fruits ellipsoid, 1.5 cm long, to 1 cm in diameter, densely puberulous, several per infrutescence, usually of different sizes. Uncommon, in mature forest. Otherwise known from Guayana and lower Amazonia, an unlikely disjunction; we suspect our plant to be a new species.

Naucleopsis chiguila Benoist Plate 213-D

Tree 20 m tall, apparently without latex. Stems surrounded by a stipular ring at each node. Leaves obovate-elliptic, apiculately acuminate, obtuse at the base, to 24 × 10 cm. Female inflorescence (not seen at Río Palenque) subsessile, ca. 2 cm in diameter, surrounded by triangular bracts to 3 cm long; tepals free, triangular, 2-5 mm long. Rare, in mature forest. Endemic to Pacific Ecuador.

Olmedia aspera R. & P. Plate 214-A

Dioecious tree ca. 10 m tall. Leaves lanceolate-oblong, somewhat falcate, acuminate, acute at the base, somewhat dentate, conspicuously scabrous, especially below, to 29 × 9 cm. Male inflorescences 1 or 2 together, 4-10 mm in diameter, with 10-30 flowers. Female inflorescence subsessile, 1-flowered, greenish, ovoid, ca. 4 mm long. Fruit subglobose, ca. 5 mm in diameter, subtended by the fleshy orange fruiting perianth. Uncommon, along Greenfield creek in mature forest. Costa Rica to Bolivia.

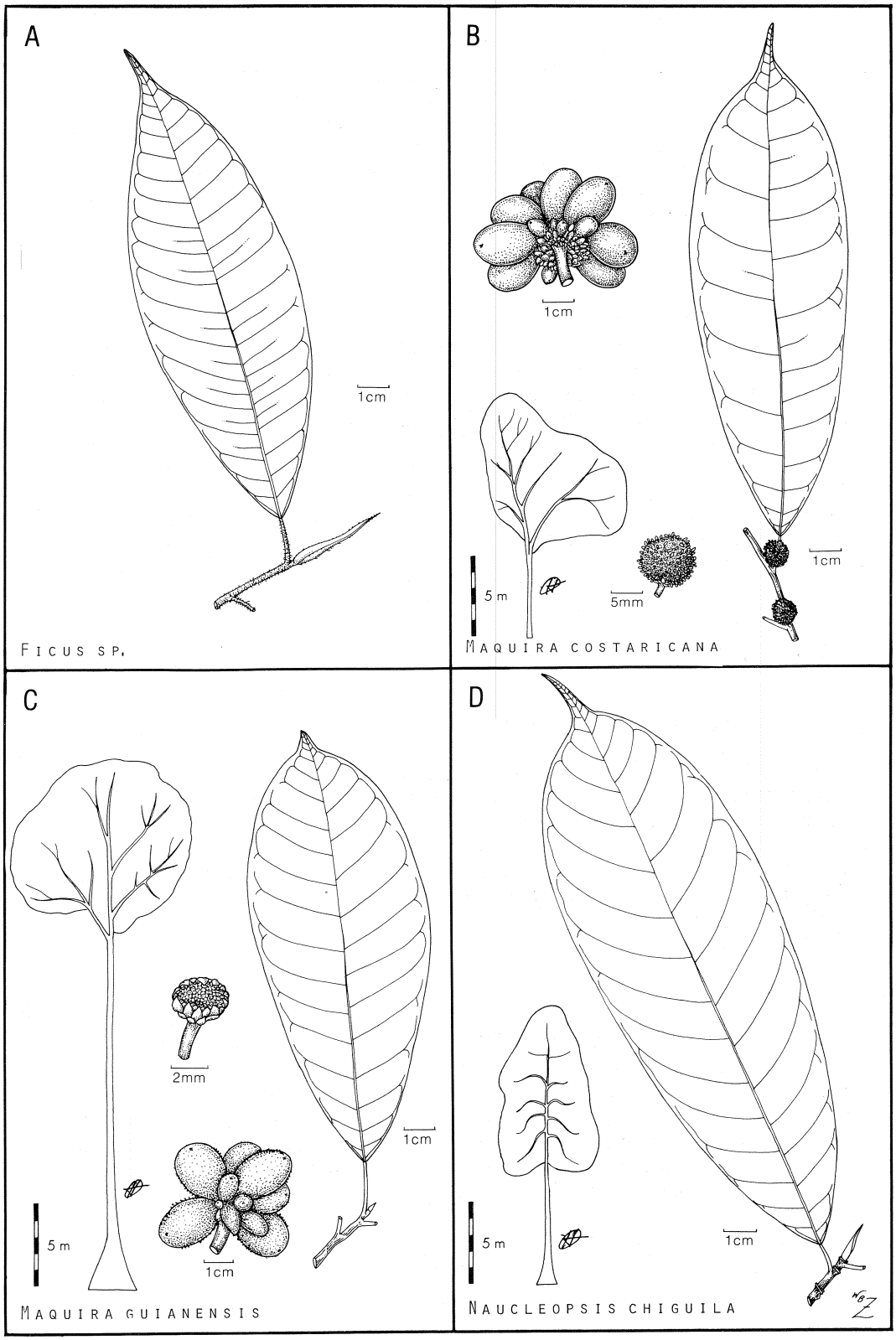
A
1cm
FICUS SP.
B
1cm
5 m
5mm
1cm
MAQUIRA COSTARICANA
C
2mm
1cm
5 m
1cm
MAQUIRA GUIANENSIS
D
5 m
1cm
NAUCLEOPSIS CHIGUILA

Plate 213

Poulsenia armata (Miq.) Standl. Plate 214-B

Middle story to canopy tree to 30 m tall. Buttresses characteristically tall, thin, and ending rather abruptly. Branchlets and terminal stipules with short spines. Leaves broadly ovate to obovate, obtuse at the apex, rounded to truncate at the base, entire, to 35 × 25 cm. Male inflorescence globose, ca. 1.3 cm in diameter, subsessile in the leaf axil; female inflorescence inconspicuous, green, bracteate, single-flowered, in the leaf axil. Common, in mature forest. Southern Mexico to Bolivia.
Common name: "Majagua"+, "Damagua"

Pourouma cf. **guianensis** Aubl. Plate 214-C

Dioecious canopy tree to 25 m tall. Leaves 3-to 5-lobed to below the middle, the lobes acute to subacuminate, cordate or subcordate at the base, to 30 cm long, scabrous above, softly whitish puberulous below; when young (tree less than 7 m) 7-lobed and scabrous beneath. Inflorescence cymose-paniculate. Flowers small, somewhat clustered into poorly defined heads. Fruits ovoid, scabrous, black and 1.5 cm in diameter when ripe. Very common, in mature forest. Agrees best with this Guiana area species in its softly pubescent mostly 3-lobed leaves; *P. chocoana* Standl. the common species of Pacific Ecuador, has adpressed pubescence on the leaf under surface.
Common name: "Uva"+

Pseudolmedia rigida (Kl. & Karst.) Cuatr. ssp. **eggersii** (Standl.) Berg.

P. eggersii Standl. Plate 214-D

Dioecious emergent tree to 50 m tall. Leaves ovate-elliptic to oblong-elliptic, long acuminate, rounded at the base, undulate-margined, somewhat asymmetrical, to 18 × 7 cm (including the 1-2 cm long tip), petiole 2-7 mm long. Fertile material not collected at Río Palenque. Both staminate and pistillate inflorescences sessile and solitary in leaf axils. Fruit a drupe, ellipsoid, 1.5-2 cm long, apiculate, subtended by perianth remnants at the base. Rare, in mature forest. The species ranges from southern Mexico and the Greater Antilles to Venezuela and Pacific Ecuador; the subspecies is restricted to Pacific Ecuador.
Common name: "Guion"+

Sorocea sarcocarpa Lanj. & W. Boer. Plate 215-A

Small or midcanopy dioecious tree to 10 m tall. Petiole less than 1 cm long; leaves narrowly obovate, long-acuminate, acute at the base, margin remotely serrate, to 22 × 8.5 cm. Male inflorescences spicate, narrow; female inflorescences racemose. Fruits subglobose, 5-6 mm in diameter, red, turning black at maturity. Uncommon, in mature forest. Endemic to western Ecuador. Very close to Central American *S. affinis* Hemsl., perhaps only subspecifically distinct.
Common name: "Tillo prieto"

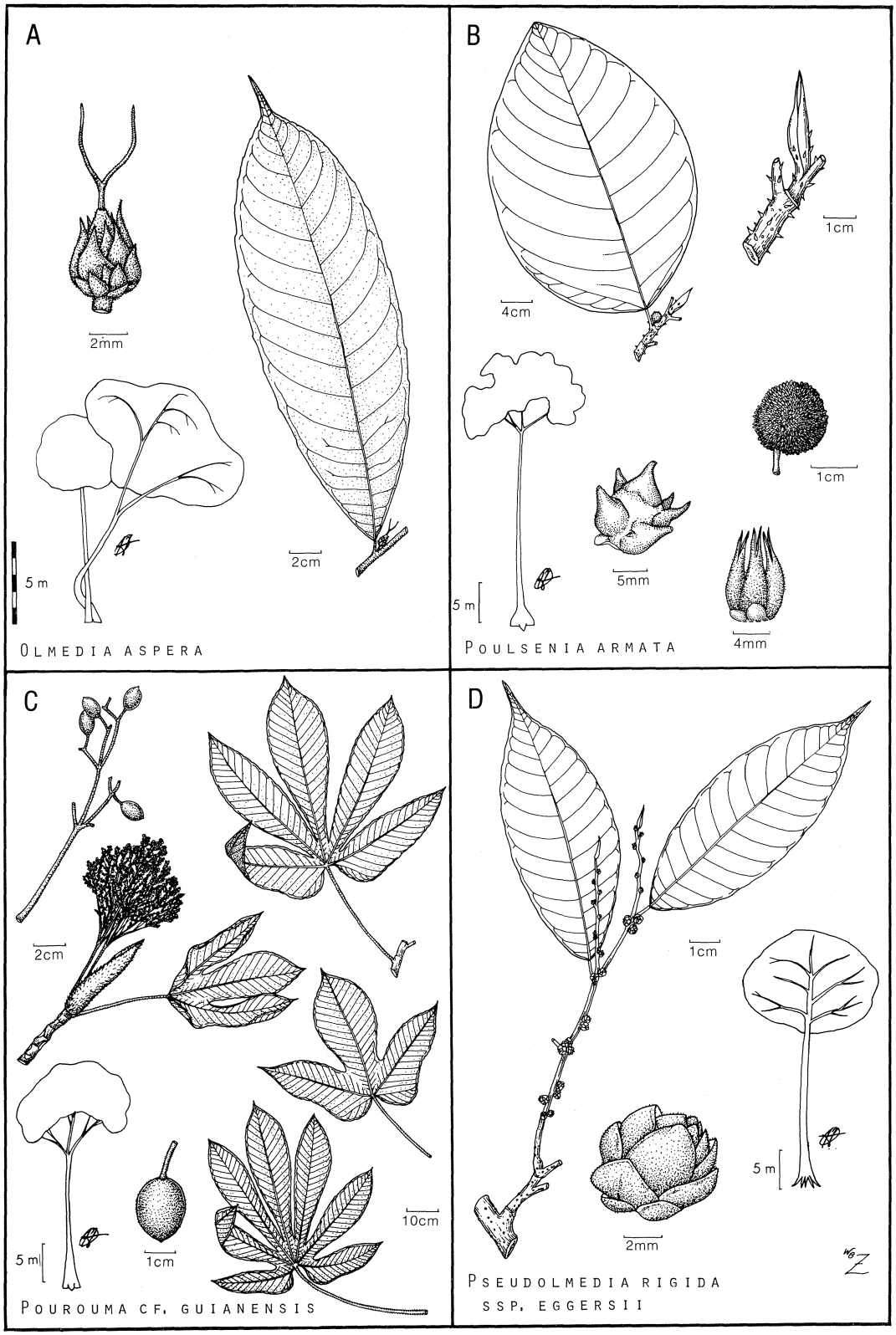
A
2mm
2cm
5 m
OLMEDIA ASPERA
B
4cm
1cm
1cm
5mm
5 m
4mm
POULSENIA ARMATA
C
2cm
10cm
5 m
1cm
POUROUMA CF. GUIANENSIS
D
1cm
5 m
2mm
PSEUDOLMEDIA RIGIDA
SSP. EGGERSII

Plate 214

MYRISTICACEAE

Dioecious trees, the wood and foliage aromatic, often with red latex. Branches usually produced in whorls (myristicaceous branching). Leaves alternate, simple, entire, without stipules. Flowers unisexual, regular; calyx 3-lobed; petals lacking; staminate flowers with 3-30 stamens, the filaments joined to form a column; ovary superior, 1-loculed, the ovule solitary. Fruit dehiscent, bivalved, the single seed enveloped by a fleshy, often laciniate, aril.

Key to the species.

1. Leaves conspicuously stellate rufescent beneath, especially along the veins, the trichomes stellate or dendroid.
   2. Secondary veins, 10-20 on a side, more than 1 cm apart . . . . . *Virola sebifera*
   2. Secondary veins more than 30 on either side, less than 1 cm apart . . . . . *Virola koschnyi*
1. Leaves glabrescent beneath, sometimes with inconspicuous minute T-shaped trichomes.
   3. Leaves with more than 20 pairs of secondary nerves, these less than 1 cm apart; most vegetative trichomes stellate . . . . . *Virola reidii*
   3. Leaves with less than 18 pairs of lateral nerves, these more than 1 cm apart; all vegetative trichomes T-shaped.
      4. Leaves with 2 conspicuous lines paralleling the midvein beneath; fruit acute; stamen filaments divergent . . . . . *Dialyanthera gordoniaefolia*
      4. Leaves without lines on the undersurface below (except sometimes when young); fruit obtuse; stamen filaments connate . . . . . *Dialyanthera otoba*

Dialyanthera gordoniaefolia (DC.) Warb. Plate 215-B

Dioecious middle story tree 15-20 m tall. Leaves obovate to elliptic, drying whitish beneath and with 2 to 4 conspicuous vernation lines paralleling the midvein. Inflorescence a raceme. Flowers small, green; with 3 sepals; male flowers with divergent filaments. Fruits acuminate, ellipsoid, 3 cm long. Uncommon, in mature forest. Endemic to Pacific Ecuador but not very distinct from *D. otoba*, at least at Río Palenque.
Common name: "Sangre de Drago", "Cuangare Indio"

Dialyanthera otoba (H. & B.) Warb. Plate 215-C

Dioecious middle story tree 15-20 m tall. Leaves obovate to narrowly elliptic, drying whitish beneath, without vernation lines. Inflorescence a raceme. Flowers small, green; with three sepals; the male flowers (not seen from Río Palenque) with connate filaments. Fruits globose, obtuse-tipped, 2.5 cm long. Costa Rica to Ecuador. Common, in mature forest. This is the first record for Ecuador, although Little listed and illustrated this plant from Esmeraldas as an undetermined species.
Common name: "Chispiador"+

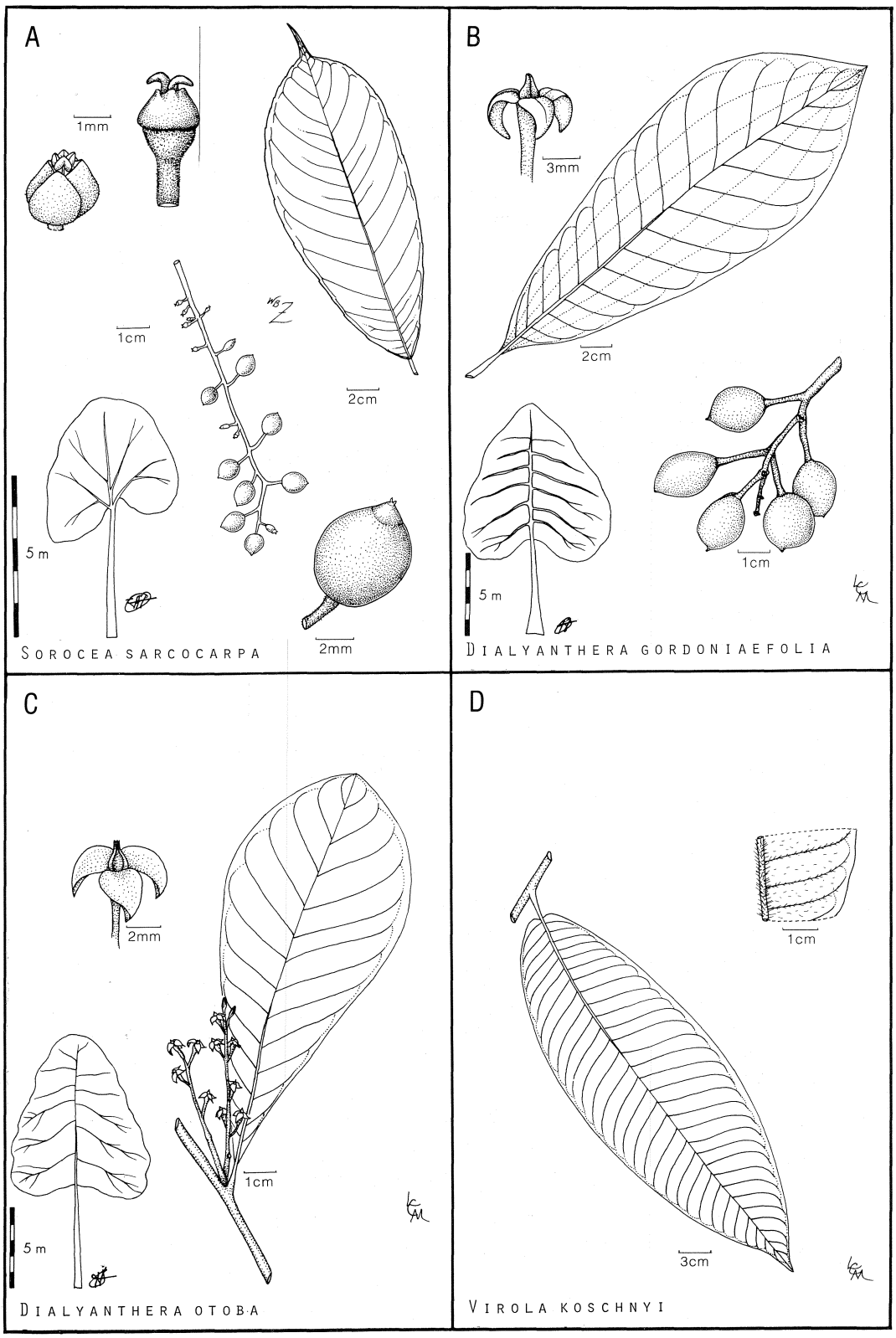
A
1mm
1cm
2cm
5 m
2mm
SOROCEA SARCOCARPA
B
3mm
2cm
1cm
5 m
DIALYANTHERA GORDONIAEFOLIA
C
2mm
1cm
5 m
DIALYANTHERA OTOBA
D
1cm
3cm
VIROLA KOSCHNYI

Plate 215

Virola koschnyi Warb. Plate 215-D

Slender treelet 4 m tall with myristicaceous branching, presumably becoming a canopy tree; branchlets rufous pilose. Leaves with turpentine odor, oblong, acute at the apex, tapering to an obtuse or narrowly cordate base, 21-32 × 7-9.5 cm, pilose along the main veins beneath with reddish brown irregularly branching trichomes, mostly more than 1 mm long; petiole 0.7-1 cm long. Rare, in mature forest. This is presumably the species treated by Little as *Virola* sp. and compared with small-leaved *V. flexuosa* A. C. Sm. Our collection is a much better match with this Central American species known from Belize and Guatemala to Panama.
Common name: "Freta dorada"

Virola reidii Little Plate 216-A

Dioecious canopy tree to 40 m tall. Leaves oblong, glabrate, with more than 20 pairs of lateral nerves, these less than 1 cm apart. Inflorescence paniculate. Flowers green; with 3 sepals. Fruits elliptic, to 3 cm long, ellipsoid, the red-arillate seed ca. 2 cm long. Infrequent, in mature forest. Endemic to Pacific Ecuador.
Common name: "Chispiador"+

Virola sebifera Aubl. Plate 216-B

Dioecious canopy tree to 30 m tall. Leaves oblong to elliptic-oblong, densely stellate pubescent along the nerves beneath and somewhat less so over the surface. Staminate inflorescence broadly paniculate; pistillate inflorescence smaller. Flowers small, greenish-brown; with 3 sepals. Fruits ellipsoidal or subglobose, 1.5-2 cm long, densely stellate pubescent. Infrequent, in mature forest. Nicaragua to Bolivia and southern Brazil.

MYRSINACEAE

Trees or shrubs. Leaves alternate, simple, without stipules, pellucid-punctate. Flowers bisexual or unisexual, regular; sepals 4-5, distinct or somewhat connate at base; corolla 4-to 5-lobed, the petals joined at the base; stamens as many as the corolla lobes and opposite them, usually mounted on the corolla; the ovary superior, 4-to 6-loculed with axillary or free central placentation. Fruit a drupe, usually one-seeded.

Key to the species.

1. Inflorescence paniculate, terminal; leaves serrate or the secondary veins strongly ascending and prominent beneath.
   2. Leaves serrate, less than 11 cm long . . . . . *Ardisia romeroi*
   2. Leaves entire, more than 20 cm long. . . . . *Ardisia longistaminea*
1. Inflorescence axillary or ramiflorous; leaves entire with secondary veins barely prominulous beneath and weakly ascending . . . .*Stylogyne gentryi*

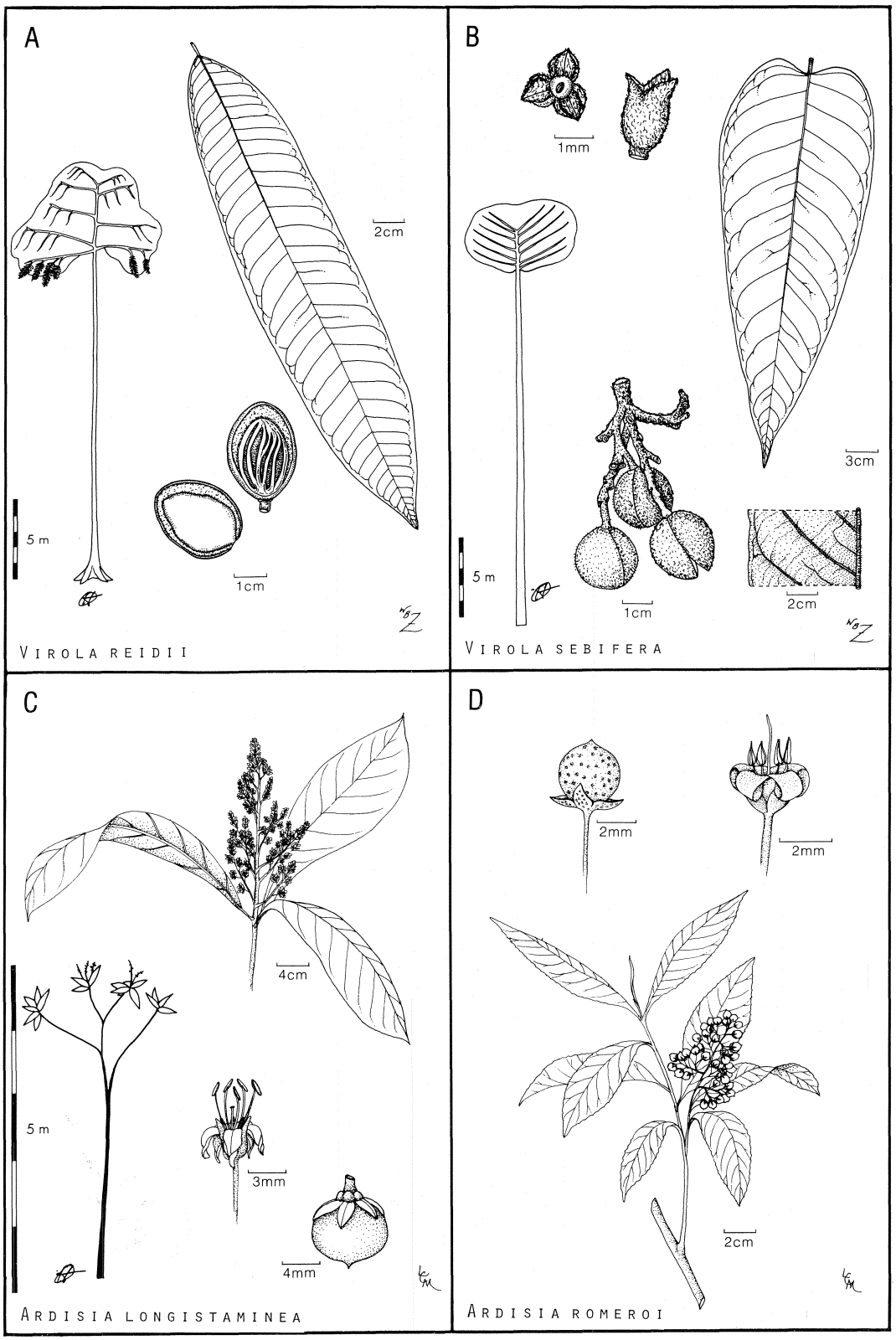
A
2cm
5 m
1cm
VIROLA REIDII
B
1mm
3cm
5 m
1cm
2cm
VIROLA SEBIFERA
C
4cm
5 m
3mm
4mm
ARDISIA LONGISTAMINEA
D
2mm
2mm
2cm
ARDISIA ROMEROI

Plate 216

Ardisia longistaminea A. C. Sm. Plate 216-C

Tree 3 m tall. Leaves obovate, acute, cuneate at the base, to 32 × 14 cm, black-punctate. Inflorescence a terminal panicle. Flowers with the sepals ca. 4 mm long; corolla white, 6-7 mm long, lobed to below middle, the lobes strongly reflexing; stamens conspicuously exserted. Fruits globose, 6 mm in diameter. Infrequent, in mature forest, expecially in Dodson forest and along the creek. Pacific South America from Ecuador to southwestern Colombia; this is the first Ecuadorian record.

Aridisia romeroi Cuatr. Plate 216-D

Shrub 2 m tall. Leaves obovate, acute at the base and the apex, to 11 × 4 cm, black-punctate, the margin serrate. Inflorescence a terminal panicle. Flowers with the sepals ca. 1.5 mm long; petals pinkish-white, 4 mm long; stamens conspicuously exserted. Fruits red, globose, 3 mm in diameter, conspicuously punctate. Uncommon, along river bank. Eastern Panama to Pacific Ecuador; this is the first Ecuadorian record.

Stylogyne gentryi Lundell Plate 217-A

Glabrous tree 3-8 m tall. Leaves elliptic to obovate-elliptic, cuneate at the base and acute or acuminate at the apex, to 33 × 8.5 cm, conspicuously pellucid-punctate. Inflorescence congested, fasciculate, in the leaf axils and along the branchlets below the leaves. Flowers with the sepals ca. 2 mm long; corolla white, pinkish toward the base, 4 to 5 mm long, lobed to below middle, the lobes strongly reflexing; stamens noticeably exserted. Fruits globose, turning red, 5-6 mm in diameter. Infrequent, in mature forest. Known only from the vicinity of Río Palenque.

MYRTACEAE

Shrubs or trees. Leaves usually opposite, simple, entire, without stipules. Flowers bisexual, regular; sepals 4-5; petals 4-5, distinct, white or pink; stamens numerous; ovary inferior, 1-loculed with intruding placentae, these commonly fused, and the ovary apparently 4-to 5-loculed. Fruit usually a berry or a loculicidal capsule.

Key to the species.

1. Fruits to 1 cm in diameter; flowers tiny; native. . . *Eugenia* cf. *dibrachiata*
1. Fruits 3 to 4 cm in diameter; flowers more than 1 cm across; cultivated or escaped.
   2. Leaves to 7 cm long; flowers white, mainly produced at the apex of the branches . . . . . *Psidium guajava*
   2. Leaves to 20 cm long; flowers red, mainly cauliflorous . . . . . *Syzygium malaccense*

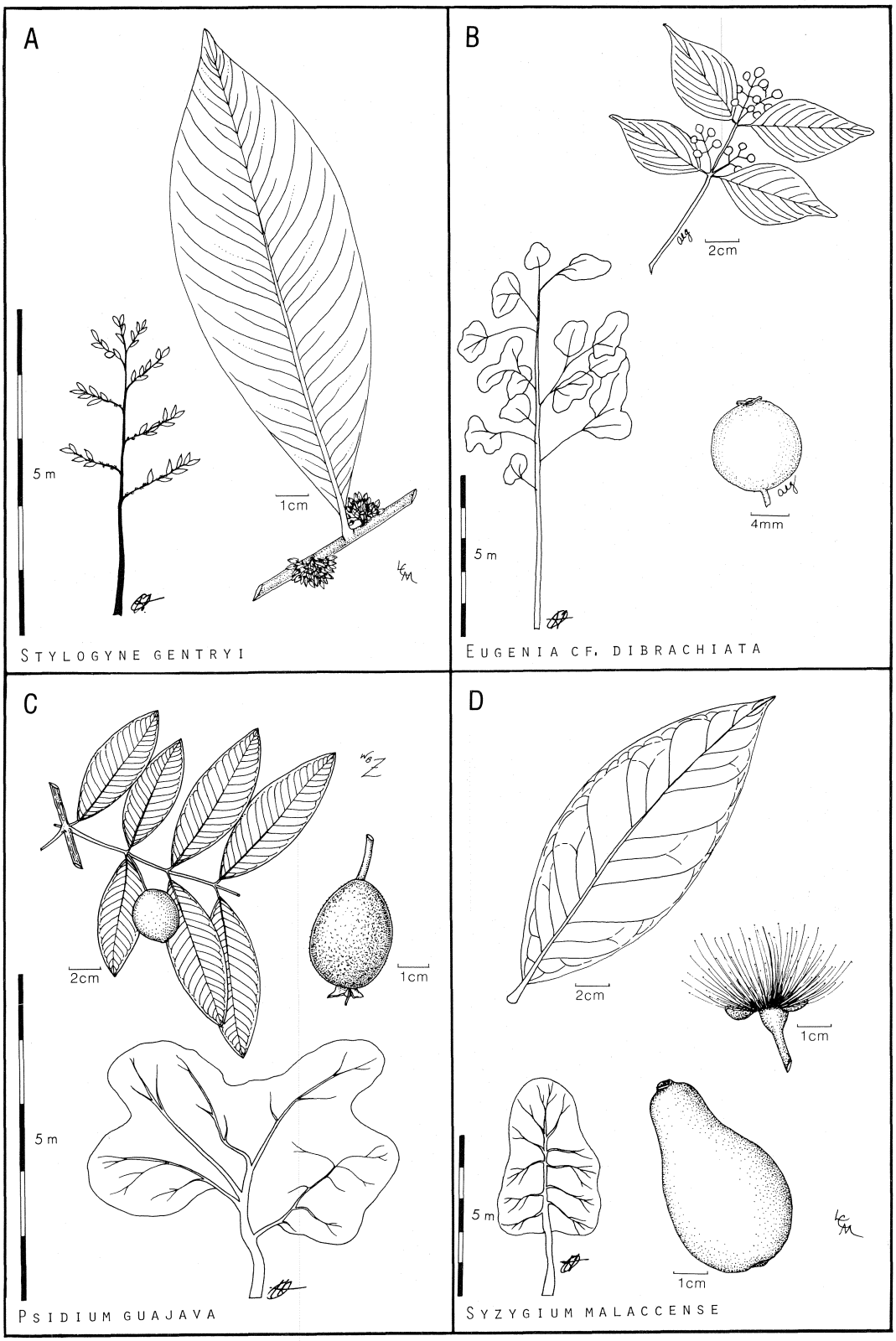
A
5 m
1cm
STYLOGYNE GENTRYI
B
2cm
5 m
4mm
EUGENIA CF. DIBRACHIATA
C
2cm
1cm
5 m
PSIDIUM GUAJAVA
D
2cm
1cm
5 m
1cm
SYZYGIUM MALACCENSE

Plate 217

Eugenia aff. **dibrachiata** McVaugh Plate 217-B

Slender middle story tree to 20 m tall. Foliage very dense. Leaves opposite, elliptic, 10 × 4 cm, glabrous, acuminate, the margin undulate. Inflorescences in axillary racemes of 5-10 flowers; flowers tiny, receptacle 2 mm in diameter. Fruit round, red when ripe, 1 cm in diameter. Infrequent, in mature forest. Close to Peruvian *E. dibrachiata* but McVaugh (pers. comm.) suggests that our plant is probably undescribed.

Psidium guajava L. Plate 217-C

Spreading tree to 5 m tall. Leaves lightly scabrous, simple, entire, elliptic, 15 × 6 cm, acute. Inflorescence axillary, of 1 or 2 flowers. Flowers with receptacle to 1 cm in diameter; petals white, stamens white. Fruit oblong, yellow when ripe, to 4 cm in diameter. Infrequent, around homesites, apparently naturalized along the river. Widespread in tropical America.
Common name: "Guayaba"+, "Guava"

***Syzygium malaccense** (L.) Merr. & Perry Plate 217-D

Tree to 10 m tall with an attractive, conical shape. Foliage dense, leaves oblong, to 20 × 10 cm, glabrous, acuminate. Flowers produced along the larger branches; receptacle to 2.5 cm in diameter; petals red, stamens red. Fruit round, red when ripe, to 3 cm in diameter. Cultivated around homesites. Native to the Old World Tropics. Illustration of flower and fruit adapted from "Common Trees of Puerto Rico."

NYCTAGINACEAE

Herbs, shrubs, vines or trees, sometimes dioecious. Leaves usually opposite, simple, entire, without stipules. Flowers bisexual, or unisexual, regular, highly colored bracts often subtending each flower; calyx 5-lobed, petal-like; petals absent; stamens 1-many; ovary superior, 1-loculed, the basal ovule solitary. Fruit usually an anthocarp enclosed by the modified and persistent calyx.

Key to the species.

1. Herb to 1 m tall; flowers large, brightly colored . . . . . *Mirabilis jalapa*
1. Vine, shrub or small tree; flowers small; green.
   2. Spiny vine; fruits with rows of stalked glands on each angle . . . . . *Pisonia aculeata*
   2. Unarmed shrub or small tree; fruits eglandular.
      3. Fruits drying with longitudinal ridges; leaves to 7 cm wide; male flowers with exserted anthers . . . . . *Guapira myrtiflora*
      3. Fruits without longitudinal ridges; leaves to 12 cm wide; male flowers with included anthers.
         4. Leaves drying blackish, abruptly acuminate . . . . . *Neea parviflora*
         4. Leaves drying olive, gradually acuminate. . . . *Neea amplifolia*

Guapira myrtiflora (Standl.) Little Plate 218-A

G. standleyana Woodson

Dioecious tree to 5 m tall. Leaves opposite, narrowly elliptic, acuminate, acute to rounded at the base, 7-17 × 4-7 cm. Inflorescence terminal, paniculate, rather few-flowered (at Río Palenque). Flowers ca. 2 mm long and 1 mm wide, greenish. Fruit berry-like, longitudinally ridged when dry. Uncommon, in mature forest. According to G. Pilz *G. standleyana* of Panama is synonymous, the species thus ranging from Panama to Peru. Illustration of the inflorescence adapted from "Arboles Comunes de la Provincia de Esmeraldas".

Mirabilis jalapa L. Plate 218-B

Herb to 1 m tall. Leaves opposite, ovate, glabrous, 6-12 × 3-6 cm. Inflorescence cymose. Flowers subtended by calyx-like bracts; tube to 3 cm long, variously colored, often variegated, opening in late afternoon. Fruit ovoid, black. Escaped from cultivation in cacao orchard. Native to tropical America. Illustration adapted from "Taxonomy of Vascular Plants."
Common name: "Maravilla," "Four-o-clock"

Neea amplifolia J. D. Sm. Plate 218-C

N. elegans Dwyer & Hayden, non P. Allen

Small tree. Leaves opposite, elliptic, gradually acuminate, obtuse to acute at the base, to ca. 36 × 12 cm. Inflorescence paniculate, several-to many-flowered. Flowers 5-10 mm long. Fruit berry-like, not ridged when dry. Rare, in mature forest. According to G. Pilz the Río Palenque plant, known only from sterile material, is identical to *N. elegans* Dwyer & Hayden of eastern Panama but that illegitimately named species is itself better retained in *N. amplifolia* which thus ranges from Costa Rica to Pacific Ecuador. Illustrated from Panamanian material.

Neea parviflora P. & E. Plate 218-D

Shrub or tree to 4 m tall. Leaves opposite, elliptic to narrowly elliptic, acute to acuminate, the base more or less acute and usually asymmetrical, 11-25 × 5-12 cm. Inflorescence terminal, openly paniculate, several-to many-flowered. Flowers pink, 5 mm long. Fruit berry-like, not ridged when dry. Uncommon, in mature forest. The Río Palenque plant has the open inflorescence of *N. woronovii* Standl. of the Magdalena Valley of Colombia which is probably not specifically distinct. As thus interpreted, *N. parviflora* ranges from Panama to Peru.

Pisonia aculeata L. Plate 219-A

Vine with recurved spines. Leaves sub-opposite, elliptic to obovate, acute at the base and the apex, 5-19 × 3.5-5.5 cm. Inflorescence paniculate. Flowers greenish-yellow, 2.5-3 mm long; stamens of male flowers exserted. Fruits pentagonal-ridged, armed with conspicuous stipitate glands on the angles. Illustration of the staminate flower and the inflorescence adapted from "Flora of Tropical Florida".
Common name: "Uña de Tigre"

NYMPHAEACEAE

Aquatic, annual or perennial herbs. Leaves alternate, simple, floating, often peltate. Flowers solitary, long-peduncled, bisexual, regular; sepals 4-5, distinct, green; corolla of many petals, showy, the innermost petals are staminodia; stamens numerous; pistil 1 or numerous and apocarpous, the ovary superior, usually many-ovulate. Fruit a leathery berry.

Key to the species.

1. Leaf margin dentate, red on the underside . . . . . *Nymphaea ampla*
1. Leaf margin entire, green on the underside . . . . . *Nymphaea blanda*

Nymphaea ampla (Salisb.) DC Plate 219-B

Robust aquatic plant with soft spines on the margins of the leaves as extensions of the veins. Leaf blade to 40 cm in diameter, red on the underside, dark green on the upper side. Petiole to 1.5 m long. Sepals green; petals white; stamens yellow. Rare, in esteros. Texas to Ecuador. Illustration of the flower adapted from "Curtis's Botanical Magazine."

Nymphaea blanda G. F. Mey. Plate 219-C

Aquatic plant with leaves green on both sides and the margins entire. Leaf blade to 15 cm in diameter. Petiole slender, to 50 cm long. Sepals green; petals white; stamens yellow. Uncommon, in shallow backwaters of the river during dry season. *Nymphaea jamesoniana* Planch. is probably no more than a form of this species. Central America to Peru. Illustration of the flower adapted from "Flores des Serres."

OCHNACEAE

Trees, shrubs, or herbs (at Río Palenque). Leaves simple, alternate, stipules present, often pectinate. Flowers bisexual, yellow, pink, or white; sepals 5; petals 5, staminodia often present; stamens 5 or 10; ovary superior, 3-loculed or 1-locular with 5-6 1-celled lobes. Fruit capsular or drupaceous.

Sauvagesia erecta L. Plate 219-D

Small herb. Leaves narrowly ovate-elliptic, obtuse, attenuate at the base, 2-3 cm long, serrate, the stipules with filiform margins. Flowers borne singly or in pairs in the leaf axils; sepals ca. 6 mm long; petals pink, ca. 5 mm long. Infrequent, in disturbed areas. Southern Mexico and the West Indies through most of South America.

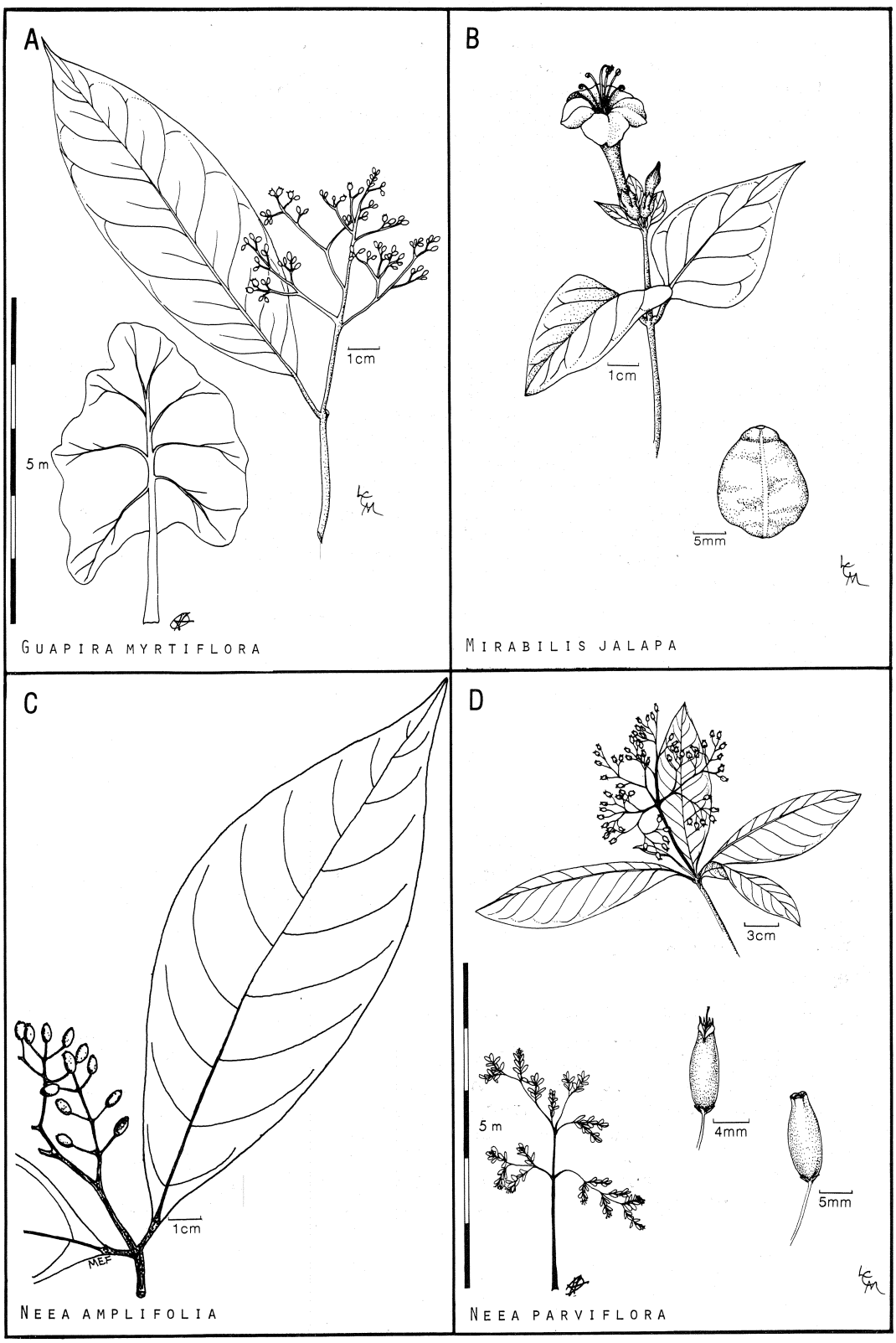
A
1cm
5 m
GUAPIRA MYRTIFLORA
B
1cm
5mm
MIRABILIS JALAPA
C
1cm
MEF
NEEA AMPLIFOLIA
D
3cm
5 m
4mm
5mm
NEEA PARVIFLORA

Plate 218

OLACACEAE

Trees or shrubs (often root parasites). Leaves usually alternate, simple and mostly entire, without stipules. Flowers small, usually bisexual; calyx 4-to 6-lobed; petals 4-6, distinct or joined at the base; stamens 4-12, opposite the petals when of the same number; ovary superior, usually 1-celled. Fruit drupaceous, in the Río Palenque genus subtended by an expanded red calyx.

Heisteria cyanocarpa P. & E. Plate 220-A

H. macrophylla Oerst.

Understory tree usually about 5 m tall. Leaves narrowly elliptic, acuminate, acute to obtuse at the base, to 23 × 9 cm. Flowers borne singly in leaf axils or on the branches or the trunk, minute, exceedingly inconspicuous. Fruits drupaceous ellipsoidal, turning black at maturity, the calyx on the fruit expanded and bright red, subtruncate. Infrequent, in mature forest. Otherwise known from Amazonian Peru and Brazil but apparently the same as *H. macrophylla* previously reported from Chiapas to Pacific Ecuador. We suspect that there may be two species at Río Palenque, one conspicuously cauliforous and usually with larger leaves, the other with mostly axillary flowers and fruits; however we are unable to consistently separate these from herbarium material.

ONAGRACEAE

Herbs or shrubs. Leaves alternate or opposite, simple, stipules none or caducous. Flowers bisexual, regular; sepals commonly 4; petals commonly 4, yellow, red, or white; stamens usually 4 or 8; ovary inferior, usually 4-loculed. Fruit a capsule or a berry.

Key to the species.

1. Plant conspicuously pilose vegetatively; flowers 5-parted . . . . . *Ludwigia affinis*
1. Plant glabrous or glabrescent; flowers 4-parted.
   2. Stems winged; fruit longitudinally winged. . . . . *Ludwigia decurrens*
   2. Stems unwinged; fruit unwinged.
      3. Fruits 4-angled, less than 1.5 cm long; sepals less than 2 mm wide . . . . . *Ludwigia erecta*
      3. Fruits 8-angled, more than 2 cm long; sepals more than 2 mm wide . . . . . *Ludwigia octovalvis*

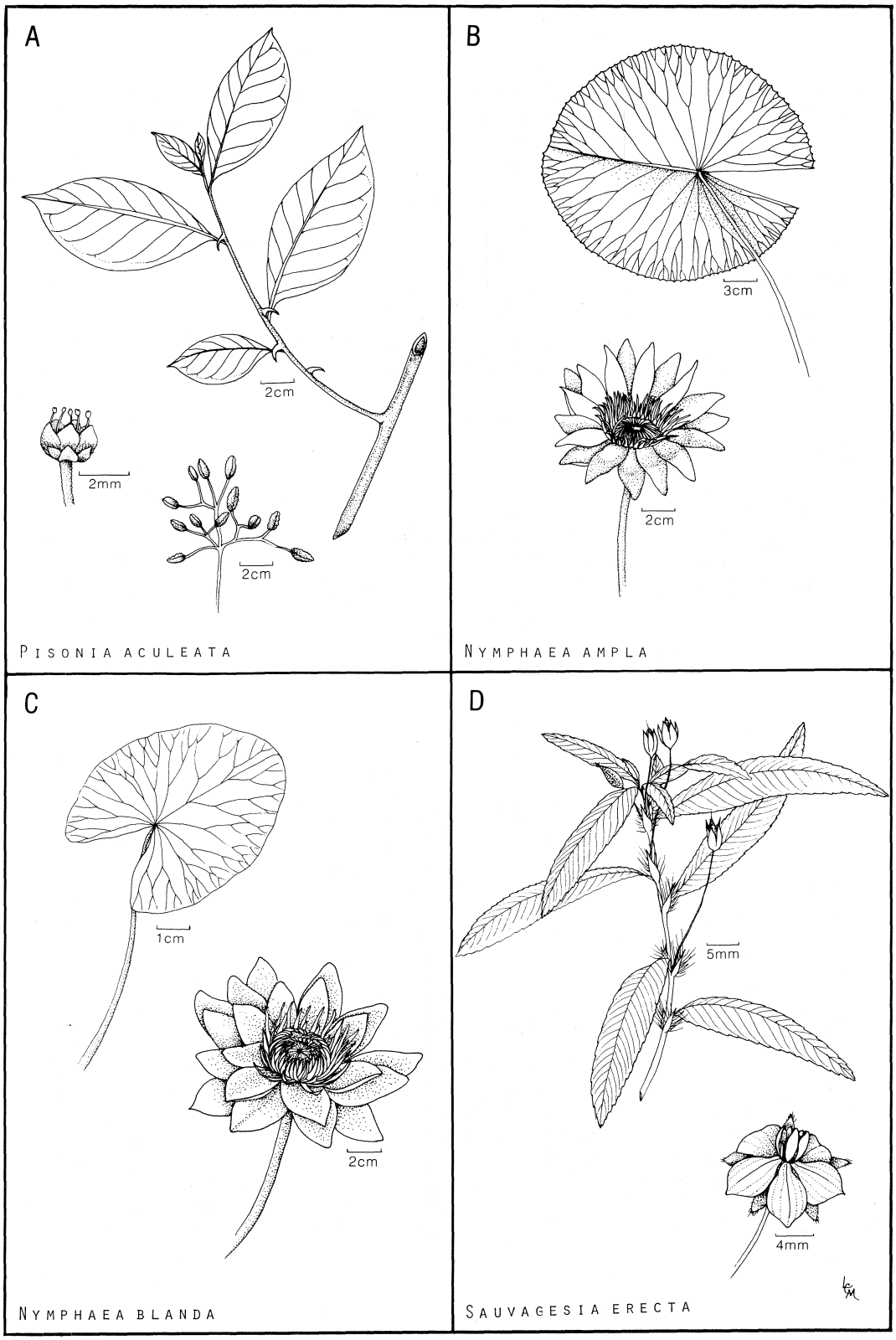
A
2cm
2mm
2cm
PISONIA ACULEATA
B
3cm
2cm
NYMPHAEA AMPLA
C
1cm
2cm
NYMPHAEA BLANDA
D
5mm
4mm
SAUVAGESIA ERECTA

Plate 219

Ludwigia affinis (DC.) Hara Plate 220-B

Herb to 1 m tall. Stems unwinged, pilose. Leaves elliptic, acute at the base and the apex, more or less pilose. Flowers 5-parted; sepals ca. 4 mm long; petals ca. 7 mm long. Fruit 1.5-3.5 cm long, terete. Rare, on gravel bar along the river. Guatemala and southern West Indies to Brazil and Bolivia.

Ludwigia decurrens Walt. Plate 220-C

Herb to 1 m tall. Stems decurrently winged. Leaves narrowly ovate to linear. Flowers 4-parted; sepals 0.7-1 cm long; petals 4, yellow, ca. 1 cm long. Fruit 1 cm long, longitudinally winged. Common, in wet areas in full sun. Southeastern United States to northern Argentina.

Ludwigia erecta L. Plate 220-D

Herb to 1.5 m tall. Stems unwinged, somewhat angulate. Leaves narrowly ovate. Flowers 4-parted; sepals 0.3-0.5 cm long; petals 4, yellow, 4-5 mm long. Fruit 1-1.5 cm long, 4-angled, unwinged. Common, in wet areas in full sun. Pantropical.

Ludwigia octovalvis (Jacq.) Raven ssp. **octovalvis** Plate 221-A

Herb to 1.5 m tall. Stems subterete. Leaves narrowly ovate to sublinear. Flowers 4-parted; sepals 6-7 mm long; petals 4, yellow, ca. 1 cm long. Fruit 2-4 cm long, 8-angled. Very common, in wet areas in full sun. Pantropical.

OXALIDACEAE

Herbs, shrubs or trees. Leaves alternate, palmately or pinnately compound, usually estipulate. Flowers bisexual, nearly regular; sepals 5; petals 5; stamens 10, the filaments united at the base; ovary superior, 5-locular with axile placentation. Fruit a capsule or rarely a berry, the seeds arillate.

Key to the species.

1. Tree to 10 m tall ..... *Averrhoa carambola*
1. Herb to 20 cm tall ..... *Biophytum dendroides*

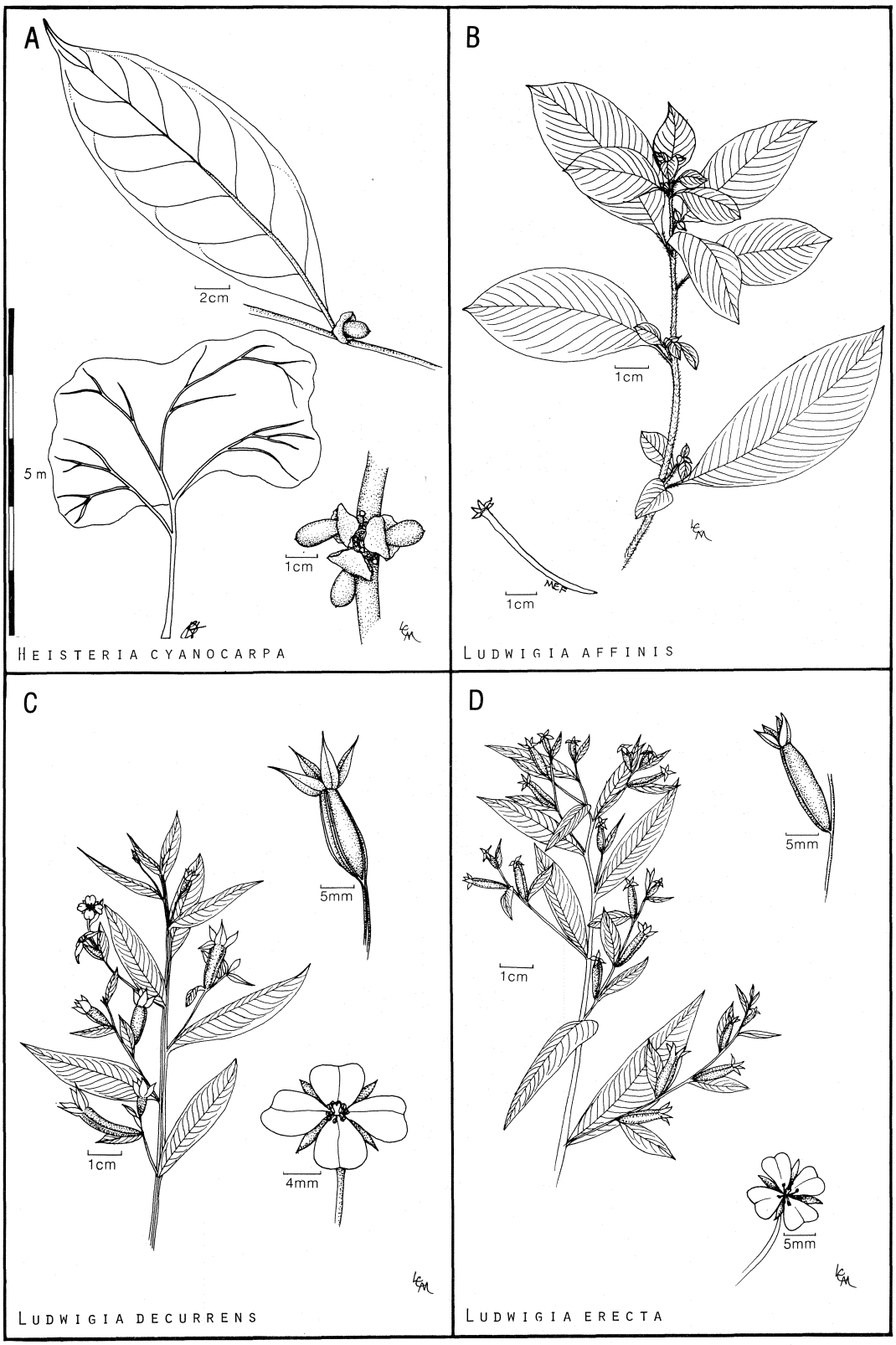
A
2cm
5 m
1cm
HEISTERIA CYANOCARPA
B
1cm
1cm
LUDWIGIA AFFINIS
C
5mm
1cm
4mm
LUDWIGIA DECURRENS
D
5mm
1cm
5mm
LUDWIGIA ERECTA

Plate 220

***Averrhoa carambola** L. Plate 221-B

Tree to 10 m tall. Leaves pinnately compound, usually with 11-15 leaflets, the leaflets obliquely oblong-ovate, more than 2 × 1 cm. Inflorescence a panicle. Corolla rose-purple. Fruit ovoid, fleshy, acutely 5-angled, yellowish. Cultivated around homesites. Probably native to southeast Asia, sparingly cultivated throughout the tropics. Illustration of the fruit adapted from "Trees of Puerto Rico," Vol. I.
Common name: "Carambola"+

Biophytum dendroides (HBK) DC. Plate 221-C

Herb to 20 cm tall. Leaves in cluster at the stem apex, pinnately compound, 20-to 30-foliolate, the leaflets parallelogram-shaped, to 1 × 0.3 cm. Inflorescence a few sessile flowers clustered at the tip of a long peduncle. Corolla pink. Local and uncommon, along the river on Arana island. Southern Mexico to western Ecuador.

PASSIFLORACEAE

Shrubs or (usually) vines with axillary tendrils. Leaves alternate, simple or compound, often strikingly lobed, stipulate. Flowers bisexual, regular; sepals 5; petals 5 (or absent), distinct, an annular corona of many erect filaments between the petals and stamens; stamens usually 5, borne with the pistil on a common stalk (androgynophore); ovary superior, usually 3-parted, unilocular with parietal placentation, the stigmas usually 3. Fruit a berry often with edible pulp surrounding the seeds.

Key to the species.

1. Treelet to 3 m tall; inflorescence branched; leaves more than 30 cm long . . . . . *Passiflora gigantifolia*
1. Vines; flowers borne singly or in pairs; leaves less than 20 cm long.
   2. Leaves less than 2 cm wide, suborbicular to elliptic. . . . . *Passiflora tryphostemmatoides*
   2. Leaves larger, either lobed or ovate.
      3. Leaves pinnately veined; stem with conspicuous winged angles. . . . . *Passiflora quadrangularis*
      3. Leaves palmately veined from the base; stem subterete, not winged.
         4. Leaves 2-lobed.
            5. Leaf base cordate; fruit elongate, fusiform . . . . . *Passiflora capsularis*
            5. Leaf base truncate; fruit round . . . . . *Passiflora* cf. *biflora*
         4. Leaves entire or 3-lobed.
            6. Bracts below the flower much dissected; plants pilose throughout . . . . . *Passiflora foetida*
            6. Bracts below the flower entire; plants puberulous or glabrate.
               7. Pedicels 6-8 cm long; leaves 3-lobed . . . . . *Passiflora resticulata*
               7. Pedicels less than 3 cm long; leaves (at Río Palenque) entire.

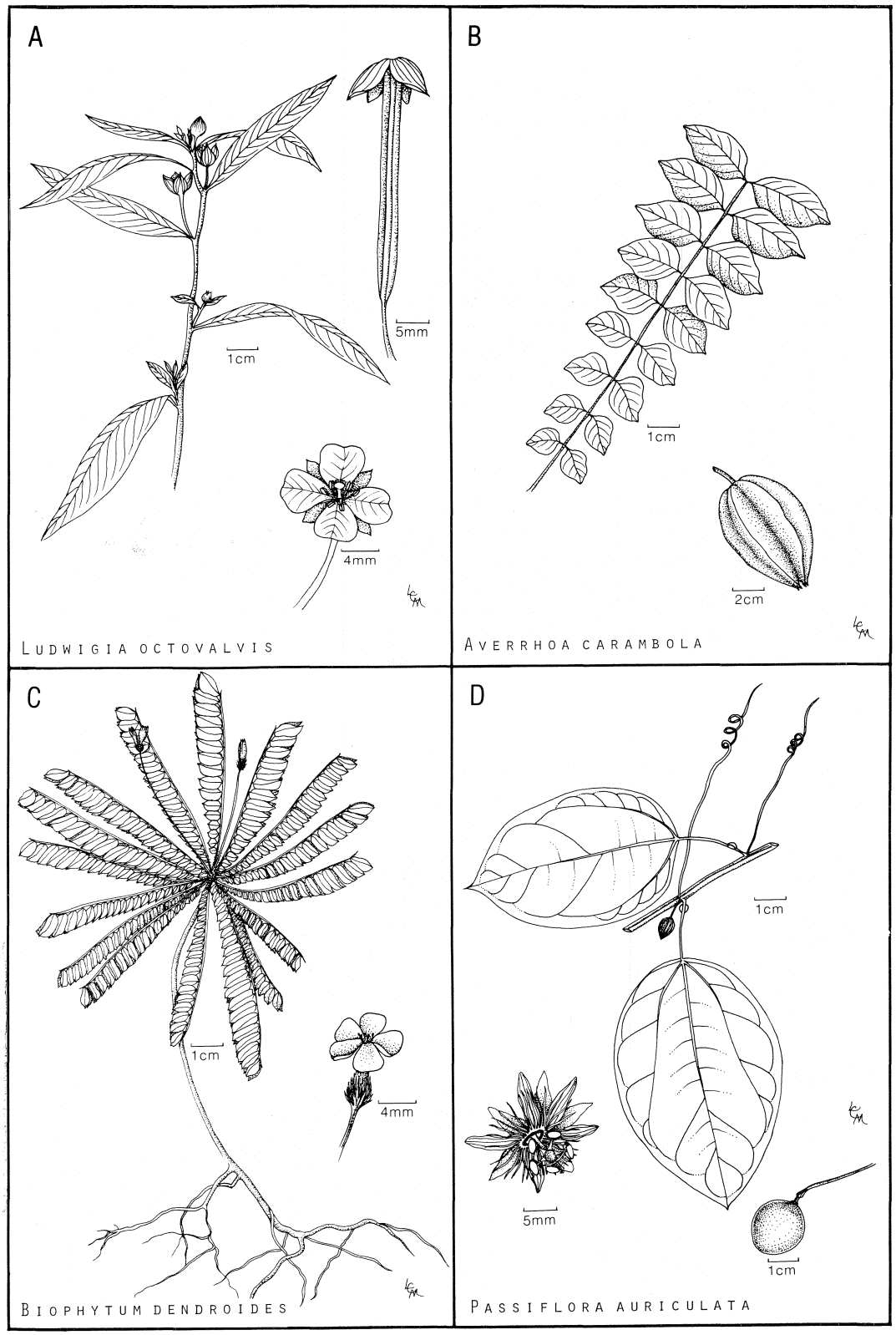
A
1cm
5mm
4mm
LUDWIGIA OCTOVALVIS
B
1cm
2cm
AVERRHOA CARAMBOLA
C
1cm
4mm
BIOPHYTUM DENDROIDES
D
1cm
5mm
1cm
PASSIFLORA AURICULATA

Plate 221

8. Leaf cordate at the base; petiole with 2 small glands at the apex and two more in the upper quarter; bracts foliaceous . . . . . *Passiflora tiliifolia*
8. Leaf rounded at the base; petiole with two large earlike glands near the base; bracts minute . . . . . *Passiflora auriculata*

Passiflora auriculata HBK Plate 221-D

Herbaceous vine. Leaves (at Río Palenque) entire, ovate, acute at the apex, rounded at the base, 3-veined from the base; petiole with 2 large ear-like glands near base. Flower petals 5-7 mm long, greenish white; corona greenish white with a purple base. Fruits globose, ca. 1.5 cm in diameter. Common, at the forest edge. Nicaragua to Bolivia.

Passiflora cf. **biflora** L. Plate 222-A

Herbaceous vine. Leaves 2-lobed, both the base and the apex essentially truncate, apices of the lobes subacute, 7-8 cm long, 12-13 cm wide across the apex, the petiole eglandular, 3-4 cm long. Flowers not seen. Fruit ellipsoid, ca. 2 cm in diameter. This is probably not *P. biflora* as the fruits are larger and the leaves larger with more pointed lobes than in Panamanian material of this species. In the absence of flowers it cannot be keyed out and it is closer to Chocó material identified as *P. biflora* than to anything else at MO.

Passiflora capsularis L. Plate 222-B

Herbaceous vine. Leaves 2-lobed, cordate at the base, the two apices of the lobes subacute; petiole eglandular. Petals 1-1.5 cm long, white; corona white. Fruit fusiform-oblong, 5-6 cm long, 1.5-2 cm in diameter. Uncommon, at the forest edge. Guatemala and the West Indies to Paraguay; this is the first record for Ecuador.

Passiflora foetida L. Plate 222-C

Herbaceous viscid-pubescent vine. Leaves (at Río Palenque) ovate, acute, truncate to subcordate at the base, serrulate to sub 3-lobed, 3-veined from the base; petiole eglandular. Flowers subtended by complexly pinnatisect bracts; petals white, ca. 2 cm long; corona purple and white. Fruits globose, 2-3 cm in diameter. Infrequent, in disturbed areas. Throughout tropical America; also introduced in the Old World tropics.
Common name: "Bombillo"

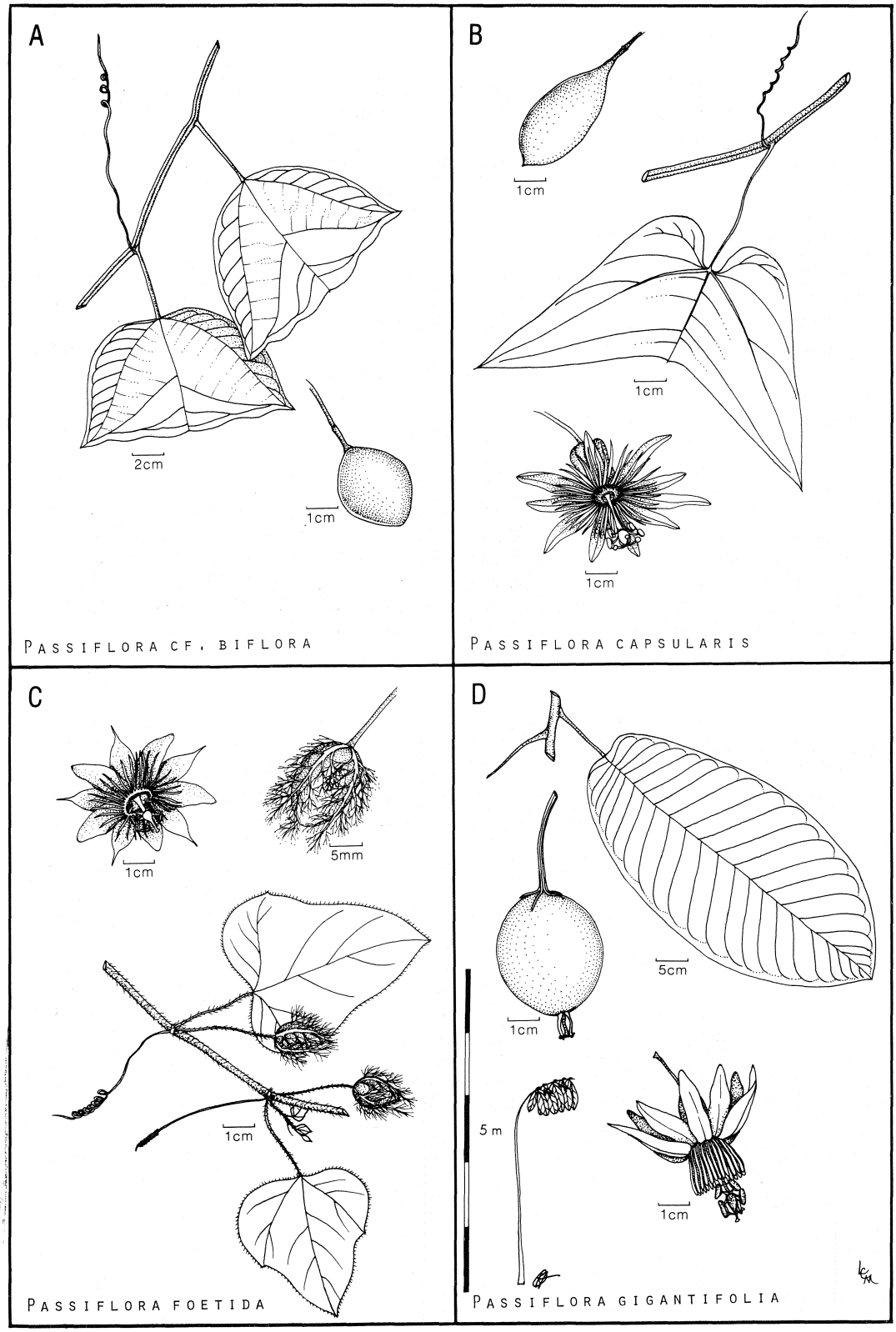
A
2cm
1cm
PASSIFLORA CF. BIFLORA
B
1cm
1cm
1cm
PASSIFLORA CAPSULARIS
C
1cm
5mm
1cm
PASSIFLORA FOETIDA
D
5cm
1cm
5 m
1cm
PASSIFLORA GIGANTIFOLIA

Plate 222

Passiflora gigantifolia Harms Plate 222-D

Understory treelet to 3 m tall. Leaves entire, oblong-obovate, acute at the apex, rounded at the base, pinnately veined, to 60 or 70 cm long. Inflorescence a few-flowered, few-branched panicle. Flowers not subtended by bracts; petals cream or white, ca. 3.5 cm long; corona yellow. Fruits (previously undescribed) globose, ca. 3-5 cm in diameter, the 3 style branches persistent at the apex, each 8-9 mm long. Infrequent, in mature forest. Endemic to Pacific Ecuador.

***Passiflora quadrangularis** L. Plate 223-A

Vine. Leaves entire, ovate, acuminate, rounded to truncate at base, pinnately veined; petiole with ca. 3 pairs of ear-like glands. Flowers subtended by a whorl of 3 foliaceous bracts 4-5 cm long, large; petals ca. 3 cm long, purple; corona purple and white. Fruits large, ellipsoid, edible. Cultivated around homesites. Cultivated and naturalized throughout tropical America; place of origin obscure.
Common name: "Badea"+

Passiflora resticulata Mast. & Andre Plate 223-B

Herbaceous vine. Leaves shallowly 3-lobed, otherwise entire, the lobes rounded, the base truncate to broadly subcordate, 5-veined from base; petiole with a pair of stalked glands near the middle. Flowers subtended by 1.5-2 cm long foliaceous bracts; the petals pink, 1.5 cm long. Fruits ellipsoidal, 5 cm in diameter. Uncommon, at the forest edge. Ecuador and Colombia, mostly from 1500-2500 m; this is the first lowland record.

Passiflora tiliifolia L. Plate 223-C

Vine. Leaves ovate, entire, acute at the apex, cordate at the base, 5-veined from the base; petiole with a pair of glands at apex and a second pair slightly lower. Flowers subtended by 3 large partially-fused foliaceous bracts to 4 cm long; petals purplish, ca. 3 cm long; corona striped white and purple. Fruits ellipsoidal ca. 6 cm in diameter. Uncommon, in mature forest. Panama to Peru.
Common name: "Granadilla de Monte"+

Passiflora tryphostemmatoides Harms Plate 223-D

P. gracillima Killip

Slender herbaceous vine. Leaves suborbicular to elliptic, rounded at the base and the apex, to 3 × 2 cm, obscurely pinnately veined; petiole with two sessile glands at the extreme apex. Inflorescence with two flowers and a terminal tendril. Flowers ca. 3 cm in diameter; petals 0.5-1 cm long. Fruits globose, ca. 2 cm in diameter. Uncommon, in mature forest. The Río Palenque material is all in juvenile condition. The transition from perfectly orbicular leaves to oblong-elliptic leaves can be seen on the same plant. Since this is the character Killip used to separate *P. gracillima* from *P. tryphostemmatoides*, the two are clearly synonymous. Common. Panama to western Ecuador.

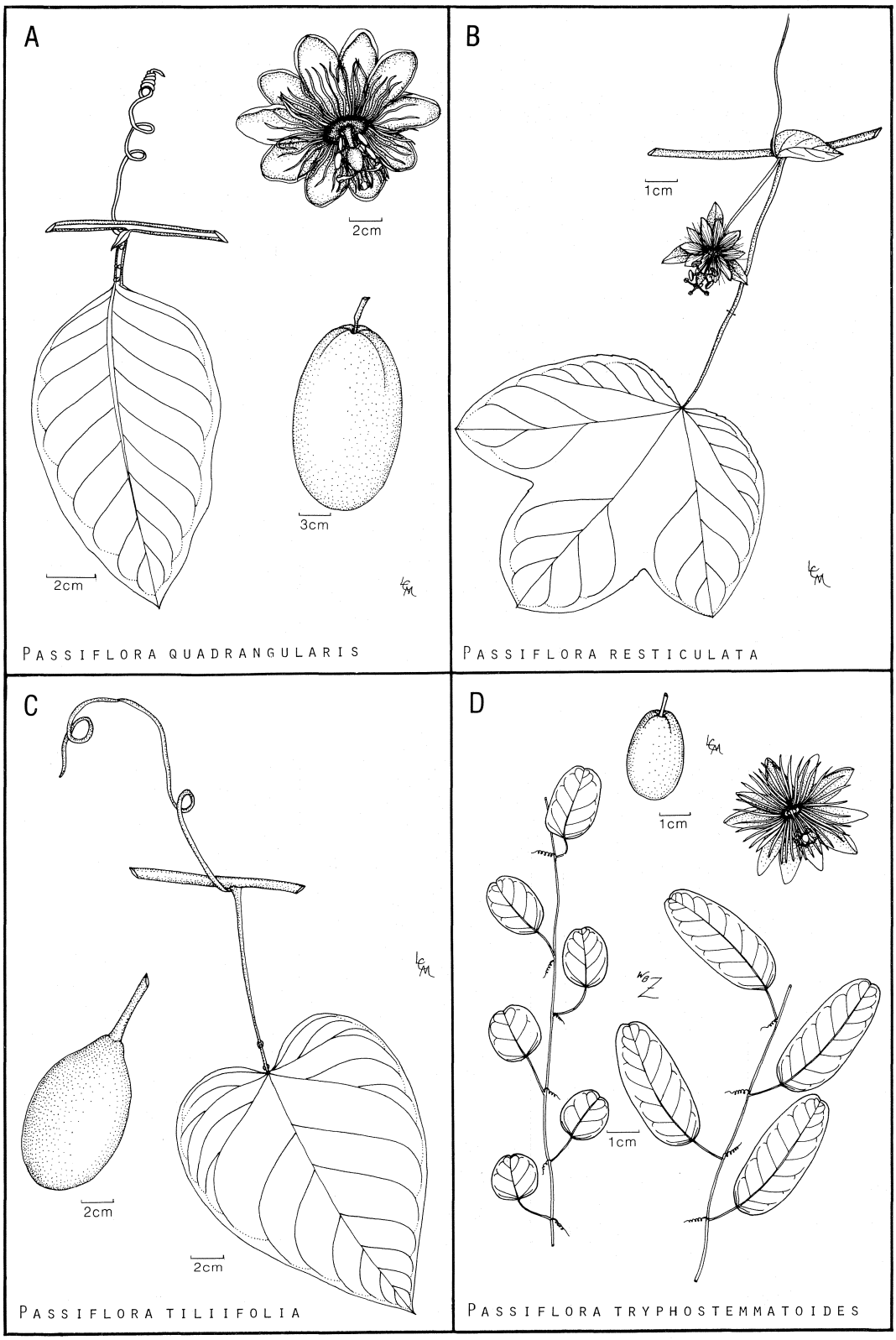
A
2cm
3cm
2cm
PASSIFLORA QUADRANGULARIS
B
1cm
PASSIFLORA RESTICULATA
C
2cm
2cm
PASSIFLORA TILIIFOLIA
D
1cm
1cm
PASSIFLORA TRYPHOSTEMMATOIDES

Plate 223

PHYTOLACCACEAE

Herbs, shrubs or trees. Leaves alternate, entire; stipules absent or minute. Flowers bisexual or rarely unisexual, regular, small; sepals 4-5; petals absent; stamens 3-to-many, often borne on a disc; ovary superior, 2-to many-loculed, or apocarpous with each pistil unilocular. Fruit variable, often a berry with red juice.

Key to the species.

1. Leaves less than 4 cm long; inflorescence paniculate . . . . *Microtea debilis*
1. Leaves more than 6 cm long; inflorescence racemose . . . . . *Phytolacca rivinoides*

Microtea debilis Sw. Plate 224-A

Herb. Leaves obovate, 1.5-4 × 0.8-2 cm, obtuse, the base cuneate-attenuate. Inflorescence a terminal panicle. Flowers minute, white; stamens 5. Fruit a minute, tuberculate drupe. Common, on rocky beaches along the river. Guatemala and the West Indies to Peru and Brazil.

Phytolacca rivinoides Kunth & Bouché Plate 224-B

Herb to 2 m tall. Leaves elliptic to ovate-elliptic, acute or acuminate, the base obtuse. Inflorescence a leaf-opposed raceme. Flowers with 5 white sepals each 2 mm long; stamens ca. 10. Fruit a purple berry 5-6 mm in diameter. Infrequent, in disturbed areas. Mexico and the West Indies to Bolivia. Common name: "Jaboncillo"

PIPERACEAE

Erect or scandent herbs, shrubs or small trees; nodes often swollen and jointed. Leaves alternate, rarely opposite or whorled, petiolate, entire, stipules joined to the petiole when present. Flowers very minute, bisexual or unisexual, generally in dense fleshy spikes; sepals and petals absent; stamens 1-4(-6); ovary superior, 1-loculed, the solitary ovule basal. Fruit a small drupe.

Key to the species.

1. Plants succulent or herbaceous; seeds sticky; mostly epiphytes.
    2. Leaves peltate . . . . . *Peperomia tropaeolifolia*
    2. Leaves not peltate.
        3. Plants terrestrial.
            4. Plants semiprostrate.
                5. Leaves to 5 cm long. . . . . *Peperomia pteroneura*
                5. Leaves to 1.5 cm long . . . . . *Peperomia manabina*
            4. Plants erect . . . . . *Peperomia pellucida*
        3. Plants epiphytic.
            6. Leaves cordate at the base. . . . . *Peperomia serpens*
            6. Leaves acute or obtuse at the base.
                7. Leaves round or nearly so.
                    8. Leaves variegated with red. . . . . *Peperomia prostrata*
                    8. Leaves green.

9. Plants erect . . . . . *Peperomia josei*
9. Plants vining.
10. Leaves 0.3-0.5 cm in diameter; pubescent . . . . . *Peperomia rotundifolia*
10. Leaves 0.8-1.2 cm in diameter; glabrous . . . . . *Peperomia panamensis*

7. Leaves elliptical or rhombic in shape.
11. Inflorescence extensively branched, either at the base or along the rachis.
12. Inflorescence branched in whorls along the rachis; stems terete . . . . . *Peperomia verticillatispica*
12. Inflorescence branched from the base; stems square, edges slightly winged . . . . . *Peperomia emarginulata*
11. Inflorescence solitary or rarely branched once or twice.
13. Plants erect . . . . . *Peperomia obtusifolia*
13. Plants vining.
14. Nodes swollen, red; leaves to 10 cm long . . . . . *Peperomia macrostachya*
14. Nodes not swollen, green; leaves to 5 cm long . . . . . *Peperomia cacaophylla*

1. Plants woody (except some species of *Trianaeopiper*); seeds not sticky; mostly terrestrial trees and shrubs (when vines, stems more or less woody).
15. Leaves peltate; inflorescence branched . . . . . *Pothomorphe peltata*
15. Leaves not peltate; inflorescence unbranched.
16. Subwoody herbs; inflorescence from the axil of the leaf.
17. Base of the leaf unequally cordate, the leaf obviously bullate.
18. Stems densely crisp-pubescent; upper surface of the leaf green throughout . . . . . *Trianaeopipier garciae*
18. Stems glabrous; upper surface of the leaf with an elongate yellow splash down the midvein . . . . . *Trianaeopiper filistilum*
17. Base of the leaf equally lobed, leaf surface smooth.
19. Base of the leaf strongly cordate, the lobes in contact or overlapping . . . . . *Trianaeopiper killipii*
19. Base of the leaf very shallowly cordate . . . . . *Trianaeopiper mexiae*
16. Trees, shrubs or vines; inflorescences leaf-opposed.
20. Vines.
21. Peduncle to 6 cm long; stems and petioles long villous . . . . . *Piper longipilosum*
21. Peduncle not more than 2.5 cm long; stems and petioles tomentose to glabrous, not long villous.
22. Veins of the leaf originating from the base of the leaf or from the lower one-third of the midnerve.
23. Veins of the leaf originating from the base of the leaf, except for a vein on each side from the lower one-third of the midvein; inflorescence green . . . . . *Piper multiplinervium*

23. Veins of the leaf originating from the lower one-fourth of the midnerve more or less equally spaced; inflorescence purple. . . . . *Piper concepcionis*

22. Veins of the leaf originating from the lower one-half to two-thirds of the midnerve.

24. Leaves, stems and petioles completely glabrous. . . . . *Piper brachypodon*

24. Leaves, stems and petioles pubescent, minutely so in some species.

25. Stems, petioles and leaf veins short-villous.

26. Stipules persistent for a time, equaling the length of the internode; stems rusty pubescent . . . . . *Piper debilicaule*

26. Stipules abscising early; stems grey pubescent. . . . . *Piper eustylum*

25. Stems, petioles and leaf veins minutely puberulent.

27. All leaves more than 7 cm wide; inflorescence more than 2 mm thick . . . . . *Piper entradense*

27. Leaves less than 5 cm wide (except lower-most sterile leaves); inflorescence less than 2 mm thick . . . . . *Piper scansum*

20. Trees or shrubs.

28. Petioles warty, leaves very large (mature leaves usually more than 30 cm wide) ovate, base of the fertile leaves unequally lobed; stout trees to 6 m tall.

29. Petiole 3-4 cm long; inflorescence 40 cm long; leaves light green on the upper surface . . . . . *Piper imperiale*

29. Petiole 6-10 cm long; inflorescence to 70 cm long; leaves blue-green on the upper surface . . . . . *Piper squamulosum*

28. Petioles smooth, leaves medium-large to small (not more than 20 cm wide, usually much less), base of the leaves equally or unequally lobed, cordate to acute or obtuse; shrubs to slender trees to 4 m tall.

30. Leaves pilose with long (ca. 2 mm) trichomes, especially on the petiole and along the midvein beneath . . . . . *Piper* cf. *florencianum*

30. Leaves not pilose, glabrous or puberulous with short trichomes.

31. Leaf surface scabrous (sandpapery) to the touch.

32. Leaves pubescent with scattered slender trichomes above . . . . . *Piper eriopodon*

32. Leaves scabrous above but glabrous or with sparse short trichomes.

33. Shoot apex with the ligule-like stipular developments drying dark brown or black. . . . . *Piper sanctae-felicis*

33. Shoot apex without the stipular development drying brown . . . . . *Piper hispidum*

31. Leaf surface smooth to the touch.

34. Lateral veins all originating from the base of the leaf blade.

35. Leaves 9-to 13-nerved, the base cordate . . . . . *Piper marginatum*

35. Leaves 5-to 7-nerved, the base truncate. . . . . *Piper reticulatum*

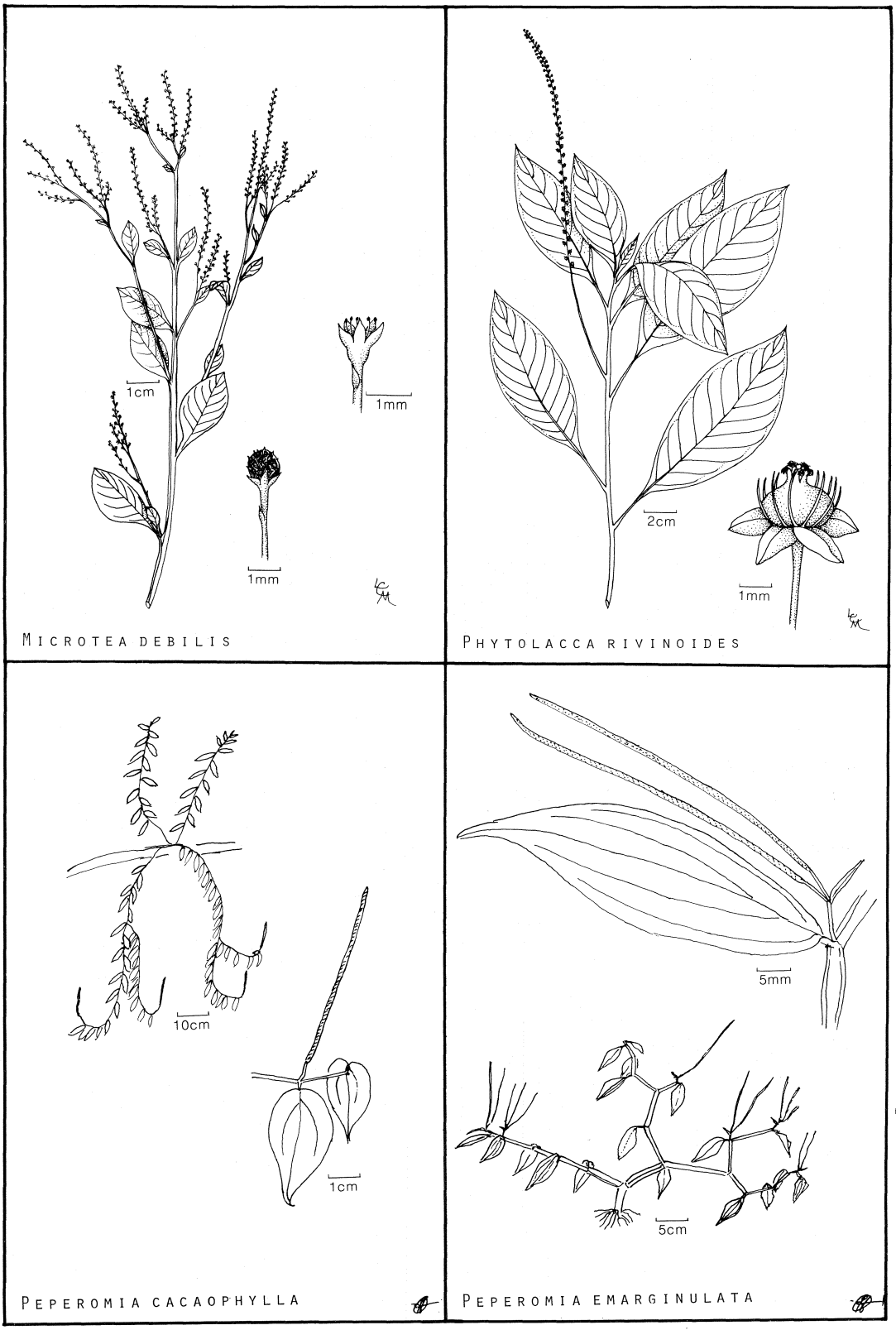
1cm
1mm
1mm
MICROTEA DEBILIS
2cm
1mm
PHYTOLACCA RIVINOIDES
10cm
1cm
PEPEROMIA CACAOPHYLLA
5mm
5cm
PEPEROMIA EMARGINULATA

Plate 224

34. Lateral veins originating along the midvein.
    36. Leaves (at least the lower ones) with obvious basal lobes.
        37. Leaves unequally lobed at the base . . . . . *Piper pseudonobile*
        37. Lower leaves equally lobed at the base, cordate, upper leaves truncate at the base. . . . . *Piper carrilloanum*
    36. Leaves without obvious basal lobes, acute or obtuse at the base.
        38. Lateral veins originating from the lower two-thirds of the midvein.
            39. Apex of the leaf tapering acutely; ovary and fruit with sunken styles. . . . . *Piper mexiae*
            39. Apex of the leaf long acuminate; ovary and fruit with 3 obvious, projecting styles. . . . . *Piper sternii*
        38. Lateral veins originating along most of the length of the midvein.
            40. Mature spikes 1.5-2 cm long; leaves less than 5 cm wide . . . . . *Piper phytolaccaefolium*
            40. Mature spikes more than 4 cm long; leaves more than 5 cm wide . . . . . *Piper augustum*

Peperomia cacaophylla Yunck. Plate 224-C

Creeping epiphytic vine. Stems elongate, slender, often pendent, to 5 cm between nodes, the nodes not swollen, green. Leaves alternate, rhombic, 1.5 × 3 cm, essentially glabrous, with the margin red. Inflorescences to 12 cm long. Uncommon, in trees overhanging the river. Western Ecuador.

Peperomia emarginulata C. DC. Plate 224-D

Epiphytic, growing erect to 30 cm tall. Stems 4-angled. Leaves alternate, rarely opposite, narrowly rhombic-elliptical, thick, glabrous with 2 veins on each side of the midvein; petiole to 8 mm long. Spikes 1 to 4 in each leaf axil, to 10 cm long, 2 mm thick, white. Rare. Found near Río Palenque at both higher and lower elevations and to be expected at Río Palenque. Peru and Ecuador.

Peperomia josei Yunck. Plate 225-A

Small epiphytic plants. Stems erect, to 6 cm tall. Leaves alternate, nearly round, moderately fleshy. Inflorescences to 2 cm long. The whole plant having a yellow-green cast. Infrequent, in the tree tops in mature forest. Colombia and Ecuador.

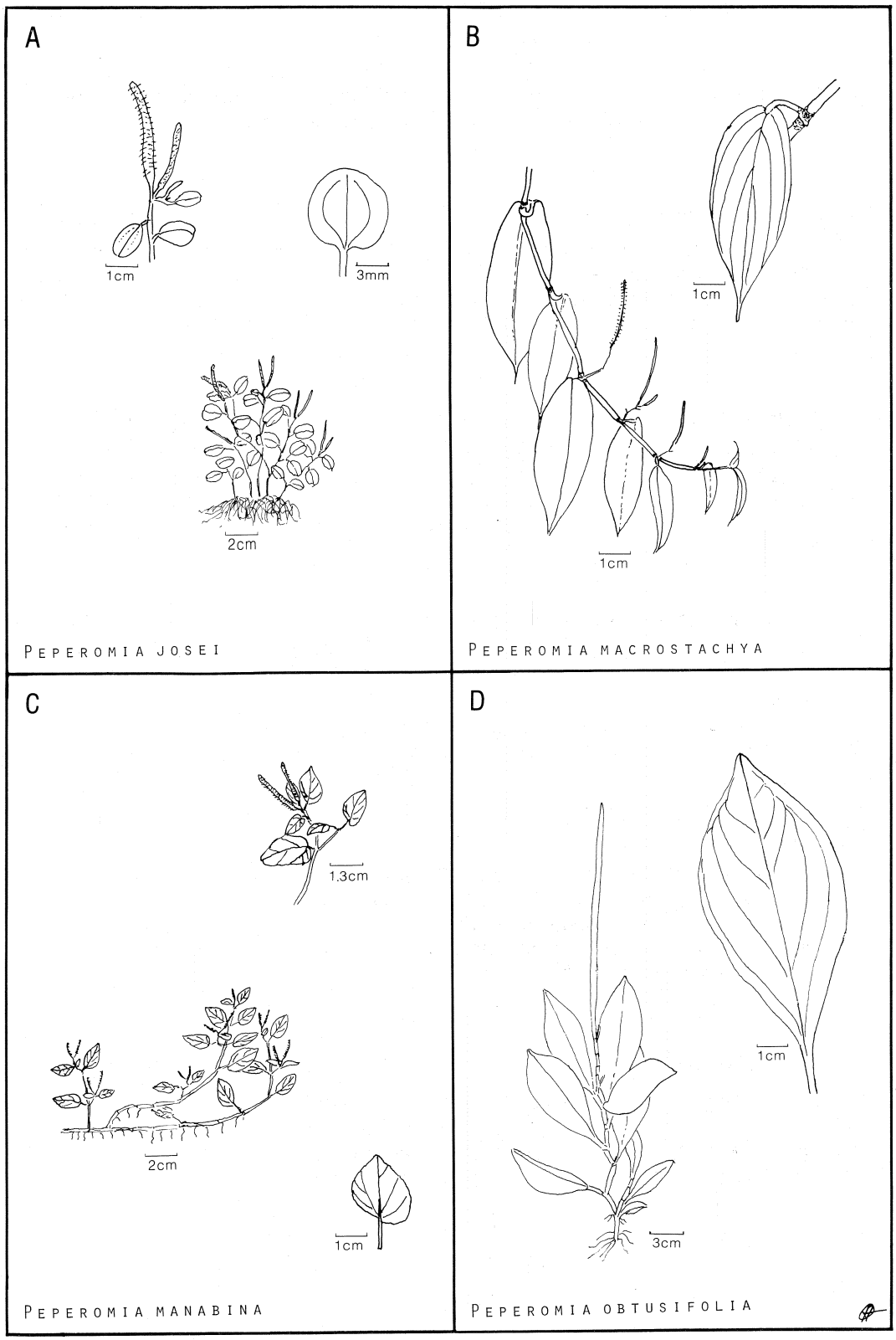
A
1cm
3mm
2cm
PEPEROMIA JOSEI
B
1cm
1cm
PEPEROMIA MACROSTACHYA
C
1.3cm
2cm
1cm
PEPEROMIA MANABINA
D
1cm
3cm
PEPEROMIA OBTUSIFOLIA

Plate 225

Peperomia macrostachya (Vahl) A. Dietr. Plate 225-B

Creeping epiphytic vines. Stems elongate, often pendent, to 6 cm between the nodes, the nodes swollen, bright red. Leaves alternate, elliptical to rhombic, to 4 × 8 cm. Inflorescences to 15 cm long. Common, in understory and in trees overhanging the river. Northern South America.

Peperomia manabina C. DC. Plate 225-C

Creeping terrestrial herbs. Stems rooting at the nodes, terete, to 2 cm between the nodes. Leaves alternate, obliquely ovate, the margins crenate, to 1.3 × 1.8 cm. Inflorescences terminal, in pairs, to 1.5 cm long. Uncommon, in cacao orchard. Western Ecuador.

Peperomia obtusifolia (L.) A. Dietr. Plate 225-D

Erect fleshy epiphytic plants. Stem short, to 15 cm long, 3 cm between nodes. Leaves alternate, elliptical to rhombic, thick, to 8 × 13 cm. Inflorescences to 20 cm long, often branched at least once. Uncommon, in the tree tops in mature forest. West Indies and tropical America.

Peperomia panamensis C. DC. ex Schröder Plate 226-A

Creeping epiphytic vine. Stems elongate, very slender, to 1 cm between leaves. Leaves alternate, nearly round, to 10 × 9 mm, glabrous, moderately fleshy. Inflorescences to 2 cm long. This plant is very similar to *P. rotundifolia* except that it is glabrous and slightly larger in all its features. Infrequent, in the tree tops in mature forest. Costa Rica to Ecuador and Trinidad.

Peperomia pellucida (L.) HBK Plate 226-B

Terrestrial, succulent herb to 40 cm tall, erect. Stems terete, very succulent. Leaves alternate, cordate to obtuse at the base, to 8 × 4 cm. Inflorescences erect, to 5 cm long. Common, in the shade in disturbed forests and along paths in mature forest. American and Asian tropics.
Common name: "Sarpullido"+

Peperomia prostrata Mast. Plate 226-C

Creeping epiphytic vine. Stems elongate, very slender, to 1 cm between the leaves. Leaves alternate, nearly round, very fleshy, to 1.2 × 1 cm, glabrous, variegated with red markings. Inflorescences to 6 cm long, erect. Rare, in the trees overhanging the river. Pacific Ecuador and Colombia.

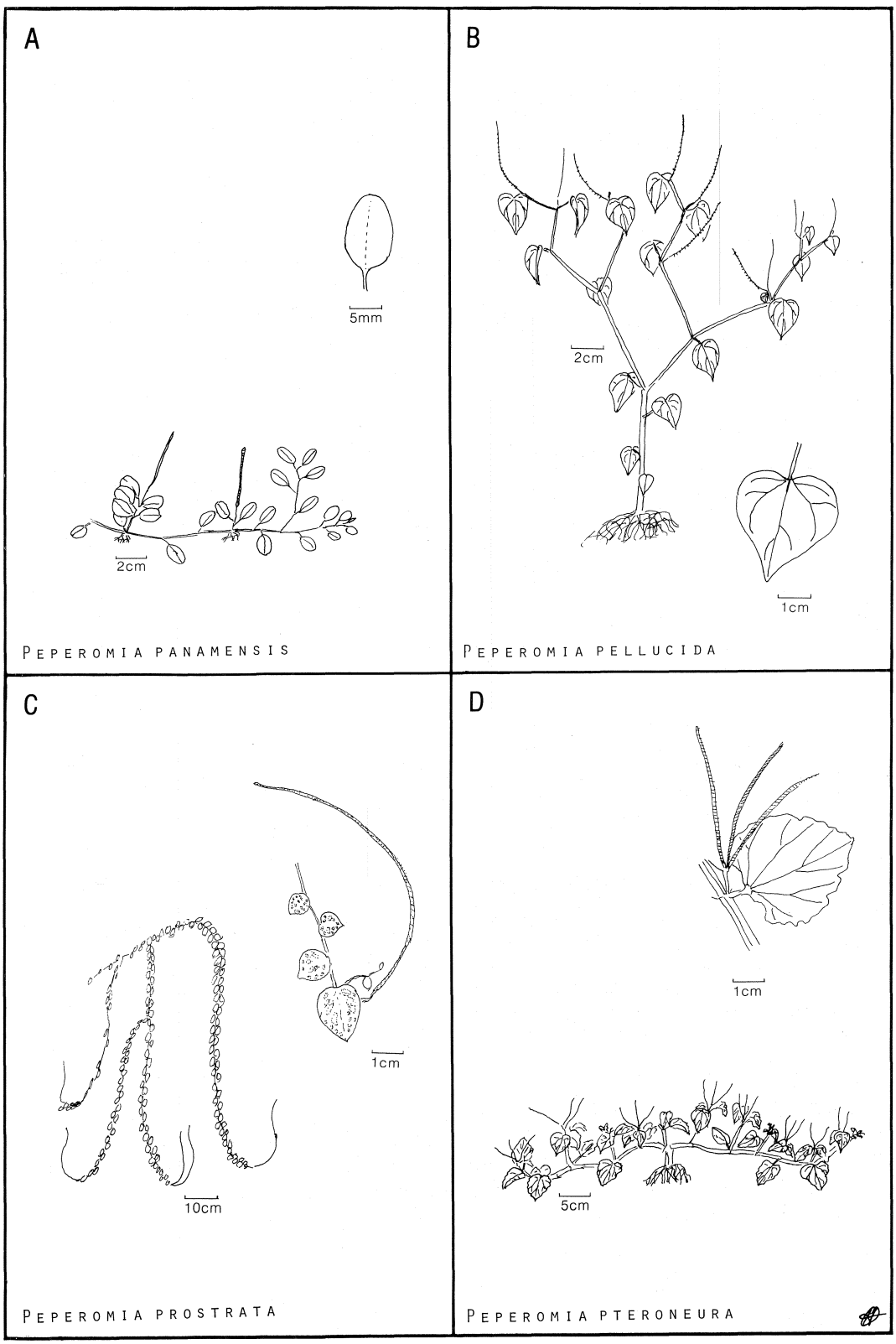
A
5mm
2cm
PEPEROMIA PANAMENSIS
B
2cm
1cm
PEPEROMIA PELLUCIDA
C
1cm
10cm
PEPEROMIA PROSTRATA
D
1cm
5cm
PEPEROMIA PTERONEURA

Plate 226

Peperomia pteroneura C. DC. Plate 226-D

Terrestrial, succulent herb. Stems triangular, very succulent, to 6 cm between nodes. Leaves alternate, broad, to 6 × 4 cm, plicate, undulate on the margin, essentially glabrous. Inflorescences spreading, 6 cm long, green. Uncommon. Creeping on the floor of mature forest. Western Ecuador. The plants much resemble a *Begonia.*

Peperomia rotundifolia (L.) HBK Plate 227-A

Very tiny creeping epiphytic vine. Stems elongate, very slender, to 5 mm between leaves. Leaves alternate, round, very fleshy, pubescent, to 6 × 6 mm. Inflorescence to 2 cm long. Common, in mature forest. Easily confused with *P. panamensis* but much smaller and pubescent. Widespread in tropical America.

Peperomia serpens (Sw.) Loud. Plate 227-B

Creeping epiphytic vine. Stems slender, elongate, to 5 cm between leaves. Leaves alternate, cordate at the base, essentially glabrous, to 5 × 4 cm. Inflorescences to 6 cm long, erect, green. Infrequent, usually at the base of the tree trunks in mature forest. West Indies, Costa Rica and Panama, through tropical South America.

Peperomia tropaeolifolia Sodiro Plate 227-C

Creeping epiphytic vine. Stems fleshy, to 10 cm between nodes. Leaves alternate, peltate, ovate, 5 × 11 cm; petiole to 7 cm long. Inflorescence to 7 cm long. Infrequent, usually near the base of the tree trunks in mature forest. Western Ecuador.

Peperomia verticillatispica Trel. and Yunck. Plate 227-D

Creeping, erect, vine-like epiphytic plant. Stems fleshy, to 5 cm between nodes. Leaves alternate, elliptic, leaf blade 5 × 10 cm, essentially glabrous; petioles to 7 cm long. Inflorescence much branched, erect, white, to 20 cm tall. Flowering in February and March. Common, often near the base of tree trunks, in mature forest. Western Ecuador.

Piper augustum Rudge Plate 228-A

Tree to 3 m tall. Stems and petioles glabrous. Leaves ovate, the base obtuse, 20 × 35 cm, nearly glabrous, pinnately nerved throughout; petiole 5-10 mm long. Inflorescences erect until mature, growing to 2 cm thick by 20 cm long. Infrequent, in mature forest. Costa Rica to Amazonian Peru.

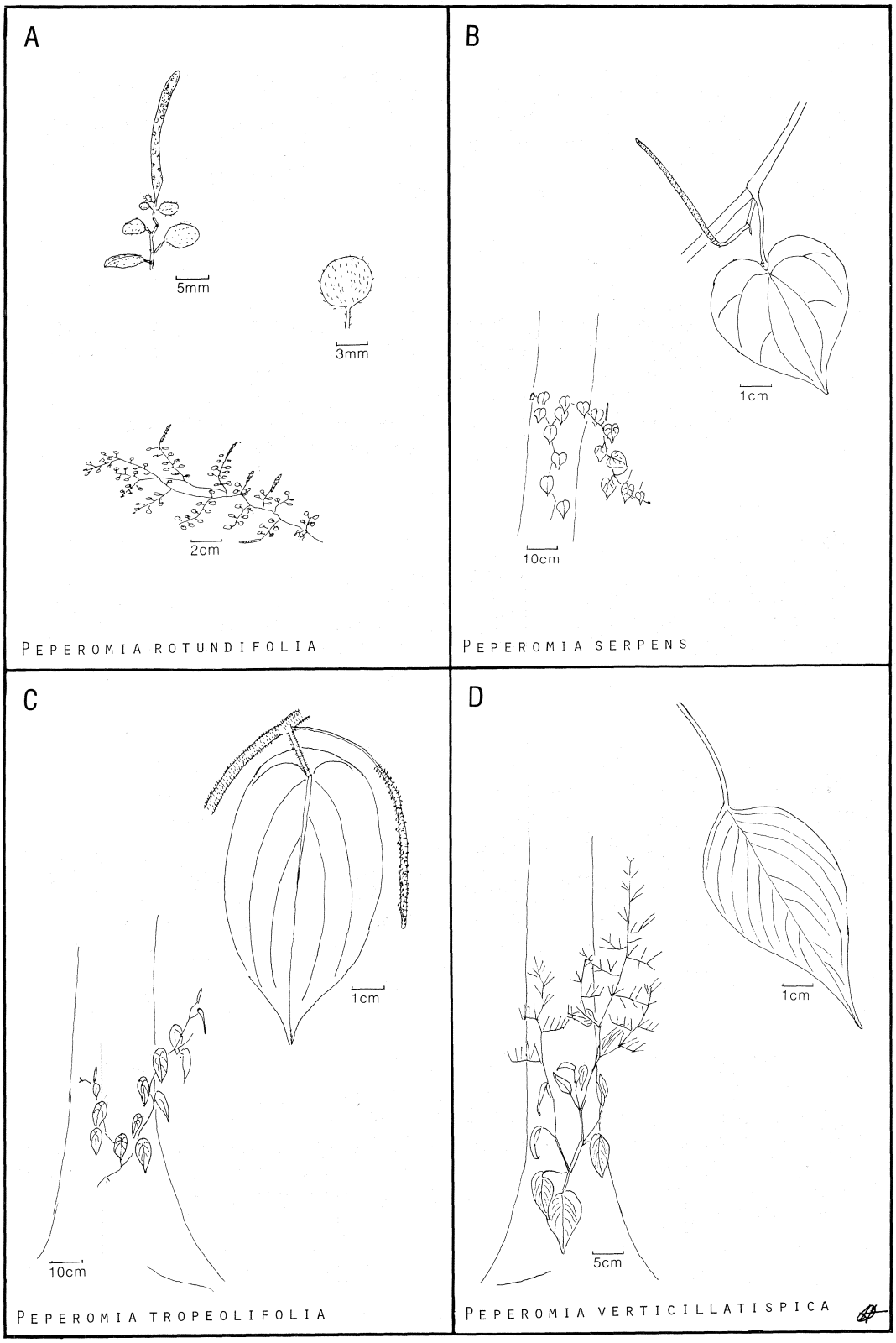
A
5mm
3mm
2cm
PEPEROMIA ROTUNDIFOLIA
B
1cm
10cm
PEPEROMIA SERPENS
C
1cm
10cm
PEPEROMIA TROPEOLIFOLIA
D
1cm
5cm
PEPEROMIA VERTICILLATISPICA

Plate 227

Piper brachypodon (Benth.) C. DC. Plate 228-B

Large vine, stem to 7 cm in diameter. Stems and petioles glabrous. Leaves ovate, the apex acuminate, the base truncate to obtuse (one side distinctly longer than the other) thick, to 10 × 13 cm, glabrous; 2-3 veins on each side of the midvein originate from the lower 1/4 of leaf, an additional vein produced from the midpoint of the leaf on one side only; petiole to 1 cm long. Spikes erect, green, 3 mm thick, to 5 cm long, peduncle to 1 cm long. Uncommon, in mature forest. Costa Rica to western Ecuador.

Piper carrilloanum C. DC. Plate 228-C

Tree to 3 m tall. Stems and petioles glabrous, nodes swollen. Basal leaves broadly ovate, cordate at the base, to 25 × 25 cm; petiole winged at the base, wings surrounding stem. Fertile leaves ovate, acuminate, truncate at base, to 10 × 15 cm; lateral veins originating along the midvein for two-thirds of its length; petiole unwinged. Spikes erect, 4 mm thick, 20 cm long, white. Rare, in mature forest. Costa Rica to western Ecuador.

Piper concepcionis Trel. Plate 228-D

Vine growing on tree trunks, the stems cascading downward. Stems and petioles glabrous. Leaves elliptic, the base obtuse, to 25 × 30 cm, nearly glabrous; lateral veins originating from the lower one-fourth of the midvein; petiole 2 cm long, terete. Inflorescences 3 mm thick, to 5 cm long, erect, purple. Infrequent, in mature forest. This may be only a form of *P. brachypodon.* Costa Rica to Ecuador.

Piper debilicaule Trel. & Yunck. Plate 229-A

Vine growing on tree trunks, the stems cascading downward. Stems and petioles red-villose. Stipules somewhat persistent, to 6 cm long. Leaves obliquely elliptic, shortly acuminate at apex, base obtuse, to 15 × 9 cm; veins villose on underside, lateral veins originating from lower half of midvein; petiole to 2 cm, red-villose. Spikes erect, cream, peduncle to 2 cm long, the fertile portion 12 cm long by 5 mm thick. Rare, in mature forest. Southwestern Colombia and Ecuador.

Piper entradense Trel. & Yunck. Plate 229-B

Vine growing on tree trunks, stems cascading downward from 5 m. Stems nodose, glabrous. Leaves elliptic, the base unequally lobed, 7-20 × 10-25 cm; lateral nerves produced from the lower one-half of the midvein, minutely puberulent beneath; petiole to 1 cm long, minutely puberulent. Spikes erect, white, 2-4 mm thick, 3-5 cm long. Common, on tree trunks in mature forest. Western Ecuador.

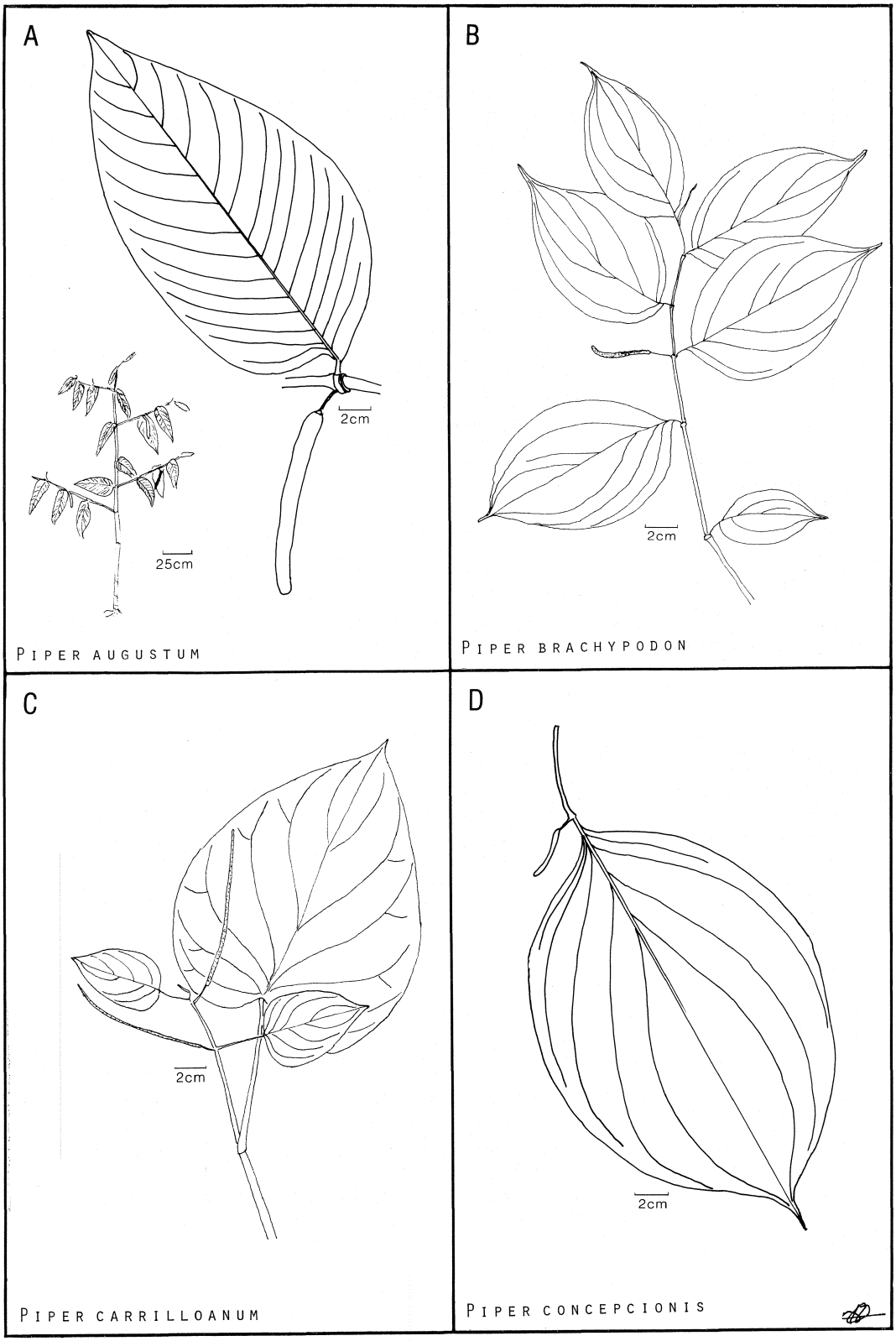
A
2cm
25cm
PIPER AUGUSTUM
B
2cm
PIPER BRACHYPODON
C
2cm
PIPER CARRILLOANUM
D
2cm
PIPER CONCEPCIONIS

Plate 228

Piper eriopodon (Miq.) DC. Plate 229-C

Erect, slender tree to 3 m tall. Stems short-hirsute, nodes swollen. Leaf surface scabrous above with slender hairs widely dispersed, short-hirsute beneath, elliptic-ovate; 15 × 5 cm, major lateral veins arising from the lower one-half of the midvein; petiole to 1.5 cm long; shoot apices without a ligule-like stipular development and the prophylls not drying brown. Inflorescences erect, gray, 4 mm thick, to 10 cm long. Infrequent, in second growth and much disturbed forest. Northern South America, but *P. villiramulum* C. DC. of Nicaragua to Panama is probably conspecific.

Piper eustylum Diels Plate 229-D

Vine growing on tree trunks; stems cascading downward from 4 m. Stems and petioles tomentose. Leaves ovate-elliptic, the base unequally obtuse, 9-15 × 18-25 cm; lateral veins originating from the lower half of the midvein; petiole to 1 cm long. Spikes erect, green, 3-4 mm thick, 7 cm long. Infrequent, on tree trunks in mature forest. Northwestern Ecuador.

Piper aff. **florencianum** Trel. & Yunck. Plate 230-A

Erect, slender tree to 5 m tall. Stems densely villose with trichomes to 4 mm long. Leaves oblong ovate, the base deeply unequally cordate, to 35 × 17 cm, sparsely villose; lateral veins pinnate from basal one-half; petioles 7-9 cm, winged to within 2 cm of the blade, densely villose. Inflorescences not seen. Rare, on trail 6. Southeastern Colombia and western Ecuador, but identification is tentative.

Piper hispidum Sw. Plate 230-B

Erect, slender tree to 5 m tall. Stems green, pubescent, the nodes swollen. Leaves with short petiole, the surface scabrous, glabrous between the veins, elliptic-ovate; to 15 × 5 cm; the major lateral veins arising from the lower one-third of the midvein; shoot apices without a ligule-like stipular development and the prophylls drying brown. Inflorescences erect, 4 mm thick, to 18 cm long, white. Infrequent, in disturbed areas. Widespread in tropical America.

Piper imperiale (Miq.) C. DC. Plate 230-C

P. guayasanum C. DC.

Tree to 5 m tall. Stems and petioles warty, lightly pubescent. Leaves ovate, 20-35 × 25-70 cm, the older leaves equally lobed at the base, the fertile leaves very unequally lobed; lateral veins originating from the lower half to two-thirds of the midvein; petiole 4-6 cm long, winged for the lower half. Spikes pendent, 6 mm thick, to 40 cm long when mature, white. Common, in mature forest. Western Ecuador. This species and *P. squamulosum* C. DC. belong to the *P. obliquum* R. & P. complex. Their distinguishing features are constant at the Science Center. We are unable to distinguish between *P. imperiale* and *P. guayasanum*.

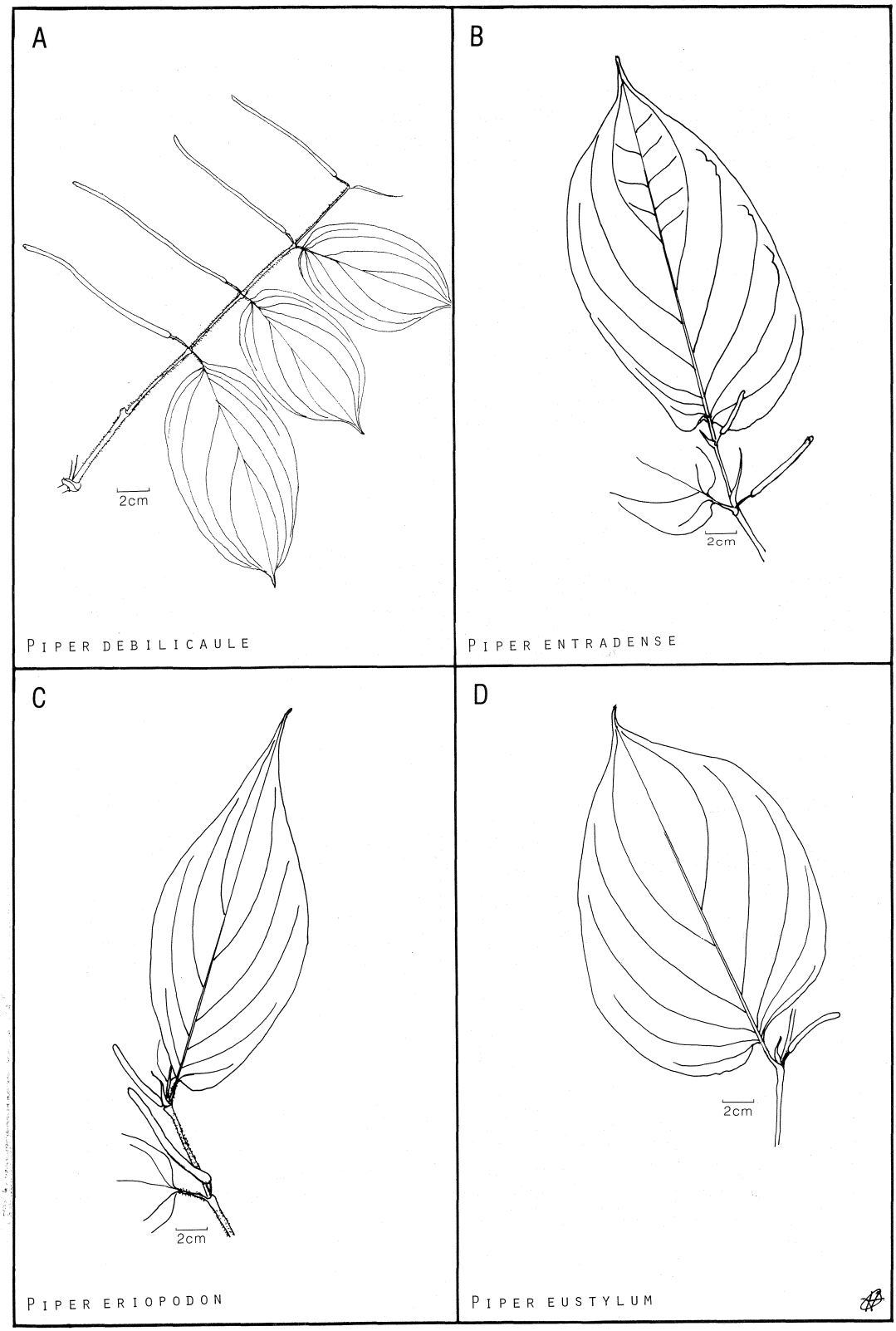
A
2cm
PIPER DEBILICAULE
B
2cm
PIPER ENTRADENSE
C
2cm
PIPER ERIOPODON
D
2cm
PIPER EUSTYLUM

Plate 229

Piper longipilosum C. DC. Plate 230-D

Vine on trunks of small trees to 2 m high. Stems slender, the nodes swollen, long-pilose. Leaves rhombic-elliptic, long-acuminate at the apex, unequally cordate-lobed at the base, to 13 × 27 cm; 6 veins on each side of the midvein originating from the lower half, villose; petioles to 1 cm long, long-pilose. Peduncle 5 cm long; spike 3 mm thick, 5 cm long, grey. Uncommon, in mature forest. Western Ecuador.

Piper marginatum Jacq. Plate 231-A

Erect tree to 6 m tall. Stems and petioles glabrous. Leaves glabrous, ovate, cordate at the base, equally lobed, 8-15 × 10-20 cm; lateral veins 9-13, originating from the base of the midvein; petiole 1-5 cm long, winged for lower three-fourths. Spikes white, erect, curved, 4 mm thick, 15 cm long. Very common, mostly in second growth. Widespread in tropical America.
Common name: "Cordoncillo"+

Piper mexiae Trel. & Yunck. Plate 231-B

Erect shrub to 3 m tall. Stems glabrous. Leaves glabrous, obliquely elliptic, the apex acute, the base obliquely unequally acute to slightly lobed on one side, 8-10 × 20-25 cm; lateral veins originating from the lower two-thirds of the midvein, very short pubescent; petiole to 1 cm long, glabrous. Spikes erect, green, 2 mm thick, 8 cm long, the ovary and the fruit without projecting styles. Uncommon, in mature forest. Western Ecuador. Specimen 6131 with the leaf veins completely glabrous may not be the same.

Piper multiplinervium C. DC. Plate 231-C

Large vine. Stems and petioles glabrous. Leaves broadly ovate, apex slightly acuminate, base mostly broadly cordate, becoming truncate on same branches, glabrous, to 22 × 15 cm; 3 veins on each side of midvein originating from the base, one on each side from the midpoint; petiole to 6 cm long. Inflorescence erect, cream, to 11 cm long, about 2 mm thick. Uncommon, in mature forest. Previously reported only from Costa Rica and western Colombia and also occurs in Panama.

Piper phytolaccaefolium Opiz in Presl Plate 231-D

Shrub to 2 m tall. Stems and petioles glabrous. Leaves essentially glabrous, elliptic, acute at the base, 3-6 × 10-13 cm; lateral veins 8-10, originating through most of the length of the midvein; petiole to 1 cm long. Spikes erect, grey, 5 mm thick by 2-4 cm long. Uncommon, in mature forest. Guatemala through northern South America.

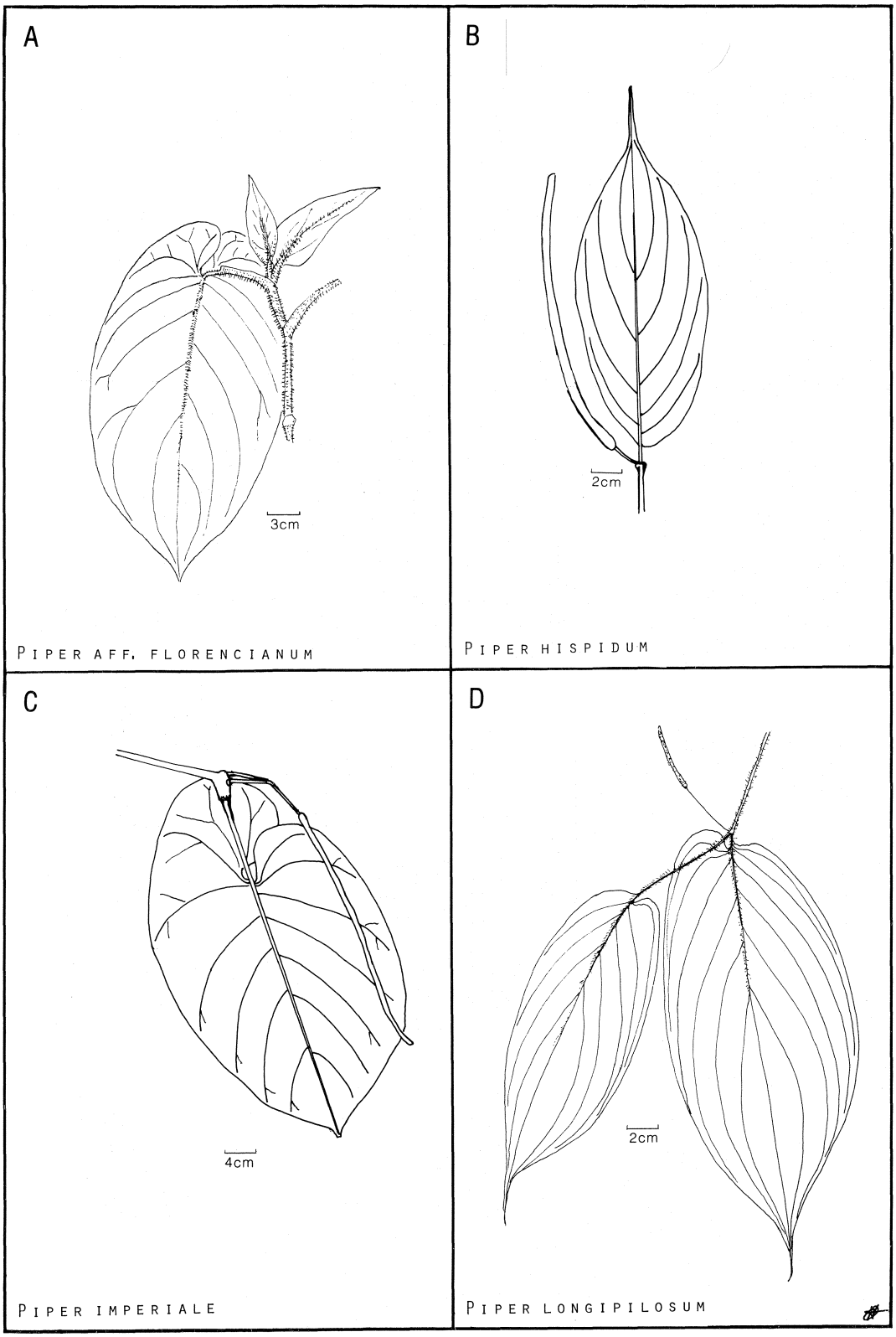
A
3cm
PIPER AFF. FLORENCIANUM
B
2cm
PIPER HISPIDUM
C
4cm
PIPER IMPERIALE
D
2cm
PIPER LONGIPILOSUM

Plate 230

Piper pseudonobile C. DC. Plate 232-A

Tree to 3 m tall. Stems and petioles glabrous. Leaves oblong-ovate, the base deeply unequally cordate, to 20 × 40 cm, nearly glabrous; lateral veins from below the upper one-third; petioles 4-9 cm, winged to the blade. Inflorescence yellow, pendent, 6 mm thick, 12 cm long; peduncle 4 cm long. Rare, in mature forest along the creek. Endemic to western Ecuador.

Piper reticulatum L. Plate 232-B

Tree to 6 m tall. Stems and petioles glabrous. Leaves ovate, cordate at the base, equally lobed, 8-25 × 15-30 cm; lateral veins 5-7, originating from the base of the midvein; petiole 1-5 cm long, winged for lower half. Spikes erect, grey-green, curved, 5 mm thick, 15 cm long. Fruit with a disc at the top. Uncommon, in disturbed areas and mature forest. Widespread in tropical America.

Piper sancti-felicis Trel. Plate 232-C

Treelet to 3 m tall. Like *P. hispidum* but the scabrous leaves often completely glabrous above and the shoot apices with a ligule-like stipular development which dries dark brown or black, the prophylls also dry dark brown or black. Spikes erect, white, 4 mm thick, 12 cm long. Common, in disturbed areas. Costa Rica to Ecuador.

Piper scansum Trel. & Yunck. Plate 232-D

Vine. Vegetatively very like *P. sternii* except for the scandent habit. The upper leaves are perhaps smaller (3-5 cm wide) and with more secondary veins (since the upper secondary veins are as pronounced as the more ascending lower ones rather than appearing tertiary as in *P. sternii*); lower leaves are much larger (to 22 × 14 cm) and strongly asymmetrical at the base. Uncommon, in mature forest. Previously reported from western Colombia. Several collections from eastern Panama have been tentatively referred to this species but these are described as erect and better identified with *P. sternii.*

Piper squamulosum C. DC. Plate 233-A

Tree to 5 m tall. Stems and petioles warty, slightly pubescent to matted-yellow-villose on the same plant. Leaves broadly ovate, the upper surface bluish when young, the older leaves equally cordate-lobed at the base, the fertile leaves much smaller, unequally lobed, 20-35 × 25-70 cm; lateral veins originating from the lower half of the midvein; petiole 6-8 cm long, winged for basal half. Spikes pendent, 8-10 mm thick, 70 cm long. Infrequent, in mature forest. Western Ecuador. Similar to *P. imperiale*, but differs especially in the dark bluish leaf color and less warty stem and petiole.

Piper sternii Yunck. Plate 233-B

Erect shrub to 3 m tall. Stems glabrous. Leaves glabrous, obliquely elliptic, the apex long acuminate, the base obliquely unequal, acute to slightly lobed on one side, 6-8 × 15-18 cm; lateral veins originating from the lower two-thirds of the midvein, very short pubescent; petiole to 1 cm long, glabrous. Spikes erect, green, 3 mm thick, 9 cm long; ovary and fruit with 3 projecting styles. Uncommon, in mature forest. Panama to western Ecuador.

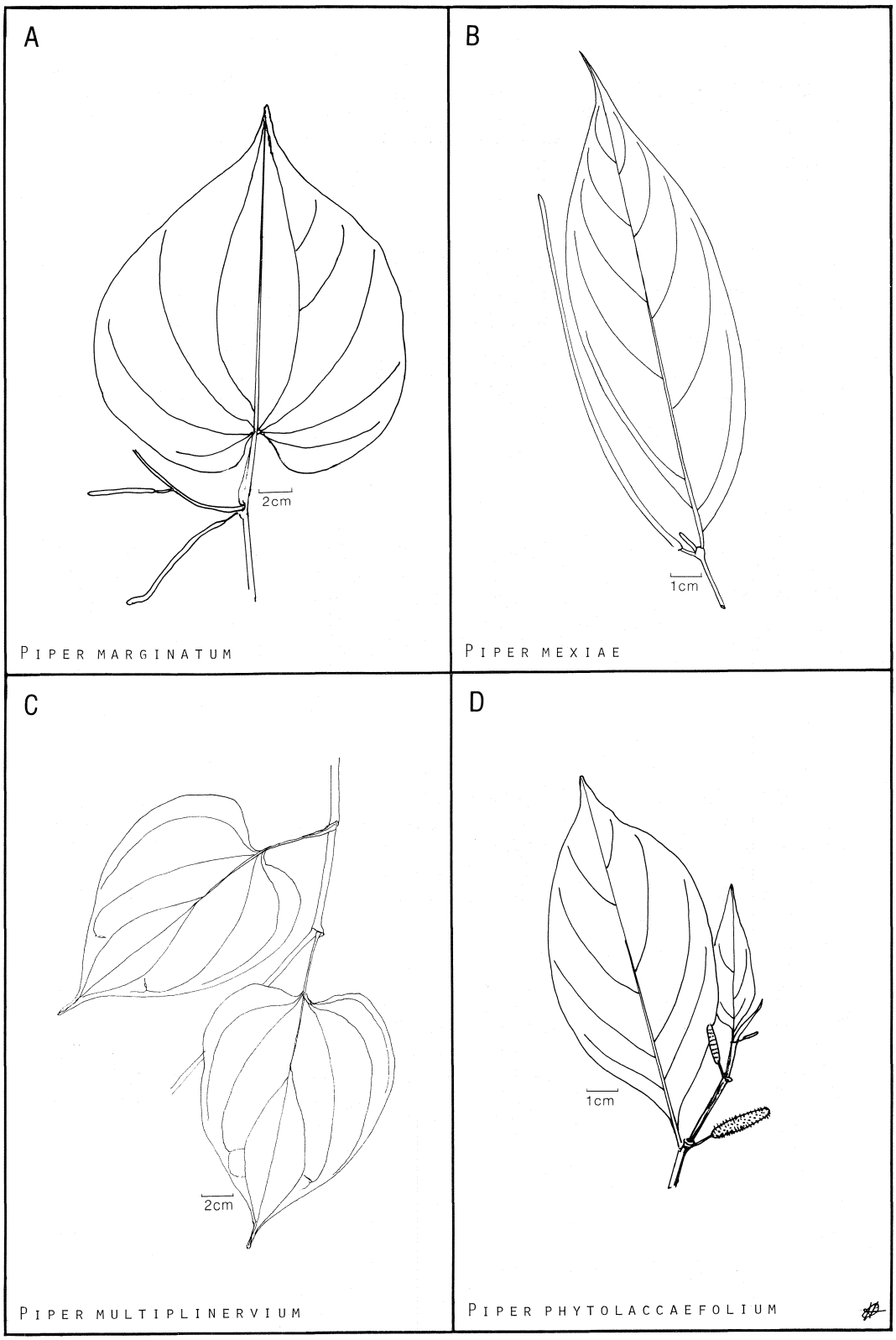
A
2cm
PIPER MARGINATUM
B
1cm
PIPER MEXIAE
C
2cm
PIPER MULTIPLINERVIUM
D
1cm
PIPER PHYTOLACCAEFOLIUM

Plate 231

Pothomorphe peltata (L.) Miq. Plate 233-C

Soft wooded, erect shrub to 2 m tall. Stems and petioles glabrous. Leaves rounded-cordate, peltate, 16 × 18 cm or much more; petioles 9-20 cm long, winged for one-fourth to one-half of length. Spikes white, umbellately arranged, 4 mm thick, 5-10 cm long. Common, in second growth and mature forest. Widespread in tropical America.
Common name: "Santa Maria"+

Trianaeopiper filistilum (C. DC.) Trel. & Yunck. Plate 233-D

Stout, woody herb to 1 m tall. Stems and petioles warty, crisp-pubescent. Leaves obovate, bullate, plain green, the base unequally cordately lobed, 20-40 cm, the midvein with a yellow-white splash down the center; lateral veins originating from below the upper two-thirds of the length of the midvein; petiole 2-3 cm long, winged. Spikes 5 mm thick by 3-5 cm long. Infrequent, in mature forest. Western Ecuador.

Trianaeopiper garciae Trel. & Yunck. Plate 234-A

Stout, woody herb to 1 m tall. Stems and petioles warty, crisp-pubescent. Leaves obovate, bullate, plain green, the base unequally cordately lobed, 20-30 × 15-45 cm, lateral veins originating from the lower two-thirds of the midvein; petioles 2 cm long, winged to middle. Flowering spikes 5 mm thick by 3 cm long; fruiting spikes 1 × 12 cm. Common, in mature forest. Panama, western Colombia and Ecuador.

Trianaeopiper killipii Trel. Plate 234-B

Erect subwoody herb to 1 m tall. Stems and petioles glabrous. Leaves ovate, the base equally cordate, the lobes touching or overlapping; petiole to 15 cm long, sheathed for lower one-third; lateral veins originating along the lower two-thirds of the midvein. Inflorescence originating from the axils of the leaves, purple. Infrequent, in mature forest. Western Colombia and Ecuador.

Trianaeopiper mexiae Trel. & Yunck. Plate 234-C

Erect shrub to 1 m tall. Stems and petioles glabrous. Leaves ovate, the base equally truncate to slightly lobed, 20 × 30 cm, glabrous; lateral veins originating from the lower half of the midvein; petiole to 8 cm long, shallowly winged for lower one-third. Inflorescences originating from the axils of the leaves. Infrequent, in mature forest. Western Ecuador.

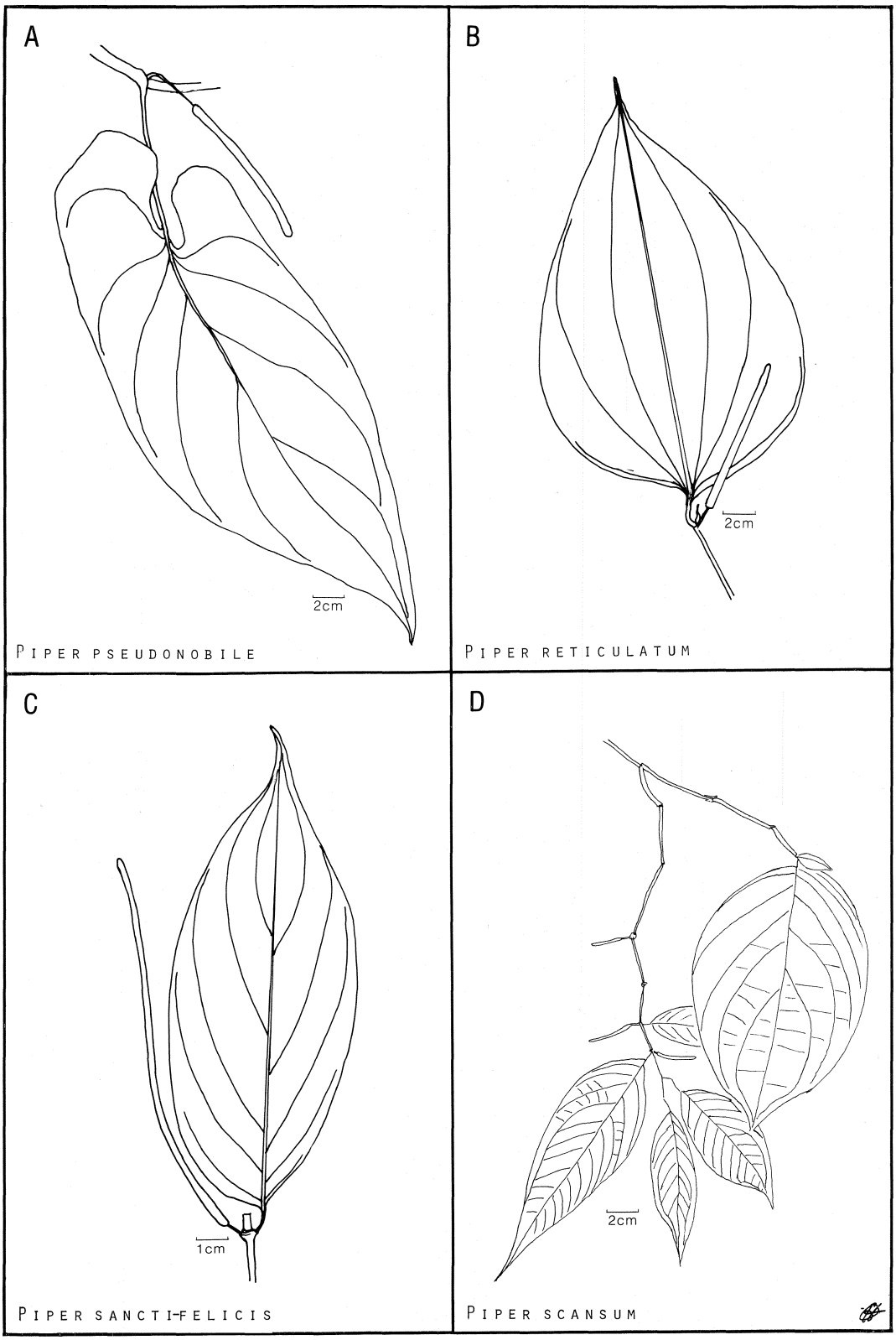
A
2cm
PIPER PSEUDONOBILE
B
2cm
PIPER RETICULATUM
C
1cm
PIPER SANCTI-FELICIS
D
2cm
PIPER SCANSUM

Plate 232

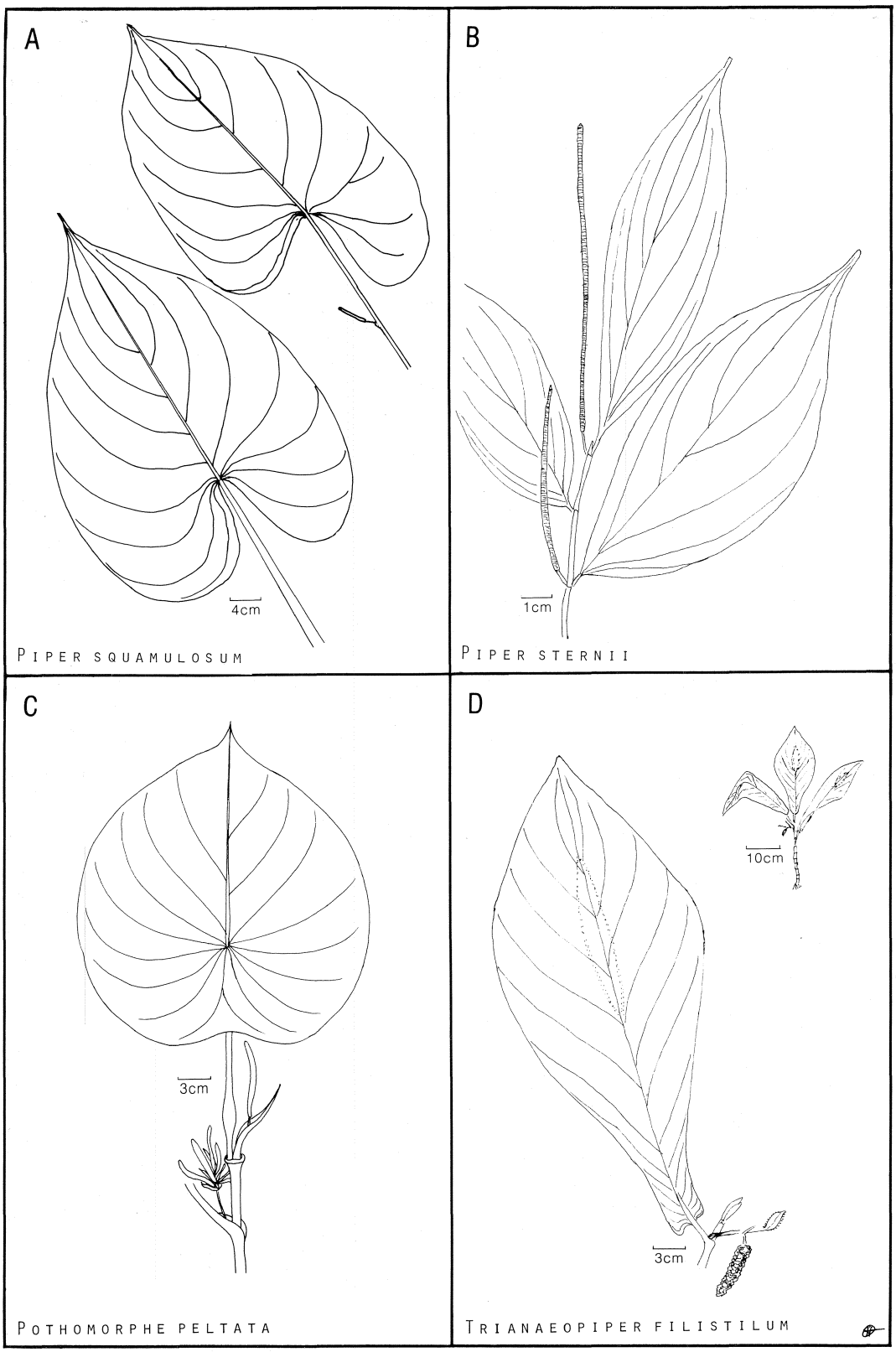
A
4cm
PIPER SQUAMULOSUM
B
1cm
PIPER STERNII
C
3cm
POTHOMORPHE PELTATA
D
10cm
3cm
TRIANAEOPIPER FILISTILUM

Plate 233

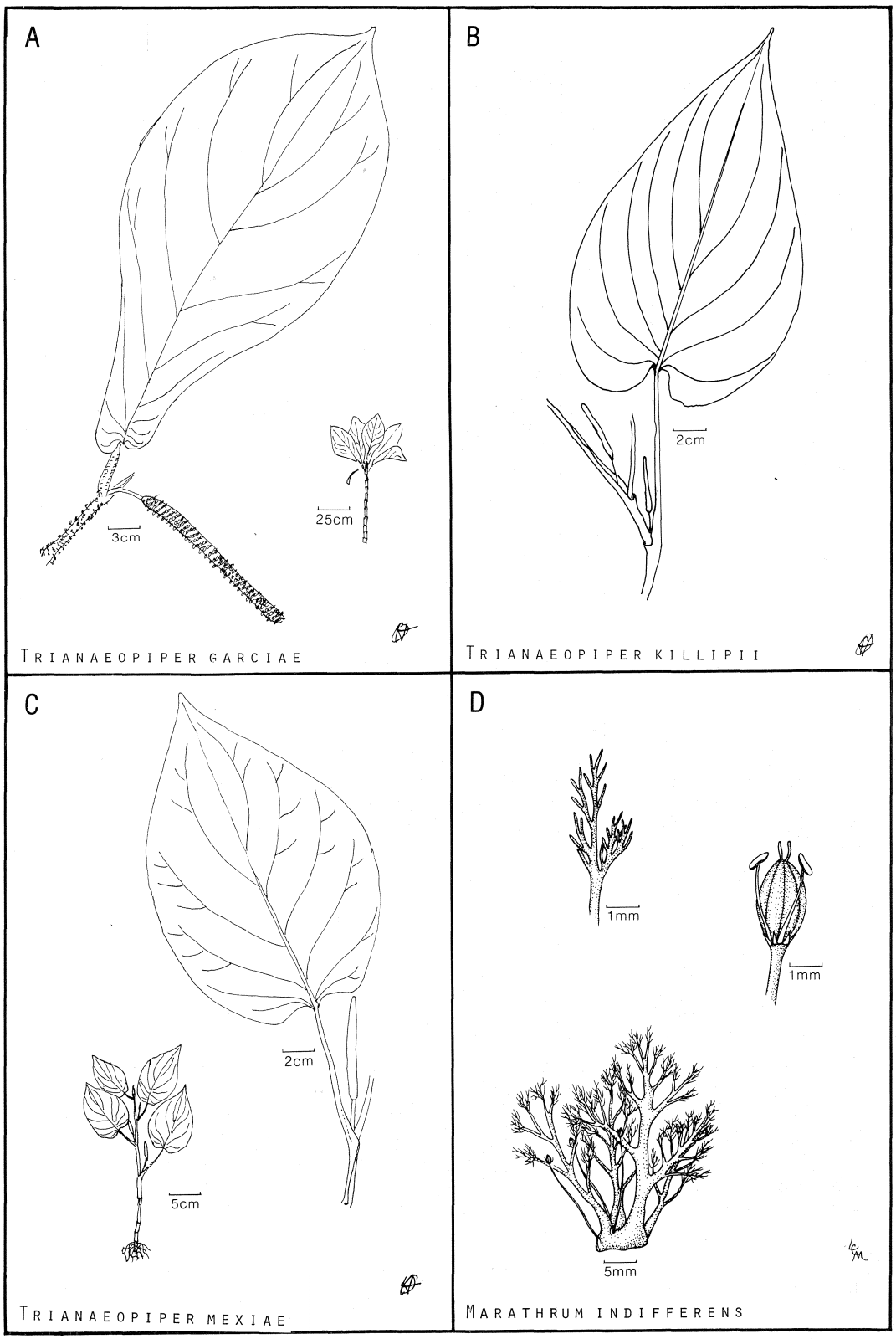
A
3cm
25cm
TRIANAEOPIPER GARCIAE
B
2cm
TRIANAEOPIPER KILLIPII
C
2cm
5cm
TRIANAEOPIPER MEXIAE
D
1mm
1mm
5mm
MARATHRUM INDIFFERENS

Plate 234

PODOSTEMONACEAE

Small aquatic herbs growing on rocks in fast-moving water. Leaves alternate, usually much-divided, the ultimate divisions often filiform. Flowers bisexual, actinomorphic or zygomorphic; sepals 2-many, usually reduced and inconspicuous; stamens 1-many; ovary superior, 2-to 3-celled. Fruit a small 2 or 3 valved capsule.

Marathrum indifferens V. Roy. Plate 234-D

Small aquatic herb. Leaves 3-4 times pinnate, the ultimate divisions filiform. Flowers few, borne singly on pedicels ca. 2 cm long; sepals reduced to scales ca. 1 mm long; stamens as long as the ovary; ovary ca. 2 mm long, surmounted by 2 divaricate styles. Locally common, on rock outcrops in the river below the building. Previously known from Mexico to Panama; this is the first record for Ecuador.

POLEMONIACEAE

Herbs, shrubs, small trees or vines. Leaves usually alternate, entire to compound, without stipules. Flowers bisexual, regular; calyx 5-lobed; corolla contorted in the bud, tubular, 5-lobed; stamens 5, mounted on the corolla, an intrastaminal disc usually present; ovary superior, 3-locular. Fruit a capsule.

Cobaea lutea Don Plate 235-A

Herbaceous vine usually scrambling over vegetation. Leaves compound, with 2-6 pairs of leaflets, apex of the rachis produced into a tendril; leaflets elliptic, the margin entire, revolute. Pedicel slender, to 30 cm long. Sepals green, narrowly ovate, united at the base, to 2 cm long; corolla yellow-green, to 4 cm long, 2 cm wide, the lobes 5, triangular; stamens 5, exserted, the filaments 5 cm long; style 6 cm long. Infrequent, in disturbed areas and at the forest edge. Southern Mexico to Pacific Ecuador.