



LIBRARY OF THE  
UNIVERSITY OF ILLINOIS  
AT URBANA-CHAMPAIGN

580.5  
FB  
v. 29

JUL 14 1972



BIOLOGY

0.5  
B  
29  
0.8

6 1963

TROPICAL AMERICAN MYRTACEAE, II  
NOTES ON GENERIC CONCEPTS  
AND DESCRIPTIONS OF  
PREVIOUSLY UNRECOGNIZED SPECIES

ROGERS McVAUGH

FIELDIANA: BOTANY  
VOLUME 29, NUMBER 8  
*Published by*  
CHICAGO NATURAL HISTORY MUSEUM  
MAY 31, 1963

BIOLOGY LIBRARY  
101 BURRILL HALL







TROPICAL AMERICAN MYRTACEAE, II  
NOTES ON GENERIC CONCEPTS  
AND DESCRIPTIONS OF  
PREVIOUSLY UNRECOGNIZED SPECIES

ROGERS McVAUGH

*Curator of Vascular Plants, University Herbarium,  
The University of Michigan*

FIELDIANA: BOTANY

VOLUME 29, NUMBER 8

*Published by*

CHICAGO NATURAL HISTORY MUSEUM

MAY 31, 1963

## CONTENTS

	PAGE
Introduction . . . . .	395
1. <i>Calyptranthes</i> Sw. . . . .	397
The Genus in Continental North America . . . . .	397
Miscellaneous Notes . . . . .	412
2. <i>Eugenia</i> L. . . . .	413
Synopsis of Mexican Species West of the Isthmus of Tehuantepec . . . . .	413
Notes on Miscellaneous Species . . . . .	464
3. <i>Marlierea</i> Camb. . . . .	470
4. <i>Myrcia</i> DC. . . . .	470
Miscellaneous Notes . . . . .	470
5. <i>Myrcianthes</i> Berg . . . . .	473
Synopsis of the Genus (Eastern South America Excluded) . . . . .	473
Nomenclature . . . . .	476
6. Certain Eugenioid Genera . . . . .	498
Revision of <i>Myrciaria</i> Berg, in North America and Northern South America . . . . .	499
A New Species of <i>Plinia</i> L., from Costa Rica . . . . .	505
The Genus <i>Siphoneugena</i> Berg . . . . .	507
7. <i>Pimenta</i> Lindl. . . . .	511
8. <i>Psidium</i> L. . . . .	512
Delimitation of the Genus . . . . .	512
Additions to the Genus . . . . .	519
Species Described by Standley from British Honduras . . . . .	522
Miscellaneous Notes . . . . .	524
Index . . . . .	530





## Tropical American Myrtaceae, II<sup>1</sup>

The following notes have been prepared as a necessary preliminary to a formal treatment of the Myrtaceae of Guatemala. There has been no comprehensive revision of North American Myrtaceae since the work of Berg (1855-62), and it was found impossible to revise the Guatemalan species without full consideration of those of Mexico, the rest of Central America, and the West Indies.

The myrtaceous flora of Central America is a comparatively small one. The number of genera represented in the flora of Guatemala, for example, is 8 (the same as in Costa Rica and Panama). The number of species is about 95 as far as known, as against 35-40 in Costa Rica and about as many in Panama. The flora of Surinam includes about 90 species. The myrtaceous flora of Peru includes 14 genera and about 175 species; that of Brazil, according to estimates by Berg, includes more than 600 species in 33 genera.

The genera represented in Central America are all, with the possible exception of *Pimenta*, represented in South America by more diversified populations and larger numbers of species. There seems to be little or no direct relationship between the North American and South American species, except for weedy species like *Psidium guajava* and a few like *Myrcianthes fragrans* and *Myrciaria floribunda* that are widespread in the West Indies and range to northern South America and continental North America.

In general there seems to have been a strong phylogenetic connection between the myrtaceous flora of the West Indies and that of Central America, especially of the Atlantic lowlands that extend from Honduras to Yucatan. In all the genera having lowland representatives (that is, all except *Ugni*), some of the species are identical with West Indian species or scarcely distinguishable from them. The greatest amount of relative similarity between the two floras, as pointed out above, is where they are geographically closest. Other connections, however, are suggested between the flora of Jamaica and that of Costa Rica (in *Myrcianthes*), and most curiously (and

<sup>1</sup> An earlier paper with the same title dealt primarily with the Myrtaceae of Peru (Fieldiana, Bot. 29: 143-228. 1956).

as yet unexplainedly) along an interrupted axis extending from Cuba to Yucatan and thence to western Jalisco and the Tres Marías Islands.

There seems to be a certain amount of endemism in both western and eastern Mexico and in the Central American highlands, and a relatively great amount—perhaps a reflection of greater thoroughness of exploration—in Petén and British Honduras. Any supposedly undescribed species from Central America should be carefully compared with West Indian material, not only because of the possibility that the same species may occur in both regions, but also because of the high probability that the West Indian plant has already been named and described. This is true not only because of the many species described by Linnaeus, Lamarck, Swartz and others in the eighteenth and early nineteenth centuries, but also because of the many Myrtaceae described by Urban and others in more recent times. Between 1895 and 1931, for example, about 70 species of *Calypttranthes* were described from the West Indies; this is almost exactly the same number as all the species of *Calypttranthes* known to Berg a century ago.

Notable contributions to our knowledge of the flora of Central America have been made in the last few decades by Paul C. Standley and C. L. Lundell. More than half of all the known Guatemalan species of Myrtaceae were first recognized and described by one or the other of these workers.

In my own work of revision I have been aided by many friends and colleagues who have lent herbarium materials and have assisted in other ways. To the authorities at the Jardin Botanique de l'État, Brussels (BR); the Botanical Museum, Copenhagen (C); Chicago Natural History Museum (F); the Harvard University Herbaria (A, GH); the Royal Botanic Gardens, Kew (K); the Herbarium of the Botanical Institute of the Academy of Sciences, Leningrad (LE); the Herbario Nacional del Instituto de Biología, Mexico City (MEXU); the University of California, Berkeley (UC); the United States National Herbarium, Washington (US); and the Naturhistorisches Museum, Vienna (W), I am grateful for permission to study types and other unique and valuable specimens.

Dr. C. L. Lundell has been most gracious in permitting me free access to his large collections of Myrtaceae from Petén and elsewhere in the Maya area, including the types and in most instances abundant duplicate materials of species he has recently described. I am also much indebted to Dr. Faustino Miranda for providing me with a study set of his own collections from Chiapas and elsewhere in south-eastern Mexico.

In the systematic notes that follow, the terminology is intended to conform to that used in my earlier papers and also in the *Flora of Peru* (Field Mus. Bot. 13, pt. 4: 569–818. 1958), and a paper on *Calyptranthes* and *Marlierea* (Mem. N. Y. Bot. Gard. 10: 61–91. 1958). Some changes in concepts are noted below.

## 1. CALYPTRANTHES Sw.

### THE GENUS IN CONTINENTAL NORTH AMERICA

There appear to be several centers of endemism in *Calyptranthes*. Few species are widely distributed. At least one species, *C. fasciculata* Berg, ranges from the Guianas to the Lesser Antilles, but no primarily South American species is known to range northward into North America or even into Colombia except Colombian Guayana. About 16 species are known from the region between the Amazon and the Orinoco (cf. Mem. N. Y. Bot. Gard. 10: 65–79. 1958), and about 20 were treated recently in the *Flora of Peru* (Field Mus. Bot. 13, pt. 4: 591–616. 1958). The genus is almost absent from the whole Andean region of South America and from the cis-Andean lowlands bordering the Pacific. North of the Amazon and west of the Andean foothills I know of but two local species, viz. *C. killipii* Standl., from the coastal lowlands about Buenaventura, Colombia, and *C. meridensis* Steyerf., from mountains in the State of Mérida, Venezuela.

In view of the restricted distribution of a majority of the South American species, and the apparent absence of the genus from much of northwestern South America, it is perhaps not surprising to find that most of the North American species are distinctive and comparatively distantly related. There is apparent, however, among the North American species, a strong West Indian influence.

The genus *Calyptranthes* in the West Indies was reviewed by Urban many years ago (Bot. Jahrb. 19: 591–603. 1895), at which time he recognized about 30 species. About 70 additional West Indian species, almost all from the Greater Antilles, have since been described by Urban, Britton, and others. A new revision of all the Antillean species is much needed, but indeed there seems to be more diversity among the species of *Calyptranthes* in the Caribbean basin than in any other area in tropical America.

Two well-known West Indian species, *C. pallens* and *C. zuzygium*, occur in southern Florida as well; *C. zuzygium* has not been found

elsewhere on the North American continent, but *C. pallens* is represented in Mexico and Central America by several varieties. A species of Cuba and Jamaica, *C. chytraculia*, is represented on the mainland by the var. *americana*, which ranges from Mexico to northern Colombia. Other species common to the West Indies and the continent may become known as the flora is revised.

The following key includes all the species known to occur naturally in continental North America. Descriptions of species are not included unless they are unavailable elsewhere.

### KEY TO THE SPECIES

Leaf-bases broadly cordate or subcordate, the blades nearly sessile or subclasping, on stout short petioles 3 mm. long or less; blades usually acute or obtuse, sometimes obscurely acuminate, never caudate; young leafy branchlets 2- or 4-angled or -winged except in *C. chiapensis* with leaves 12-23 cm. long.

Young branchlets and inflorescence densely ferruginous-tomentose with contorted and mostly 1- or 2-branched but nearly erect hairs 0.4-1.3 mm. long.

Leaves 1.3-5 cm. wide, 4-12 cm. long, mostly lanceolate; branchlets bicarinate or winged.

Branchlets bialate, the wings terminating distally at each node between the leaf-bases; buds 5.5-7 mm. long; panicles 9-flowered; San Luis Potosí.  
*C. hernandezii* McVaugh.

Branchlets bicarinate, the keels terminating distally in the median line of the leaf-bases; buds 4.5-5 mm. long; panicles 30-60-flowered; British Honduras.....*C. bartlettii* Standl.

Leaves 6.5-7.5 cm. wide, 12-23 cm. long, oblong; branchlets terete or compressed, not carinate; Chiapas.....*C. chiapensis* Lundell.

Young branchlets and inflorescence glabrous or thinly pubescent with appressed flat dibrachiate hairs 0.1-0.2 mm. long; branchlets 2- or 4-angled or -winged.

Branchlets biconvex in cross section, bicarinate, the winglike angles terminating distally in the midlines of the leaf-bases; Guatemala (Alta Verapaz, Petén).....*C. contrerasii* Lundell.

Branchlets 4-angled, 2 of the angles terminating distally in the midlines of the leaf-bases, the other 2 winged, terminating distally between the leaf-bases.

Plants quite glabrous; leaves ovate-oblong; Mexico (Mesa Chica, Veracruz).....*C. karwinskyana* Berg.

Plants thinly pubescent with minute appressed hairs; leaves lanceolate or elliptic-lanceolate; Tabasco, Chiapas, British Honduras, Petén.

*C. karlingii* Standl.

Leaf-bases acute or cuneate, or sometimes abruptly rounded, never cordate; blades usually definitely petiolate, often acuminate, sometimes caudate; branchlets various.

Flowers 9 or fewer in each panicle, the two lateral branchlets and the terminal one each bearing a single pedicellate flower or a cluster of 2-3 sessile flowers; inflorescence 3-5 cm. long, the very slender or even capillary peduncle usually much longer than the rest of the panicle; leaves long-acuminate, 3-7.5 cm. long.

Branchlets 4-angled or -winged, glabrous or essentially so; Mexico (Chiapas) to Panama.....*C. hylobates* Amsh.



Branchlets terete, when young with abundant appressed or contorted rufous dibrachiate hairs.

Branchlets tomentulose with coarse contorted hairs; leaves rounded at base; petioles 2 mm. long; axis of inflorescence filiform, bearing 3 (-5) flowers; Mexico.....*C. tenuipes* McVaugh.

Branchlets appressed-pubescent with straight longitudinally oriented hairs; leaves acute at base; petioles 3-6 mm. long; peduncle up to about 1 mm. wide, the panicle with 9 flowers or fewer; Guatemala.

*C. paxillata* McVaugh.

Flowers more numerous, usually 20-30 or more in each panicle, often sessile or subsessile in small clusters near the tips; panicles as a whole usually 5 cm. long or more, twice or more compound; leaves various, 10-16 cm. long if the flowers are 9 or fewer (in *C. perlaevigata* with buds 7-8 mm. long).

Plants glabrous or sparingly pubescent; pubescence, if any, usually consisting of minute flat appressed dibrachiate hairs 0.1-0.3 mm. long, these often nearly confined to the base of the hypanthium, the nodes of the inflorescence, and the undeveloped vegetative buds.

Panicles 15-20 cm. long; peduncles compressed, 10-12 cm. long, 3-4.5 mm. wide; leaves as far as known 11-12 cm. wide, up to 35 cm. long; inflorescence and buds thinly reddish-pubescent; British Honduras-Petén boundary.....*C. megistophylla* Standl.

Panicles mostly 10 cm. long or less (if infrequently to 15 cm. long, the peduncles 3-5 cm. long, less than 2 mm. wide); leaves mostly 12-15 cm. long or less, in one Panamanian species up to 28 cm.

Leaves 12-28 cm. long, caudate-acuminate; buds obovoid, 2-2.5 mm. long, glandular-verrucose; plants sparingly pubescent at flowering time, the panicles and the bases of the buds appressed-pubescent with reddish hairs; Panama.....*C. tumidonodia* Schery.

Leaves shorter (or the plants quite glabrous) and merely obtuse or acute or short-acuminate; northern Central America to Mexico.

Leaves prevailingly obovate to elliptic, obtuse or rounded at tip, 3.5-6.5 cm. long; small connecting veins evident on the lower surface in dried leaves as a raised reticulum; branchlets not winged; pubescence appressed, rather sparse, grayish- or yellowish-white; British Honduras.....*C. cuneifolia* Lundell.

Leaves prevailingly elliptic to lanceolate or ovate, acute or acuminate (if small and obtuse the branchlets winged, the small veins obscure, the pubescence, if any, reddish).

Leaves small and obtuse, mostly 2.5-4.5 cm. long, usually narrow, often varying on the same plant from 2-5 (-7) times as long as wide; branchlets persistently and prominently corky-winged; pubescence sparse, evanescent, of rather loosely appressed yellow- or reddish-brown hairs; Honduras to British Honduras.

*C. hondurensis* Standl.

Leaves usually larger and acute or acuminate, usually 2-3 times as long as wide; branchlets wingless or somewhat obscurely winged.

Flower-buds 3-4.5 mm. long, glabrous; whole plant essentially glabrous; calyptra (2.5-) 3-4 mm. wide; persistent collar-like base of the calyx 3-4 mm. wide in fruit.

Midvein narrowly impressed above; inflorescence pyramidal, many-flowered, up to 15 cm. long, the lowest branches of the panicle up to 6 cm. long, often as long as the peduncle; flowers clustered near the tips; branchlets winged; state of Mexico.....*C. hintonii* Lundell.

Midvein convex or flat above, sometimes concave, not narrowly impressed; inflorescence mostly 5–7 cm. long or less, with 5–15 flowers, the lowest branches of the panicle up to 2 cm. long and much shorter than the peduncle; flowers mostly solitary.

Leaves 3–6 cm. long, obtuse to acuminate; branchlets winged; calyptra membranaceous, 2.5–3.5 mm. wide; flowers conspicuously pedicellate and solitary; West Indies, Florida.

*C. zuzygium* (L.) Sw.

Leaves 10–12 cm. long, prominently acuminate; branchlets compressed, not winged; calyptra conic, thickened, 4 mm. wide; flowers nearly sessile in pairs at the 1–2 nodes of the panicle; Chiapas. . . . . *C. perlaevigata* Lundell.

Flower-buds [as far as known] (2?–) 2.5–3 mm. long; plants and buds glabrous or pubescent; calyptra [as far as known] 1.5–2.5 mm. wide; persistent collar-like base of the calyx 1.5–3 mm. wide in fruit; midvein impressed or sulcate above.

Flower-buds and distal nodes of the panicle sparingly pubescent with appressed reddish or pale hairs.

Leafy branchlets (at least some of them) wing-angled in most plants; inflorescence rather slender, the principal secondary branches of the panicle less than 1 mm. wide; mountains of Chiapas.

*C. pallens* var. *mexicana* (Lundell) McVaugh.

Leafy branchlets not wing-angled; inflorescence stout, the principal secondary branches of the panicle much flattened, their lowest internode often 6–10 mm. long, 1.5 mm. wide; southern Veracruz(?), British Honduras, Yucatan [*C. euryphylla* Standl.] . . . *C. millspaughii* Urb.

Plants glabrous except for a few hairs on the youngest vegetative parts; branchlets not winged.

El Salvador and British Honduras; petioles 7–10 mm. long; veins and glands scarcely apparent in mature leaves.

*C. calderonii* Standl.

Veracruz; petioles 3.5–6 mm. long; veins sometimes inconspicuous, but evident beneath; glands apparent, the leaves pellucid-punctate or impressed-punctate.

Leaves 3–4 times as long as wide, 1.5–2.5 cm. wide, coriaceous, impressed-punctate but scarcely pellucid-punctate; lateral veins strongly ascending, leaving the midvein at an angle of 45° or less; ventral surface of the petiole channeled, the thick obtuse margins bordering an ill-defined V-shaped or somewhat concave trough; fruit 5–8 mm. in diameter, the fruiting disk 1.5–2 mm. wide . . . . . *C. schlechtendaliana* Berg.

Leaves 1.6–3.3 times as long as wide, 1.5–4.5 cm. wide, thin, evidently pellucid-punctate but rarely or only in age impressed-punctate; lateral veins divergent, leaving the midvein at an angle of much more than 45°; ventral surface of the petiole broadly and smoothly concave or channeled, the angles acute and continuous; fruit 4–6 mm. in diameter, the fruiting disk 1.3–1.5 mm. wide. . . . . *C. schiedeana* Berg.

Plants rather generally pubescent on the young growth and the inflorescence, often softly and loosely so, at least some of the hairs branched and spreading or erect, often up to 0.5 mm. long, at least to some extent persistent on the branchlets, the inflorescence and the fruits.

Leaves prevailingly obovate to elliptic, obtuse or rounded at tip, 3.5–6.5 cm. long; branchlets not winged; small connecting veins evident on the lower surface in dried leaves as a raised reticulum; pubescence appressed, rather sparse, grayish- or yellowish-white; British Honduras. *C. cuneifolia* Lundell.

Leaves prevailingly elliptic to lanceolate or ovate, acute or acuminate (if small and obtuse the branchlets winged, the small veins obscure, the pubescence reddish).

Leaves small and obtuse, mostly 2.5–4.5 cm. long, usually narrow, often varying on the same plant from 2–5 (–7) times as long as wide; branchlets persistently and prominently corky-winged; pubescence sparse, evanescent, of rather loosely appressed yellow- or reddish-brown hairs; Honduras to British Honduras. *C. hondurensis* Standl.

Leaves usually larger and acute or acuminate, if narrow usually consistently so; branchlets usually wingless.

Young leafy branchlets softly brown- to rufous-tomentose with hairs of two types: straight and nearly erect, simple or short-branched hairs up to 2 mm. long, these standing above the tomentum of contorted and somewhat appressed hairs with two equal or strongly unequal branches; hairs of the panicles of the contorted, appressed type; buds 3 mm. long or less, obovoid, mostly short-apiculate; branchlets not winged.

Leaves narrowly elliptic-lanceolate, 1–2.3 cm. wide, 4–6 times as long as wide; Tabasco, British Honduras and northern Guatemala. . . . . *C. lindeni* Berg.

Leaves elliptic-ovate, 2.5–6 cm. wide, 2–3 times as long as wide.

Leaves mostly 4–6 cm. wide, 7–13 cm. long; pubescence pale reddish, reddish-brown or yellowish-brown; southern Mexico to northern Colombia. *C. chytraculia* var. *americana* McVaugh.

Leaves mostly 2–4 cm. wide, 5–10 cm. long; pubescence reddish brown to dark red; Cuba and Jamaica.

*C. chytraculia* (L.) Sw., var. *chytraculia*.

Pubescence of leafy branchlets not as above, not noticeably different from that of the panicle-branches.

Hairs coarse, 0.3–1.5 mm. long, erect and the branchlets tomentose, or appressed but then the individual hairs 0.5–1 mm. long; buds [as far as known] 4.5 mm. long or more; branchlets not wing-angled.

Leaves broadly rounded at base; lateral veins impressed above; petioles 8–11 mm. long; buds ovoid, short-apiculate, 4.5–6 mm. long; tomentum dense, yellowish-brown, the very numerous erect hairs simple or forked, up to 1.3–1.5 mm. long; Guatemala. . . . . *C. macrantha* Standl. & Steyerl.

Leaves acute at base; lateral veins not impressed above; petioles 4–7 mm. long; hairs various.

Branchlets bristly-tomentose, the very coarse hollow erect pale yellowish-brown forked hairs up to 0.3–0.7 mm. high; buds unknown, the calyptra shallowly dome-shaped, 2 mm. wide, short-apiculate; Honduras. . . . *C. zanquiniensis* A. Molina.



- Branchlets clothed with appressed nearly sessile longitudinally oriented golden-brown dibrachiate hairs 0.5–1 mm. long; buds 9–14 mm. long, the trumpet-shaped calyptra 6–9 mm. long; Panama. . . . . *C. johnstonii* McVaugh.
- Hairs minute, dibrachiate, often appressed, sometimes crisped, mostly 0.1–0.3 mm. long, the pubescence of the young branchlets and inflorescence rusty-brown, yellowish brown or, especially on the leaves, nearly colorless.
- Peduncle 2.5–3 mm. wide just below the lowest branches; buds 4–4.5 mm. long; calyptra 2.5–3 mm. wide; hairs dark reddish brown; Costa Rica, at 2600 m. . . . . *C. pittieri* Standl.
- Peduncle 1.5–2 mm. wide or less; buds 3 mm. long or less; calyptra 2.5 mm. wide or usually less; hairs coppery to yellow or gray-white.
- Branchlets wing-angled; leaves cuneate at base, often 4–7 cm. long, usually glandular-punctate above; inflorescence copiously soft-pubescent with reddish or sometimes pale reddish; West Indies; southern Florida; Isthmus of Tehuantepec; Yucatan. . . . . *C. pallens* Griseb., var. *pallens*.
- Branchlets terete or compressed, not wing-angled; leaves acute at base, varying to somewhat rounded or occasionally to cuneate; Mexico and Central America.
- Inflorescence stout, the principal secondary branches of the panicle much flattened, their lowest internodes often 6–8 mm. long, 1.5 mm. wide; pubescence of very small flat closely appressed longitudinally oriented hairs; Veracruz; British Honduras to Yucatan; [*C. euryphylla* Standl.] . . . . . *C. millsapaughii* Urban.
- Inflorescence more slender, the internodes of the secondary panicle-branches terete or slightly compressed, 1 mm. wide or less; pubescence, at least in part, of crisped or soft hairs; mountains of Mexico and Guatemala.
- Leaf-blades often 7–12 cm. long, eglandular above; petioles 8–10 mm. long; branchlets terete or compressed; panicles often 50–60-flowered; inflorescence with often densely aggregated coppery hairs about the base of the hypanthium but otherwise rather sparingly pubescent; mountains of Guatemala and southern Mexico. *C. pendula* Berg.
- Leaf-blades often 3–7 cm. long, often glandular-punctate above but sometimes inconspicuously so; petioles 2.5–6 mm. long; branchlets sometimes wing-angled.
- Branchlets of the inflorescence copiously soft-pubescent at least in the flowering stage, the hairs often pale and the whole inflorescence appearing somewhat grayish; leafy branchlets rarely if ever wing-angled; panicles often 50–60-flowered; Costa Rica. *C. pallens* var. *williamsii* (Standl.) McVaugh.
- Branchlets of the inflorescence glabrous or sparingly appressed-pubescent with minute coppery hairs; leafy branchlets sometimes wing-angled; panicles mostly 30–35-flowered; Mexico. *C. pallens* var. *mexicana* (Lundell) McVaugh.

***Calyptranthes chytraculia* (L.) Sw. Prodr. 79. 1788. *Myrtus chytraculia* L. Syst. Nat. ed. 10. 1056. 1759.**

Known originally from the West Indies only, this species seems to be represented in Central America by a slightly different taxon, described below as a variety. The characteristic pubescence is so nearly identical in all these plants, and so distinctive, that there can be little doubt of close relationships among them. The mostly reddish-brown hairs are abundant, rather soft, those of the panicles mostly much contorted, loosely appressed and with two equal or strongly unequal branches; the young leafy branches bear similar hairs, and bear also a number of fine, straight, nearly erect hairs up to 2 mm. long, these simple or with a short branch near the base. As far as I know, these two kinds of hairs, that give the young leafy branches a unique shaggy appearance, are found only in *C. chytraculia* and in *C. lindeniana* Berg, which hardly differs except in its very narrow leaves.

Some Central American specimens are virtually indistinguishable from West Indian ones, but usually the leaves of Central American plants are larger (4–6 cm. wide, 7–13 cm. long, as against 2–4 cm. wide, 5–10 cm. long, in typical *chytraculia*). The hairs in West Indian specimens are often reddish-brown or dark red, whereas in Central American plants the hairs are paler, varying from reddish-brown to yellowish-brown or pale reddish. A specimen from northern Colombia (region of Santa Marta, *H. H. Smith* 897), agrees perfectly with specimens from northern Central America. Miss Amshoff, in the *Flora of Panama* (Ann. Missouri Bot. Gard. 45: 169. 1958), referred a single Panamanian specimen to *C. chytraculia* with the note that it "quite agrees with specimens from British Honduras distributed as *C. millspaughii* Urb."

The plant of British Honduras and Central America has long been confused with *Calyptranthes millspaughii* Urb. (Symb. Antill. 7: 294. 1912), which was based on *Millspaugh* 1537 from Cozumel Island. This plant belongs to a quite different species. The pubescence is scanty, of short flat appressed coppery hairs, not at all like the shaggy abundant pubescence of *chytraculia*. The panicles are 4 cm. long or less, about 30-flowered, contrasting with the larger, many-flowered panicles of *chytraculia*.

The taxonomy of *C. chytraculia* may be summarized as follows:

***Calyptranthes chytraculia* (L.) Sw., var. *chytraculia*.**

Cuba and Jamaica; for synonymy and citation of specimens see Urban, Bot. Jahrb. 19: 597–598. 1895.

***Calyptranthes chytraculia* (L.) Sw., var. *americana* McVaugh, var. nov.**

A var. *chytraculia* foliis maioribus 7–13 cm. longis, pilis pallidioribus pallide rufis, vel rufo-flavidis usque ad fulvis, differt.

Near the Atlantic Coast of Central America, mostly at elevations of 200 meters or less, often along rivers or lake shores; British Honduras and Department of Petén, Guatemala, to northern Colombia.

Representative specimens examined:

BRITISH HONDURAS: Maskall, *P. H. Gentle 1217* (MICH); Big Fall, Belize River, *Lundell 4343* (MICH); Cohune Ridge, El Cayo Dist., *Lundell 6431* (MICH); Temash River, *W. A. Schipp 1295* (MICH).

GUATEMALA: Petén: Uaxactún, 4 Apr. 1931, *H. H. Bartlett 12447* (MICH, type; UC), 24 Apr. 1931, *Bartlett 12723* (MICH).—Izabal: Along Río Frío, *Steyermark 41632* (MICH).

NICARAGUA: Isla de Providencia, *Proctor 3414* (US); Pearl Lagoon, *Allen 6524* (F).

***Calyptranthes hernandezii* McVaugh, sp. nov.**

Frutex 1–1.5 m. altus, ramulis bialatis, alis inter folia terminantibus; ramuli paniculaeque tomentosae, pilis flaccidis flavidis saepe inaequaliter dibrachiatis usque ad 1.3 mm. longis tectae; folia subsessilia, cordata, obtusa, 4–9 cm. longa, 2–3.7-plo longiora quam latiora; paniculae 5–6 cm. longae, 9-florae, floribus trigeminis sessilibus, alabastris 5.5–7 mm. longis apiculatis, calyptra 3–5 mm. longa, 3.5–4 mm. lata; stylus 10 mm. longus; stamina ca. 100.

A shrub 1–1.5 meters high, the branchlets bialate, the wings 0.5 mm. high, terminating distally between the leaf-bases; branchlets and inflorescence loosely tomentose with erect flaccid simple or unequally forked pale yellow-brown hairs up to 1.3 mm. long; leaves coriaceous, glabrate, nearly sessile, lanceolate to oblong or ovate on the same plant, 1.3–3 cm. wide, 4–9 cm. long, 2–3.7 times as long as wide; blades narrowed to a broad or slender but always obtuse tip, cordate at base, the stout petiole 1–2 mm. long, 2 mm. wide, ventrally concave; midvein broadly and deeply concave above; lateral veins rather close and parallel, 10–20 including some intermediate ones, inconspicuous, more evident beneath; marginal vein about equaling the lateral ones and but slightly arched between them, 1–1.5 mm. from the margin; blades green and sometimes impressed-punctate above, paler and with convex resinous glands beneath; paired panicles 5–6 cm. long, 9-flowered, the peduncle 3–4 cm. long, stout, compressed, up to 2.5 mm. wide; flowers sessile in 3's at the tip of a terminal branch 1.5 cm. long and at the tips of a pair of lateral branches 8 mm. long, 2.5 mm. wide; bracts at the base of the flower-cluster boat-shaped, scarious, deciduous at anthesis, enveloping the lateral bud, 6 mm. long; bracteoles similar, deciduous, ovate, 3 mm. long; buds 5.5–7 mm. long, broadly fusiform or the body subglobose and 4 mm. in diameter, the base tapering and sessile, the tip bearing an apiculum 1–2.5 mm. long; calyptra domelike, 3–5 mm.

long including the apiculum; hypanthium after anthesis funnellform, 3.5–4 mm. wide at the mouth; style about 10 mm. long; stamens about 100, 7–8 mm. long, the anthers 0.5 mm. long; petals and fruit not seen.

MEXICO: San Luis Potosí: Near river edge, Taman, 15 km. southwest of Tamazunchale, [elevation ca. 200 m.], 14 Apr. 1944, *E. Hernández X. 159* (LL, type).

***Calyptranthes johnstonii* McVaugh, sp. nov.**

Arbor vel frutex, ramulis teretibus, ramulis foliisque juvenilibus et inflorescentia copiose pilis flavidis, nitidis, dibrachiatis, 0.5–1 mm. longis, obsitis; folia late elliptica, 6–11 cm. longa, basi acuta, petiolis 4–6 mm. longis, nervo medio supra ad basin impresso; inflorescentiae geminatae, spicatae, 5–7 cm. longae, pauciflorae; alabastra cornuta, 9–14 mm. longa, hypanthiis campanulatis, 3–5 mm. longis; stylus 8–10 mm. longus; fructus globosus, glabrescens, ca. 1.5 cm. crassus.

Shrub or tree 2.5–10 m. high, the "bark on trunk and stems pale, moderately smooth, not exfoliating" (Johnston); branchlets terete; inflorescence, and young branchlets and leaves, copiously appressed-pubescent with lustrous golden-brown dibrachiate hairs 0.5–1 mm. long; leaves coriaceous, broadly elliptic, about equally narrowed to the prominently short-acuminate tip and the acute base, (2.5–) 3–5 cm. wide, 6–11 cm. long, the margins decurrent on the inner angles of the channeled petiole 4–6 mm. long, 1–1.5 mm. thick; midvein impressed above near base; lateral veins rather numerous and parallel, 12–15 pairs, not very conspicuous (more so on the lower surface); marginal vein about equaling the lateral ones and somewhat arched between them, 1–2 mm. from the margin; leaves dark green and glandular-punctate above, sparingly pubescent and inconspicuously glandular beneath; inflorescence paired at the terminal nodes of old branchlets, spicate, 5–7 cm. long; flowers few, probably 2–3 clustered at a node 2–4 cm. above the base and 2–3 clustered at the tip of the spike; buds cornute, 9–14 mm. long, the calyptra trumpet-shaped, 6–9 mm. long, 4 mm. wide at mouth, thence abruptly contracted to a slender tapering tip 5–8 mm. long; hypanthium 3–5 mm. long, campanulate, prolonged 2.5 mm. beyond the summit of the ovary; style 8–10 mm. long; stamens about 50; petals none(?), or 1–2, narrow, 1–2 mm. long; fruit globose, glabrescent, about 1.5 cm. in diameter, surmounted by a collar about 4 mm. wide, 1 mm. high; mature seeds not seen.

PANAMA: Canal Zone: South of Ft. Sherman, in wet places back of the mangrove swamp, 1 Apr. 1956, *I. M. Johnston 1764* (MICH, type, in flower), *1764* (MICH, isotype, with nearly mature fruits); 3 miles northwest of Gatun Locks, edge of marsh, 9 Aug. 1955, *Johnston 1571* (MICH); near Ft. Sherman, *P. C. Standley 30933* (US).

***Calyptranthes millspaughii* Urb. Symb. Antill. 7: 294. 1912.**  
***C. euryphylla* Standl. Contr. U. S. Nat. Herb. 23: 1034. 1924.**

Examination of the type of *C. millspaughii*, a flowering specimen from Cozumel Island, Quintana Roo, *Millspaugh 1537* (F), shows this to represent a distinctive taxon, quite different from the copi-



ously soft-hairy Central American plant that has in recent years passed under the name of *C. millspaughii*. The more pubescent plant is *C. chytraculia* var. *americana* McVaugh, well known along the Atlantic coast from British Honduras to Colombia. The true *C. millspaughii* seems to be known from but a single collection in addition to the type; the second collection is also a flowering specimen, from British Honduras, Stann Creek District, Freshwater Creek, *J. Kelly* no. 1 (F, US).

There is a strong superficial resemblance between *C. millspaughii* and *C. pendula* Berg, and likewise between *C. millspaughii* and the several varieties of *C. pallens*. From all of these *C. millspaughii* may be distinguished by the broad, flat, short internodes of the panicle branches. The hairs of the inflorescence of *C. millspaughii* are distinctive also; they are copper-colored, longitudinally oriented, very closely appressed and straight, the individual hairs readily observed. In *C. pendula* and in the varieties of *C. pallens* the hairs are crisped and often somewhat matted together.

The type and only known specimen of *C. euryphylla* Standl., collected at Catemaco, Veracruz, in April 1894, *Nelson* 421 (US), bears half-grown fruit; flowers and buds are wanting. The leaves and the panicle-branches are sparingly pale-pubescent, the appressed hairs very like those of *C. millspaughii* but almost colorless. Apparently the paleness of the hairs is related to the maturity of the plant when collected, for the hairs persisting on the fruit and on some of the distal nodes of the panicle are copper-colored and precisely like those of *C. millspaughii*. The lower internodes of the lateral panicle-branches in the type of *C. euryphylla* are 10 mm. long or less and about 1.5 mm. wide, exactly comparable to those of *C. millspaughii*. The foliage of *C. euryphylla*, as noted by Standley, is notable in that the leaves are ovate and rather broadly rounded at base, and the petioles are short; I suspect that this represents an individual difference. In other respects the leaves of *euryphylla* and *millspaughii* are closely similar; both are impressed-punctate above, with impressed midvein; the lateral veins are but indistinctly seen in the rather opaque brownish lower surface of the rigid dried leaves. Allowing for the differences between flowering and fruiting specimens, there can be little doubt that *C. euryphylla* and *C. millspaughii* are conspecific.

**Calyptranthes pallens** Griseb. Veg. Kar. 67. 1857. ?*Eugenia pallens* Poir. in Lam. Encyc. Suppl. 3: 122. 1813 (fide Urban, Bot.

Jahrb. 19: 598. 1895). *C. chytraculia*  $\delta$  *pauciflora* Berg, Linnaea 27: 27. 1855.

A species of the Caribbean basin, the nomenclaturally typical variety occurring in the West Indies, southern Florida, the Yucatan Peninsula and the Isthmus of Tehuantepec, Mexico; other varieties, distinguished somewhat subjectively, occur in Mexico and Central America.

A tree or tree-like shrub 5–8 m. high; leaves coriaceous, rather broadly elliptic, or sometimes broadest a little above or below the middle, narrowed about equally to both ends, 2–4 (–6) cm. wide, 3–7 (–10) cm. long, 2–3 (–3.5) times as long as wide; margins of the blade decurrent at base on the inner angles of the channeled petiole; midvein impressed above at least near base; lateral veins close and parallel, obscure on both surfaces, 10–20 pairs including some poorly defined intermediate ones; marginal vein about equaling the lateral ones and slightly arched between them, 0.5–1.5 mm. from the margin; leaves smooth and dark green above; panicles usually bracteate and paired at the base of an otherwise leafy shoot, sometimes axillary on ordinary leafy branches, the individual panicles pyramidal, 3–4 times compound, the flowers in small clusters near the tips, not appearing closely sessile; peduncles 2–5 cm. long; buds 2.5–3 mm. long including the narrow base, obovoid, rounded and often slightly apiculate; calyptra domelike; hypanthium after opening campanulate, 2 mm. long; style 4–5 mm. long; stamens about 50–60, up to 3.5 mm. long; petals tiny, adhering to the calyptra and falling with it; ripe fruit dark red, globose or oblate, 5–8 mm. in diameter.

Young leafy branchlets 2-winged; leaves cuneate at base, usually glandular-punctate above; inflorescence copiously soft-pubescent with reddish or sometimes pale hairs; panicles often 50–60-flowered; West Indies; southern Florida; Isthmus of Tehuantepec. . . . . var. *pallens*.

Young leafy branchlets not winged, or some plants with a few branchlets winged; leaves acute at base, varying to somewhat rounded or occasionally to cuneate, often glandular-punctate above but sometimes inconspicuously so; Mexico and Central America.

Branchlets of the inflorescence copiously soft-pubescent at least in the flowering stage, the hairs often pale and the whole inflorescence appearing somewhat grayish; leafy branchlets rarely if ever winged; panicles often 50–60-flowered; Costa Rica. . . . . var. *williamsii*.

Branchlets of the inflorescence glabrous or sparingly appressed-pubescent with minute coppery hairs; leafy branchlets sometimes winged; panicles mostly 30–35-flowered; Mexico. . . . . var. *mexicana*.

### ***Calyptranthes pallens* Griseb., var. *pallens*.**

Vegetative branches prominently 2-winged, the wings terminating distally between the leaf-bases; inflorescence, branchlets, and to some extent the foliage, rather persistently appressed-pubescent with pale rusty-brown, yellowish brown or, especially on the leaves, nearly colorless dibrachiate hairs 0.1–0.3 mm. long; leaves prominently acuminate at tip, broadly cuneate at base, usually glandular-punctate above; petioles 6–8 mm. long; panicles 10–12 cm. long or less, usually with 50–60 or more flowers, the lowest branches often as long as the peduncles, the latter 2–4 cm. long; calyptra 1.3–1.7 (–2) mm. across.

West Indies and southern Florida. By Urban (Bot. Jahrb. 19: 598. 1895) reported from Cuba, Jamaica, Haiti, Cayman Islands, St. Thomas, St. Croix and Guadeloupe. I have accepted Urban's identification of this species but I have not seen the type. The nomenclature of *C. pallens* is somewhat involved. The name is often cited as *C. pallens* (Poir.) Griseb., with the implication that it was based upon *Eugenia pallens* Poir. The latter is included by Urban in the synonymy of *C. pallens*, but without the customary sign of verification [!]. Grisebach, however, in his first publication of *C. pallens*, made no mention of *Eugenia pallens* Poir., citing only *C. chytraculia* var. *δ pauciflora* Berg. Berg's variety *pauciflora* was based wholly upon a specimen collected in Guadeloupe by Bertero, and studied by Berg in Sonder's herbarium. Urban indicated with a [!] that he had verified the identity of var. *pauciflora*, and that it was indeed the same as *C. pallens* Griseb. The type of *Eugenia pallens* Poir., however, was collected on the island of St. Thomas by Ledru; it may well represent the same species, as supposed by Urban, but it does not form part of the nomenclatural basis of *Calyptranthes pallens* Griseb. The latter is readily identified from Grisebach's description in Fl. Brit. W. Ind. 233. 1860, as it is the only species with 2-edged branchlets and "cymes rusty-sericeous."

The following specimens are quite indistinguishable from West Indian material of *C. pallens*, except that the petioles are no more than 3–5 mm. long:

MEXICO: Oaxaca: Mena, *C. D. Mell* 7, 20 Jan. 1927 (US); Chi-vela, *Mell* 2275, 7 Mar. 1934 (US); Rincón Antonio, *C. R. Orcutt* 3233 (F, US).—Yucatan: 3 km. de El Cuyo en el camino a Colonia Yuca-tán, *O. G. Enríquez* 479 (MICH).

***Calyptranthes pallens* Griseb., var. *williamsii* (Standl.) McVaugh, comb. nov.** *C. williamsii* Standl. Ceiba 1: 156. 1950. ?*C. costa-ricensis* Berg, Linnaea 27: 20. 1855.

Vegetative branchlets terete or slightly compressed; inflorescence, branchlets, and to some extent the foliage rather persistently appressed-pubescent with pale rusty-brown, yellowish brown or nearly colorless dibrachiate hairs 0.1–0.3 mm. long; leaves acuminate at tip (sometimes obscurely so), the base usually not cuneate but the margins narrowed and rounded to an acute base; blades inconspicuously if at all glandular, sometimes glandular-punctate above; petioles 4–6 mm. long; panicles 6–8 cm. long, about 50–60-flowered, the lowest branches shorter than the peduncles, the latter 3–5 cm. long; calyptra 2–2.5 mm. wide.

Mountain slopes, river banks and open pastures, at elevations of 800–2000 m., central Costa Rica, as far as known mostly in the provinces of Cartago and San José, flowering March–April, fruiting in June.

A similarity between the West Indian *pallens*, and the species described as *C. costa-ricensis* Berg, was suggested by Urban. Berg's original description of "*C. Costa-Ricensis*" seems to apply satisfactorily to the plant described above, but I have not seen the type ("*Costa Rica et Veragua, de Warszewicz, . . . v.s. in hb. Berol.*") and therefore prefer to base this new variety on a species that can be satisfactorily typified.

Specimens examined:

COSTA RICA: Río María Aguilar, *J. D. Smith 6499* (F); Río Ciruelas, massif du Barba, *Tonduz 2211* (F); Sta. María de Dota, *Standley 41716* (F); San Sebastián, *Standley 32683* (F); San José, *Standley 34816* (F), *47371* (F); Cerro de la Carpintera, *Standley 34516* (F); Mt. Carpintera, *H. E. Stork 314 p.p.* (MICH); Alto de Ocho-mogo, *Williams & Molina 13841* (F; US, type), *Williams 16001* ("probably from same tree from which type came," MICH); Cerro Carpintera, above Tres Ríos, *Williams 16141 p.p.* (MICH); La Carpintera, Cerro del Aguacate, *Williams 16579* (MICH); along Río Sucio near Corinto, *Williams 16555* (MICH).

***Calyptranthes pallens* Griseb., var. *mexicana* (Lundell) McVaugh, comb. nov. *C. mexicana* Lundell, *Wrightia* 2: 166. 1 May 1961.**

Vegetative branches winged or wingless, the wings sometimes apparent only on a few of the young branchlets of individual plants; inflorescence and branchlets very sparingly pubescent, the appressed and usually coppery hairs mostly 0.1–0.2 mm. long, and aggregated chiefly about the base of the hypanthium and the distal nodes of the panicle; leaves acuminate at tip (sometimes obscurely so or some leaves merely obtusely rounded), acute or sometimes cuneate at base, often glandular-punctate above; petioles 2.5–5 mm. long; panicles 3–7.5 cm. long, 30–35-flowered, the lowest branches shorter than the peduncles, the latter 2–4.5 cm. long; calyptra 2–2.5 mm. wide.

Arroyos, brushy slopes, stream-sides, wet mountain forests, southern and western Mexico, at elevations from ca. 500 m. to 2600 m.

MEXICO: Chiapas: Mt. Ovando, near Escuintla, *E. Matuda 1838* (LL, type; MO); Tres Cruces, 2600 m., *Matuda 5024* (F; LL, paratype).—Jalisco: Pihuamo, *M. E. Jones 18* (F, US); 10 miles south of Autlán, *Wilbur & Wilbur 1415* (MICH); San Sebastián, Hda. del Ottotal, *Y. Mexia 1806* (MICH, US).—Nayarit: 8 miles west of Tepic, *McVaugh 18903* (MICH); María Madre Island, *T. S. Maltby 110* (US).—Sinaloa: Without collector or locality (US 1014144); Ixtagua, Mun. San Ignacio, *J. González Ortega 776* (MEXU).



The following specimen, superficially differing from the preceding ones in its long internodes and rather narrow and slenderly acuminate leaves up to 10 cm. long and 3–4 times as long as wide, is apparently merely a flowering stump-sprout or other vigorous shoot:

MEXICO: Sinaloa: San Ignacio, *M. Nárvaez M. & A. E. Salazar* 846 (US).

### ***Calyptranthes paxillata* McVaugh, sp. nov.**

Arbor parva, ramulis subteretibus vel compressis; ramuli inflorescentiaeque, et folia juvenilia, pilis rufidulis appressis dibrachiatibus subsessilibus longitudinaliter directis 0.5–1 mm. longis obsiti; folia elliptica vel elliptico-lanceolata, caudato-acuminata, 4–7 cm. longa, basi acuta vel cuneata, petiolis 3–6 mm. longis, nervo medio supra versus basin canaliculato; inflorescentiae 3–4.5 cm. longae, ca. 9-florae, e basi ramulorum foliosorum vel abortivorum geminati oriundi; pedunculi 3.5 cm. longi, statu frutescenti 1 mm. crassi; alabastra obovoideo-fusiformia, 4.5–5 mm. longa, apiculo obtuso 1–1.3 mm. longo paxillato; stylus 7–8 mm. longus.

A small tree with nearly terete or compressed branchlets; branchlets, inflorescence and young foliage covered with appressed, nearly sessile, dibrachiate and longitudinally oriented coppery hairs 0.5–1 mm. long; leaves glabrate, elliptic or elliptic-lanceolate, 1.5–3.5 cm. wide, 4–7 cm. long, 2.3–3 times as long as wide, caudate-acuminate, the slender tapering tip 1–1.5 cm. long, obtuse; base of blade acute or cuneate, the margins decurrent on the inner angles of the petiole 3–6 mm. long, 0.8–1.2 mm. thick; midvein channeled above near base; lateral veins obscure, close and parallel, about 15 on each side, including some intermediate ones; marginal vein about equaling the lateral ones, nearly straight between them, 1 mm. from the margin; inflorescence of paired panicles from an abortive axillary axis or from the lowermost (bracteate) node of a leafy shoot; panicles 3–4.5 cm. long, twice compound, bearing 9 flowers or fewer; peduncle up to 3.5 cm. long, compressed, 1 mm. wide below the lowest branches; buds obovoid-fusiform, 4.5–5 mm. long, 2–2.5 mm. in diameter, broadest above the middle, tapering to the base, rather abruptly contracted to a blunt peglike apiculum 1–1.3 mm. long; hypanthium after anthesis funnelform, 2.5–3 mm. high, the rim prolonged 2 mm. beyond the summit of the ovary; calyptra about 3 mm. across, 2.5 mm. long including the apiculum; style 7–8 mm. long; stamens about 100, up to 4 mm. long; petals 1–2, minute, remaining attached to the calyptra and falling with it; fruit unknown.

GUATEMALA: Alta Verapaz: Wet forest above Tactic, above the bridge across Río Frío, alt. 1400–1500 m., 30 Mar. 1941, *P. C. Standley* 90457 (US, type).

This species is distinctive by virtue of its copious appressed pubescence of long hairs, the few-flowered panicles, long styles and long-apiculate fusiform buds. This peculiar “peglike” apiculum gives the name to the species; I do not find the word *paxillatus* in any Latin dictionary at my disposal, but as the word “paxillate” may be found in English dictionaries, it seems reasonable to provide a Latin equivalent for it.

***Calyptranthes schiedeana*** Berg, *Linnaea* 27: 28. 1855. *Myrcia aromatica* Schlecht. *Linnaea* 13: 415, pro max. part. 1839. Not *C. aromatica* St. Hil.

This species and the next were based by Berg upon the two collections assigned by Schlechtendal to *Myrcia aromatica*. The type of *C. schiedeana* was from Hacienda de la Laguna, Veracruz, *Schiede* (in herb. Schlecht.), and was presumably the collection upon which *M. aromatica* was chiefly based. Several collections by C. A. Purpus (e.g. nos. 2927, 10778), all from Veracruz, seem to represent the same species as a presumed isotype shown in Field Mus. Neg. 23392.

***Calyptranthes schlechtendaliana*** Berg, *Linnaea* 27: 29. 1855. *Myrcia aromatica* Schlecht. *Linnaea* 13: 415, quoad spec. in sylvis Papantlae coll. 1839.

The type of *C. schlechtendaliana* was *Schiede* no. 25 (in herb. Schlecht.), collected at Papantla, Veracruz, and presumably the same specimen mentioned by Schiede on page 416 as similar to his *Myrcia aromatica*, described on the previous page. A photograph purporting to be *C. schlechtendaliana* (Field Mus. Neg. 36864) seems actually to represent a specimen of *C. schiedeana*.

One collection, *Purpus* 8810 (UC, US), from Veracruz without definite locality, seems to represent *C. schlechtendaliana*. The differences between it and *C. schiedeana* are listed in the key above. As far as can be determined from the scanty material at hand, the two species are distinct.

### ***Calyptranthes tenuipes* McVaugh, sp. nov.**

Frutex, ramulis teretibus; ramuli teneri densiuscule pilis crassis, contortis, nitidis, fuscis, dibrachiatis 0.5–0.8 mm. longis obsiti; folia ab initio subglabra, lanceolato-ovata, caudato-acuminata, 3–5 cm. longa, basi rotundata, petiolis 2 mm. longis, nervo medio supra impresso; inflorescentiae 3–4 cm. longae, ut videtur 3–5-florae, e basi ramulorum foliosorum geminati oriundi; pedunculi filiformes, statu fructescenti 0.3–0.4 mm. crassi; flores non vidi; fructus globosus, 7–9 mm. crassus, umbilicatus; seminis maturi cotyledones carnosiusculi, contorto-plicati.

A shrub 2 m. high, glabrate, the branchlets terete; young branchlets, and to a lesser extent the very young inflorescence, more or less thickly pubescent with coarse contorted lustrous reddish-brown dibrachiate hairs 0.5–0.8 mm. long; leaves glabrous from the first except for a few hairs on the lower surface near the midvein, the blades lance-ovate, caudate-acuminate, 1–2.3 cm. wide, 3.5 cm. long, the narrow acumen 1–1.8 cm. long, rounded and 1–2 mm. wide at its tip; base of blade rounded, the margins passing abruptly onto the inner angles of the deeply sulcate petiole 2 mm. long, 1 mm. thick; midvein impressed and sulcate above, the other veins obscure, the lateral ones about 10 pairs, the marginal vein about 1 mm. from

the margin; blades dark green and nearly featureless above, paler beneath, the glands obscure; inflorescences 3–4 cm. long, paired at the base of a leafy shoot; peduncle 2–2.5 cm. long, filiform, 0.3–0.4 mm. thick in fruit; flowers unknown, probably 3–5, on pedicels or lateral branches up to 3 mm. long; fruit globose, 7–9 mm. in diameter, surmounted by a collar about 2 mm. wide, less than 1 mm. high; seed 1, globose, lustrous, up to 8 mm. in diameter; cotyledons contorted.

In the absence of flowers this species is assigned to the genus *Calyptranthes* on the basis of the contorted cotyledons, the collar-like remains of the calyx suggesting that the buds open by a calyptra, and the dibrachiate hairs characteristic of *Calyptranthes* but not found in other genera of the Myrcioideae.

MEXICO: Veracruz: In a deep barranca below Atzalan, elev. ca. 1650 m., 13 Mar. 1946, A. J. Sharp 46165 (MICH, type).

***Calyptranthes zuzygium* (L.) Sw. Prodr. 79. 1788. *Myrtus zuzygium* L. Syst. Nat. ed. 10. 1056. 1759.**

A West Indian species, known from Hispaniola, Jamaica and Cuba; also in southern Florida. Reported from "Michoacán and Tres Marías Islands" by Standley (Contr. U. S. Nat. Herb. 23: 1034. 1924); judging from specimens annotated by Standley, these reports are based upon *M. E. Jones* 18, from Pihuamo, Jalisco (not Michoacán, as labeled by Jones), and *T. S. Maltby* 110, from María Madre Island. I should refer these specimens to *Calyptranthes pallens* var. *mexicana*, q.v.; *C. zuzygium* is so far unknown in Mexico.

#### MISCELLANEOUS NOTES

***Calyptranthes towarensis* (Berg) Steyermark, Fieldiana, Bot. 28: 1010. 1957. *Myrcia towarensis* Berg, Linnaea 27: 118. 1855.**

This name resulted from a misinterpretation of *Myrcia towarensis*, and a misidentification of *Tamayo* 227, which is indeed not a *Myrcia* but a species of *Calyptranthes*. The type of *M. towarensis*, however (*Moritz* 1747), represents an undoubted and distinctive species of *Myrcia*. In addition to the type collection, which I have seen at Chicago Natural History Museum, the following specimens from Venezuela seem to be representative of *M. towarensis*: Colonia Tovar [the type locality], *Fendler* 42 (PH, NY); Caracas, *Linden* 13 (F).

***Calyptranthes vexata* McVaugh, nom. nov. *C. apoda* McVaugh, Mem. N. Y. Bot. Gard. 10: 70. 1958, not *C. apoda* Urban, Symb. Antill. 9: 96. 1923.** I am indebted to Dr. Richard S. Cowan for calling this nomenclatural lapse to my attention.

## 2. EUGENIA L.

SYNOPSIS OF THE MEXICAN SPECIES WEST OF THE  
ISTHMUS OF TEHUANTEPEC

In 1924, in Standley's *Trees and Shrubs of Mexico*, 24 species of *Eugenia* were recorded; two additional species now known to belong to *Eugenia* (*Myrtus oaxacana* and *M. ledophylla*) were also included in this work but under the genus *Myrtus*. Now after almost four decades of active botanical exploration in Mexico, approximately 60 species of *Eugenia* are known to occur as native plants in that country. The following synopsis includes the approximately 40 species known from west and north of the Isthmus of Tehuantepec. The myrtaceous flora of Chiapas and Tabasco, and that of the Yucatan peninsula, is quite a different one and as yet imperfectly known. Essentially all the known species are treated in the *Flora of Guatemala* (Fieldiana, Bot. 24). From western Chiapas and Tabasco very few collections are available; it may be supposed that some new species will come to light from this region, and that some additional species will be found to extend into the region from the isthmus. Eventually it may be convenient and useful to treat all Mexican species in one publication, but it is expedient in the present state of knowledge to treat as a unit what may be called the endemic Mexican flora, as distinct from that with Central American or West Indian affinities.

It is difficult to make a generally useful key to any large group of species of Myrtaceae, for several reasons. Vegetative similarities throughout the family are so great that sterile specimens may be quite unrecognizable even to one familiar with many species. Floral morphology varies little from one species to another. The most useful "recognition characters" (i.e., those possible to use in a key) are those of the inflorescence and those of pubescence. The inflorescence in *Eugenia* is almost always an unbranched axillary axis bearing one or more opposite and decussate pairs of pedicellate flowers. In any one species the length of this "raceme," the number of pairs of flowers, and the characteristics of the bracts and pedicels, are constant within rather narrow limits. Unfortunately for the taxonomist, almost all the species abandon on occasion their characteristic modes of flowering. Apparently when stimulated to vigorous growth almost any axillary branch may develop not into a short leafless and completely fertile raceme, but into a leafy twig bearing normal pedicellate flowers at its lower nodes. Often the lowermost one or two nodes bear small deciduous bracts instead of ordinary green leaves.



When the raceme becomes a leafy branch in this way, the lowermost flowers on casual inspection may seem to be borne at leafless nodes, and the upper flowers solitary and pedicellate in the axils of ordinary green leaves. Obviously a key based on the morphology of the inflorescence must be interpreted with care.

Pubescence in *Eugenia* provides a series of characters most useful to the taxonomist. Again, however, this is of limited use because the pubescence, if present at all, usually disappears soon after the plants flower, at least before the fruit matures. It would be quite feasible to construct a key to flowering material, based largely on characters of the pubescence; fruiting material of the same species would be quite indeterminable by the use of the same key.

The following synopsis thus does not pretend to present a mechanically perfect key to all the species involved. The plan is the same as that of the key in the *Myrtaceae of Guatemala*; those interested in the exceptions and qualifications of such a key may consult that work.

#### KEY TO THE SPECIES

Species that are noticeably appressed-pubescent or tomentose (at least at flowering time), and have at the same time relatively slender and elongate racemes (the pairs of flowers well separated).

Bracteoles thin and conspicuous, mostly glabrous or nearly so and contrasting with the heavily pubescent hypanthium, persistent in flower and fruit, 0.7–1.5 mm. long, usually connate along the proximal margins, involucre-like; pubescence copious, appressed, of pale sordid simple hairs.

Bracteoles acute or acuminate, broadly ovate-deltoid, 1–1.5 mm. long; bracts thin, persistent, the upper ones often much the longest and 1–2 mm. long; raceme-axis usually more than 1 cm. long, with well-separated nodes; lateral veins 10–20 on each side of the midvein [group of *Eugenia biflora*].....*E. karwinskyana*.

Bracteoles obtusely pointed or rounded, less than 1 mm. long; bracts ovate-deltoid, somewhat indurated at base, less than 1 mm. long; axis of the raceme rarely as much as 1 cm. long, the nodes approximate; lateral veins 4–6 (–8) on each side.....*E. argyrea*.

Bracteoles not conspicuous, usually pubescent like the hypanthium and the pedicel, persistent (and then somewhat thickened at base), or deciduous at anthesis, not connate and involucre-like even if persistent; pubescence various, the hairs often reddish and often dibrachiate.

Leaves narrowly lanceolate or oblanceolate, 1 cm. wide or less, (3–) 5–8 times as long as wide; hairs reddish, appressed, dibrachiate; region of Acapulco, Guerrero.....*E. avicennia*.

Leaves broader, mostly 2–4 (–7) cm. wide, 1.5–3 times as long as wide.

Herbage and inflorescence densely hirsute-tomentose with dark reddish-brown erect hairs about 0.5 mm. long, these at flowering time quite obscuring the surfaces; raceme 1–1.5 cm. long; disk 2.5 mm. wide; blades 10–14 cm. long; petioles 10–15 mm. long; Veracruz.

*E. praeterita*.

Herbage and inflorescence paler and often sparingly hairy, the hairs coppery red, yellowish red, yellowish white or silvery, often closely appressed or loosely contorted and somewhat matted.

Flowers small; disk in flower mostly 1.3–2 mm. wide; stamens 50–75; larger calyx-lobes 1.5–2.5 mm. wide; leaves broadly elliptic to ovate or obovate, thinly pubescent with pale appressed hairs, 1.6–2 (–2.5) times as long as wide; petioles 4–6 mm. long; raceme-axis usually less than 5 mm. long; Pacific lowlands of Mexico, to Guatemala.

*E. rekoii*.

Flowers larger; disk in flower 2–3 (–5) mm. wide; stamens 100–200; larger calyx-lobes up to 2.5–4 mm. wide and long; raceme-axis 1–2.5 (–8) cm. long, seldom shorter.

Bracteoles deciduous at anthesis or before, 2.5–5 mm. long; racemes mostly 2–4 cm. long; pubescence often of loosely matted and contorted hairs, yellowish white to pale reddish brown.

Leaf-margins cuneately decurrent on the petiole, the blades often appearing acute at base; leaves soon glabrate, usually glabrous beneath or nearly so, even at flowering time; hairs of the inflorescence sparse, appressed. . . . . *E. salamensis* var. *rensoniana*.

Leaf-margins abruptly contracted to the petiole, the base of the blade rounded or subauriculate, often asymmetric; leaves densely and persistently pubescent or tomentulose beneath; hairs of the inflorescence abundant, stalked, forming a loose tomentum. . . . . *E. salamensis* var. *salamensis*.

Bracteoles persistent through anthesis and usually much longer; axis of the raceme usually less than 2 cm. long; pubescence closely appressed, silvery to pale reddish or yellowish.

Leaves permanently silvery-scurfy beneath, obovate or obovate-elliptic, rounded at apex; midvein flat or convex above; axis of raceme usually less than 1 cm. long. . . . . *E. hypargyrea*.

Leaves at maturity glabrous or with fine scattered pale hairs beneath (when young sometimes with a silvery coating), mostly elliptic with acuminate tip; midvein impressed or channeled above; axis of the raceme usually 1–2 cm. long.

Leaves broadly elliptic, 1.6–2 times as long as wide, 2.5–5.5 cm. wide, abruptly short-acuminate; style 7–8 mm. long; larger calyx-lobes 3.5 mm. long and wide; fruit with 8 prominent wing-angles, ellipsoid, 1 cm. in diameter, 2 cm. long; Jalisco and Nayarit. . . . . *E. pleurocarpa*.

Leaves narrowly elliptic, (2–) 2.3–3 times as long as wide, 1.5–2.5 cm. wide, gradually acuminate; style 6–7 mm. long; larger calyx-lobes 2.5 mm. long and wide; fruit smooth, not winged, oblong or obovoid, 1 cm. long or a little more; state of Mexico and Oaxaca; to Central America. . *E. guatemalensis*.

Species either glabrous or nearly so at flowering time, or the hairs small and up-standing, or if the plants heavily pubescent or tomentose then the racemes short (usually less than 1 cm. long) and the nodes approximate.

Racemes slender and elongate, 1–2.5 (–4) cm. long; plants glabrous or nearly so at maturity.

Plants glabrous; midvein (when dry) elevated on the upper leaf-surface; Colipa, Veracruz, known from the type only. . . . . *E. colipensis*.

Branchlets and petioles minutely hispidulous, the tender growth bearing tiny appressed coppery dibrachiate hairs also, a few of the latter persisting

near the base of the lower leaf-surface; midvein impressed above, sparingly hispidulous in the furrow; a widespread species. . . . *E. oerstediana*.

Racemes short and crowded, if more than 1 cm. long then with numerous approximate nodes; flowers often fasciculate or glomerate, sometimes solitary at the lowermost nodes of new leafy branchlets and on the same plant in abbreviated racemes.

Cauliflorous species, the flowers mostly long-pedicellate in clusters at usually leafless nodes on old wood, the axis of the raceme almost none, or 1–3 mm. long; coarse plants with relatively large leaves, flowers and fruits (leaves 7–20 cm. long; disk 2.5–6 mm. wide; pedicels (3–) 8–30 mm. long; fruit 1.5–2.5 cm. long).

Leaves cordate-auriculate at base.

Pedicels very stout, 3 mm. long; petioles 8–10 mm. long; buds 10–11 mm. long, the hypanthium canescent; disk 6–7 mm. wide; San Luis Potosí. . . . *E. xilitlensis*.

Pedicels slender, 8–10 mm. long; petioles 5–7 mm. long; buds 5–6.5 mm. long, the hypanthium glabrous or the base somewhat pubescent; disk 3.5 mm. wide; Veracruz. . . . *E. trunciflora*.

Leaves acute to cuneate at base, or somewhat rounded to a cuneately decurrent base.

Midvein broad and flat or convex above (sometimes with narrow median channel near base); lateral veins not impressed; plants essentially glabrous; disk 3.5–4 mm. wide; larger calyx-lobes 2.5 mm. long, 3–3.5 mm. wide; buds 4.5–6 mm. long; Oaxaca to Guatemala.

. . . . *E. choapamensis*.

Midvein deeply and narrowly impressed above; lateral veins depressed below the upper surface but the veins and veinlets convex, in a reticulate pattern; herbage and inflorescence sparingly puberulent with tiny erect hairs; disk 3.5 mm. wide; larger calyx-lobes 6 mm. long, 5 mm. wide; buds 8 mm. long; Chiapas and Tabasco. . . *E. teapensis*.

Species not cauliflorous, the inflorescences usually in the axils of new leaves, if occasionally at leafless nodes then the raceme-axis prolonged or the pedicels very short, or both; flowers relatively small, the calyx-lobes at most 3.5–4 mm. long and wide, usually much less; disk at most 3.5 mm. wide, usually much less.

Plants abundantly and conspicuously hairy at flowering time, the inflorescence and usually the branchlets hairy, setose, appressed-pubescent or tomentose, the hairs often 2-branched (the branches equal or very unequal); small erect hairs if present few, or obscured by the other pubescence. . . . . Key A, page 416.

Plants glabrous, puberulent or minutely hispidulous, the hairs if present 0.1–0.3 mm. long, often incurved (bracts and flower-parts sometimes longer-ciliate, or the branchlets with slightly longer hairs, but the leaves then essentially or quite glabrous); dibrachiate hairs none except in one species. . . . . Key B, page 418.

# KEY A

Appressed dibrachiate hairs numerous on the branchlets and pedicels (one branch of the hairs often much longer than the other); bracteoles and calyx-lobes usually pubescent to about the same extent as the hypanthium.

Flowers glabrous or nearly so; plants as a whole soon glabrous, the youngest branchlets and foliage bearing small evanescent partly dibrachiate hairs; flowers usually in slender elongate racemes. . . . . *E. oerstediana*.

Flowers and pedicels appressed-pubescent, usually densely so; hairs more or less persistent, the plants in age eventually glabrate.

Leaves narrowly lanceolate or oblanceolate, 1 cm. wide or less, (3-) 5-8 times as long as wide; region of Acapulco, Guerrero. . . . . *E. avicenniae*.

Leaves broader, 1.5-3 times as long as wide, usually much more than 1 cm. wide.

Species with small, relatively broad, short-petiolate leaves [blades 5-7 cm. long or often less, 1.5-2.5 (-3) times as long as wide; petioles 1-6 mm. long].

Leaves more narrowly elliptic, less than 2 cm. wide, 2-3 times as long as wide; petioles 1-2 mm. long; larger calyx-lobes up to 3 mm. long and wide; Sinaloa only. . . . . *E. inconspicua*.

Leaves broader, 1.5-4 cm. wide, 1.5-2.5 times as long as wide.

Leaves blunt or obscurely acuminate; petiole 3 mm. long; flowers larger (disk 2.5-3 mm. wide; style 5-6 mm. long or more; larger calyx-lobes 2.5-3 mm. wide); Morelos; Mexico; Veracruz.

*E. yautepecana*.

Leaves prominently or sometimes obscurely acuminate (on short branches sometimes blunt); petioles 4-6 mm. long; flowers smaller (disk 1.3-2 mm. wide; style 4-4.5 mm. long; larger calyx-lobes 1.5-2 mm. wide); Pacific lowlands, Sinaloa to Oaxaca; Guatemala.

*E. rekoii*.

Species with larger leaves and flowers and usually longer racemes (blades 5-9 cm. long; petioles mostly 5-10 mm. long; disk 2-3 mm. wide or more; calyx-lobes 2.5-4 mm. long and wide; raceme mostly 1-2 cm. long); ordinarily to be sought in the key above (*E. hypargyrea*, *E. guatemalensis*, *E. pleurocarpa*) . . . . . See key above, page 415.

Hairs of the branchlets and pedicels not dibrachiate, either simple and antorsely appressed or spreading-ascending, or sometimes loosely contorted or erect; hypanthium often heavily pubescent and then often contrasting with the more nearly glabrous bracteoles and calyx-lobes.

Flowers glomerate, sessile or nearly so, the pedicels and the axes of the racemes usually concealed by the clustered flowers; plants often somewhat hirsutulous, at least in the inflorescence.

Leaves elliptic-oblong, rounded at apex and usually at base also, 1.6-2 times as long as wide, 3.5-6 (-8?) cm. long, short-petiolate; herbage rather generally short-hirsutulous; disk in fruit 1.5-1.7 mm. wide; bracteoles persistent, not connate, broadly rounded, 1-1.5 mm. wide, 1 mm. long; Sinaloa. . . . . *E. sinaloae*.

Leaves acute or acuminate, sometimes bluntly acuminate.

Herbage at maturity nearly glabrous (or the midveins pilose), the inflorescence hirsute with coarse, straight or contorted, coppery hairs up to 0.5-0.8 mm. long; calyx-lobes and the connate bracteoles nearly glabrous except the margins; leaves 3-7 cm. long, the petioles 5-8 mm. long; Sierra Madre Oriental, Veracruz to Tamaulipas.

*E. symphoricarpos*.

Herbage and inflorescence abundantly and similarly pubescent or hirsutulous.

Petioles 3-4 mm. long; herbage and inflorescence tawny-hirsutulous with erect hairs 0.5-1 mm. long; bracteoles distinct, ovate, acute, 0.5-1 mm. long; flowers small, the disk 1-1.5 mm. wide; eastern Mexico to Panama. . . . . *E. organoides*.



Petioles 5–12 mm. long; bracteoles 1–2 mm. long, connate at base and forming a broad 2-lobed involucre investing and often concealing the hypanthium; flowers somewhat larger.

Young herbage and inflorescence closely appressed-pubescent with pale sordid hairs; leaves abruptly acuminate; midvein deeply impressed above; calyx-lobes pubescent on both sides; disk 2.5 mm. wide; Oaxaca.....*E. oaxacana*.

Inflorescence appressed-pubescent, the branchlets, petioles, leaf-margins and midvein (beneath) short-hispidulous with erect hairs; leaves bluntly deltoid-acuminate; midvein shallowly concave in the nearly flat blade; calyx-lobes glabrous within except at tips; disk 1.5 mm. wide; western Michoacán.....*E. alnifolia*.

Flowers evidently pedicellate, the raceme-axis usually evident also but sometimes very short.

Flowers solitary in the axils of foliage-leaves, slender-pedicellate; pubescence gray to white; Veracruz.....*E. ledophylla*.

Flowers in short or elongate bracteate racemes.

Bracteoles thin and conspicuous, glabrous or nearly so and contrasting with the canescent hypanthium; flowers evidently slender-pedicellate.

Bracteoles acute or acuminate, 1–1.5 mm. long; pubescence gray to white; flowers mostly in racemes 2–4 cm. long [the group of *Eugenia biflora*].  
*E. karwinskyana*.

Bracteoles obtuse or rounded, mostly less than 1 mm. long; flowers mostly in racemes 2–6 mm. long, with several approximate nodes; young herbage coppery-pubescent, the hairs of the inflorescence coppery or yellowish.....*E. argyrea*.

Bracteoles usually not contrasting with the hypanthium, either glabrous or pubescent, if glabrous the hypanthium also glabrous or nearly so, or the flowers sessile; flowers in congested racemes mostly less than 1 cm. long.

Branchlets and petioles setose-hispid with pale sharp erect hairs 0.3–0.5 mm. long (the inflorescence sparingly so); hypanthium glabrous, after flowering prolonged into a narrow neck 0.5 mm. high, 1 mm. in diameter; longer calyx-lobes deltoid-ovate, 1.5–2.3 mm. long.

*E. principium*.

Pubescence of herbage and inflorescence appressed, or in addition with numerous very short erect hairs 0.1–0.3 mm. long.

Calyx-lobes 1.5–2 mm. long, membranous, reflexed from the base soon after anthesis; raceme-axis 2–4 mm. long, the pedicels filiform, 8–12 mm. long; bracteoles distinct, scarious; midvein slightly engraved above in the nearly plane blade; plants nearly glabrous, the inflorescence and young herbage sparingly appressed-pubescent; coastal Michoacán.....*E. turneri*.

Calyx-lobes 1–1.5 mm. long or less, neither evidently membranous nor strongly reflexed; pedicels mostly shorter; bracteoles usually somewhat united by the proximal margins, involucre-like; midvein concave or sulcate. [Here are to be found exceptionally pubescent individuals of *E. axillaris* or *E. acapulcensis*.]

See key below, page 421.

## KEY B

Plants nearly glabrous, the very young herbage with small coppery appressed dibrachiata hairs, a few such hairs persisting on the lower leaf-surface and

the midvein near base; flowers at least partly in racemes 1–2.5 (–4) cm. long; bracteoles broad, membranous, persistent, up to 1.5 mm. long and wide; widespread in Mexico and Central America. . . . . *E. oerstedea*na.

Dibrachiate hairs none; flowers never in long slender racemes.

Flowers large and nearly sessile (disk 3–4 mm. wide; larger calyx-lobes 3.5–4 mm. wide; style 7–9 mm. long; pedicels 0.5 mm. thick, 1.5 mm. long or less); plants glabrous; Veracruz. . . . . *E. mexicana*.

Flowers much smaller, or the pedicels slender and 6–10 mm. long.

Pedicels evidently slender and elongate, 6–16 mm. long; bracteoles distinct, scarious; calyx-lobes foliaceous or scarious, more or less reflexed in anthesis; staminal ring bristly; flowers fasciculate, 1–3 pairs from a very short axis.

Flowers large (disk 2.5–3.5 mm. wide; larger calyx-lobes up to 3.5 mm. wide); Veracruz to Chiapas; primarily West Indian. . . . . *E. rhombea*.

Flowers small (disk 1.5 mm. wide; larger calyx-lobes up to 2 mm. wide); western Michoacán. . . . . *E. turneri*.

Pedicels usually 5 mm. long or less (the lower ones in *E. acapulcensis* often 5–9 mm. long); calyx-lobes mostly somewhat thickened near base, erect and imbricate.

Leaves 1.4–4 cm. long, oblong-linear, 6–8 times as long as wide, 2–4 mm. wide; plants glabrous; Oaxaca. . . . . *E. standleyi*.

Leaves broader and usually much longer, if only 2–4 cm. long then mostly 2–3 (–4) times as long as wide.

Leaves small, 1–2.5 cm. long, 3–10 mm. wide, obovate to ovate or elliptic, rounded or obtusely pointed at apex; midvein slightly concave above, at least near base; herbage and inflorescence minutely hispidulous-puberulent; Tamaulipas to Oaxaca. . . . . *E. liebmanni*.

Leaves usually larger, generally of an elliptic or a lanceolate type, narrowed toward the acuminate or sometimes blunt apex.

Leaves narrowly lanceolate or linear-lanceolate, 1 cm. wide or less, 6–8 times as long as wide; Oaxaca, Tabasco. . . . . *E. lindiana*.

Leaves mostly 2–3 (–4) times as long as wide.

Leaves flat in drying, the midvein not depressed beneath the general level of the upper surface of the blade, the vein itself flat or slightly elevated or convex, sometimes shallowly channeled especially near the base; leaves often opaque and featureless above, the veins scarcely or not at all apparent.

Pedicels 3–5 mm. long; fruit about 5 mm. in diameter; hypanthium usually finely puberulent; base of the style glabrous; eastern Mexico to Honduras, little known from western Mexico.

*E. capuli*.

Pedicels 1–2.5 (–4) mm. long; fruit about 6–8 mm. in diameter; hypanthium glabrous; disk sparingly hairy about the base of the style; Jalisco, Colima, western Michoacán.

*E. michoacanensis*.

Leaves in drying curving down toward the midline, the midvein thus depressed below the general level of the upper surface of the blade, the resulting furrow concave or sometimes very narrow and (in section) V-shaped.

Midvein deeply and narrowly impressed above; leaves acutely narrowed at both base and apex, dark green and lustrous above, with inconspicuous veins; pedicels mostly 3–5 mm.

long, slender; bracteoles connate, involucrate; disk 1.5 mm. wide (2–2.5 mm. wide in fruit); fruit 10–13 mm. in diameter; Sierra Madre Oriental. . . . . *E. xalapensis*.

Midvein usually depressed in a broad concave channel, neither deeply nor very narrowly impressed; pedicels often shorter and stouter; combined characters never as above.

Larger calyx-lobes 2–2.5 mm. wide; disk 2–3 mm. wide; pedicels 1–3 mm. long; fruit globose, 1–1.6 cm. in diameter; mountains of south-central Mexico, mostly at elevations of 1000–2000 meters.

Leaves glabrous, lustrous and nearly featureless above, the midvein glabrous, rather narrowly impressed; disk 2.5 mm. wide in flower, 3 mm. in fruit; Jalisco; state of Mexico. . . . . *E. culminicola*.

Petioles and midveins of the leaves persistently puberulent, the midvein concave on the upper surface, often appearing flat because of the persistent hairs; disk 1.5–2 mm. wide in flower, 2.5 mm. wide in fruit.

Herbage and inflorescence hispidulous and somewhat viscid-puberulent; fruit unknown; Morelos. . *E. mirandae*.

Herbage puberulent when young, the inflorescence sometimes nearly glabrous; fruit globose, 1–1.6 cm. in diameter; Puebla; Hidalgo; San Luis Potosí. . *E. pueblana*.

Larger calyx-lobes 1–2 mm. wide; disk 1–2 mm. wide; pedicels various; fruit globose, oblate or oblong, usually less than 1 cm. in diameter.

Pedicels stout and short [0.4–0.6 mm. thick in flower, 1–2 (–3.5) mm. long]; midvein concave or channeled above, the sides of the channel hispidulous with short golden or pale hairs; bracteoles 0.5 mm. long, truncate or obtuse, distinct and persistent but not involucre-like; fruit ellipsoid, 7 mm. in diameter, 9–10 mm. long; state of Mexico to Nayarit. . . . . *E. crenularis*.

Pedicels, if only 1–2 mm. long, more slender; midvein flat or somewhat elevated or concave, not hispidulous as above; bracteoles usually somewhat united by their proximal margins, involucrate; fruit globose or oblate; lowlands of eastern Mexico, one species extending along the Pacific coast to Sinaloa.

Leaves drying yellow-green or yellow; midvein convex on the upper surface of the leaf, or toward the base of the blade flat or even sulcate; hypanthium densely and very minutely puberulent with pale appressed hairs smaller than those of the pedicels, closely invested by and partly covered by the bracteoles; calyx-lobes finely pubescent on both sides; fruit transversely oval, 7–8 mm. wide in the longer axis, 5–6 mm. long.

*E. farameoides*.

Leaves drying brownish green, green, brownish red or reddish; midvein flat or sulcate above; hypanthium usually glabrous, sometimes finely hispidulous like the pedicels, mostly or wholly exerted beyond the bracteoles; calyx-lobes mostly quite glabrous; fruit globose.

Leaves ovate or rhombic-ovate to elliptic, 3–6.5 cm. long, opaque, the veins scarcely evident above in dried leaves; petioles ventrally flat or concave, dilated into the base of the blade; pedicels in flower 3 mm. long or less; buds 1.5–2.7 mm. long; disk 1 mm. wide; style 3–4.5 mm. long; fruit 7–8 mm. in diameter; plants usually glabrous; West Indies; Yucatan Peninsula; rare or doubtful from Veracruz to Oaxaca.

*E. axillaris.*

Leaves elliptic or obovate, or ovate, 6–12 cm. long, veiny, the lateral and marginal veins pale above in dried leaves; petioles deeply channeled, usually passing abruptly into the blade; midvein often flat and wrinkled near base, often somewhat depressed below the surface of the blade, and most of it in a furrow between two low parallel convex ridges; pedicels (at least the lower ones) 5–13 mm. long; buds 2.5–4 mm. long; disk 1.3–2 mm. wide; style (5–) 7–8 mm. long; fruit 1 cm. or more in diameter; plants often hispidulous; Central America; Yucatan Peninsula; Chiapas; west of the Isthmus of Tehuantepec mostly near the Pacific Coast, north to Sinaloa.

*E. acapulcensis.*

***Eugenia acapulcensis*** Steud. Nom. ed. 2. 1: 601. 1840. ?*E. carthagenensis* Jacq. Sel. Amer. 152, t. 178, f. 53. 1763. ?*E. carthagenensis*  $\beta$  *baruensis* Jacq. l.c. 153. ?*E. baruensis* (Jacq.) Jacq. Coll. 3: 183. 1790. *Myrtus maritima* HBK. Nov. Gen. & Sp. 6: 146 [folio ed. 116]. 1823. ?*E. guadalupensis* DC. Prodr. 3: 275. 1828. *E. maritima* (HBK.) DC. l.c. 282, not *E. maritima* DC. l.c. 271. ?*E. bonplandiana* Berg, Linnaea 27: 228. 1856. *E. mosquitensis* Berg, Linnaea 31: 257. 1862. *E. deltoidea* Standl. Contr. U. S. Nat. Herb. 23: 1045. 1924. *E. antiquae* Riley, Kew Bull. 1927: 121. 1927. *E. escuintlensis* Lundell, Phytologia 2: 4. 1941. *E. ovatifolia* Lundell, Bull. Torrey Club 69: 396. 1 May 1942. *E. bartlettiana* Lundell, Contr. Univ. Mich. Herb. 7: 30 May 1942. *E. bracteolosa* Lundell, l.c. 31. *E. campechiana* Lundell, l.c. 32. *E. sibunensis* Lundell, l.c. 34. *E. comitanensis* Lundell, Wrightia 3: 12. 1961.

As the above long list of synonyms suggests, the taxonomy of this species-complex is little understood and apparently involved. The members of the complex seem to be most abundant and diverse in northern Central America and adjacent Mexico, but some of them occur in the West Indies and in northern South America. What appears to be a single and rather homogeneous species along the Pacific Coast of Mexico from Guerrero westward, and also in eastern Central America, becomes in Guatemala and the Yucatan Peninsula rather more variable. In the Yucatan Peninsula it comes into contact with the morphologically similar *E. axillaris* (Sw.) Willd.,



the latter primarily a West Indian species, and it is of course possible that some of the puzzling variability has resulted from past or continuing hybridization. The distinction between the mainland species (which may for the present be called *E. acapulcensis*) and *E. axillaris* is not always easy and is often subjective. The distinctions between the two species are set forth above in the key. My interpretation of *axillaris* is essentially that of Urban in his revision of the West Indian Myrtaceae (Bot. Jahrb. 19: 639–641. 1895). Urban interpreted a Swartzian specimen as representative of the plant that has commonly been passing as *E. axillaris* in Florida and the West Indies. It is a glabrous plant with relatively thick opaque ovate leaves, the midvein sulcate on the upper surface of the leaf, the flowers small and in very short crowded axillary racemes. On the continent of North America it seems to be of limited distribution; it is frequent in southern Florida, and it occurs on the Yucatan Peninsula and probably at a number of localities in the Atlantic lowlands of Guatemala and Honduras. Elsewhere in Central America it is replaced by *E. acapulcensis*.<sup>1</sup>

Urban seems to have included in his concept of *Eugenia axillaris* not only this most widely distributed West Indian type, but also some variants with larger, thinner, more veiny and sometimes elliptic or obovate leaves, viz. those that on the mainland would be referred to *E. acapulcensis*. Throughout the West Indies these larger-leaved plants seem to be in the minority, but they are represented in herbaria by numerous specimens from peripheral areas, e.g. Guadeloupe, central and western Cuba, and the Isle of Pines. On the mainland, as suggested above, *acapulcensis* is more widespread and abundant, whereas *axillaris* is of very limited distribution. The exact relation between the two is as yet not understood, and further taxonomic studies, especially in the West Indies, are much needed.

On the North American continent *E. acapulcensis* occupies a considerable range, and is morphologically rather homogeneous over most of this range. The nomenclaturally typical population ranges along the Pacific coast of Mexico at least from Guerrero to Sinaloa, and is known from a large series of specimens. The following char-

<sup>1</sup> In the past few decades many hundreds of herbarium specimens from Mexico and Central America have been determined as *Eugenia axillaris* without much regard for the actual identity of the plants. The name became a handy tag to apply to almost any *Eugenia* having small flowers in crowded axillary racemes. Many of these misidentified specimens are now to be referred to *E. acapulcensis*, but any one of a score of other species may occasionally turn up among the specimens labeled *axillaris*.

acterization is based primarily on these, but also applies to most Central American specimens from Honduras to Panama:

Branchlets, petioles and inflorescence usually minutely hispidulous (sometimes quite glabrous), the raceme sometimes thickly pubescent in addition with small golden hairs; leaves usually elliptic, varying to obovate or rarely to ovate, abruptly short-acuminate with a broad blunt tip, less often slenderly acuminate, or some or all leaves obtuse; blades acute or cuneate at base, or sometimes rounded in the broader leaves on the same plants; axis of the raceme mostly 3–6 mm. long.

In the lowlands from Guatemala to Tabasco may be observed certain tendencies toward variation from this general pattern. Glabrous individuals are relatively more frequent; leaves are seldom obtuse, often slenderly acuminate, more often ovate and rounded at base; relatively long and many-flowered racemes (up to about 15 mm. long) occur more frequently; occasional individuals with small flowers seem otherwise identical with the larger-flowered members of the same populations. Some of these variations may be normal for the species, some may represent unusual individuals, some may have resulted from hybridization. Some small populations in this geographical area seem reasonably distinct, e.g. *Eugenia flavoviridis* Lundell; others (including those listed above in synonymy) are questionably distinct, but some of them may represent local populations. Of the species recently described from the Guatemala-Yucatan area, *E. bartlettiana* (known from the type only) has rather loosely few-flowered racemes but is otherwise not unusual for *E. acapulcensis*; *E. bracteolosa* is glabrous, with rather long racemes and narrowly pointed leaves; *E. campechiana* is not distinctive; *E. escuintlensis*, known from the type only, was a glabrous plant having the flowers partly in racemes and partly solitary at the bases of new vigorous shoots; *E. oratifolia* was based primarily on individuals with short petioles and pedicels, but the leaves, in spite of the specific epithet, are not significantly broader than the average for the species; *E. sibunensis* is glabrous, with slenderly acuminate leaves. I have studied the types of these species in the Herbarium of the University of Michigan.

Of the earlier synonyms of *Eugenia acapulcensis* (listed above), *E. deltoidea* Standl. is known only from the type (Nelson 2292, US!). This is a glabrous specimen but otherwise very like the type of *Myrtus maritima* HBK. (*E. acapulcensis*); cf. Field Mus. Neg. 36894. The type localities of the two species are only a short distance apart.

Two specimens from farther east on the Pacific slope of Mexico, *Seler 1793* (US!) and *Seler 2029* (US!), both from Juchitán, Oaxaca, were determined at Berlin by Loesener as *Eugenia bonplandiana*

Berg. This name is included in the above synonymy of *E. acapulcensis* because of the assumption that Loesener probably had access to the type of *E. bonplandiana* when he made the determinations of Seler's specimens. Berg based *E. bonplandiana* on a specimen collected by Humboldt and Bonpland in "Columbia" ("*Eugenia laurifolia* Willd. herb. no. 9486"); if Loesener's comparison was a critical one, it may well be that the type of *E. bonplandiana* was a member of the *acapulcensis* complex, collected perhaps somewhere in northern Colombia along the lower Río Magdalena, or possibly even at Cartagena, where Humboldt and Bonpland spent three weeks.

Also from the vicinity of Cartagena came the specimens described by Jacquin under the names of *Eugenia carthagenensis* and its variety *baruensis*. In general terms *E. carthagenensis* was described as having the leaves ovate, obtusely acuminate, glabrous, short-petiolate, 4 inches long; the common peduncles [i.e. presumably the axis of the raceme] short and many-flowered; the flowers 4 lines in diameter; the fruit globose, the size of a pea, red, finally black. The figure published with this description unfortunately shows but a single detached leaf, which could perhaps represent our plant.

Urban (Bot. Jahrb. 19: 639. 1895) regarded *E. carthagenensis*  $\beta$  *baruensis* as probably a synonym of *E. axillaris*, but if he was right in his understanding of Jacquin's concepts I suspect that the specimens from Cartagena were not true *axillaris* but *acapulcensis*. It has not been possible at this writing for me to learn the identity of the taxa described by Jacquin.

An earlier name that may well prove to be synonymous with *E. acapulcensis* is *E. guadalupensis* DC. A photograph of the type, Field Mus. Neg. 33492, shows a broad-leaved plant extraordinarily like those common along the American mainland. The type should be compared with Central American material.

Two species described from eastern Central America, *E. mosquitensis* Berg and *E. antiquae* Riley, seem to represent almost identical populations. The type of *E. mosquitensis* (Wullschlägel in 1855, from "Pearl Key Lagoon, Mosquito" [Nicaragua]), which I have seen through the courtesy of the authorities at Brussels, consists of a few twigs in young bud. The branchlets and pedicels are hispidulous, as commonly in specimens from Panama; the leaves are broadly elliptic, shortly and bluntly acuminate, rounded to a cuneate base. In my judgment this is the common plant of Panama, the same as that named *E. antiquae*. I have not seen the type of the latter, but judging from the original description it is the same plant.

This was referred by Amshoff in the *Flora of Panama* (Ann. Missouri Bot. Gard. 45: 189. 1958) to *E. acapulcensis*.

One species referred by Amshoff (l.c.) and previously by Standley (Contr. U. S. Nat. Herb. 23: 1046. 1924) to the synonymy of *E. acapulcensis*, proves to be very different. This is *Eugenia colipensis* Berg, Linnaea 29: 243. 1858. The type (from Colipa, Veracruz, Karwinsky 241, LE!) is an over-mature fruiting specimen, evidently a species close to or identical with *E. oerstedeana* Berg, but differing from that species in having the leaves impressed-punctate above, and the midvein in the dried leaves elevated above in a narrow ridge. In other respects, including the racemes 3–5 cm. long, the fruit about 1 cm. in diameter, the thin persistent bracteoles, the venation of the leaves, the short pubescence of the branchlets and the minute flat dibrachiate hairs at the base of the lower leaf-surface, it exactly simulates a specimen of the *oerstedeana*–*florida* alliance. Apparently nothing like it has since been collected.

One species not listed above, *Eugenia itzana* Lundell, Bull. Torrey Club 69: 395. 1 May 1942, surely belongs with the *acapulcensis* complex, but its status is in doubt. The type (Yucatan, Chichen Itzá, Lundell 7589, MICH!) is an immature flowering specimen that superficially suggests a small-leaved example of *acapulcensis*. One paratype, Steere 1373, is scarcely distinguishable from *E. axillaris*. All four specimens cited in the protologue of *E. itzana* are small-flowered for *acapulcensis*, resembling in this respect *E. axillaris*. Hardly an independent species, *E. itzana* seems to fall between *acapulcensis* and *axillaris*.

The very recently published *Eugenia comitanensis*, from near Comitán, Chiapas, *E. Matuda* 5753 (LL, type!), represents in my opinion a glabrous and rather narrow-leaved phase of *E. acapulcensis*. The leaf-margins are somewhat revolute, as they often are in *E. acapulcensis*, but quite entire. Superficially they appear to be "obscurely crenulate," as noted in the protologue.

### *Eugenia alnifolia* McVaugh, sp. nov.

Frutex vel arbor parva, ramulis petiolisque, foliorum marginibus et nervo medio (subtus) breve hispidulis; folia elliptico-oblonga, 6–10 cm. longa, 1.7–2.2-plo longiora quam latiora, deltoideo-acuminata, petiolis 5–7 mm. longis, nervo medio supra concavo; flores numerosi glomerati sessiles, bracteolis connatis extus pubescentibus, hypanthio velutino; calycis lobi extus sericei, 1.5–1.8 mm. lati; discus 1.5 mm. latus; stylus 7 mm. longus; ovarium biloculare, ovulis quoque loculo ca. 5; fructus ignotus.

A shrub or small tree, the branchlets and petioles, and the leaf-margins and lower surfaces of the midveins short-hispidulous with hairs 0.1–0.2 (–0.5) mm.



long; inflorescence densely appressed-pubescent; leaves elliptic-oblong, 3–5 cm. wide, 6–10 cm. long, 1.7–2.2 times as long as wide, on shoots relatively longer and sometimes obovate, but on flowering branchlets broad at the middle and about equally rounded to the bluntly deltoid-acuminate tip and the acute base, the margins at the very base cuneately but shortly decurrent on the channeled petiole 5–7 mm. long, 1–1.5 mm. thick; midvein shallowly concave above in the nearly flat blade, somewhat persistently hirsutulous at base, on the lower surface elevated nearly its whole diameter and strongly hirsutulous, the other veins and the leaf surface essentially glabrous; lateral veins 7–10 on each side in addition to some intermediate ones, inconspicuous above, elevated and rather prominent beneath, not forming a well-defined marginal vein but diminishing distally and each arching over irregularly, 2–5 mm. from the margin, to join the next succeeding one; leaves dark green and probably lustrous above, paler and dull and finely dark-dotted beneath; inflorescences consisting of dense many-flowered axillary glomerules 1–1.5 cm. in diameter, at leafy or leafless nodes on old wood, the racemes very short, often 2–3 at one node, each bearing 2–4 closely approximate pairs of sessile flowers; bracts persistent, very short; bracteoles membranous, appressed-pubescent without, orbicular-reniform, 1–2 mm. wide and almost as long, narrowed at base and somewhat connate, forming a broad 2-lobed involucre nearly concealing the hypanthium; buds 3.5 mm. long, obovoid, the broadly cup-shaped or hemispheric hypanthium velutinous, 1 mm. wide and almost as high; calyx-lobes in unequal pairs, broadly rounded, closely appressed-silky without, glabrous within except near the tips, the outer ones 1 mm. long, 1.5 mm. wide, the inner pair 1.3 mm. long, 1.8 mm. wide; disk about 1.5 mm. wide, hairy around the base of the style; style 7 mm. long or more, glabrous; stamens about 35, about as long as the style, the anthers 0.7–0.8 mm. long; petals white, elliptic-obovate, 3 mm. long, 2.5 mm. wide; ovary bilocular, the ovules about 5 in a compact group in each locule. “Cafecillo” (Hda. Coahuayula, *Emrick*).

Michoacan: Distr. Coalcomán, Aquila, in woods, 15 Jan. 1942 (fl.), *G. B. Hinton 16292* (K; MICH, type; NY; UC; US); Hacienda Coahuayula, Nov. 1906 (fl.), *G. M. Emrick 74* (F); Hda. California, Mun. Apatzingán, 1200 m., *Leavenworth & Hoogstraal 1447* (F).

A species somewhat resembling *E. organoides* but differing obviously in the distribution of the foliar pubescence, in the larger flowers, and in the differently pubescent inflorescence.

***Eugenia argyrea* Lundell, Wrightia 3: 10. 1961.**

This very recently described species was known to its author from the type only. It proves to be widely distributed and apparently abundant in Central America; it is in fact represented in herbaria by more specimens than almost any other Central American species. In view of the distinctive appearance of the flowering specimens, and its wide distribution, it is indeed odd that neither Berg nor any of the more recent special students of the Myrtaceae seems to have noticed it. Among the small-flowered species of *Eugenia* bearing the flowers in abbreviated racemes the plant is easily recog-

nized by the contrast between the glabrous or nearly glabrous bracteoles and calyx-lobes, and the tawny-pubescent hypanthium. The characteristic coppery-silky pubescence of the young growth is distinctive but does not long persist.

A formal description of this species as I understand it can be found in the *Flora of Guatemala* (Fieldiana, Bot. 24) and need not be repeated here. The geographical distribution of *E. argyrea* is indicated by the following list of specimens examined:

MEXICO: Veracruz: Santa Lucrecia, *C. D. Mell* 580 (F, US).—Oaxaca: Chivela, *Mell* 32 (US), *Mell s.n.*, 10 Dec. 1928 (US); 17 km. northwest of La Ventosa, *R. M. King* 605 (MICH).—Chiapas: Camino Berriozabal a S. Fernando, *F. Miranda* 5829 (MICH); Ocozocuatla, *Miranda* 7454 (MICH); Siltepec, *E. Matuda* 1609 (F, MICH), *Matuda s.n.*, 8 Aug. 1937 (K, MICH); Cascada, near Siltepec, *Matuda* 5074 (LL, type).

GUATEMALA: Alta Verapaz: Between Semococh and Chajamayic, *J. A. Steyermark* 45725 (F); pantano 2.5 miles west of Cubilgüitz, *Steyermark* 44309 (F).—Izabal: Puerto Barrios, *Standley* 25118 (US).

HONDURAS: Atlantida: *Standley* 53775 (F), 56628 (F, US).—Yoro: *J. B. Edwards* P-820 (F, US).—Colon: *Von Hagen* 1334 (F).—Comayagua: *Standley* 56511 (F, US), *J. Valerio* R. 2892 (F), *Yuncker et al.* 5742 (F).

NICARAGUA: Chontales: La Libertad, *Standley* 9028 (F).

COSTA RICA: Rodeo, *H. Pittier* 1642 (US), 3241 (US); vicinity of San Ramón, *A. M. Brenes* 5372, 6751, 14977, 20357, 20358 (all F); San Ramón, *Austin Smith* P2332 (UC).

PANAMA: Campana, *P. H. Allen* 1324 (F, US); Canal Zone, *Pittier* 2567 (F).

COLOMBIA: Region of Santa Marta, *H. H. Smith* 907 (MICH), *Smith* 1927 (MICH, US).

***Eugenia avicenniae*** Standl. Contr. U. S. Nat. Herb. 23: 1043. 1924.

Because of the very narrow leaves this plant seems distinctive. It is presumably related to the other west-Mexican species with reddish and somewhat appressed, dibrachiate hairs, viz. *E. rekoii* and *E. salamensis*. The species is still unknown except for a few collections from the vicinity of Acapulco, Guerrero, the type locality.

**Eugenia axillaris** (Sw.) Willd. Sp. Pl. 2: 970. 1800. *Myrtus axillaris* Sw. Prodr. 78. 1788.

This species appears to intergrade to some extent with *E. acapulcensis* Steud.; see the discussion under that species. In Mexico *E. axillaris* is known certainly from the Yucatan Peninsula, but records from the Mexican mainland should be regarded with suspicion.

**Eugenia biflora** (L.) DC. Prodr. 3: 276. 1828. *Myrtus biflora* L. Syst. Nat. ed. 10: 1056. 1759. *E. fieldingii* Berg, Linnaea 29: 242. 1858.

As pointed out in the *Flora of Peru* (pt. 4, no. 2: 684–685), this is one of the most variable species of *Eugenia*. Widely distributed in South America and the West Indies, it is well known in Panama and perhaps in Costa Rica, but in northern Central America it is scarcely known except in the lands bordering on the Gulf of Honduras. The latter region is already known for its strong phytogeographic connections with the West Indies.

The commonest form in Central America is one much resembling the West Indian var. *virgultosa* (Sw.) Krug & Urban, and also much like the prevailing form throughout much of South America, viz. a plant with lanceolate leaves 3–4 times as long as wide, long-acuminate and bristle-tipped, impressed-punctate on the upper surface; the style is 5–6 mm. long, the bracts of the raceme narrow and mostly 3–4.5 mm. long, the bracteoles often 1.5 mm. long, the whole inflorescence densely silky, and the flowers only about 6–8 to a raceme. This plant is represented in herbaria by a number of collections from Belize and Stann Creek Districts, British Honduras, and from the Department of Izabal, Guatemala.

Apparently more widely distributed on the North American mainland than the above variety of *E. biflora* are several so-called species that are certainly closely related to one another and to *E. biflora*. A comprehensive revision of the whole species complex may indicate that the "species" of Mexico and Central America are not distinct from the inclusive *biflora*. All are alike in having abundant pale appressed silky or silky-strigose pubescence of simple hairs, the inflorescence an elongate raceme with compressed internodes, usually 3–6 pairs of flowers, the bracts persistent and the distal ones increasingly longer, the bracteoles somewhat coherent by their basal margins, closely investing the hypanthium, scarious and often thinly strigose and so contrasting with the canescent hypanthium, the calyx-

lobes broad, and silky or silky-strigose within. The distinctions between the species appear to depend chiefly on leaf-shape, and on the presence and abundance of glandular depressions on the upper leaf-surface. Distinctions between *E. karwinskyana* and *E. yucatanensis* seem to be particularly weak; the few apparent differences in flower-size and in pubescence have been studied in relatively few specimens, and are not very suggestive.

The following key contrasts *E. biflora* (sensu stricto) with the closely related "species" of the mainland:

Leaves lanceolate, 3-4 times as long as wide, bristle-tipped, impressed-punctate above, the glandular depressions numerous and conspicuous. . . . . *E. biflora*.

Leaves elliptic to ovate or broadly lanceolate, not bristle-tipped (acuminate, but the tip obtuse or sometimes subacute), not at all or sparingly and obscurely impressed-punctate above.

Leaves mostly 3-4 times as long as wide; eastern Mexico to Guatemala.

*E. karwinskyana*.

Leaves mostly 1.7-2.5 times as long as wide; Yucatan Peninsula.

*E. yucatanensis*.

Confined as far as known to the Yucatan Peninsula, *E. yucatanensis* Standl. seems to be frequent in the lowlands from the State of Yucatan to Petén. It is scarcely distinguishable from some Jamaican material of *E. biflora* in which the leaves are rather broadly elliptic, obtusely acuminate, 1.7-2.5 times as long as wide, not at all or scarcely impressed-punctate above. The plants are somewhat less prominently silky than those of *E. biflora*, and the flowers apparently a little smaller.

A third "species," ranging from San Luis Potosí, Mexico, to northern Guatemala, is *Eugenia karwinskyana* Berg, Linnaea 29: 244. 1858 (*E. tabascensis* Lundell, Phytologia 1: 482. 1941). This plant has ovate or elliptic leaves narrower than those of *E. yucatanensis*, obtusely acuminate, 2.6-4 times as long as wide, sometimes impressed-punctate above. The plants are more prominently pubescent than those of *E. yucatanensis*, sometimes indeed approaching *E. biflora* in this respect. The flowers are usually 8-10, or sometimes as many as 18, in a raceme.

The type of *E. karwinskyana* Berg, which I have seen through the courtesy of the authorities at Leningrad, is a flowering specimen in which the inflorescence is notably canescent; the type of *E. tabascensis* Lundell is less strongly pubescent and has somewhat narrower leaves but is surely conspecific. The following are to be referred to *E. karwinskyana* as now understood:



MEXICO: San Luis Potosí: Tamazunchale, *Lundell 7113* (MICH).—Hidalgo: Km. 339 between Chapulhuacan and Tamazunchale, *Lundell 12400* (MICH); Huejutla, *Karwinsky 242* (LE, type).—Tabasco: Boca Cerro, Tenosique, *Matuda 3561* (MICH, type of *E. tabascensis*).

GUATEMALA: Alta Verapaz: Region of Chelac, northeast of Carhá, *Standley 70388* (F).

Another member of the species complex that includes *E. biflora* is apparently the following:

***Eugenia ledophylla*** (Standl.) McVaugh, comb. nov. *Myrtus ledophylla* Standl. Contr. U. S. Nat. Herb. 23: 1038. 1924.

The type, *Purpus 7804* (US!) is a silky-pubescent plant in which the leaves are small for *biflora*, up to about 1.5 cm. wide, 5 cm. long, lanceolate or lance-ovate, cuspidate, impressed-punctate above. The pubescence throughout is like that of *biflora*, as are the bracteoles subtending the buds. The type bears nearly mature fruit; another specimen from Zacuapan, Veracruz, presumably a topotype, *Purpus 8053* (UC), is in bud. The flowers in both collections are borne on slender pedicels 1–1.5 cm. long, solitary in the axils of foliage leaves on new tender branchlets. It is conceivable that these specimens came from a plant or plants abnormally stimulated so as to cause excessive development of the axillary branches that normally become short, leafless, bracteate racemes in the species of *Eugenia* related to *E. biflora*. Whatever may prove to be the relationship of this plant, it is quite out of place in *Myrtus*.

A synonym of *E. biflora* is *Eugenia fieldingii* Berg ["in Mexico (Fielding)"], the type of which proves to be an average specimen of *E. biflora*. The racemes are young but otherwise characteristic, the leaves are silky and impressed-punctate above and often cuspidate. The source of the specimen, however, can hardly be Mexico. The Fielding cited as collector was presumably Henry Barron Fielding (1805–1851; cf. Britten & Boulger, Biog. Ind. Brit. Bot. ed. 2. 107. 1931), who amassed a large private herbarium but who, as far as I can learn, did not himself collect in tropical America.

In 1858 Berg published three new taxa based on American collections attributed to "Fielding." Only one of the specimens, the type of *Myrtus acerosa* (Linnaea 29: 253) was cited by number (*Fielding 1448*). Berg saw these specimens "in herb. hort. bot. Petrop." Through the kindness of the authorities at Leningrad I have been able to study all three specimens.



The types of *E. fieldingii* and *Myrtus acerosa*, and that of *Myrcia saxicola*  $\beta$  *grandifolia* (Linnaea 29: 219), all seem to have been collected by the same person. Each bears a small collector's field-label, slit to pass over the end of the twig; each bears on this label in a large smooth hand in faded black ink a short notation evidently by the collector, and in addition a serial number in another hand (evidently added in different ink); also the words "Hb. Fischer" in a small angular hand, and the word "Fielding" in what appears to be still another hand. Berg has added his annotation in one instance to this label, and in the other two on a separate label. The pertinent data are as follows:

Name	Serial No.	Collector's Notations
<i>Myrtus acerosa</i> . . . . .	1448	636 Myrtaceae Bajasan
<i>Eugenia fieldingii</i> . . . . .	1449	Indiana fruit eatable
<i>Myrcia saxicola</i> $\beta$ <i>grandifolia</i> . . . . .	1958	205 Casapi Myrtacea

From the data on No. 1449 the collector apparently was English-speaking. From the handwriting in which the field-labels are written I think there can be little doubt that these are collections of Andrew Mathews, whose principal Peruvian collections came to Kew in the 1830's. His Myrtaceae were arranged in systematic sequence, according to the then-current practice, and assigned serial numbers replacing the original field-numbers. The serial numbers assigned the Myrtaceae included at least 1447-1454, and in another series 1957 and 1958. No. 1449 was cited under *Eugenia biflora* in the *Flora of Peru* (p. 685), where the locality was given as Tarapoto. I assume that "Indiana" (if I have interpreted correctly the writing on the label) is a locality near Tarapoto, and that the type of *E. fieldingii* is from eastern Peru. It is certainly not Mexican.

No. 1958 was cited under *Myrcia splendens* (Sw.) DC. in the *Flora of Peru* (p. 661), where the locality was given as Cassapi. Presumably the type of *M. saxicola*  $\beta$  *grandifolia* is a duplicate of this collection. The specimen belongs to one of the compact-leaved types of *M. splendens*.

The type of *Myrtus acerosa* [*Myrteola acerosa* (Berg) Burret], was cited in the *Flora of Peru* (p. 806) as *Fielding 1448*. I have not seen a sheet of this number definitely attributed to Mathews, but he traveled in this part of Peru and there seems no reason to doubt that he collected this particular specimen. The few buds on the type are immature; some are seemingly 4-merous, not 5-merous as

Berg described them, and others are 5-merous. Vegetatively the plant much resembles Ecuadorean specimens of *Myrteola microphylla* var. *microphylla*, but as noted in the *Flora of Peru* the branchlets in *M. acerosa* are spreading-setose and the very narrow leaves are revolute-sagittate when dry; in *M. microphylla* the branchlets are canescent and the leaves revolute-linear or -lanceolate.

Fielding's herbarium, the principal part of which went to Oxford University, is said to have contained 2000 sheets of Mathews' Peruvian plants, viz. the set reserved by the collector for himself (cf. Hook. Journ. Bot. & Kew Misc. 6: 283. 1854). Apparently some of these specimens, probably sent out as duplicates, found their way to St. Petersburg where Berg saw them and assumed that Fielding was the original collector.

***Eugenia capuli*** (Schlecht. & Cham.) Berg, *Linnaea* 27: 238. 1856. *Myrtus capuli* Schlecht. & Cham. *Linnaea* 5: 561. 1830. *Eugenia schiedeana* Schlecht. *Linnaea* 13: 418. 1839. *E. contrerasii* Lundell, *Wrightia* 2: 206. 1961.

In his revision of West Indian Myrtaceae, Urban referred the Mexican *E. capuli* to the synonymy of *E. monticola* (Sw.) DC., var. *latifolia* (DC.) Krug & Urb. (*Bot. Jahrb.* 19: 636. 1895). In this course he has not been followed, as far as I can learn, by any botanist working with the floras of continental North America. Probably, however, *E. capuli* and *E. monticola* actually are conspecific; some Central American specimens are quite indistinguishable from individual West Indian ones. On the other hand most Mexican and Central American plants differ from typical *monticola* in having the leaves wider and longer (but neither so long nor so wide as described for var. *latifolia*!); the petioles longer; the blades relatively longer on the average because of the frequent occurrence of forms with caudate-acuminate tips; the pedicels longer; but the flowers in general smaller and the fruits smaller. Aside from these quantitative differences I cannot distinguish between West Indian and Central American specimens. Pubescence in both populations is variable; plants from the mainland are usually but not always less conspicuously puberulent than West Indian specimens, which may indeed be very obscurely puberulent or quite glabrous. After examination of a large series of specimens from both eastern and western Mexico, from the Yucatan Peninsula and from the adjacent lowlands in Central America, I cannot find any convincing basis for recognizing more than a single species in the population.

From the standpoint of practical taxonomy it seems preferable to recognize *E. capuli* as an independent species at least until the relationships of the several West Indian populations of *E. monticola* are better understood. There is much as yet unexplained variation among these insular populations, whereas *E. capuli* is abundant and relatively homogeneous over a considerable lowland area from Tamaulipas to northern Central America.

The species complex that includes *E. monticola* and *E. capuli* has also several representatives in northern South America and in eastern Central America. A revision of the entire complex is much to be desired.

The principal species that are involved are as follows:

***Eugenia micrantha*** (HBK.) DC. Prodr. 3: 282. 1828. *Myrtus micrantha* HBK. Nov. Gen. & Sp. 6: 144 [folio ed. 115]. 1823. Type locality, Honda, Colombia.

Distinguished from West Indian *monticola* chiefly by the longer racemes, the axis of which may be 1 cm. long or more in *micrantha*, usually 3–6 mm. long or less in *monticola*. The pubescence in *micrantha* is short and inconspicuous. The known range extends from about the vicinity of Caracas, Venezuela, to the valley of the Río Magdalena in Colombia.

***Eugenia casearioides*** (HBK.) DC. Prodr. 3: 275. 1828. *Myrtus casearioides* HBK. Nov. Gen. & Sp. 6: 145 [folio ed. 115]. 1823. Type locality, "in monte Cocollar Cumanensium," i.e. on the Orinoco.

Distinctive chiefly in having the branchlets rather long-pubescent with spreading hairs up to 0.5–0.7 mm. long. The pedicels are short and the flowers glomerate, i.e. the axis of the raceme is very short. The species is known chiefly from northern Venezuela, and from one locality in Colombia (Norte de Santander).

***Eugenia pittieri*** Standl. Field Mus. Bot. 8: 145. 1930. Type locality, Panama.

Specimens from Costa Rica and Panama, identified as *E. pittieri*, are essentially indistinguishable from *E. monticola* of Tobago, e.g. *Broadway s.n.*, 19 Sep. 1910 (US). The branchlets are setose with coarse, antrorsely curved, sordid hairs 0.3–0.5 mm. long, these occurring also on the midveins and margins of the leaves; the hypanthium

and the pedicels are nearly glabrous. The type, *Pittier 4484* (F), is in young bud but otherwise not different from other specimens (F and US).

***Eugenia chepensis*** Standl. Field Mus. Bot. 8:144. 1930. Type locality, Panama.

The type of this species, *Pittier 4716* (F) was the only specimen cited in the protologue, where the pedicels were described as "2–3.5 mm. longis," and a little later as "comparatively long." Actually the pedicels are not long when compared with those of *E. capuli* or even with those of *E. monticola*; Standley was comparing them with those of *E. pittieri*, whose flowers he described as sessile. Amshoff, in the *Flora of Panama* (Ann. Missouri Bot. Gard. 45: 185. 1958) describes the pedicels of *chepensis* as 4–10 mm. long. It is doubtful that *chepensis* is distinct from *pittieri*, or that either one is distinct from *monticola*.

The *monticola* complex seems to be represented on the Isthmus of Tehuantepec rather sparingly, but interestingly enough two additional species have been described from this area, both on the basis of their unusually narrow leaves. One of these is *Eugenia lindeniana* Berg, Linnaea 29: 240. 1858. The type collection, from Teapa, Tabasco, *Linden 619* (LE, type; MICH), has narrowly lanceolate leaves 11 mm. wide or less, 6–8 times as long as wide; except for this one feature the specimen seems to be an average moderately hispidulous flowering specimen of *E. capuli*. Another specimen that presumably should be referred to *E. lindeniana* is:

Tabasco: Boca Cerro, Tenosique, *E. Matuda 3592* (MICH).

The recently published *Eugenia tenuissima* Lundell (Wrightia 3: 19. 1961) was based entirely on *Martínez Calderón 546*, from Chiltepec, District of Tuxtepec, Oaxaca. I have seen isotypes (MEXU and UC). The specimens bear nearly mature fruit; a great deal of the pubescence has been eroded away, but seems to be characteristic of *E. capuli* as I understand that species. The leaves are unusually narrow for *E. capuli*, 3.2–4.5 times as long as wide, and up to no more than 1.4 cm. wide. In other respects the specimens are quite typical of *E. capuli*; the type was compared in the protologue of *E. tenuissima* with *E. lindeniana*, which does indeed have even narrower leaves than *tenuissima*. The leaves of the type collection of *lindeniana*, however, although very narrow, are not acutely pointed



but are obtuse exactly as in *tenuissima*. It is not likely that these two narrow-leaved extremes are specifically different from *E. capuli*. A second specimen, very like the type of *E. tenuissima*, is:

Oaxaca: Upper Coatzacoalcos River, *C. D. Mell 601* (F, US).

In recent months Dr. C. L. Lundell has performed a signal service by calling attention to what he supposes to be distinct populations among the *Eugenias* related to *E. capuli*, specifically those species with puberulent herbage, small elliptic or lanceolate leaves having the midvein flat or convex (not sulcate or impressed) above, the flowers small in short crowded racemes and the fruit small and globose. The fruits in *E. capuli* are typically small and slender-pedicellate, 4–6 mm. in diameter, the fruiting pedicels 0.3 mm. thick, and the axis of the raceme rarely more than 4–5 mm. long.

In *Eugenia tikalana* Lundell (*Wrightia* 2: 210. 1961) the fruits are mostly 9–12 mm. in diameter, the fruiting pedicels 0.4–0.6 mm. thick, and the axis of the longer racemes on most plants ranges from 6–10 (or up to 25) mm. long. Through the courtesy of Dr. Lundell I have seen a fine series of collections of *E. tikalana* from Petén.

In *E. michoacanensis* Lundell (*Wrightia* 3: 16. 1961) the plants are superficially very similar to those of *E. capuli* and *E. tikalana*, but the fruits are intermediate in size (6–8 mm. in diameter). As apparently plants with large, intermediate and small fruits all occur in the same general areas in southwestern Mexico, and as the plants are otherwise so similar, it seems likely that these species are not genetically isolated. These large-fruited forms need further study but apparently represent one or more populations distinct from *E. capuli*.

The small-fruited *E. contrerasii* Lundell, described in the same publication as *E. tikalana*, seems amply distinct from that species in Petén, where both are common. In the protologue of *E. contrerasii*, however, it was compared not with *E. tikalana* but in a very general way with *E. capuli*. I do not find any way in which *E. contrerasii* differs from *E. capuli* as that species occurs in eastern Mexico.

***Eugenia choapamensis* Standl.** *Field Mus. Bot.* 22: 93. 1940.

The type, *Mexia 9254* (F!), was from near San Juanito, Distr. Choapam, Oaxaca. The species is known from several additional collections from Oaxaca to Guatemala. It is treated at length in the *Flora of Guatemala*.



Oaxaca: Pluma Hidalgo, *C. Leyva* in 1947 (US); Distr. Tuxtepec, Chiltepec, 20 m., *G. Martínez Calderón* 525 (US).—Tabasco: El Azufre, Teapa, 25 Mar. 1957 (fr.), *F. Miranda* 8488 (MICH).

***Eugenia colipensis* Berg, Linnaea 29: 243. 1858.**

Glabrous or essentially so in age, the racemes minutely and sparingly hispidulous; leaves elliptic, acute to acuminate at both ends, 3–4 cm. wide, 6–10 cm. long, the petioles 5–8 mm. long; blades impressed-punctate above; midvein elevated as a narrow ridge on the upper surface; racemes 2–4 cm. long, each with 4–7 pairs of flowers on straight pedicels 4–6 mm. long; bracteoles persistent, not connate, broadly ovate-deltoid, 1 mm. long; fruit about 1 cm. in diameter, subglobose, the disk 1.5–2 mm. wide, the calyx-lobes rounded, erect, the larger ones 1.5–1.7 mm. wide.

Still known from the type only, this apparently distinctive species should be sought in the Atlantic lowlands in Veracruz. See the discussion above under *E. acapulcensis*.

***Eugenia crenularis* Lundell, Wrightia 3: 12. 1961. *E. hintonii* Lundell, Wrightia 3: 14. 1961.**

A shrub or small tree 3–4 m. high, the branchlets and petioles uniformly but rather sparsely hispidulous with sharp erect hairs 0.1–0.3 mm. long; axis of inflorescence, and pedicels, similarly but often very sparsely pubescent or essentially glabrous, the bracteoles coarsely ciliate, the bracts usually strigose especially distally with coarse appressed reddish hairs 0.2–0.4 mm. long; leaves thin, often crenulate, or apparently so because of differentially revolute margins, the blades lanceolate to elliptic or narrowly ovate, 1–3 cm. wide, (2–) 3–7.5 cm. long, (2–) 2.3–3 (–3.7) times as long as wide, often much narrowed toward both ends from the middle or below, the tip blunt-pointed or obscurely or sometimes narrowly acuminate, the base usually less drawn out than the apex, acute or rounded, the margins at the very base cuneately but usually shortly decurrent on the ventrally hispidulous and channeled petiole 3–6 mm. long; midvein concave or channeled above, the sides of the channel more or less densely and persistently hispidulous with short golden or pale hairs; lateral veins 8–10 on each side in addition to some poorly differentiated intermediate ones, somewhat convex on both surfaces and forming with the small veins a reticulum when dry, not forming a well-defined marginal vein but connected by a series of irregularly angled arches 0.7–2.5 mm. from the margins; blades lustrous above, paler beneath; glands usually evident as scattered convexities above, as small dark or resinous dots beneath; inflorescence an abbreviated axillary raceme, or 2 racemes superposed, the stout axis 1–4.5 (–7) mm. long, bearing 1–3 (–5) opposite and decussate pairs of flowers on rather stout pedicels 1–2 (–3.5) mm. long, 0.4–0.6 mm. thick in flower; terminal flower often present, sessile in the bracts (simulating bracteoles) at the terminal node; bracts persistent, ovate or slightly elongate, 0.5–0.8 mm. long; bracteoles similar to the bracts, about 0.5 mm. long and wide, truncate or obtuse, persistent, distinct; buds rather closely sessile in the bracteoles, short-pyriform, 2–2.5 mm. long; hypanthium (usually) glabrous or sparingly puberulent, campanulate, 1 mm.

long; calyx-lobes short and broad, thin and membranous, soon irregularly reflexed, the outer ones 0.5–1 mm. long, 1–1.5 mm. wide, the inner 0.8–1.3 mm. long, 1.5–2 mm. wide; disk 1.3–1.4 mm. wide, glabrous; style 5–6 mm. long; stamens 50–60, up to 5 mm. long, the anthers 0.5–0.6 mm. long; petals white, obovate, ciliate, 3.5 mm. long; ovary bilocular, the ovules about 10 in a compact group in each locule; fruit ellipsoid, black, about 7 mm. in diameter, 9–10 mm. long, obtuse at both ends, or slightly prolonged distally to the erect or appressed calyx-lobes.

State of Mexico: Dist. Temascaltepec: Temascaltepec, 18 Mar. (fl.), *Hinton 405* (K); 1 Feb. (imm. fr.), *Hinton 3255* (K, US); 5 May (fl.), *Hinton 7679* (US); 2 June (fl.), *Hinton 7695* (US, isotype); San José, 21 Feb. (fr.), *Hinton 291* (K); 7 Mar. (bud), *Hinton 359* (K).—Guerrero: Dist. Mina: Manchón, 28 Sep. (imm. fr.), *Hinton 9603* (MICH, isotype of *E. hintonii*); 21 Apr. (fl.), *Hinton 10076* (US); Tierras Blancas, 6 May (fl.), *Hinton 10146* (US).

The following specimens appear to belong to the same species, as indicated by the quality and distribution of the pubescence, leaf-shape, texture, venation and crenulation, presence of the terminal flower, general flower-morphology, and fruit shape. They differ, however, in having the racemes longer (often 4–6 mm. long with up to 4 pairs of flowers), the pedicels 1.5–3 mm. long and apparently fleshy (shrinking in drying), the disk up to 1.5 mm. wide, and the hypanthium distinctly and rather closely puberulent.

State of Mexico: Dist. Temascaltepec: San Lucas, 7 July (fl. & imm. fr.), *Hinton 4294* (K, MICH, US).—Jalisco: Sierra del Halo, 23 June (fl.), *McVaugh 15029* (MICH); 14 Aug. (past fl.), *McVaugh 16187* (MICH).—Nayarit: 9.5 miles west of Tepic, 11 Sep. (past fl.), *McVaugh 18949* (MICH).

### ***Eugenia culminicola* McVaugh, sp. nov.**

Frutex subglaber, ramulis petiolisque breve hispidulis, demum glabris; folia ovato-lanceolata, 2.7–4 cm. longa, 2.3–2.5-plo longiora quam latiora, obtusa vel vix acuminata, nervo medio supra glabro, impresso; laminae nitidae, nervis lateralibus inconspicuis; racemi perbreves, floribus subsessilibus, bracteolis distinctis, hypanthio glabro infundibuliforme; calycis lobi rotundati, majores 0.8 mm. longi, 1.7 mm. lati; discus floris 2.5 mm. latus, fructus 3 mm.; stylus 5–6 mm. longus; ovarium biloculare, ovulis quoque loculo 6–8.

Shrub 1.5 meters high, the branchlets short-hispidulous, the petioles at first sparingly so; leaves ovate-lanceolate, 1–1.8 cm. wide, 2.7–4 cm. long, 2.3–2.5 times as long as wide, blunt or bluntly acuminate at tip, acute at base, the margins more or less cuneately decurrent on the channeled petiole 3–4 mm. long; midvein narrowly impressed above; lateral veins 4–6 on each side, scarcely apparent in dried leaves; blades lustrous and nearly featureless above, probably paler and dull beneath, and there obscurely gland-dotted; inflorescence a much-abbreviated axillary raceme or 2 racemes superposed, the axis up to 2.5 mm. long, bearing up to 6

closely approximate opposite decussate pairs of flowers on pedicels 1 mm. long or less (up to 2.5 mm. long in fruit); bracts indurate-persistent, ovate-deltoid, divaricate, 0.8 mm. long; bracteoles suborbicular-deltoid, ciliate, persistent, distinct, 0.5 mm. long and 0.7 mm. wide; buds 3.5–4 mm. long, turbinate, the glabrous funnellform hypanthium 1.5–2 mm. long; calyx-lobes rounded, unequal, the smaller ones 0.4 mm. long, 1.2 mm. wide, the larger pair 0.8 mm. long and 1.7 mm. wide; disk about 2.5 mm. wide in flower (3 mm. in fruit); style 5–6 mm. long; stamens about 75; ovary bilocular, the ovules 6–8 in a compact group in each locule; fruit purple-black, ellipsoid or obovoid, substipitate, 8–10 mm. in diameter, 10–12 mm. long, crowned by the calyx-lobes up to 1.5 mm. long and 2.5 mm. wide.

State of Mexico: Dist. Temascaltepec, Cumbre-Peña Blanca, *Alnus* woods, 1 Mar. 1936 ["3-1-36"] (bud), *G. B. Hinton 8957 p.p.* (TEX); in fruit, *Hinton 8957* (US, TEX *p.p.*); in flower, with few detached fruits, *Hinton 8957* (GH, type).

The fruiting specimens associated with the budding plants of *Hinton 8957* may conceivably belong to another species and are probably from another plant; the leaves are more veiny and the pedicels are longer (up to 8 mm.).

A common and often very abundant treelike shrub in several localities in high barrancas in Jalisco, in forests of pine or fir or with various deciduous trees, is apparently the same species but is known only in fruit. Fruiting plants are quite glabrous; the dark green and lustrous leaves are up to 9.5 cm. long, on petioles 5–8 mm. long; the fruits are borne in clusters, 1–3 pairs on an axis 2–4 mm. long, the pedicels 1 mm. thick or more, 1–3 mm. long, the fruits themselves subglobose, turning red and then black, 8–15 mm. in diameter; the disk is about 3 mm. wide, the calyx-lobes persistent but inconspicuous on the fruit, broad and low, about 1 mm. long, 2 mm. wide.

Jalisco: Sierra de Cuale, southwest of Talpa de Allende, barrancas in fir zone, 1800–2250 m., 19–21 Nov. 1952, *McVaugh 14301* (MICH); Sierra de Manantlán, 15–20 mi. southeast of Autlán, cloud-forests ca. 2000 m., 6 Nov. 1952, *McVaugh 13944* (MICH); ca. 40 km. west of Ayutla, fir forest, elev. 2100–2200 m., 29 Nov. 1960, *McVaugh 21559* (MICH).

This species apparently has much in common with *E. pueblana* Lundell, which apparently occupies a similar ecological niche in the mountains to the east and northeast of *E. culminicola*. Neither species is adequately understood. The flowers of *E. pueblana* are smaller in several respects than those of *E. culminicola*, and the plants are more generally and persistently puberulent. The mid-vein in *E. culminicola* is somewhat more deeply impressed and is consistently glabrous.

***Eugenia farameoides* A. Rich. Ess. Fl. Cub. 588. 1845.**

This plant seems not to have been reported in the literature except from Cuba, but it is well represented in herbaria by collections from the Yucatan Peninsula, where it has been passing under the name of *Eugenia flavifolia* Standl. Full description and synonymy are given in the *Flora of Guatemala*. The plant is also known from Veracruz and from the lowlands of Oaxaca. Dried specimens are easily recognized because of their yellow-green color suggestive of some species of *Symplocos*.

Veracruz: Between Acayucan and Minatitlán, 22 Sep. 1957 (fl.), *F. Miranda* 8546 (MICH).—Oaxaca: Cerro Campana, 400 m., 12 July 1926 (fl.), *E. Makrinius* 619 (US).

***Eugenia guatemalensis* Donn. Sm. Bot. Gaz. 23: 245. 1897.**

Description and full synonymy are given in the *Flora of Guatemala*. This species is very similar on the one hand to *E. rekoii* of the Pacific slope of Mexico, and on the other to the species with wing-angled fruit and similarly pale rufous-pubescent branchlets and racemes, *E. pleurocarpa* of western Mexico and *E. octopleura* of Central America and the West Indies. Additional material, especially fruiting material that can be matched with flowering specimens of known origin, is much needed to clarify the relationships between these species. A few specimens from Mexico are referred without much doubt to *E. guatemalensis*:

State of Mexico: Dist. Temascaltepec, 11 Nov. 1933 (bud), *Hinton* 3368 (A).—Oaxaca: Mountains, Joyacatlán, ca. 1800 m., 18 June 1894 (fl.), *L. C. Smith* 29 (GH).—Chiapas?: "Chiapas, etc.," Sep. (fr.), *Ghiesbreght* 893 (GH).

***Eugenia hypargyrea* Standl. Contr. U. S. Nat. Herb. 23: 1044. 1924.**

This plant belongs to the complex of species that includes *E. guatemalensis* and *E. rekoii*, but seemingly is distinct by virtue of its very fine silvery rather than reddish indumentum, and by its relatively large obtuse obovate leaves. It is known from but few collections; the type was from Zacuapan, Veracruz, *Purpus* 6171 (US!) and a recent collection is from Chiapas. Description and full synonymy are given in the *Flora of Guatemala*.



Chiapas: Bajada del Puerto de la Sepultura, carretera al N. de Arriaga, 600 m., 23 Aug. 1951 (fl.), *F. Miranda 7262* (MICH).

***Eugenia inconspicua*** Standl. Contr. U. S. Nat. Herb. 23: 1043. 1924.

"Compact upright shrub 8 feet high" [Palmer], the foliage nearly glabrous [from the first?], the branchlets and inflorescence [and the youngest leaves?] densely appressed-pubescent with pale dibrachiate hairs mostly 0.2–0.4 mm. long, the whole plant ultimately glabrate; leaves elliptic to elliptic-obovate, 1–1.8 cm. wide, 3–4.5 cm. long, 2–3 times as long as wide, narrowed about equally to an obtusely pointed or obscurely and bluntly acuminate tip, and to an acute base, the margins acutely or cuneately decurrent on the channeled petiole 1–2 mm. long; midvein concave above at least near base, or shallowly channeled between two obscure parallel ridges; lateral veins 5–6 on each side, ascending, pale and readily visible on both surfaces of dried leaves, scarcely forming a marginal vein but arching over 0.5–1 mm. from the margin in a series of irregular angled arches to join the next succeeding ones; blades darker and very minutely (or obscurely) pale-verruculose above, paler beneath, with scattered small dark resinous glands apparent on both surfaces; inflorescence a much-abbreviated axillary raceme, the axis up to 2 mm. long, bearing 1–2 opposite decussate pairs of flowers on slender pedicels, these in fruit up to 4.5 mm. long, 0.6 mm. thick; bracts ovate, subsistent, 1 mm. long or less; bracteoles oblong, divaricate, distinct, persistent, up to 1.3 mm. long; calyx-lobes broadly rounded, concave, sparingly beset with large resinous convex glands 0.2 mm. in diameter, appressed-pubescent on both surfaces, but persistently and more densely on the inner; larger lobes up to 3 mm. long and wide; disk in fruit 2.5–3 mm. wide; immature fruit obovoid, 6 mm. in diameter, 8 mm. long, topped by the erect concave calyx-lobes.

Sinaloa: Culiacán, *Palmer 1786* in 1891 (US, type!).

Still unknown except in the vicinity of Culiacán, this species is strikingly close to *E. yautepecana*, with which it was compared by Lundell in the protologue of the latter. The above description of *E. inconspicua*, and the one of *E. yautepecana* (q.v., infra), were prepared with awareness of the similarities between the species. It is probable that *yautepecana* and *inconspicua* are no more than subspecifically different, but flowering specimens of the latter, and indeed additional material of both species, are needed to resolve this question.

***Eugenia karwinskyana*** Berg, Linnaea 29: 244. 1858.

Description and full synonymy are given in the *Flora of Guatemala*. For a discussion of the taxonomic position of *E. karwinskyana*, see above under *E. biflora*.

***Eugenia ledophylla*** (Standl.) McVaugh.

See above under *E. biflora*.



***Eugenia liebmannii*** Standl. Contr. U. S. Nat. Herb. 23: 1044. 1924.

A shrub 5 meters high, persistently but minutely hispidulous-puberulent, the branchlets, petioles and inflorescence thickly beset with sharp erect hairs 0.1–0.2 mm. long; leaves soon glabrate, at first sparingly strigose like the very youngest branchlets with coarse coppery hairs; leaves elliptic to obovate or ovate, 3–10 mm. wide, 10–25 mm. long, 1.6–3 (–4) times as long as wide, rounded or obtusely pointed at apex, gradually rounded to a narrow base, the pale thick revolute margins rather abruptly decurrent on the channeled petiole 1–1.5 mm. long, 0.5 mm. thick; blades sometimes apparently acute at base because of the inrolled margins; midvein slightly concave above at least near base; lateral veins inconspicuous, sometimes scarcely apparent above, 3–4 pairs, the lowest 1 (or 2) strongly ascending, nearly parallel to the margin and 1–1.5 mm. within it, the distal veins diverging at a wide angle from the midvein and joining the basal (marginal) one at or above the middle of the blade; blades smooth above or with a few convex glands, dull and paler beneath and there rather abundantly dark-dotted; inflorescence an abbreviated axillary raceme, or 2 racemes superposed, the axis 2 mm. long or less, bearing 1–4 opposite and decussate pairs of flowers on pedicels 1.5–3 mm. long; flowers sometimes solitary and opposite at the lowermost (bracteate) nodes of new branchlets; bracts dark, scarious, 0.5 mm. long; bracteoles ovate, obtuse, distinct but persistent, 0.5–0.6 mm. long; buds 2–2.5 mm. long, the short-campanulate hispidulous hypanthium 0.5–0.8 mm. long, abruptly expanded into the globe of the petals; calyx-lobes broadly rounded, nearly flat, fimbriate-ciliate but otherwise nearly glabrous, about 1 mm. long and wide; disk 1–1.5 mm. wide; style 4–4.5 mm. long; stamens about 40, up to 4 mm. long, the anthers 0.5 mm. long and about as wide; petals white, prominently gland-dotted, orbicular-obovate, 3 mm. long; ovary bilocular, the ovules 10–11 in a compact group near the center of the dissepiment in each locule; fruit glandular-verrucose, globose or transversely oval, 4–5 mm. in diameter or up to 6 mm. wide, 4 mm. broad and high.—U. of Mich. Neg. 1415.

Tamaulipas: 9 mi. south of C. Mante, 31 Aug. 1948 (fr.), *Kenoyer & Crum 3678* (MICH); area of Sierra de Tamaulipas, between “La Chona” and Río Sta. Olaya, elev. 50 m., 26 Sep. 1956 (fr.), *F. Martínez M. & G. Borja L. F-2150* (TEX).—Veracruz: Near Ebano along Río Pánuco, *H. LeSueur 554* (TEX).—San Luis Potosí: Villa Juárez, lowland thickets, July 1937 (fl.), *Lundell & Lundell 7270* (MICH).—Oaxaca: Villa Alta, Aug. 1842 (fr.), *Liebmann 3969* (US, type).

Plants of this species are superficially similar to very small-leaved examples of *E. buxifolia*; the two species may indeed be closely related. Their geographical ranges, however, are quite distinct. Morphologically the two may be distinguished by the differences in leaf-size, by the considerably more veiny leaves of *E. buxifolia* and the more abundant and larger hairs; and by the flowers, which are consistently smaller in *E. buxifolia*.

Sterile specimens of *Eugenia liebmannii* may be distinguished from those of *Myrtus ehrenbergii* Berg, a similarly small-leaved plant of eastern Mexico, by the petioles (glabrous in *M. ehrenbergii* even on the young antrorsely hispidulous branchlets), by the midvein (distinctly convex on the upper surface in *M. ehrenbergii*) and by the yellowish resinous convex glands on both leaf-surfaces in *M. ehrenbergii*. The latter is a plant of desert mountains in San Luis Potosí, at least as indicated by modern specimens:

San Luis Potosí: San Luis Potosí to Tampico, *Palmer 1124* in 1878-79 (NY); Cerro de las Minas, Guadalcázar, 25 Oct. 1891 (fl.), *P. Maury 7557* (MEXU); San José Pass, 10 Oct. (fr.), *Pringle 3524* (A, GH); Minas de San Rafael, May 1911, *Purpus 5211* (GH, MO, UC), *Purpus 8588* in 1910 (UC).

***Eugenia lindeniana* Berg, Linnaea 29: 240. 1858.**

See above under *Eugenia capuli*.

***Eugenia mexicana* Steud. Nom. Bot. ed. 2. 1: 603. 1840.**  
*E. macrocarpa* Schlecht. Linnaea 5: 560. 1830; op. cit. 13: 417. 1839, not *E. macrocarpa* Roxb., 1814.

Probably a tree, 5-6 meters high, glabrous except for reddish hairs on the vegetative buds; leaves elliptic-ovate, 2.5-4 (-5.5) cm. wide, 6-7.5 (-9) cm. long, 1.7-2.2 times as long as wide, the blades about equally rounded to a blunt decurved-deltoid-acuminate tip and a broadly angular or rounded base, the margins at the very base cuneate-decurrent on a channeled petiole 5-10 mm. long, 1-1.3 mm. thick; midvein impressed above as a V-shaped channel; lateral veins 8-12 on each side including some intermediate ones, inconspicuous, straight and divaricate, mostly passing directly into a weak marginal vein 1-2 (-4) mm. from the margin; blades dark green and lustrous above, paler and perhaps glaucous beneath and there finely dark-dotted; inflorescence a stout axillary raceme, the axis 3-6 mm. long (in *Pringle 8192* up to 10-16 mm. long), 1-1.7 mm. thick, straw-color in drying, the internodes strongly compressed and angled; flowers in 1-5 opposite and decussate pairs in the racemes, or opposite at the lowermost (bracteate) nodes of new leafy branchlets; pedicels almost none, or stout, glandular-verrucose, up to 1.5 mm. long, 0.5 mm. thick; bracts broad and scarious, membranous, (or their bases indurate-persistent), sparingly ciliate, glandular-verrucose, loosely enfolding the base of the pedicel, about 1.5 mm. long, 1.5-3 mm. wide; bracteoles glandular-verrucose, short-ciliate, broadly rounded and connate, forming a deep involucre 3 mm. long and 2 mm. wide that envelops the base of the hypanthium; buds 5-6 mm. long, obovoid, the broadly campanulate hypanthium more or less hidden by the bracteoles; calyx-lobes broadly rounded, membranous, unequal, the outer pair 1.5 mm. long and 3 mm. wide, the inner 2-2.5 mm. long and 3.5-4 mm. wide; disk 3-4 mm. wide; style 7-9 mm. long; stamens about 150, up to 6-8 mm. long, the anthers 0.5-0.7 mm. long; petals obovate or ovate, 5-6 mm. long, up to 5 mm. wide at base; ovary bilocular, the ovules about 6-10 in a compact group in each locule; fruit unknown.

Veracruz: Jalapa, woods, 4000 ft., 19 May 1899 (fl.), *Pringle 8192* (MEXU, MICH, UC); in sylvis jalapensibus, "*Schiede & Deppe*" (G); Jalapa, *Schiede 544* (NY, ex herb. Meisner., "comm. cl. Schlechtendal 1840").

As indicated in the description above, the specimens collected by Pringle are somewhat more luxuriant, with larger leaves, longer racemes and pedicels, and slightly larger flowers than the plants collected by Schiede. All the specimens are otherwise very similar and certainly belong to the same species.

Schlechtendal in 1839 reported the number of ovules as 3-5 in each locule of the ovary; this was based on the flowering specimens collected by Schiede and distributed to several herbaria including those cited above. My own examination of these same specimens indicates that the number of ovules varies from 6 to 8; in Pringle's specimens the number is about 10. The type of *Eugenia macrocarpa* Schlecht. was a fruiting specimen also collected near Jalapa but some years earlier; its identity is unknown, but there is no reason to suppose it was a different species.

### ***Eugenia michoacanensis* Lundell, Wrightia 3: 16. 1961.**

Shrub or small tree up to 10-12 meters high, 12-15 cm. in diameter, the branchlets very minutely puberulent with erect sharp hairs; ventral surface of petiole, and of the midvein near base, pubescent; axis of the raceme, and the bracts and bracteoles, sometimes strigose with lustrous reddish hairs 0.2-0.4 mm. long; leaves thin, elliptic-lanceolate, lanceolate or ovate, 1-3 cm. wide, 3-7.5 cm. long, 2.3-3 times as long as wide, usually prolonged distally to a blunt, gradually acuminate tip, the acumen broad and short or narrowly triangular and up to more than 1 cm. long; base acute (the margins often about at right angles) or somewhat rounded, the margins at the very base cuneately decurrent on the channeled petiole 3-6 mm. long; midvein when dry flat or broadly convex on the plane surface of the blade, pubescent at least near base; lateral veins 6-8 on each side, inconspicuous, more apparent beneath, ascending and nearly straight; marginal vein about as strong as the laterals and but slightly arched between them, 1-1.5 (-3) mm. from the margin; blades dull green and darker above, paler beneath; glands often visible as small convexities above, as dark dots beneath; inflorescence an abbreviated axillary raceme or 2-3 racemes superposed, the axis 3-6 (-10) mm. long, bearing 5-7 opposite and decussate pairs of flowers on slender, minutely puberulent pedicels 1-2.5 (-4) mm. long; bracts persistent, broad, scarious or indurate, 0.5-0.8 mm. long; bracteoles ovate or broader, persistent, contiguous or nearly so but scarcely connate, 0.5 mm. long; buds 2-2.5 mm. long, short-pyriform; hypanthium short-campanulate, glabrous, 0.7 mm. long; calyx-lobes broad and low or obtusely triangular, membranous, glabrous, up to about 0.7 mm. long, 1-1.3 mm. wide; disk 1-1.2 mm. wide in flower, sparingly hairy about the base

of the style; style 4–4.5 mm. long, hairy below the middle; stamens about 50, up to 4.5 mm. long, the anthers 0.5 mm. long; petals white, obovate, 2.5–3 mm. long; ovary bilocular, the ovules 5 in a compact group in each locule; fruit depressed-globose, ripening red, probably finally black, 6–8 mm. in diameter, the calyx-lobes appressed together over the disk and outlining a circular figure 1.5–1.7 mm. wide.

Michoacán: Dist. Coalcomán; San Pedro, 600 m., 19 June (fl.), *Hinton 13812* (US, isotype); Huizontla, 12 Dec. (imm. fr.), *Hinton 16212* (MICH, US); Aquila, *Hinton 16244* (MICH).—Colima: Foot-hills of the Nevado de Colima south of Hda. San Antonio, 11 Aug. (fl.), *McVaugh 16101* (MICH); Río Cihuatlán 13 mi. north of Santiago, 27 July (fl.), *McVaugh 15797* (MICH).—Jalisco: Puente San Pedro 5 mi. southwest of Tecalitlán, 2 Dec. (imm. fr.), *McVaugh & Koelz 1307, 1308* (MICH); 9 mi. north of west end of Bahía Navidad, 12–13 Dec. (imm. fr.), *McVaugh & Koelz 1725* (MICH); same tree, 1 Oct. (fl.), *McVaugh 19717* (MICH); Santiago–Durazno road, 11 mi. north of Río Cihuatlán, 1 Aug. 1957, *McVaugh 15973* (MICH).—Guerrero: Nanorida(?), 1500 m., 16 June 1899 (fl.), *Langlassé 1062* (US); Dist. Adama, Achotla, 570 m., 25 Nov. 1937 (fr.), *Y. Mexia 8898* (US); Acahuizotla, 10 May 1903 (fr.), *E. W. Nelson 7041* (US).

This species is very close to and perhaps not distinct from *E. capuli*, which differs in its smaller fruit, longer pedicels, and usually puberulent hypanthium, but glabrous style-base; see discussion above under *E. capuli*.

***Eugenia mirandae*** D. Ramírez Cantú, An. Inst. Biol. Mex. 14: 487. 1944.

Tree probably 5–10 meters high, viscid and viscid-pubescent, the branchlets, petioles and inflorescence densely short-hispidulous with viscid hairs 0.1–0.2 mm. long, the surfaces between the hairs apparently also viscid; leaf-margins undulate-crenate, somewhat revolute, slightly viscid-pubescent; leaves thin, elliptic or lanceolate, 1.5–2.5 cm. wide, (4–) 5–7 cm. long, 2.5–3.5 times as long as wide, usually narrowed about equally to the gradually and bluntly acuminate tip and to the acute base, the tip sometimes more prolonged and the base then somewhat rounded; margins at base cuneately decurrent on the channeled but nearly terete petiole 5–7 mm. long, 0.7–0.9 mm. thick; midvein impressed above in a concave channel in the otherwise plane leaf, the channel hairy; lateral veins 6–8 on each side, inconspicuous but in dried leaves convex on both surfaces, in a reticulum including the smaller veinlets; marginal vein not well defined, about as strong as the lateral ones and formed by the strongly arched and asymmetrical continuations of these, 1.5–3 mm. from the margin; blades more or less concolorous, more lustrous above, at flowering time with numerous convex glands on both surfaces; inflorescence an abbreviated axillary raceme (or 2 racemes superposed), the axis up to 5 mm. long, bearing 1–3 opposite and decussate pairs of flowers on pedicels 1.5–3 mm. long, the terminal flower sometimes present between bracts simulating bracteoles; bracts



broad and short, hairy near the tips, 0.5 mm. long; bracteoles scarious, persistent, distinct, broadly ovate-deltoid, 0.5–0.7 mm. long and about as wide; buds 3–4 mm. long, pyriform, the hypanthium minutely puberulent, viscid, campanulate, somewhat attenuate at base; calyx-lobes broadly rounded, glabrous, up to 1.8–2 mm. wide, 0.8–1.3 mm. long; disk 1.7–2 mm. wide, hairy around the base of the style; style 5–6.5 mm. long, hairy in the proximal two-thirds; stamens about 75, about as long as the style, the anthers 0.5 mm. long; petals white, ovate, 3.5 mm. long; ovary bilocular, the ovules about 10 in a compact group in each locule; fruit probably black, oblong-obovoid, 8 mm. in diameter, 12 mm. long.

Morelos: Sierra de Tepoxtlán, 7500 feet, May 1900 (fl.), C. G. Pringle 8333 (MEXU, MICH, UC).

The above description is based entirely on *Pringle 8333*. Dr. Faustino Miranda informs me that these specimens are essentially topotypes of *E. mirandae*. I find no very convincing differences between *Pringle 8333* and specimens of *Eugenia pueblana* Lundell, except that the Pringle specimens are somewhat viscid almost throughout. As this is a most unusual condition in this group of Myrtaceae, it is possible that these plants are abnormally coated with insect exudations or other substance.

Very recently, through the kindness of Srta. Débora Ramírez Cantú, I have studied type-material of *Eugenia mirandae*. The type [Morelos, "bajando del Parque a Texpoxtlán," 4 May 1943 (fl.), D. Ramírez C. s.n. (MEXU)] is a nearly glabrous flowering specimen. I cannot distinguish it from *Pringle 8333* except that it completely lacks the viscid covering described above, and the mid-veins are glabrous rather than pubescent. In this latter feature it differs from *E. pueblana* and resembles the newly described *E. culminicola*. From *E. culminicola* it differs in having smaller flowers (disk 1.5–2 mm. wide) and in the slightly longer pedicels. In the one (terminal) flower dissected the type of *mirandae* has about 10 ovules in each locule as in *Pringle 8333*, whereas in *pueblana* the number of ovules is usually 4–5, and in *culminicola* 6–8. None of the three species is well known, and it is possible that these several populations in the highlands of Morelos, Puebla, Hidalgo and Mexico may ultimately prove to be conspecific.

### ***Eugenia oaxacana* Berg, Linnaea 30: 683. 1861.**

Shrub or tree, the branchlets, petioles and inflorescence, and probably the young foliage, closely (antrorsely) appressed-pubescent with pale sordid hairs about 0.3 mm. long, the leaves soon glabrate, a few hairs persistent on the lower surface; leaves thin, coriaceous, elliptic-oblong, 3.5–6.5 cm. wide, 8.5–15 cm. long, about twice as long as wide, about equally rounded to the abruptly acuminate tip



and to the acute or cuneate base, the acumen obtuse, about 1 cm. long, the margins long-decurrent on the petioles 8–12 mm. long, 1.3–1.5 mm. thick; midvein deeply impressed above, elevated nearly its whole diameter beneath; lateral veins rather close and parallel, 10–12 on each side in addition to some intermediate ones, rather inconspicuous but in dried leaves convex on both surfaces, rather more prominent beneath; marginal vein about as strong as the lateral ones and forming a series of angled arches between them, 2–3 mm. from the margin; blades lustrous and yellowish green above, paler and dull and drying brown beneath, minutely dark-dotted beneath; flowers in axillary glomerules, the inflorescence a much-congested axillary raceme (or 2 racemes superposed), the axis 5 mm. long or less, up to 1.5 mm. thick, bearing 1–4 pairs of sessile flowers; bracts ovate, indurate, 1 mm. long; bracteoles persistent, very broadly rounded, glabrous within, about 2 mm. wide and 1.5 mm. long, slightly connate, forming a laterally notched involucre closely investing the hypanthium; buds and open flowers not seen; hypanthium in post-anthesis densely pale-sericeous, subglobose, 1.5–2 mm. long and high, about as long as the prominent erect concave calyxlobes, which are broadly rounded, strongly imbricated, pubescent both sides, the inner ones longer, the outer pair 1.5 mm. long, 2–2.5 mm. wide; disk 2.5 mm. wide; style about 5 mm. long; ovary bilocular, the ovules 7–8 in a compact group in each locule.

Oaxaca: Chinantla, Nov. 1842, *Liebmann 3963* (C); "Dep. Oajaca," sin. dat., *Liebmann 3962* (C); Tepinapa, *B. P. Reko 4198* in 1920 (US).

I have not located the type of this species. Berg gave the type locality merely as "in Mexico ad Oaxacam," and of the type he said merely "v. specimen unicum valde mancum in herb. Buchinger." From his detailed description I presume the above specimens belong to the same species.

**Eugenia oerstedeana** Berg, *Linnaea* 27: 285. 1856. *E. vincentina* Krug & Urb. ex Urb. Bot. Jahrb. 19: 621. 1895. *E. konzattii* Standl. Contr. U. S. Nat. Herb. 23: 1041. 1924. *E. cocquericotensis* Lundell, Bull. Torrey Club 64: 554. 1937. *E. petenensis* Lundell, Bull. Torrey Club 69: 397. 1942.

This Central American species seems to be a close relative of *Eugenia florida* DC., a widespread species of the lowlands of northern South America. The two are virtually indistinguishable except that in *E. florida* the inflorescence is usually a raceme bearing 4–5 (or up to 10) pairs of flowers on pedicels 3–4 (or occasionally to 7) mm. long. The terminal flowers usually abort. Occasional specimens have some or most of the flowers solitary in the axils of small bracts at the lowermost nodes of leafy branchlets. In *E. oerstedeana* the racemes are developed in relatively few plants (fewer than half the specimens examined); terminal flowers are often present; solitary

bracteate flowers are usually present, either in addition to the flowers in racemes, or to the exclusion of these; the pedicels are 6–10 (or up to 25) mm. long.

Typical *florida* apparently has not been reported from Panama, but the following specimen is to be referred there:

Chiriquí: Progreso, *Cooper & Slater 158* (F).

The Central American and Mexican populations I interpret as a single series that has been derived from *E. florida* or something very like it, by the gradual restriction of the flowers to the lower axils of leafy branches, the reduction in frequency of non-leafy racemes and an increase in the frequency with which a terminal flower develops, the elongation of the pedicels and perhaps also a reduction in the number of ovules (in *E. florida* the usual number seems to vary from 4 to 7; in *E. oerstediana* the number may be 4–6, but is often only 2 or 3). A further specialization seems to have occurred in the somewhat localized Mexican population that was described as *E. conzattii*; here solitary flowers and short racemes may be found on the same plant with 3-flowered “dichasia.” I interpret the dichasium as a development from a solitary terminal flower, lateral pedicels having arisen from the axils of the floral bracteoles. The distinctive appearance of this 3-flowered inflorescence which Standley called “cymose” led him to associate this species with *Eugenia* [*Myrcianthes*] *fragrans*, to which it has little relationship. The following specimens from eastern Mexico show this tendency to the production of “dichasia”:

Oaxaca: *Galeotti 2882, 2887; Mell 602; Conzatti et al. 3113* (type of *E. conzattii*) (all US).—San Luis Potosí: *Palmer 148* in 1904 (US); *R. M. King 4405* (TEX).

The type of *E. oerstediana* Berg, which I have seen through the courtesy of the authorities at Copenhagen, is an over-mature flowering specimen; the leaves have the typical venation of the *florida-oerstediana* complex, and also bear on the lower surface near the base the minute sessile reddish flat dibrachiate hairs that mark these otherwise nearly glabrous species. A few of the flowers are axillary, but most of them are in racemes 1–2 cm. long, bearing 4 or 5 pairs of flowers on filiform pedicels 7–9 mm. long; the flowering disk is 1.5–1.7 mm. wide, and the ovules are 3–4 in each locule of the ovary.

The type of *E. petenensis* Lundell (*Lundell 3746*, MICH) is a flowering specimen bearing relatively few flowers and most of these solitary in the axils of bracts or ordinary leaves; the ovules appear to be 2 in each locule.

A large series of specimens is available for study, exhibiting many conditions intermediate between those in which the inflorescences are all racemose and those in which the flowers are all solitary. I cannot believe that more than one species is involved. I should rather question the propriety of recognizing *E. oerstedeana* as a species distinct from *E. florida*. Some Central American specimens are scarcely distinguishable from *E. florida*, e.g. the following, in which the flowers are almost all in racemes, the pedicels are 3–5 mm. long or less, and the ovules 4–6:

BRITISH HONDURAS: El Cayo District, Vaca, *P. H. Gentle* 2533 (MICH); Little Cocquericot, Belize River, *C. L. Lundell* 4090 (MICH, type of *E. cocquericotensis*).

HONDURAS: Comayagua: Malcotal, Minas de Oro, *J. B. Edwards* P-195 (F).

The type of *E. vincentina* [St. Vincent, "in sylvis ad leeward side rara 200–500 m. alt., m. April. flor.," *H. H. Smith & G. W. Smith* 1521 (NY!)] is a flowering specimen with new thin leaves on young shoots, racemes 3–4 cm. long, filiform pedicels 8–15 mm. long, terminal flowers often present. The leaves have the special features of the *oerstedeana*-complex, namely the sunken midvein which is hispidulous above in the furrow; small sessile dibrachiate hairs on the lower leaf-surface near the base of the petiole; and the slightly "engraved" arching veins on the upper leaf-surface. According to Krug and Urban the ovules are 3 in each locule. The plant is indistinguishable from many Central American specimens of *E. oerstedeana*.

***Eugenia organoides* Berg, Linnaea 29: 229. 1858.**

Here has been treated a variety of plants, all with short-velutinous foliage and branchlets, short petioles, and very small flowers in sessile glomerules. Such plants, varying in leaf-size and shape, in compactness of the inflorescence, and in density of pubescence, range from northern Veracruz to Colombia. The type, *Karwinsky* 238, from Papantla, Veracruz, which I have seen through the courtesy of the authorities at Leningrad, is a strongly hirsute specimen with rather broadly ovate leaves 3.5–6 cm. wide, 6.5–11 cm. long, rounded or even subcordate at the base; most other specimens as far as I know have the leaves averaging 2–3 cm. wide, and acute or merely rounded at base. The flowers in the type are not unusual except that the hypanthium is more than ordinarily hirsute. In the type the ovules are 5–6 in each locule of the ovary; in other specimens the number may be as small as 4, or as many as 9–10.

Perhaps more than one species is included under what is now called *E. organoides*. Variation seems to be considerable. Few specimens in the fruiting condition are available. Dr. C. L. Lundell has recently described, in the course of his intensive studies on the flora of the Maya area, a species that should be compared with *E. organoides* when a thorough revision of that species is undertaken. The type of this new species, *E. rubella* Lundell (Wrightia 3: 18. Dec. 1961) was originally thought by Dr. Lundell to represent *E. organoides*, but to be atypical in having pedicellate flowers. The specimen certainly resembles other plants of *E. organoides* except that the buds are borne on pedicels up to 4 mm. long. Two additional collections from the same locality in Oaxaca [District of Tuxtepec, Chiltepec, in llanos, *G. Martínez Calderón 157* (MEXU, UC, US), 218 (UC, US)] are to be referred to *Eugenia rubella* if that species be a valid one, but some features of these specimens cast doubt upon that validity. The racemes in the Oaxaca specimens are at first crowded, but in most instances become 8–14 mm. long, 2–3 superposed in an axil, closely simulating the racemes of *Eugenia acapulcensis*. The pedicels are not 4 mm. long as in the type of *E. rubella*, but 1–2 (–2.5) mm. long. The pubescence of the branchlets and the racemes (in the type of *rubella* and also in the Oaxaca plants) seems exactly that of *E. organoides*, as does the impressed midvein of the leaves. It is possible that *E. rubella* is a valid species, but it may be of hybrid origin or merely the result of some abnormality (e.g., the developing ovaries in *Martínez 218* are partially transformed into galls).

Full description and synonymy of *E. organoides* are given in the *Flora of Guatemala*. Not to be confused with *E. organoides* is the Guatemalan *E. chinajensis* Standl. & Steyerf., a very distinctive species marked by its coarsely setose foliage, branchlets and inflorescence, and by the broad-based subcordate and subsessile leaves. The flowers are unknown, but are probably larger than those of *E. organoides*.

### ***Eugenia pleurocarpa* Standl. Field Mus. Bot. 4: 243. 1929.**

Still unknown except from western Jalisco and southern Nayarit, this species is apparently related to *Eugenia octopleura* Krug & Urban, which I take to be the same as *E. doubledayi* Standl. and *E. koepperi* Standl.; this is discussed more fully elsewhere in this paper. A full description of *E. octopleura* may be found in the *Flora of Guatemala*. The prominently wing-angled fruits seem to be found



in these two species alone among the North American ones; in the absence of fruit, sterile specimens of either species may be confused with *E. guatemalensis* or *E. rekoii*. The following material of *E. pleurocarpa* has been seen:

Nayarit: Hills 6–7 miles south of Compostela, 900–1000 m., 11–12 July 1957 (fl.), *McVaugh 15322* (MICH), 5 Sep. 1960 (imm. fr.), *McVaugh 18743* (MICH); mountains above La Cucaracha, seaward slopes 12–13 miles south of Las Varas, 300–400 m., 20 Sep. 1960 (imm. fr.), *McVaugh 19194* (MICH).—Jalisco: Quimixto, 14 km. southwest of Puerto Vallarta, 28 Mar. 1959 (fr.), *A. Carter & F. Chisaki 1238* (MICH); Quimixto, 70 m., 29 Nov. 1926 (fr.), *Y. Mexia 1176* (F, type; MICH); vicinity of San Sebastián, 1500 m., *Mexia 1446* (US), *1843a* (US).

***Eugenia praeterita* McVaugh, sp. nov.**

Frutex vel arbor tomentuloso-hirsuta, pilis erectis crebris atrorufis ca. 0.5 mm. longis; folia coriacea, supra glabrescentia nitidaque, subtus tomentulosa, elliptica, apice acuminata, basi cuneata, 10–14 cm. longa, ca. 2.2–2.5-plo longiora quam latiora, marginibus revolutis, petiolis 10–15 mm. longis, nervo medio impresso; racemus 1–1.5 cm. longus, florum 2–5 pares gerens; pedicelli crassi recti 2–3.5 mm. longi; bracteolae divaricatae, distinctae, late ovatae, usque ad 1 mm. longae; alabastra 3 mm. longa; hypanthium campanulatum vel urceolatum, post anthesin 3 mm. longum; calycis lobi late ovato-deltoidi, obtusi, intus glabri vel subglabri, usque ad 2 mm. longi latique; discus 2.5 mm. latus; stylus 5 mm. longus; ovarium biloculare, ovulis quoque loculo 8–10.

A shrub or tree, the branchlets, petioles, lower leaf-surfaces and inflorescence densely short-hirsute-tomentulose with dark reddish-brown erect hairs about 0.5 mm. long; leaves coriaceous, soon glabrous and lustrous above, somewhat persistently tomentulose beneath, elliptic, about equally narrowed to the acuminate tip and the acute or cuneate base, 4–6 cm. wide, 10–14 cm. long, about 2.2–2.5 times as long as wide, the revolute margins strongly decurrent on the broadly channeled rugulose petiole 10–15 mm. long, 1.5–2 mm. thick; midvein sharply impressed above; lateral veins 8–10 on each side, evident above, more conspicuous beneath, stronger than the intermediate ones if any; marginal vein about equaling the lateral ones and arched between them, 1.5–2.5 mm. from the margin; blades probably darker green above, paler and minutely dark-dotted beneath; inflorescence a stout raceme (or 2 racemes superposed), the axis 1–1.5 cm. long, somewhat angular, 1–1.5 mm. thick, bearing 2–5 opposite and decussate pairs of flowers on stout straight pedicels 2–3.5 mm. long, about 1 mm. thick including the hairs; bracts suborbicular, indurated but subdeciduous, 1 mm. long; bracteoles divaricate, distinct, broadly ovate, apparently indurated and somewhat persistent, 1 mm. long or less; buds about 3 mm. long, ellipsoid, the calyx somewhat closed over the petals until anthesis; hypanthium just after anthesis 3 mm. long, campanulate or urceolate; calyx-lobes broadly ovate-deltoid, blunt, incurved, glabrous or nearly so within, the larger ones 2 mm. long and wide; disk 2.5 mm. wide; style about 5 mm. long; petals 3–4 mm. long, hairy without; ovary bilocular, the ovules 8–10 in a compact group in each locule.



Veracruz?: Amatlán, July 1842, *Liebmann s.n.* (C), *Liebmann 3959* (C, type; US).

Extraordinarily different from any other species of Mexico or Central America by virtue of the dense covering of dark reddish-brown tomentum.

### ***Eugenia principium* McVaugh, sp. nov.**

Frutex vel arbor parva, ramulis petiolisque setoso-hispidis, bracteis bracteolisque ciliatis, racemis sparse hispidis; folia ovata vel elliptico-ovata, 2.2–4.5 cm. longa, (1.7–) 2–2.4-plo longiora quam latiora, apice obtusa vel obtuse acuminata, basi rotundata, petiolis 2 mm. longis, marginibus incrassatis, nervo medio impresso, basin versus hirsutulo; racemus 2–4 mm. longus, florum 2–4 pares gerens, pedicellis (1–) 2.5–7 mm. longis; bracteolae in sicco atrofuscae, persistentes, non connatae; alabastra 4–4.5 mm. longa; hypanthium campanulatum vel urceolatum, post anthesin globosum vel obovoideum, supra ovarium constrictum; calycis lobi erecti, rosei, inaequales, plani, vix imbricati, majores basi 1.2–1.7 mm. lati, 1.5–2.3 mm. longi; discus in hypanthio prolongato vix conspicuus; stylus 5 mm. longus vel longior; ovarium biloculare, ovulis quoque loculo 4–9; fructus ignotus.

A shrub or small tree up to 3–10 meters high, the branchlets and petioles setose-hispid with pale sharp erect lustrous hairs 0.3–0.5 mm. long; bracts and bracteoles coarsely ciliate; raceme-axis and pedicels sparingly beset with hairs like those of the branchlets; leaves coriaceous, ovate or elliptic-ovate, 1–2.5 cm. wide, 2.2–4.5 cm. long, (1.7–) 2–2.4 times as long as wide, narrowed from the middle or below to a blunt or bluntly acuminate tip, rounded at base, the margins passing abruptly onto the thick inner angles of the broadly channeled petiole 2 mm. long; margins coarsely ciliate, scarcely revolute but cartilaginous-thickened, the nearly terete vein-like thickening 0.2 mm. in diameter, evident from beneath; midvein somewhat impressed above, hirsutulous toward the base; lateral veins 5–7 on each side, inconspicuous, hardly apparent in mature leaves; marginal vein about equaling the lateral ones, 1–1.5 mm. from the margin; leaves smooth and opaque above, pale and almost glaucous beneath; the glands obscure on both surfaces; inflorescence a stout much abbreviated raceme (usually without an additional raceme superposed), the axis up to 2–4 mm. long, bearing 2–4 approximate, opposite and decussate pairs of flowers on pedicels (1–) 2.5–7 mm. long; bracts drying chestnut color, indurate-persistent, convex on the backs, ovate-deltoid to oblong, 1–1.5 mm. long; bracteoles drying chestnut, persistent but distinct, broadly ovate-deltoid, divaricate and flat in age, 1 mm. long or a little more; buds about 4–4.5 mm. long, the globe of the petals abruptly expanded above the short glabrous hypanthium 0.5–1 mm. high; hypanthium campanulate or urceolate, sometimes attenuate to the base, in post-anthesis becoming globose or obovoid and surmounted by a prominent narrow neck 0.5 mm. high and 1 mm. in diameter below the prominent erect “rose-pink” calyx-lobes; lobes in unequal pairs, deltoid-ovate or elliptic and rounded, flat, scarcely imbricate even in the bud, the larger ones 1.2–1.7 mm. wide at base, 1.5–2.3 mm. long, the smaller pair deltoid, 1–1.2 mm. long and wide; disk 1.7–2 mm. wide, poorly developed or at least not evident in the prolonged neck of the hypanthium, slightly hairy about the base of the style; style 5 mm. long or more; stamens about 50, about as long as the style, the anthers 0.5–0.6 mm.

long; petals white, elliptic-ovate, ciliate, 4–5 mm. long; ovary bilocular, the ovules 4–6 in a compact group in each locule (in the type), or 7–9 in each locule (in the Panama specimens); fruit not seen.

MEXICO: Colima: Palm [*Orbignya*] forest near Playa de Santiago, in dense shade, sandy soil near sea level, 21 July 1957 (past fl.), *McVaugh 15581* (MICH, type).

PANAMA: C.Z.: West of Limon Bay, Gatun Locks and Gatun Lake, thin soil over limestone, 2 Apr. 1956 (fl.), *I. M. Johnston 1773* (MICH).—Darien: Forests around Pinogana, 16–21 Apr. 1914 (fl.), *H. Pittier 6532* (US).

It seems strange that this species has never before been recognized, as it has a combination of unusual morphological features in the hypanthium and calyx-lobes, and it seems to be of wide geographical range. Except for the difference in ovule-number, which may represent an individual peculiarity, the Panama specimens are very like the type. The specific epithet refers to the great palms—since unfortunately destroyed by the hurricane of 1959—among which the type was collected.

### ***Eugenia pueblana* Lundell, *Wrightia* 2: 167. 1961.**

A tree or large shrub 2–6 meters high, up to 10–12 cm. in diameter, the branchlets when young more or less antrorsely puberulent with short reddish hairs, the petioles and midveins of the leaves puberulent with short coarse hairs, the inflorescence often nearly glabrous; leaves lance-ovate or elliptic, 1–2.5 cm. wide, 2.5–5.5 cm. long, 2–3 times as long as wide, gradually acuminate (the slender tip blunt), acute to rounded at base, the margins cuneately decurrent on the slightly splayed summit of the nearly terete but shallowly channeled petiole 3–6 mm. long; midvein concave above, appearing flat because of the persistent stiff hairs; lateral veins about 4–6 on each side, inconspicuous, more evident beneath; marginal vein ill-defined, 1–2 mm. from the margin; blades probably darker above, drying brownish and dull beneath, finely verruculose above, scarcely glandular beneath; inflorescence a much-abbreviated axillary raceme (sometimes at leafless nodes on old wood), the axis almost none, the flowers in 1–2 (–4) approximate pairs, on pedicels 0.5–1.3 mm. long, 0.4 mm. thick; bracts minute, hairy; bracteoles persistent, minute, deltoid-orbicular, ciliate, 0.3 mm. long; buds 3.5 mm. long, pyriform, the globe of the petals 2.5 mm. in diameter, much surpassing the short-stipitate minutely puberulent hypanthium 1–1.5 mm. long; calyx-lobes rounded, the larger ones 0.5–0.7 mm. long, 1.5 mm. wide; disk 1.5 mm. wide (2.5 mm. wide in fruit); style 5 (–6?) mm. long; stamens about 50, about as long as the style, the anthers 0.5 mm. long; petals suborbicular, 3 mm. long; ovary bilocular, the ovules 4–5 in a compact group in each locule; fruit globose, red, probably at length black, 1.3–1.6 cm. in diameter, the low calyx-lobes usually persistent.

MEXICO: Puebla: Wet mixed forest west of Huauchinango, 1 Nov. 1943 (fr.), *C. L. Lundell 12618* (isotype, MICH).—Hidalgo: Zacualtipán, *M. Martínez*, in June 1940 (GH); forested ravines 6 miles from

Zacualtipán, road to Tlahuelompa, 2000 m., 14 Oct. 1949 (bud), *H. E. Moore 5295* (MICH); Capatla below Alumbres near Zacualtipán, ca. 1800 m., 21 Mar. 1946 (fr.), *A. J. Sharp 46214* (MICH).

The following specimens apparently represent the same species, but the leaves are up to 3.5 cm. wide, 7 cm. long, the axis of the raceme up to 3.5 mm. long, the inflorescence and the hypanthium strongly puberulent:

MEXICO: San Luis Potosí: Tamasopo Canyon, 25 June 1890 (fl.), *Pringle 3534* (A); Las Canoas, 25 June 1890 (fl.), *Pringle 3534* (GH).

The following specimens differ from typical *E. pueblana* in having the hypanthium more strongly puberulent, and the midvein on the upper surface of the leaf glabrous:

MEXICO: State of Mexico: Dist. Temascaltepec, Calera, wet barranca, ca. 770 m., 19 Apr. 1933 (fl.), *Hinton 3797* (K).

As noted above in the discussion of *Eugenia mirandae*, that species is perhaps not distinct from *E. pueblana*.

***Eugenia reko*** Standl. Contr. U. S. Nat. Herb. 23: 1044. 1924.

A relatively well-collected species, ranging from Sinaloa to Oaxaca and occurring also in Guatemala. It seems to be most abundant in tropical deciduous forests, on hills near the Pacific Ocean. The following specimens have been seen:

MEXICO: Sinaloa: Los Caballos, Sierra Tacuichamona, ca. 300 m., 16 Feb. 1940 (fr.), *H. S. Gentry 5643* (MICH); Hda. Caña, San Ignacio, 460 m., *J. G. Ortega 858* (F, US; doubtfully this species).—Jalisco: East of La Manzanilla on Bahía Tenacatita, 150–200 m., 11 Nov. 1960 (fl.), *McVaugh 20966* (MICH).—Colima: Manzanillo, Dec. 1890 (fr.), *E. Palmer 1020* (F, US); west side of Cuyutlán lagoon, 28 Nov. 1925 (fr.), *R. S. Ferris 6107* (F, US).—Guerrero: Acaapulco, Oct. 1894–Mar. 1895 (fr.), *Palmer 357* (F, MICH, US), 21 Aug. 1935 (fl.), *L. H. MacDaniels 144* (F).—Oaxaca: Cafetal Apango (Cerro Huatulco), 400 m., 18 Aug. 1917 (fl.), *B. P. Reko 3356* (US, type); Distr. Tamiltepec, Playa de Minizo, 7 Dec. 1921 (fr.), *Conzatti 4416* (US).

***Eugenia rhombea*** (Berg) Krug & Urb. ex Urb. Bot. Jahrb. 19: 644. 1895. *E. foetida*  $\gamma$  *rhombea* Berg, Linnaea 27: 212. 1856. ?*E. leptopa* Lundell, Bull. Torrey Club 69: 396. 1942.

Berg's *Eugenia foetida*  $\gamma$  *rhombea* was based on two specimens, one from Florida (*Cabanis*) and the other from "St. Domingo"

(Bertero). In the original publication (Linnaea 27: 212. 1856) the name appears to be based directly upon *E. foetida*  $\beta$  *maleolens* (Pers.) DC., and so superfluous when published, but this is evidently the result of a typographical error on Berg's part; on the preceding page (p. 211) Berg had published his var.  $\beta$  *maleolens*, again based directly upon *E. maleolens* Pers. and with a reference to DeCandolle. Presumably Berg meant to indicate (on p. 212) that his *rhombea* had made up a part of the more inclusive *maleolens*, as the latter was understood by DeCandolle.

Apparently *Eugenia leptopa* was a mixture. As pointed out in the protologue, the paratypes differ in some respects from the type, which is a fruiting specimen with narrow leaves and with somewhat immature obovoid fruit, unlike the oblate fruit of *E. rhombea*. Nothing like the type of *E. leptopa* has come to my attention, but I should refer the paratypes to *E. rhombea*.

For description of *E. rhombea* see the *Flora of Guatemala*. This species is little known in Mexico except in the Yucatan Peninsula, but the following specimen has been seen:

Chiapas: Cerros de Don Ventura, northwest of Tuxtla Gutiérrez, 1000 m., 30 Dec. 1948 (fr.), *F. Miranda 5101* (MICH).

The very similar *Eugenia fiscalensis* Donn. Sm. (Bot. Gaz. 54: 235. 1912) is thought to differ from *E. rhombea* in having slightly smaller flowers and leaves, and in having the calyx-lobes and margins of the staminal disk more reflexed in anthesis. Until more material of *E. fiscalensis* can be obtained, its status cannot be determined. The following incomplete specimen seems to represent a species much like *E. fiscalensis*:

Oaxaca: 11 km. northwest of La Ventosa, Trans-Isthmian highway, 50 m., 14 July 1958 (past fl.), *R. M. King 538* (MICH).

As suggested by their association in the key above, *E. rhombea* and the newly described *E. turneri* have many superficial similarities. The latter is known only from the type, a flowering specimen referable neither to *E. rhombea* nor to *E. fiscalensis*. The leaves in *E. turneri* are gradually rounded to the base, elliptic-lanceolate, 2.3–3 times as long as wide, the marginal vein relatively straight and less than 1 mm. from the margin; the axis of the raceme is usually 2–4 mm. long and, like the young branchlets, appressed-pubescent. In *E. rhombea* and *E. fiscalensis* the leaves are more abruptly rounded at base, ovate, 1.5–2 times as long as wide, the marginal veins more strongly arched between the laterals and 1–3 mm. from the margins;



the axis of the raceme is scarcely developed (or in extreme instances up to 2 mm. long), and the whole plant is glabrous. It is probable that additional and perhaps more fundamental differences will be apparent when *E. turneri* is better known.

***Eugenia salamensis*** Donn. Sm. Bot. Gaz. 27: 333. 1899. *Psidium rensonianum* Standl. Journ. Wash. Acad. 14: 241. 4 June 1924. *Eugenia oaxacana* Standl. Contr. U. S. Nat. Herb. 23: 1043. 1 Dec. 1924, not *E. oaxacana* Berg, 1861. *E. tomentulosa* Standl. l.c. *E. purpusii* Standl. Contr. U. S. Nat. Herb. 23: 1678. 15 Nov. 1926. *E. mexiae* Standl. Field Mus. Bot. 4: 243. 1929. *E. hiraefolia* Standl. Field Mus. Bot. 17: 202. 1937.

Apparently comprising a single species is a series of almost identical populations ranging from Panama to northwestern Mexico. The oldest name for the inclusive species seems to be that of Smith; it seems odd that no member of this rather widely distributed Central American group ever came to the attention of Berg.

Trees 3–5 m. high, or large shrubs, at least when young rather loosely pale- or rufous-tomentose with somewhat contorted stalked or partly sessile dibrachiate hairs; leaves rather large, elliptic-oblong or -obovate, sometimes broadly elliptic or obovate, 6–16 (–20) cm. long, blunt or rounded or sometimes short-acuminate at tip; inflorescence a stout tomentose raceme 2–4 cm. long, with several pairs of rather large flowers on pedicels often 5–10 mm. long; buds 4–5.5 mm. long; disk (3–) 4–5 mm. wide; calyx-lobes broadly rounded, tomentose on both sides; bracteoles linear or oblong, 2–5 mm. long, deciduous at or before anthesis; fruit ellipsoid-oblong, 1.5–2 cm. long.

Certain rather ill-defined regional populations can be recognized, as follows:

Leaves soon glabrate, usually glabrous beneath or nearly so even at flowering time; hairs of the inflorescence appressed, sparse; leaf-margins cuneately decurrent on the petiole. . . . . var. *rensoniana*.

Leaves persistently and densely pubescent or tomentulose beneath; hairs of the inflorescence abundant, stalked, forming a loose tomentum; leaf-margins abruptly contracted to the petiole, the base of the blade sometimes subauriculate, often asymmetric.

Leaves broadly obovate or broadly elliptic, 1.4–2 times as long as wide; lateral veins with few intermediates, widely spaced, 6–8 on each side; Costa Rica and Panama. . . . . var. *hiraefolia*.

Leaves elliptic to elliptic-obovate, 2–3 times as long as wide; lateral veins 8–12 on each side, the number indefinite because of the presence of intermediate ones; Guatemala and Mexico. . . . . var. *salamensis*.

***Eugenia salamensis*** Donn. Sm., var. *salamensis*. *E. tomentulosa* Standl. Contr. U. S. Nat. Herb. 23: 1043. 1924. *E. mexiae* Standl. Field Mus. Bot. 4: 243. 1929.



Leaves elliptic or obovate, blunt or rounded or short-acuminate at tip, narrowed and then abruptly rounded to the base, scarcely decurrent, often subauriculate, 3–7 cm. wide, 6–12 (–16) cm. long, 2–3 times as long as wide; petioles 4–10 mm. long; midvein depressed and usually tomentulose, often with narrow elevated central ridge when dry; pedicels 2–6 (–8) mm. long; bracteoles 2.5–5 mm. long; style 7–9 mm. long.

Specimens examined:

MEXICO: Sinaloa: Without locality, *Ortega 299* (US); San Ignacio, *Conzatti 299* (MEXU); Rosario to Colomas, *Rose 3174* (US); San Ignacio, Hda. Caña, *Ortega 858* (K).—Nayarit: Acaponeta, *Rose 1476* (US, type of *E. tomentulosa*), *M. E. Jones 22903* (UC); Acaponeta, Tiger Mine, *Jones 22902* (UC); 19 miles northwest of Tepic, *McVaugh & Koelz 725* (MICH).—Jalisco: South of Puerto Vallarta, *Mexia 1129* (F, type of *E. mexiae*; MICH; UC), *Carter & Chisaki 1204, 1205, 1209* (all MICH).—Colima: 7 miles north of Santiago, *McVaugh 15915* (MICH).—Michoacán: Dist. Coalcomán, *Hinton 16124, 16266, 16274* (all K, MICH & UC).—Guerrero: Dist. Montes de Oca, San Antonio, *Hinton 10578* (MICH, UC, US).

GUATEMALA: Salamá: Llano Grande, Bergwald, *Seler 2445* (US, type).—Guatemala: Without locality, *Aguilar 137* in 1939 (F).—Quiché: Without locality, *Aguilar 893, 1176* (both F).—Jalapa: Between Jalapa and Paraíso, *Standley 77345* (F).

***Eugenia salamensis*** Donn. Sm., var. ***rensoniana*** (Standl.) McVaugh, comb. nov. *Psidium rensonianum* Standl. Journ. Wash. Acad. 14: 241. 1924. *E. oaxacana* Standl. Contr. U. S. Nat. Herb. 23: 1043. 1924, not *E. oaxacana* Berg, 1861. *E. purpusii* Standl. Contr. U. S. Nat. Herb. 23: 1678. 1926.

Leaves on short shoots obovate with 5–8 lateral veins, obtuse or rounded, on longer shoots elliptic, obtuse or acuminate, about twice as long as wide with 8 or more lateral veins; blades often acute at base and the margins evidently and usually cuneately decurrent; petioles 5 mm. long; pedicels 3–10 mm. long; bracteoles 2 mm. long; disk 3.5 mm. wide.

Specimens examined:

MEXICO: Oaxaca: San Gerónimo [Ixtepec], July 1914, *Purpus 7139* (F; UC; US, type of *E. oaxacana* Standl.).

EL SALVADOR: *S. Calderón 838* (US, type of *P. rensonianum*), 1930 (US), *Renson 339* (F, US).

This taxon is poorly known. It is characterized by little except the thin pubescence of the inflorescence at anthesis, and by the glabrous or nearly glabrous leaves.

**Eugenia salamensis** Donn. Sm., var. **hiraeifolia** (Standl.) McVaugh, comb. nov. *E. hiraeifolia* Standl. Field Mus. Bot. 17: 202. 1937. *Psidium rensonianum* sensu Standl. l.c. 18: 779. 1937.

Leaves broadly obovate, broadly elliptic or oblong-obovate, rounded or obscurely acuminate at tip (obtusely deltoid-acuminate on shoots), narrowed toward the base from the middle or above but abruptly contracted to the petiole and often unequally subauriculate, 4–6 (–11) cm. wide, 9–12 (–20) cm. long, 1.4–2 times as long as wide; petioles 4–7 mm. long; midvein rather deeply but broadly depressed, usually with elevated median ridge when dry; pedicels 3–8 mm. long; bracteoles 2–3.5 mm. long; style 5–6 mm. long.

Specimens examined:

COSTA RICA: Entre Cañas y Tilarán, Guanacaste, *Brenes 12688A* (NY), 12688 (F, NY); San Pedro de San Ramón, *Brenes 21873* (F); San José, *Werckle* (Herb. Nat. C. R. 16437) (F, NY); El Rodeo, Villa Colón, *M. Valerio 944* (F); Camino de Concepción a Desmonte, *J. A. Echeverría 4180* (F, UC); Près du pont de Río Grande, Chemin de fer au Pacifique, *Pittier* (Herb. Nat. C. R. 16405) (US).

PANAMA: Monte Oscuro near Panama City, *J. Zetek 3550* (F, type of *E. hiraeifolia*).

The type of *Eugenia hiraeifolia* is a well-matured vigorous leafy branchlet bearing a single raceme and one fruit; the pubescence has almost all fallen, a little persisting in protected places on the leaves and the fruit; the leaves toward the end of the shoot are unusually elongated and bluntly acuminate, but I believe the specimen belongs to the same species as the Costa Rican plants cited above. Miss Amshoff has already pointed out (*Act. Bot. Néerl.* 5: 278–279. 1956) the similarity between these Costa Rican specimens and the Panamanian *E. hiraeifolia*.

Plants of this variety are surely conspecific with those of var. *salamensis* but are readily distinguished, at least in the specimens at hand, by the larger and broader, more obtuse leaves with fewer and more distinct veins.

**Eugenia sinaloae** Standl. Contr. U. S. Nat. Herb. 23:1042. 1924.

This species is known to me from the type only: Sinaloa: Guadalupe, *Rose et al. 14793* (US). Very little can be added to the original description, except to say that the pubescence is very like that in *Eugenia origanoides*, namely of abundant pale erect hairs, readily observed with the unaided eye. The flowers are unknown.

**Eugenia standleyi** McVaugh, nom. nov. *Myrtus oaxacana* Standl. Contr. U. S. Nat. Herb. 23: 1038. 1924. Not *Eugenia oaxacana* Berg, 1861, nor *E. oaxacana* Standl. 1924.

The short-racemose inflorescence and the bibracteolate tetramerous flowers establish this plant without question as a species of *Eugenia*. It is apparently still known from the type only:

Oaxaca: Between Juchitán and Chivela, Nelson 2631 (US).

**Eugenia symphoricarpus** McVaugh, sp. nov.

Arbor vel frutex, ramulis hispidulis; racemis foliorumque costis plusminusve pilis crassiusculis aeruginosis rectis vel contortis usque ad 0.8 mm. longis obsitis; folia elliptica vel ovata, 3–7 cm. longa, 1.5–2.8-plo longiora quam latiora, apice acuminata, marginibus in petiolum 5–8 mm. longum cuneatim decurrentibus, nervo medio supra depresso, laminis supra atroviridis lucidis, subtus pallidioribus; flores numerosi, sessiles, glomerulis axillaribus dense congesti, bracteis oblongo-lanceolatis vel ovatis obtusis 1.5–4 mm. longis, bracteolis conspicuis, vix connatis sed imbricatis, sub hypanthium tomentulosum involucrem efformantibus; calycis lobi concavi, majores 2 mm. longi latique; discus 1.5 mm. latus; stylus 7 mm. longus; stamina ca. 60; ovarium biloculare, ovulis quoque loculo (3–) 5–8; fructus ad modum *Symphoricarpi* glomerati, subglobosi, diametro 5 mm.

Probably a small tree, somewhat pubescent when young, finally glabrate; branchlets hispidulous or antrorsely pubescent with dark reddish hairs; inflorescence, and both sides of the midveins of the foliage leaves, more or less beset with rather coarse, straight or contorted coppery hairs up to 0.5–0.8 mm. long; leaves elliptic or ovate, 1.5–4 cm. wide, 3–7 cm. long, 1.5–2.8 times as long as wide, broadly and bluntly or rather slenderly acuminate at tip, rounded to the cuneately narrowed base, the margins cuneately decurrent on the slender channeled petiole 5–8 mm. long, 0.7–1 mm. thick; midvein depressed above in a V-shaped channel, elevated at least half its diameter beneath, more or less persistently pilose with contorted hairs; lateral veins 6–8 on each side including some intermediate ones, convex on both surfaces in dry leaves but not very conspicuous, straight and ascending; marginal vein about equaling the lateral ones and arched between them, 0.5–1.5 mm. from the margin; blades dark green and lustrous above, when dry much paler and dull beneath, dark-dotted beneath; flowers numerous in dense axillary glomerules up to 1–1.5 cm. in diameter, the raceme axis (often 2 or more superposed) up to 3–6 mm. long, hirsute, bearing up to 3–6 approximate opposite decussate pairs of sessile flowers; buds 2.5 mm. long, obovoid; bracts oblong-lanceolate to ovate, blunt-tipped, glabrous or coarsely ciliate, about 1 mm. wide at base, 1.5–4 mm. long; bracteoles conspicuous, ovate, ca. 1.3 mm. long and more than 1 mm. wide, their margins overlapping but scarcely connate, the whole forming a deep involucre enveloping and nearly concealing the broadly campanulate, densely rufous-tomentulose hypanthium 0.7–1 mm. long; calyx-lobes concave, thin, glandular-verrucose, suborbicular or a little longer or shorter, the outer ones up to 1.5 mm. long and 2 mm. wide, the inner 2 mm. long and wide; disk 1.5 mm. wide, hairy around the base of the style; style 7 mm. long; stamens about 60, about as long as the style, the anthers 0.5 mm. long;

petals white, 3 mm. long; ovary bilocular, the ovules (3-) 5-8 in a compact group in each locule; fruits in dense clusters, probably black, subglobose or obovoid, up to 5 mm. in diameter, tipped by the prominent erect thin calyx-lobes.

At middle elevations, 800-1500 meters, in the Sierra Madre Oriental, flowering April-May, fruiting May-September.

Tamaulipas: Sierra de Tamaulipas, *Martínez M. & Borja L. F-1923* (TEX), *F-2076* (TEX).—Veracruz: Orizaba, *C. Mohr* in 1857 (US); Cerro del Carrisal, Orizaba, *P. Toro* in Apr. 1891 (MEXU); Zacuapán, *C. A. Purpus 2058* (GH, UC), *7523* (A, GH, NY; UC, type); Paso del Correa, *Liebmann 3970* (C); Barranca near Rancho Viejo, Apr. 1934, *Purpus 16254* (A).—Locality unspecified: Mexico, *Sumichrast 1955* (K).

### ***Eugenia teapensis* McVaugh, sp. nov.**

Frutex vel arbor minuscule sparseque puberula, foliis majusculis ellipticis 6-9 cm. latis, 14-20 cm. longis, obtuse acuminatis, venis lateralibus marginalibusque et costa supra impressis, lateralibus prominentibus, intermediis vix evolutis; racemi crassi usque ad 3 mm. longi 4-6-flori, pedicellis tenuibus 10-11 mm. longis, bracteolis ovatis parvis persistentibus, floribus majusculis; alabastra 8 mm. longa; calycis lobi concavi, inaequales, majores 6 mm. longi obovati; discus 3.5 mm. latus; stylus 7-10 mm. longus; stamina plurima (ca. 200), antheris 1-1.2 mm. longis; ovarium biloculare, ovulis quoque loculo ca. 12.

A tree or shrub, nearly glabrous, the foliage, branchlets and inflorescence sparingly beset with minuscule erect hairlike processes; bracts, bracteoles and calyx-lobes ciliate; leaves elliptic, rather large and prominently veined, 6-9 cm. wide, 14-20 cm. long, 2-2.5 times as long as wide, about equally narrowed to the bluntly acuminate tip and the acute to rounded base, the margins somewhat decurrent on the corky-rimose petiole 6-8 mm. long, 2-2.5 mm. in diameter; midvein deeply and narrowly impressed above in a V-shaped cleft, elevated nearly its whole diameter beneath; lateral veins 6-10 on each side, well separated and without any conspicuous intermediate ones, prominent beneath, depressed below the upper surface of the blade but the individual veins and veinlets convex in a reticulate pattern; marginal vein about as strong as the lateral ones, similarly impressed above, forming strong somewhat asymmetrical arches 5-10 mm. from the margin; blades probably darker green and lustrous above and with some convex glands, the lower surface sparingly dark dotted; inflorescence an abbreviated raceme, the axis stout, dorsiventrally compressed, up to 1.5-3 mm. long, bearing 2-3 opposite decussate pairs of flowers on slender pedicels 10-11 mm. long; bracts small; bracteoles ovate, persistent, distinct, 1 mm. long; buds 8 mm. long, obovoid, the conic hypanthium 2.5 mm. long; calyx-lobes deeply concave, in unequal pairs, the smaller pair orbicular, 4-5 mm. long and wide, the larger pair obovate, 5 mm. wide, 6 mm. long; disk 3.5 mm. wide; style 7-10 mm. long; stamens about 200, up to 9 mm. long, the anthers 1-1.2 mm. long; petals white, obovate, 10 mm. long; ovary bilocular, the ovules about 12 in a compact group in each locule; fruit unknown.



Tabasco: Forêts sombres de Teapa, April (fl.), *Linden 623* (K, type).—Chiapas: Near El Ocote, ca. 30 km. northwest of Ocozucua, 27–28 July 1958 (fl.), *E. Hernández X.* (Hb. Miranda 8870) (MICH).

***Eugenia trunciflora*** (Cham. & Schlecht.) Berg, *Linnaea* 27: 223. 1856. *Myrtus* (?) *trunciflora* Schlecht. & Cham. *Linnaea* 5: 561. 1830.

The original collections of this species came from “sylvis umbrosis inter Mesachica et Mapilque” and from Papantla, both localities in Veracruz, *Schiede 547*. I have not seen these specimens, but from the original description and that given by Berg I suppose the following belong to the same species; the leaves are mostly broadest at or above the middle; the flowers are a little more than half as large as those of *E. xilitlensis* (q.v.) and are borne on slender pedicels 8–10 mm. long (the original description says “Pedunculi 3–9 lineas longi”):

Veracruz: Zacuapán, *C. A. Purpus 2434* (UC, US), *7663* (US).

***Eugenia turneri* McVaugh, sp. nov.**

Arbor 6–7-metralis, subglabra, ramulis juvenilibus racemis pubescentibus; folia lanceolata vel elliptico-lanceolata, 3.5–5.5 cm. longa, 2.3–3-plo longiora quam latiora, apice anguste sed obtuse acuminata, basi gradatim rotundata, petiolis 4.5–5 mm. longis, nervo medio supra inciso; racemi abbreviati 2–4 mm. longi, vel flores ramulorum novorum nodis infimis solitarii bracteati; pedicelli filiformes 8–12 mm. longi; bracteolae scariosae, distinctae, vix deciduae; alabastra 3.5 mm. longa, supra hypanthium glabrum subglobosa; calycis lobi membranacei, post anthesin reflexi, majores 2 mm. longi; discus 1.5 mm. latus, annulus staminalis subhirsutus; stylus 4 mm. longus; ovarium biloculare, ovulis quoque loculo 2 (–1); fructus ignotus.

Tree 6–7 meters high, nearly glabrous, the vegetative buds, axis of the raceme, and the very youngest growth appressed-pubescent with pale hairs 0.1–0.3 mm. long; leaves lanceolate or elliptic-lanceolate, 1.5–2 cm. wide, 3.5–5.5 cm. long, 2.3–3 times as long as wide, the tip slenderly but bluntly acuminate, the base gradually rounded, the margins at base passing abruptly to the rather deeply channeled petiole 4.5–5 mm. long, 0.6 mm. thick; midvein slightly engraved above in the nearly plane surface of the blade; lateral veins 6–8 on each side including some intermediate ones, slightly elevated when dry but very inconspicuous on both sides; marginal vein about equaling the lateral ones and somewhat arched between them, less than 1 mm. from the margin; blades nearly concolorous and yellow-green when dry, very smooth but apparently not lustrous above, a little paler beneath and roughened by many small inconspicuous glands; inflorescence an abbreviated axillary raceme (sometimes at leafless nodes or terminal!), or the flowers solitary and opposite at the lowermost (bracteate) nodes of new leafy branchlets; raceme-axis 2–4 mm. long, bearing 2–3 pairs of flowers on filiform



pedicels 8–12 mm. long; bracts scarious, pubescent, 0.5 mm. long; bracteoles lance-ovate, 0.5–0.7 mm. long, scarious, distinct, ciliate, subpersistent; buds 3.5 mm. long, subglobose above the short-campanulate glabrous hypanthium 1 mm. long; calyx-lobes membranous, ciliate, unequal, the outer pair broadly rounded or elliptic-ovate, 1.2 mm. wide, 1.5 mm. long, the inner pair suborbicular-oval, 1.7 mm. wide and 2 mm. long, all the lobes reflexed from near the base soon after anthesis; disk about 1.5 mm. wide, the staminal ring bristly; style 4 mm. long; stamens about 50, about as long as the style, the anthers about 0.7 mm. long and wide with broad basal lobes; petals white, ovate, ciliate, 3.5–4 mm. long; ovary bilocular, the ovules 2 and collateral, or only 1, in each locule; fruit not seen.

For a note on the relationships of this species, see above under *E. rhombea*.

Michoacán: 1 mile east of La Placita, near the Pacific Coast, dry stream bottom, 4 July 1950 (fl.), *B. L. Turner 2073* (MICH, type).

***Eugenia xalapensis*** (HBK.) DC. Prodr. 3: 276. 1828. *Myrtus xalapensis* HBK. Nov. Gen. & Sp. 6: 145. 1823.

Shrub or small tree 1–4 meters high, soon glabrate, the growing branchlets and the youngest petioles minutely hispidulous-puberulent, the mature leaves and the pedicels and flowers quite glabrous; leaves ovate or ovate-elliptic, 1.5–3.5 cm. wide, 3–7 cm. long, 1.7–2.7 times as long as wide, the tip prominently acuminate (the very tip blunt), the base acute, the margins cuneately decurrent on the inner angles of the channeled petiole 4–8 mm. long; midvein deeply and narrowly impressed above; lateral veins 5–6 on each side in addition to some intermediate ones, inconspicuous above, apparent beneath; marginal vein about as strong as the lateral ones and little arched between them, 0.5–1.5 mm. from the margins; blades dark green and lustrous above, much paler beneath; glands apparent beneath as small dark or resinous dots, sometimes as convexities above; inflorescence an abbreviated axillary raceme, or some flowers opposite at the lowermost (bracteate) nodes of new leafy branchlets; raceme-axis up to 1 cm. long with 4 pairs of flowers, usually 2–4 mm. long with 1–3 opposite and decussate pairs of flowers on pedicels 3–5 mm. long; bracts indurate-persistent, blunt, oblong or ovate, 1–1.5 mm. long; bracteoles connate, oblong-ovate, obtuse, forming a deeply 2-lobed involucre with divaricate lobes 0.8 mm. long and wide; buds 3–3.5 mm. long, pyriform, the hypanthium turbinate or campanulate, often somewhat attenuate at base, 1–1.5 mm. long; calyx-lobes suborbicular, thin-margined, the larger ones 1.3–2 mm. long and wide; disk 1.5 mm. wide (2–2.5 mm. wide in fruit); style (not seen expanded) probably about 5 mm. long; stamens 60–70, up to 4 mm. long, the anthers 0.5 mm. long; petals white, about 3 mm. wide, concave, suborbicular; ovary bilocular, the ovules about 10 in a compact group in each locule; fruit black, globose, 10–13 mm. in diameter, the calyx-lobes scarcely persistent.

Veracruz: Xalapa, 770 hex., *Bonpland* (P, type, not seen; Field Mus. Neg. 36911), *Schiede 543* (NY), *Rose & Hay 6173* (NY), *L. H. MacDaniels 802* (F), 849 (F), *C. R. Orcutt 2855* (F), *C. L. Smith 1507* (F), 1898 (F).—Hidalgo: Bluffs near Tutotepec, 5300 ft., 28 Aug. 1945 (fr.), *A. J. Sharp 45866* (MICH); Dist. Molango, northwest

of Lake Atexca, deciduous woods, 1500 m., 9 Nov. 1946 (fr.), *H. E. Moore 1953* (UC).—San Luis Potosí: 20 mi. east of C. del Maíz, oak forest, 1200 m., 9 May 1949 (fl.), *McVaugh 10485* (MICH).—Tamaulipas: 5 mi. northwest of Gómez Farías, 3600 ft., 15 May 1949 (fl.), *B. E. Harrell 179* (MICH).—State: ? Joya de Salas trail above El Cielo, 1 Sep. 1952 (fr.), *Sharp et al. 52218* (MICH); San Luis Potosí to Tampico, Dec. 1878–Feb. 1879, *Palmer 1045* (GH, NY).

This rather local species was correctly interpreted by Schlechtendal and Chamisso (*Linnaea* 5: 560. 1830) and by Standley (*Contr. U. S. Nat. Herb.* 23: 1040, in key; 1045. 1924), but the name *E. xalapensis* has been erroneously applied to many specimens from the lowlands of eastern Mexico and adjacent Guatemala. Sterile specimens of *E. xalapensis* may ordinarily be distinguished from those of *E. symphoricarpos* (which occurs in the same general area) by the glabrous branchlets; in *E. xalapensis* only the very youngest growing branchlets are pubescent.

### *Eugenia xilitlensis* McVaugh, sp. nov.

Arbor 7–8-metralis, racemis abbreviatis hirsutulis; folia lanceolato-elliptica, 16–20 cm. longa, ca. 3-plo longiora quam latiora, acuminata, basi cordato-auriculata, auriculis rotundatis 1–1.5 mm. longis; petioli 8–10 mm. longi; nervus medius supra concavus; lamina subtus venis elevatis glandulisque numerosis maximis instructa; flores 1–2, subsessiles, e nodis defoliatis oriundes, pedicellis hirsutis 3 mm. longis; alabastra 10–11 mm. longa, hypanthio canescenti, bracteolis deciduis 3.5 mm. longis; calycis lobi maiores 7 mm. lati, 9 mm. longi; discus 6–7 mm. latus; stylus 15 mm. longus; stamina ca. 300, antheris 1.2–1.5 mm. longis; ovula quoque loculo ca. 15–20.

A tree up to 7–8 meters high, the young branchlets and foliage sparingly hirsutulous, the inflorescence thickly hirsutulous with pale hairs; leaves lance-elliptic, 5.5–6.5 cm. wide, 16–20 cm. long, about 3 times as long as wide, gradually and bluntly acuminate; blades rounded from the middle or below to the cordate-auriculate base, the auricles rounded, 1–1.5 mm. long, 3–4 mm. wide; petioles 8–10 mm. long, 2 mm. thick; midvein concave above; lateral veins 10–15 on each side including some intermediate ones; marginal vein about as strong as the lateral ones and forming angular arches between them, 2–5 mm. from the margin; leaves green and smooth above, sparingly gland-dotted, the veins appearing as fine pale parallel lines; lower surface paler, more prominently dotted with glands 0.2–0.4 mm. in diameter, the veins elevated and more evident; flowers 1–2, nearly sessile at leafless nodes, the pedicels hairy, 3 mm. long, 1–1.5 mm. thick; buds 10–11 mm. long, pyriform, the cup-shaped hypanthium canescent, 3–4 mm. long; bracteoles ovate, membranous, deciduous, 2 mm. wide, 3.5 mm. long; calyx-lobes rounded, in unequal pairs, prominently glandular, thin, pubescent along the edges, the larger ones 7 mm. wide, 9 mm. long, the smaller 4.5–5 mm. wide, 6 mm. long; sinuses splitting a little between the lobes after anthesis (perhaps as a result of pressing in the specimen seen); disk 6–7 mm. wide; style 15 mm. long; stamens about 300, about as long as the style, the anthers

1.2–1.5 mm. long; petals white, ovate, narrowed to the tip, ciliate-fringed, up to 1.5 cm. long or more; ovary bilocular, the ovules 15–20 in a compact group in each locule; fruit unknown.

San Luis Potosí: In forest west of Xilitla, Cerro Prieto, 3800 feet, 22 Apr. 1946 (fl.), A. J. Sharp 46284 (MICH, type).

This species occurs in the same general region as *Eugenia trunciflora*, which it somewhat resembles. For a key to the North American species of *Eugenia* with cordate-auriculate leaves, see below under *Notes on Miscellaneous Species*.

### ***Eugenia yautepecana* Lundell, Wrightia 2: 107. 1960.**

A shrub 3–4 meters high, the foliage nearly glabrous from the first, the branchlets and inflorescence (and the youngest leaves) densely appressed-pubescent with pale reddish or almost colorless dibrachiate hairs mostly 0.2–0.4 mm. long, the whole plant ultimately glabrate; leaves elliptic or occasionally ovate, 1.5–3.5 cm. wide, 3–6 cm. long, 2–2.4 times as long as wide (or leaves near the bases of branchlets 1.4–1.6 times as long as wide); blades often about equally narrowed to a blunt or obscurely acuminate tip and a rounded or acute base, the margins usually passing abruptly to the channeled petiole 3 mm. long (bases of the broader leaves rarely subcordate, or in the narrower ones rather long-decurrent); mid-vein broadly and shallowly concave above at least near base, or shallowly channeled between low parallel ridges; lateral veins 5–7 on each side, ascending, pale and readily visible on both surfaces of dried leaves, scarcely forming a marginal vein but recurving in a series of irregular angled arches 2–3 mm. from the margin to join the next succeeding ones; blades dark green and lustrous and very minutely pale-verruculose above, paler beneath, with numerous convex resinous glands usually apparent on both surfaces; inflorescence an abbreviated axillary raceme or two racemes superposed, the axis up to 3–6 mm. long, bearing 1–3 opposite and decussate pairs of flowers on pedicels 3–5 (–7) mm. long, up to 0.6–0.8 mm. thick in fruit; bracts ovate, 1 mm. long, the lower ones broader; bracteoles ovate, divaricate, distinct, persistent, 1–1.4 mm. long; buds 4 mm. long; calyx-lobes broadly rounded, concave, sparingly beset with large resinous convex glands 0.2–0.3 mm. in diameter, appressed-pubescent on both surfaces but persistently and more densely on the inner; inner lobes broadly rounded, 2.5–3 mm. wide, 2.5 mm. long, the outer often ovate, 1.5–2 mm. wide and long; disk 2.5–3 mm. wide, somewhat hairy about the base of the style; style 5–6 mm. long or more; stamens about 75, about as long as the style, the anthers 0.5–0.7 mm. long; ovary bilocular, the ovules about 10 in a compact group in each locule; fruit ellipsoid-oblong, black(?), 8–10 mm. in diameter, 10–15 mm. long, crowned by the erect concave calyx-lobes.

Veracruz: Barranca de Panoaya, Aug. 1919 (fl.), C. A. Purpus 8432 (UC, US), July 1920, Purpus 8505 (UC), Purpus 8561 (UC).—Mexico: Temascaltepec, Acatitlán, 27 Dec. 1934 (fr.), G. B. Hinton 7172 (K, MICH, UC, US).—Morelos: Cuernavaca, pedregal, 23 Sep. 1896 (imm. fr.), Pringle 7234 (MICH); Yautepec–Cuernavaca road, lava field, 2 Oct. 1943 (imm. fr.), Lundell & Lundell 12502 (MICH, US, isotypes).

## NOTES ON MISCELLANEOUS SPECIES

***Eugenia basilaris* McVaugh, sp. nov.**

Frutex vel arbor parva 2-4 m. alta, ramulis rufescentibus longitudinaliter rimosis, decorticantibus; ramuli hispid-hirsuti, pilis acutis fuscis 0.5-1 mm. longis obsiti; folia elliptica vel ovata, basi plusminusve cordata; petioli crassi 3 mm. longi; nervi laterales utrinque 5-8, arcuatim ascendentes, nervum marginalem vix efformantes; flores glomerati subsessiles, pedicellis 1 mm. longis subglabris; alabastra 3-4 mm. longa pyriformia, hypanthio hirsuto anguste urceolato 1.2-1.5 mm. longo; calycis lobi subglabri mox reflexi; discus 1.5 mm. latus, centro concavo, marginibus reflexis; fructus subglobosus diametro 1.7-2 cm., apice conico, disco peltato 2-2.5 mm. lato coronato; ovarium biloculare, loculis basilaribus, ovulis quoque loculo 5-7.

Shrub or small tree 2-4 m. high, the younger branchlets wrinkling in sharp ridges when dry, the thin light reddish brown outer bark in mature branchlets cracking longitudinally and flaking off; branchlets, petioles, and young leaves at least on the lower surface hispid-hirsute with erect or flexuous stout sharp dark reddish-brown hairs 0.5-1 mm. long; leaves elliptic or elliptic-ovate, 3-5 cm. wide, 6-11 cm. long, 2-2.5 (-3) times as long as wide, broadly and bluntly or sometimes slenderly acuminate, rounded toward the base from the middle or below, the base itself broadly or narrowly rounded, cordate or cordate-auriculate, with a definite shallow often asymmetric sinus between the rounded auricles; petiole about 3 mm. long, 1.5 mm. thick; midvein impressed above, elevated its whole thickness beneath; lateral veins 5-8 on each side, seen as fine lines above and often somewhat depressed when dry, prominent beneath, scarcely forming a marginal vein, but diminishing distally and arching over at a point 3-5 mm. from the margin to join the next succeeding vein; leaves often blackening in drying, darker above, not prominently glandular; flowers in axillary glomerules, the inflorescence a crowded axillary raceme or two racemes superposed, the axis up to 3-3.5 mm. long, 4-angled, bearing up to 4 pairs of flowers on stout nearly glabrous pedicels 1 mm. long (in fruit up to 3 mm. long, 1.5 mm. thick); bracts oblong, hirsute outside, 1.5 mm. long; bracteoles like the bracts, subsistent, not connate, 1 mm. long; buds 3-4 mm. long, pyriform, the globe of the petals broader than the hirsute narrowly urceolate hypanthium 1.2-1.5 mm. long; calyx-lobes ciliate but nearly glabrous, soon reflexed, the larger ones 1.5-1.7 mm. wide, 2-3 mm. long; disk 1.5 mm. wide, the center concave, the staminal ring hairy, the margins soon much reflexed; style about 6 mm. long; fruit subglobose, glabrous, glandular-verrucose, 1.7-2 cm. in diameter, prolonged into a broadly conical apex surmounted by the peltate disk 2-2.5 mm. wide, the calyx-lobes radiate, rounded, glabrous within; ovary bilocular, the locules expanded near the base of the elongate hypanthium; ovules 5-7 in each locule.

**Specimens examined:**

Costa Rica: San Ramón, bois des collines, 1200-1400 m., 5 May 1913, A. Tonduz (Herb. Nat. C. R. 17662) (F, MICH, US); San Pedro de San Ramón, bois, collines, 850-1075 m., A. M. Brenes 4282 (F, type), 4267, 4323, 4538, 5022 (all F).



This most distinctive species has been confused with *E. truncata* Berg, to which it bears little resemblance except that the leaves are about the same size. The flowers in *E. truncata* are borne on slender pedicels 10–25 mm. long.

**Eugenia truncata** Berg, *Linnaea* 27: 157. 1856. *E. oreinoma* Berg, l.c. 158. ?*E. guanacastensis* Standl. *Field Mus. Bot.* 8: 144. 1930.

According to Berg *E. truncata* was distinguished from *E. oreinoma* chiefly by the narrower and very short-petiolate leaves truncate at base. Study of the abundant Costa Rican material now available suggests that but one species is involved. The type of *E. truncata*, which I have seen through the courtesy of the authorities at Copenhagen, is a strongly pubescent specimen consisting mostly of young vegetative branchlets 3–5 cm. long; the leaves are all truncate and small for the species (cf. *Field Mus. Neg.* 20982). An isotype of *E. oreinoma* (seen at F) bears relatively large broad leaves (5.6–7 cm. wide, 8.5–13 cm. long) which are merely rounded at the base. In other respects the two specimens are similar.

The glabrous or nearly glabrous plant described as *E. guanacastensis* is evidently very closely related to *E. truncata* and may be a synonym of that species, as Standley ultimately decided. The young shoots are sometimes hirsutulous exactly as in *E. truncata*, (e.g. in *Standley & Valerio* 44240), or the whole plant may be glabrous. The petioles are but 3–4 mm. long as against the usual length of 5–8 mm. in *E. truncata*. The leaves are always auriculate-cordate.

In North America the leaves in most species of *Eugenia* are acute or cuneate at base, or if the margins are rounded abruptly in to the petiole they are usually at least slightly decurrent on the petiole; the summit of that organ may appear to be dilated or the blade may be said to be cuneately narrowed at base. In a few species, however, the blades are sometimes or always cordate or cordate-auriculate, the margins seeming to merge with the ventral surface of the petiole while curving away from its base. In several species (e.g. *E. basilaris*, *E. truncata*) the leaves are usually truncate or subcordate but may be merely rounded at base; in *E. organoides* and *E. salamensis* the leaves are infrequently subcordate; *E. papalensis* is known only from the type, which may or may not be a representative specimen. In *E. chinajensis*, *E. jutiapensis*, *E. trunciflora* and *E. xilitlensis*, as far as known, the leaves are always cordate-auriculate.



Flowers in elongate axillary racemes 2–5 cm. long; pubescence of appressed and mostly dibrachiate hairs. . . . . *E. salamensis* Donn. Sm.

Flowers glomerate or fasciculate, the racemes so much contracted that the flowers appear to arise directly from the axils or from very short lateral spurs; pubescence if present mostly of more or less erect simple hairs.

Pedicels slender, hispidulous (rarely glabrous), 1–2.5 cm. long; buds 5–7.5 mm. long.

Hypanthium in flower glabrous or very sparingly pubescent especially at base.

Lateral veins 10–12 on each side of the midvein; foliar glands up to 0.5 mm. in diameter, apparent on both sides of dry leaves, more conspicuous beneath; Veracruz. . . . . *E. trunciflora* (Cham. & Schlecht.) Berg.

Lateral veins 6–8 on each side; foliar glands mostly 0.1–0.2 mm. in diameter, scarcely visible in dried leaves; Costa Rica . . . . *E. truncata* Berg.

Hypanthium in flower densely velutinous or hirsute; lateral veins 5–6; foliar glands 0.1–0.2 mm. in diameter, visible from the upper surface or not at all; El Salvador and Guatemala . . . . *E. juliapensis* Standl. & Steyererm.

Pedicels very short, 3 mm. long or less, or the flowers sessile and glomerate.

Petioles 8–15 mm. long, the blades 12–20 cm. long.

Blades rounded to truncate at base; foliar glands scarcely apparent; flowers unknown, probably large, the disk in fruit 3–3.5 mm. wide, the larger calyx-lobes 3–4 mm. long and wide; Guatemala.

*E. papalensis* Standl. & Steyererm.

Blades cordate-auriculate; foliar glands prominent beneath, 0.2–0.4 mm. in diameter; buds 10–11 mm. long; disk in flower 6–7 mm. wide, the larger calyx-lobes 7 mm. wide, 9 mm. long; San Luis Potosí.

*E. xilitlensis* McVaugh.

Petioles 5 mm. long or less; blades mostly 10 cm. long or less; buds 2–4 mm. long.

Plants uniformly and coarsely but not very densely setose, the reddish or tawny hairs in no way obscuring the surface of the branchlets or the lower leaf-surface; setae on the midvein near the base of the lower surface of the leaf 1–1.3 mm. long; cilia of the calyx-lobes 0.5–0.7 mm. long; eastern Guatemala . . . . . *E. chinajensis* Standl. & Steyererm.

Plants finely and often densely soft-hirsutulous, the pale hairs often so numerous as to cover the branchlets and principal veins; hairs of the midvein near the base of the lower leaf-surface 0.5 (–0.8) mm. long; cilia of the calyx-lobes mostly 0.2–0.4 mm. long.

Hypanthium narrowly urceolate; fruit 1.7–2 cm. in diameter; Costa Rica.

*E. basilaris* McVaugh.

Hypanthium hemispheric to subglobose; fruit 6–8 mm. in diameter; Mexico to Colombia. . . . . *E. organoides* Berg.

### ***Eugenia egensis* DC. Prodr. 3: 281. 1828.**

This species has not previously been reported from North America. It is one of the most distinctive South American species, and I think there can hardly be any doubt of the determination of the specimen cited below. The principal range of *E. egensis* is from the

Guianas to eastern Colombia, south chiefly in the Amazon basin to eastern Bolivia.

Costa Rica: El General, bordes del Río Pacuare, 600 m., 17 Sep. 1942, *J. León 1008* (US).

***Eugenia flavoviridis*** Lundell, Amer. Midl. Nat. 29: 479. 1943. *E. dissitiflora* Lundell, Wrightia 2: 207. Sep. 1961. *E. flavida* Lundell, Wrightia 3: 14. Dec. 1961.

This appears to be a distinct taxon of the Yucatan region, superficially distinguished from other species with crowded racemes by its long-petiolate, elliptic (rather than ovate) leaves, by the rather sharply and narrowly impressed (rather than flat or merely depressed) midvein, by the coarse ascending pubescence of the racemes, and also by the very smooth upper leaf-surface in which the veins are scarcely apparent to the eye. Material from British Honduras does not seem to differ appreciably from specimens of *E. dissitiflora* recently collected in Petén. Of the approximately 15 specimens I have seen, all bear immature fruit. It is unfortunate that no flowering material is available for study. Species of this affinity are numerous in the West Indies, and it may be that the Central American plant will eventually prove to be a synonym of one of these.

The type and only known specimen of *Eugenia flavida* (Guatemala, Petén, Dos Lagunas, in low secondary forest of airfield clearing, *E. Contreras 1693*), which I have seen through the courtesy of Dr. Lundell, is a mature leafy branch from which almost all traces of pubescence seem to have been eroded. Vegetatively I cannot distinguish this specimen from similarly weathered leafy twigs of *E. "dissitiflora"* from nearby localities in Petén. The fruits accompanying the type specimen of *E. flavida* have apparently been partly rotted while lying on the ground; none is whole, but from the shape of the seeds the fruit seems to have been globose or didymous, as in *E. "dissitiflora"* (*E. flavoviridis*). Flowering material of *E. flavida* is to be sought. The type of *E. flavida* bears several persistent raceme axes 2–4 mm. long, these with indurated ovate bracts. The racemes are shorter than those of an average specimen of *E. flavoviridis* but can be matched in some specimens of that species.

***Eugenia hondurensis*** A. Molina, Ceiba 1: 261. 1951. *E. crassifolia* A. Molina l.c. 3: 169. 1953. *E. nicaraguensis* Amsh. Act. Bot. Néerl. 5: 278. 1956.

This appears to be a distinctive species related to the series including *E. salamensis* Donn. Sm., *E. purpusii* Standl., *E. mexiae* Standl., and *E. tomentulosa* Standl., but differing from all these in having the raceme reduced to a single (terminal) flower. There is much variation in leaf-form in this species, even on the same plant, the leaves on vigorous shoots often becoming large and broad. Flowering specimens have an aspect quite unlike that of fruiting specimens because the maturing branchlets and foliage lose most of the reddish tomentum that is abundant and characteristic on the young growth, and the leaves become firm and smooth.

The original specimens of *E. hondurensis* were from mature plants with half-grown fruit (*Molina* 2559, US!); flowering specimens were subsequently described under the name of *E. crassifolia*. Some of the latter, including the type of *crassifolia* (*Molina* 3031, US!), bore relatively broad obovate leaves. The Nicaraguan specimens described under the name of *E. nicaraguensis* were all in flower or in bud; the suite included some with very large broad leaves, and some with smaller narrow leaves. The type (*Standley* 9427, F!) is a flowering specimen with moderately broad leaves a little larger than those of the type of *hondurensis*. There seems to be no basis for recognizing more than one species in this group, the variation being apparently individual and seasonal.

***Eugenia laevis*** Berg, *Linnaea* 27: 177. 1856. *E. subverticillaris* Berg, *Linnaea* 29: 235. 1858 [type from Hispaniola, *Poiteau* (LE!)].

Previously unknown from the North American continent, this rather distinctive species can now be reported from Yucatan. The specimens cited below agree precisely with specimens from Hispaniola, viz. var. *laevis*. Especially noteworthy are the peculiarly and minutely verruculose leaves, the pale dibrachiate hairs of the pedicels and the canescent hypanthium, the concentration of brownish hairs at the tips of the rather long calyx-lobes, which are otherwise glabrous on the inner surface.

MEXICO: Yucatan: Izamal, *G. F. Gaumer* in 1888 (F, ex herb. Kew); 3 km. de El Cuyo en el camino a Colonia Yucatán, 7 Mar. 1956, *O. G. Enríquez* 477 (MICH); entre Valladolid y Temozón, 7 June 1956, *Enríquez* 584 (MICH).

The very recently described *Eugenia calciphila* Lundell (*Wrightia* 3: 11. Dec. 1961) is known only from the type:

GUATEMALA: Petén: Dos Lagunas, in *ramonal*, *E. Contreras* 1541 (LL).

This specimen is in young bud, with a few open flowers. The pubescence is less abundant than in the specimens from Yucatan and Hispaniola; the pedicels are nearly glabrous and the hypanthium merely strigose. I cannot find any other significant differences between this plant and other specimens of *E. laevis*, and I regard *E. calciphila* as a synonym of that species.

***Eugenia laevis* Berg, var. *gaumeri* (Standl.) McVaugh, comb. nov.** *E. gaumeri* Standl. Field Mus. Bot. 8: 28. 1930. *E. lundellii* Standl. Carnegie Inst. Wash. Publ. 461: 76. 1935.

An ample series of well-prepared specimens from Petén, collected by C. L. Lundell and his assistant, Elias Contreras, and made available to me through the courtesy of Dr. Lundell, makes it clear that *Eugenia gaumeri* and *E. lundellii* are not distinguishable unless by leaf shape, and probably not even by that feature. The original specimens of *E. gaumeri* (Kancabtsonot, Yucatan, *Gaumer 23843!*, the type) were described as having narrow leaves (1.3–1.8 cm. wide, 2–3 times as long as wide), the blades widest at the middle or below, narrowed to an obtuse apex, the very tip commonly rounded. In contrast, *E. lundellii* was described (Tuxpeña, Campeche, *Lundell 1130!*, the type) as having elliptic or obovate-elliptic or rarely oblong-obovate leaves (1–2.5 cm. wide, 3–4 cm. long), obtuse or rounded at the apex. I do not find these differences significant; broadly obovate leaves may often be found on the same plant with rather narrowly elliptic ones, and some specimens from Petén (e.g. *Lundell 15574*, *Contreras 1441*) are generally narrow-leaved, the foliage about as in some specimens from Yucatan (e.g. *Lundell 7933*), and from British Honduras (e.g. *Gentle 1202*, *1745*).

The population named above as *Eugenia laevis* var. *gaumeri* seems to differ from var. *laevis* chiefly in the shape and size of the leaves; these in var. *laevis* are mostly 4.5–6.5 cm. long and rather narrowly and prominently acuminate; in var. *gaumeri* they are mostly 2–5 cm. long, at most broadly and bluntly acuminate.

Additional specimens examined:

MEXICO: Yucatán: *Lundell 7416*.

GUATEMALA: Petén: *Bartlett 12801*; *Contreras 26*, *1362*, *1368*, *1369*, *1370*; *Lundell 15518*, *15527*, *15975*, *16489*, *16824*.—Baja Verapaz: *Standley 69775* (F).



**Eugenia octopleura** Krug & Urb. ex Urb. Bot. Jahrb. 19: 653. 1895. *E. doubledayi* Standl. Journ. Arnold Arb. 11: 36. 1930. *E. koepperi* Standl. Field Mus. Bot. 9: 320. 1940.

The type of *E. doubledayi* (Honduras, Siguatepeque, *Standley 56063*) is a fruiting specimen collected in February. Very little color is observable in the scanty pubescence persisting on the leaves. Immature branchlets, however, are closely and densely coppery-pubescent, exactly as in flowering specimens. The type of *E. koepperi* (Honduras, Mt. Cangrejal near La Ceiba, *Yuncker et al. 8400*) is a specimen with developing inflorescences; the reddish color of the pubescence is evident on the lower leaf-surfaces. The leaves are bluntly acuminate or even obtuse, and the petioles are 5–8 mm. long. Superficially the specimen seems unlike specimens of *E. doubledayi* in which the leaves are usually prominently acuminate and the petioles 8–15 mm. long. Except for these features I cannot distinguish the two so-called species.

Certain Costa Rican specimens (Zarcero, 4500 feet, *Austin Smith A239*) are seemingly identical with flowering specimens of *E. doubledayi*. Other Costa Rican material obviously of the same species (La Palma de San Ramón, 1250 m., *Brenes 4625*; La Palma, Prov. S. José, 1460 m., *Tonduz* [Herb. C. R. 12558, *J. D. Smith 7382*]) is matched perfectly by two syntypes of *E. octopleura*: *Duss 2759, 3270*. On the basis of this evidence, *E. doubledayi* and *E. koepperi* should pass into synonymy.

### 3. MARLIEREA Camb.

*Reference: Marlierea*, Sect. *Myrciopsis* McVaugh, Mem. N. Y. Bot. Gard. 10: 79. 1958.

Through an unintentional orthographic error, the name of this well-marked section was originally published as *Myrcioides* (l.c. 79). It was correctly cited as Sect. *Myrciopsis* on pages 84, 86 and 87 of the article in which it was first published.

### 4. MYRCIA DC.

#### MISCELLANEOUS NOTES

**Myrcia splendens** (Sw.) DC. Prodr. 3: 244. 1828. *Myrtus splendens* Sw. Prodr. 79. 1788. *M. rufidula* Schlecht. Linnaea 13:

416. 1839. *M. costa-ricensis* Berg, Linnaea 27: 104. 1855. *M. discolor* Berg, l.c. 111. *M. oerstediana* Berg, l.c. 112. *M. melanoclada* Berg, l.c. 113. *M. plicato-costata* Berg, l.c. 114. *M. sartoriana* Berg, Linnaea 29: 220. 1858. *M. longicaudata* Lundell, Am. Midl. Nat. 29: 481. 1943. *M. schippii* Lundell, l.c. 482.

Additional synonymy, and some comments on the distribution and taxonomy of this species, may be found in the *Flora of Peru* (13, pt. 4: 659–661. 1958). I noted there that *Myrtus splendens* Sw. perhaps was a synonym of *Eugenia periplocifolia* Jacq. Coll. 2: 108. 1788. I now doubt that the two are synonymous, for in the description of *E. periplocifolia* the plant is said to be “tota glabra”; one of the most characteristic features of *Myrcia splendens* is the abundant pubescence, readily seen with the unaided eye.

In the West Indies *Myrcia splendens* is represented primarily by a form with ovate or ovate-lanceolate leaves 1.5–3 cm. wide, 3–7 cm. long, 1.7–2.8 times as long as wide. In Trinidad, in South America generally, and in Central America and Mexico, the leaves are pre-vaillingly elliptic-lanceolate or elliptic, 6–12 cm. long and mostly 2.5–3 (–4) times as long as wide. After the examination of a large suite of specimens I am unable to find any consistent differences between North American and South American material.

Through the kindness of the authorities at Copenhagen, I have seen the types of the five Costa Rican species based by Berg upon the collections of Oersted. With the exception of the type of *M. plicato-costata*, none of the specimens seems in any way exceptional for *M. splendens*. The Oersted specimen of *M. plicato-costata* (see Field Mus. Neg. 21035) has a few veins of the longer leaves impressed on the upper surface, a feature matched in a number of other Costa Rican specimens. The specimens are otherwise so similar to *M. splendens* that I doubt their specific distinctness. All are represented by photographs in the Chicago Natural History Museum series except for *M. oerstediana*. This is a fruiting specimen with rather narrow, caudate leaves, the blades about 2.5 cm. wide, 8 cm. long; the pubescence is about that of an average specimen of *M. splendens*.

A related species, *Myrcia mollis* (HBK.) DC., known chiefly from the eastern Cordillera of Colombia, has ovate and short-petiolate leaves that are often rugose and have the veins impressed on the upper surface. The pubescence is silky, more copious than usual in *M. splendens*, and extending even to the inner faces of the calyxlobes. Similar plants occur as far north as Costa Rica; it may be that *M. plicato-costata* Berg, mentioned above, is akin to *M. mollis*.

The whole species-complex to which *M. splendens* belongs [including such species as *M. fallax* (Rich.) DC., *M. mollis*, *M. acuminata* (HBK.) DC.] is variable with respect to the amount and quality of the pubescence. The branchlets and the inflorescence are appressed-strigose or -silky, or in extreme forms merely sparingly strigose, or at the other extreme almost hirsute (cf. *Flora of Peru*, pt. 4: 660-661). It has been the fashion in recent years to recognize in Mexico and Central America two species of *Myrcia*, one with spreading pubescence, the other appressed; it is true that there are extremes of pubescence, but I cannot find any correlated characters that would seem to support a specific segregation.

In an occasional specimen from Honduras and Guatemala, about half the known collections from British Honduras, and in most specimens from Mexico, the hairs of the young branchlets and the inflorescence are spreading and somewhat reddish. The branchlets often appear shaggy or velvety. Professor F. Miranda informs me that in Chiapas the conspicuous reddish unexpanded terminal buds make the plant easy to recognize in the field. This is *Myrcia rufidula* Schlecht., which I cannot distinguish in the herbarium except in the most subjective way from less distinctively hairy specimens. Aside from the abundant Mexican material (from Veracruz, Tabasco, Chiapas) and some specimens from British Honduras, I have seen only two specimens from Honduras, one doubtful (sterile) specimen from Guatemala (Alta Verapaz, Cobán, *Standley 69529*), and a recent collection from Petén (Machaquila, *C. L. Lundell 16409*).

The recently described *Myrcia belizensis* Lundell, *Wrightia* 2: 213. 1961, was described by the collector as a woody vine. The author also noted the exceptionally long petioles, these 5-9 mm. long, or about twice as long as those of *M. splendens*. The type, which I have seen through the courtesy of Dr. Lundell, is *Gentle 6571*, from near San Antonio, Toledo District, British Honduras. The specimen is not to be distinguished from other Central American specimens of *M. splendens*, except that the long petioles and the relatively large panicles (up to 10 cm. long) suggest *Myrcia fallax* (Rich.) DC., a widespread and common species of tropical South America. In *M. fallax*, however, the inflorescence is usually relatively stout (the peduncle 2-2.5 mm. wide just below the first node), whereas in the type of *M. belizensis* the thickest peduncle is no more than 1.5 mm. wide. Typical *M. fallax* may yet be found in British Honduras, as have so many other Myrtaceae of the Caribbean basin, but *Gentle 6571* cannot be referred to it with any assurance. On the other

hand there seems to be small reason to regard *M. belizensis* as a distinct species, at least not until after more is known about the taxonomy of the complex to which *M. splendens* and *M. fallax* belong. The "vining" habit I suspect is not that of a true liana, but the habit assumed by so many woody plants in tropical forests, viz. the development of long trailing branches that depend for support upon the branches of other trees and shrubs. Similar developments are known in other species of *Myrcia*.

## 5. MYRCIANTHES Berg

### SYNOPSIS OF THE GENUS (EASTERN SOUTH AMERICA EXCLUDED)

The work of Berg in the mid-nineteenth century laid the foundations for all subsequent work on the American Myrtaceae, provided a rational scheme of classification for the many taxa that had been loosely grouped by DeCandolle in the tribe *Myrteae*, and established the existence of many genera and other more inclusive taxa that had previously been unrecognized. One such group, Berg's second major "Subtribe," the *Eugenioideae*, included 15 genera having in common a fleshy large solid embryo and a short radicle ("Embryo cotylis carnosus, discretis v. margine v. omnino conferruminatis; radicula abbreviata;" cf. Linnaea 27: 4. 1855).

The largest genus, *Eugenia*, including 473 species recognized by Berg, was characterized by the possession of 4 calyx-lobes, and the embryo was described as "exalbuminosus, carnosus; cotylis saepissime margine v. omnino conferruminatis; radicula abbreviata." Within the genus Berg recognized 8 groups (*Uniflorae*, *Biflorae*, *Racemosae*, etc.) based on features of the inflorescence. The seventh such group, *Dichotomae* (species numbered 355-407), was described as having "Pedunculi bifidi v. simpliciter aut ramosissime dichotomi, 6- -multiflori, flore in dichotomiis sessili, lateralibus saepissime pedicellatis." Most of the *Dichotomae* seem to have been known to Berg in flower only, but in at least two species (*E. dicrana*, Linnaea 27: 259. 1856, and *E. dichotoma*, l.c. 262) he described the embryo as consisting of 2 discrete unequal cotyledons.

One of Berg's new genera, *Myrcianthes* (Linnaea 27: 315. 1856) was recognized by him as coordinate with *Eugenia*, and distinguished from that genus chiefly by the possession of 5 (instead of 4) calyx-lobes. The embryo of *Myrcianthes* was fully described: "exalbuminosus, cotylis 2, discretis, carnosus, plano-convexis; radicula brevi, subexserta; gemmula saepe distincta, inter cotylas latens." *Myrcian-*



*thes* was also described as having "Pedunculi axillares, 1-3-flori v. dichotomi." The four species included by Berg in this genus were all natives of Uruguay or southern Brazil.

It now seems odd that Berg did not call attention to the obvious similarities between his *Dichotomae*, a subgroup of *Eugenia*, and his genus *Myrcianthes*. The inflorescence is the same in the two groups—and quite unlike anything else in *Eugenia*; the cotyledons are free and plano-convex in *Myrcianthes*, and also in the few species of *Dichotomae* in which Berg had seen fruit; the calyx-lobes are 5 in *Myrcianthes* (actually sometimes 4), and 4 (or sometimes 5, as pointed out by Berg for several species) in the *Dichotomae*. Whatever may have been the reason, Berg apparently did not consider the possibility that the *Dichotomae* might well be removed from *Eugenia* into another genus. Authors following Berg have at one time or another transferred most of the species of *Dichotomae* to other genera, including *Ananomis* Griseb., *Luma* A. Gray, *Myrceugenella* Kausel, *Myrcianthes* Berg, *Pseudananomis* Kausel, and *Pseudomyrcianthes* Kausel.

Plants of this general affinity are frequent along an Antillean-Andean axis, from Argentina and Bolivia to Venezuela and Colombia, the West Indies, peninsular Florida, and in Central America and Mexico north to Tamaulipas and Durango. Approximately 40 species are known from this range. There are isolated and distinct, but clearly related groups of species in Chile, and in the South Brazilian-Uruguayan-Argentinian region. Recent work indicates that the Chilean species belong to distinct and mostly endemic genera. I have already advocated (in the *Flora of Peru*, 13, pt. 4: 746. 1958) that the concept of *Myrcianthes* be expanded to include numerous Andean and West Indian species and to include *Ananomis* Griseb. (1860).

There is no general agreement on the taxonomic status of the species of eastern South America. Because of the superficial resemblance between the inflorescences and flowers of *Myrcianthes* and its relatives, on the one hand, and those of certain genera of the subtribe *Pimentinae* (e.g. *Blepharocalyx* and *Pseudocaryophyllus*) on the other, it is difficult to place an unknown flowering specimen in the proper genus. Final disposition (even to subtribe) may depend upon the availability of mature fruit and seeds. Some species are known from flowering material only. In recent years two Bergian species of *Eugenia* have been transferred by Burret to *Pseudocaryophyllus*, and one Bergian species of *Myrcianthes* by the same author to *Psidium*. Kausel (Ark. Bot. II. 3: 504. 1956) has proposed a new

genus, *Pseudomyrcianthes*, to include approximately 15 species originally placed in *Eugenia* by Cambessèdes, DeCandolle, Berg and others. On the basis of embryo characters, however, Kausel assigns *Pseudomyrcianthes* to the *Eugenioideae* proper, proposing at the same time a coordinate group *Plinioideae*<sup>1</sup> to include *Myrcianthes* and its close Andean and Antillean relatives (which he assigns to the genera *Amyrsia* and *Ananomis*, respectively).

Legrand (Not. Syst. 15: 266–267. 1958) feels that too much significance has been attached to the dichasium as a fundamental taxonomic character. He points out that in *Eugenia pyriformis* (the type species of Kausel's *Pseudomyrcianthes*), there is frequently a reduction to a 1-flowered form resembling species in other subgeneric groups of *Eugenia*. He feels that the occasional occurrence of a 3-flowered dichasium in a normally 1-flowered species (e.g. *E. arbutifolia* Berg, a synonym of *E. obtusifolia* Camb.) does not justify its inclusion in Berg's group *Dichotomae*. He reminds us that *Myrcueugenia ribeireana* (Berg) Legr. & Kaus. was originally placed in the *Dichotomae*, in the absence of fruit, on the basis of its forked inflorescence.

For want of adequate fruiting material of many of the species, and in view of the lack of agreement on generic limits in the species of eastern South America, I do not attempt to present even a summary of them at this time. Two species of *Myrcianthes*, namely *M. cisplatensis* (Camb.) Berg [including the genotype, *M. apiculata* Berg], and *M. gigantea* (Legrand) Legrand, seem to be generally accepted as members of the genus in good standing. Excluded from *Myrcianthes* have been *M. brunnea* Berg [*Psidium ovale* (Spreng.) Burret] and *M. edulis* Berg [considered by Legrand, An. Mus. Hist. Nat. Montevideo II. 4, pt. 11: 59. 1936, to be related rather to the genus *Hexachlamys* Berg (*Eugenia* subg. *Myrcichlamys* Legr.)].

Several species included by Berg among the *Dichotomae* (Linnaea 27: 246–278. 1856; Fl. Bras. 14, pt. 1: 306–312. 1857; l.c. 586–587. 1859) may be investigated as possible members of *Myrcianthes*; as far as I know their generic standing has not been challenged: *E. exoriata* Berg, *E. imbricata* Berg, *E. ischnosceles* Berg, *E. itajurensis* Camb., *E. subamplexicaulis* DC., *E. ternatifolia* Camb. and *E. viminalis* Berg. Others (*E. leandreana* Berg, *E. mutabilis* Berg) have been transferred to *Pseudocaryophyllus* by Burret, and several (*E. adamantium* Camb., *E. arbutifolia* Berg, *E. decumbens* Camb., *E.*

<sup>1</sup> Mentioned by name only; not properly described and not given any particular status.

*kochiana* DC., *E. lutescens* Camb., *E. piresiana* Camb., *E. pohliana* DC., *E. pruniformis* Camb., *E. pyriformis* Camb.) have been assigned at least provisionally to *Pseudomyrcianthes* by Kausel. Legrand has pointed out (Not. Syst. 15: 269. 1958) that *E. sylvatica* Camb. (*Pseudomyrcianthes cambessedeanae* Kausel) was wrongly assigned by Berg to the *Dichotomae*; the inflorescence is a loose raceme like that of *E. florida* DC. and *E. gardneriana* Berg.

In the following pages is presented a synopsis of the species of *Myrcianthes* occurring along the Andes and in northern South America, the West Indies and North America. The limits of the genus as I understand them were set forth in the *Flora of Peru* (Field Mus. Bot. 13, pt. 4: 746. 1958). As stated there, I believe the distinction between *Ananomis* and other genera, on the basis of the presence or absence of a plumule, to be a specious one; I have repeatedly observed a plumule in the mature seeds of *Ananomis* (*Myrcianthes*) *fragrans* and similarly in the seeds of Andean and other species of *Myrcianthes*.

As far as I know there is no species in eastern South America that occurs also along the Andean-Antillean axis, except that a form of *M. cisplatensis* is found in northern Argentina. The following key summarizes the pertinent features of *Myrcianthes* and other genera having the inflorescence a dichasium and the two cotyledons distinct and plano-convex:

- Radicle about as long as the cotyledons; cotyledons plano-convex, fleshy but thin; Chile and adjacent Argentina . . . . . *Luma* (incl. *Myrceugenella*).
- Radicle less than half as long as the cotyledon; cotyledons plumply plano-convex.
  - Calyx-lobes caducous; inflorescence often irregularly dichotomous or umbelliform; ovules 5-6; cotyledons united about one-third their length; 1 species, West Indies and Venezuela . . . . . *Pseudananomis*.
  - Calyx-lobes persistent; inflorescence regularly dichotomous with the terminal flowers sessile in the forks; ovules usually more than 6; cotyledons united at the base only.
    - Placenta shield-shaped with 6-12 marginal and inwardly directed ovules; calyx-lobes 5; Chile . . . . . *Reichea*.
    - Placenta wartlike or horseshoe-shaped, with usually 8-20 radially directed ovules in a subcapitate group; calyx-lobes usually 4 . . . . . *Myrcianthes*.

## NOMENCLATURE

The name *Luma* A. Gray (1854) is apparently the oldest name applied to any plant of this alliance. According to the recent studies by Kausel on the Myrtaceae of Chile, the seven species referred by Gray to *Luma* are to be distributed among three genera in two subtribes (see Ark. Bot. II. 3: 503. 1956, and an earlier paper, Rev. Arg. Agron. 9: 42. 1942). If *Luma* be typified by *L. chequen* (Mol.)

A. Gray, var. *a*, as suggested by Kausel (Lilloa 13: 127. 1948) and accepted by McVaugh (Taxon 5: 142. 1956), then *Myrceugenella* Kausel (1942) falls into the synonymy of *Luma*. Five of the remaining six species of *Luma* (in the sense of Gray) are to be referred to *Myrceugenia* Berg (published 1855), according to Kausel (l.c. 50. 1942). Because of this preponderance of species of "*Myrceugenia*" in the original *Luma*, Burret in 1941 reduced *Myrceugenia* to the synonymy of *Luma* and published a number of new combinations and new species in the latter genus (Notizbl. Bot. Gart. Berl. 15: 522-535; Repert. Sp. Nov. 50: 50-55). Both Kausel (Lilloa 13: 125-129. 1947) and Legrand (Darwiniana 11: 302. 1957) have argued against the course taken by Burret.

There is no nomenclatural conflict between *Luma* A. Gray (1854) and *Myrcianthes* Berg (1856) as long as the two genera are held to be taxonomically distinct. Apparently a good case can be made for their distinctness.

The species of *Luma* (*Myrceugenella* in the sense of Kausel) are all confined to Chile, or the Chilean-Argentinian region, i.e. they are geographically separated from all known species of *Myrcianthes*. They are like many species of *Myrcianthes* in having the flowers 4-merous, the bracteoles caducous and the dichasium 3-flowered or the flowers occasionally solitary. In *Myrceugenella*, however, the cotyledons are described by Kausel as "plano-convexis, carnosius sed tenuibus," the radicle is about as long as the cotyledons (illustrated in Rev. Arg. Agron. 9: 44, fig. 1, B. 1942), and the insertion of the ovules is said to be basal or sub-basal (Lilloa 13: 148. 1947). On the basis of the long radicle and the relatively thin cotyledons, Kausel now regards *Myrceugenella* as a member of the *Myrciinae* ("*Myrcioideae*") (Ark. Bot. II. 3: 503. 1956). I cannot comment upon this disposition of the genus, but in any event *Myrceugenella*, or *Luma*, appears to be a small endemic Chilean group that for the present may be regarded as a distinct genus.

The name *Amyrsia* Raf. (1838) has recently been taken up by Kausel (Ark. Bot. II. 3: 512-514. 1956) for several Andean species that I should refer to *Myrcianthes*. Rafinesque's genus *Amyrsia* was a mixture (cf. Taxon 5: 137. 1956), including three species of *Myrcianthes* in the present sense, and one species of *Myrteola* (subtribe *Pimentinae*). Rafinesque gave no indication of any preference for one species or another as genotype, and my choice of lectotype was made on the basis of the original description, which permitted the positive identification of the *Myrteola* element because Rafinesque



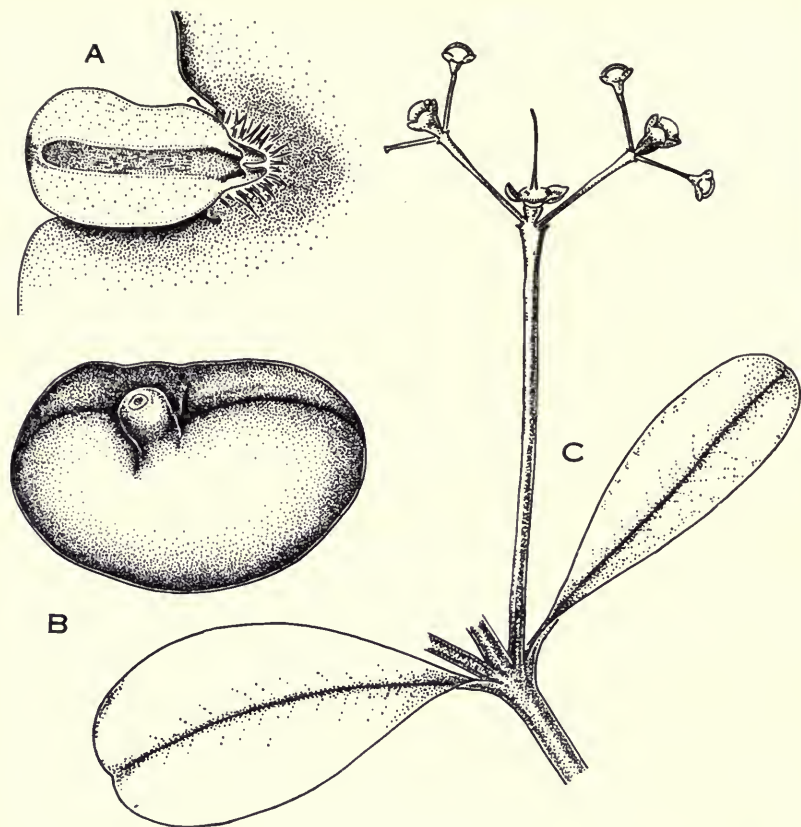


FIG. 12. Dichasium and embryo in *Myrcianthes*. A, Seed of *M. karsteniana*, García 94 (ca.  $\times 17$ ); inner face of one cotyledon showing position of hypocotyl and radicle, and small, apparently bilobed plumule at right. B, The same (ca.  $\times 7$ ); outer coats removed to show plano-convex cotyledons and projecting radicle. C, Seven-flowered dichasium in *M. fragrans*, Steere 2976 ( $\times \frac{2}{3}$ ).

compared the genus to "Pimentus," from which he separated it because of the bilocular ovary, and the many seeds "as in *Myrtus*." None of the species now referred to *Myrcianthes* could fit this description, as ordinarily but one seed develops in each fruit. If *Amyrsia* be typified on the basis of the *Myrteola* element, the genus *Myrteola* Berg (1856) may well be proposed for conservation, as was done in Taxon 5: 163-164. 1956. It would seem most unfortunate to preserve the poorly founded genus *Amyrsia* in any sense whatever, especially since both of its constituent elements have since become known under other names. If Kausel's proposal be

accepted, and *Amyrsia* typified on the basis of the *Myrcianthes* element, then the latter name should be proposed for conservation.

**Myrcianthes** Berg, *Linnaea* 27: 315. 1856. *Anamomis* Griseb. *Fl. Brit. W. Ind.* 240. 1860.

Small or medium-sized trees with opposite or ternate leaves; flowers in 1-7-flowered (or sometimes 15-31-flowered) dichasia, these usually solitary and axillary, sometimes so numerous in the upper axils as to form a compound inflorescence, or modified into a terminal myrcioid panicle bearing the flowers in small dichasia at the tips; central flowers of the dichasia usually sessile; calyxlobes and petals 4 (in some species regularly 5), or an occasional flower 5-merous; ovary usually 2-locular, the numerous (usually 8-20) ovules radiating from a centrally affixed placenta; seeds maturing 1 (-4); cotyledons 2, distinct, plano-convex; radicle terete, half as long as the cotyledons or less; plumule evident in the mature seed.

Lectotype species: *M. apiculata* Berg [= *M. cisplatensis* (Camb.) Berg]. See Taxon 5: 143. 30 July 1956.

In the following pages are contrasted and listed all the species known to me from continental North America, from South America north of the Amazon River, and from Andean South America except for the approximately 20 species treated in the *Flora of Peru* (Field Mus. Bot. 13, pt. 4, no. 2: 745-775. 1958). These Peruvian species are omitted, or in a few instances mentioned for comparison. Species of southeastern South America are not included; West Indian species are treated somewhat cursorily, following Urban (Bot. Jahrb. 19: 662-665. 1895).

Certain species listed below as members of the genus *Eugenia* are probably to be referred eventually to *Myrcianthes*, but as these are unknown in the fruiting condition any formal transfers would seem to be premature.

Inflorescence, and often the young herbage, softly tomentose or velutinous with rufous, brown or pale hairs; petioles stout, distinct from the blades, (4-) 10-15 (-20) mm. long.

Calyxlobes tomentulose on both sides.

Disk 3-4 mm. wide; buds 4-5 mm. long; flowers up to 15, the dichasium often 3 times forked; ovules 5; Bolivia.....*M. pearcei*.

Disk 5-8 mm. wide; buds 7-10 mm. long; flowers mostly 3-7; ovules 15-30.

Tomentum gray or yellowish white; disk 5 mm. wide; stamens 7-8 mm. long; northern Peru.....*M. lanosa*.

Tomentum red; disk 6.5-8 mm. wide; stamens 10-14 mm. long.

Calyxlobes 5, 5-9 mm. wide; Argentina.....*M. callicoma*.

Calyxlobes 4, 4-5 mm. wide; Colombia.....*M. borealis*.

Calyx-lobes glabrous within; inflorescence irregularly 2-3 times forked; buds 5-6 mm. long; disk 4-5 mm. wide; ovules 10-11, marginal on the placenta; Ecuador..... *M. irregularis*.

Inflorescence and herbage glabrous or often strigose or silky-strigose, the hairs often white or very pale, most abundant and conspicuous on the outer surface of the hypanthium; petioles often not well set off from the cuneate base of the blade.

Leaves all or nearly all ternate; northern Andes of Venezuela and Colombia.

Coarse plants; leaves 2-3 (-5) cm. long; buds 8-9 mm. long..... *M. crebrifolia*.

Smaller-leaved plants; leaves 0.6-1.8 cm. long; buds 4-5 mm. long.

Peduncles 3-flowered; leaves spatulate..... *M. ternifolia*.

Peduncles 1-flowered; leaves obovate to suborbicular..... *E. triquetra*.

Leaves opposite [for plants of Ecuador, Peru and Bolivia, see Field Mus. Bot. 13, pt. 4: 745-775. 1958].

Plants of the Guianas, Venezuela, Colombia, West Indies or North America.

Inflorescence decompound, many-flowered, the forking branches forming a terminal leafless panicle.

Leaves 2-4 cm. long, rigidly coriaceous; panicles 5 cm. long or less beyond the last leaves; southern Colombia and Ecuador..... *E. pycnantha*.

Leaves 6-12 cm. long, thinner; panicles 6-11 cm. long; Venezuela.

*M. karsteniana*.

Inflorescence a regular axillary dichasium, once-, twice- or thrice-forked, the flowers thus mostly 3-7, occasionally only 1 or as many as 15.

Inflorescence stout, glabrous or essentially so, the peduncle 2-3.5 (-5) mm. wide near the summit.

Flowers very large, the buds 1.7-2 cm. long; style 2.5 cm. long; fruit 4-5 cm. in diameter; Guianas..... *M. prodigiosa*.

Flowers smaller, the buds less than 1 cm. long; style about 1 cm. long or less; fruit as far as known 2 cm. in diameter or usually less; Andes from Peru northward; Panama and Costa Rica.

Leaves rounded, 3 cm. long or less, the lateral veins impressed above; staminal disk glabrous; high mountains of ?Costa Rica and western Panama (*Allen 1563*)..... ?*E. rigidissima*.

Leaves elliptic to suborbicular, mostly 4-6 cm. long, the veins not impressed; disk bristly-pubescent; style 10-11 mm. long; Andes, Colombia to Peru..... *M. rhopaloides*.

Inflorescence more slender, variously pubescent (especially the hypanthium), or glabrous, the peduncle 2 mm. wide at summit or usually less; flowers smaller, the style 8.5 mm. long or less.

Peduncles minutely bristly-hispidulous with erect hairs.

Peduncles and branchlets similarly hispidulous; leaves often elliptic, sometimes obovate; dichasium often 7-flowered; Costa Rica and western Panama..... *M. fragrans* var. *hispidula*.

Peduncles hispidulous, the branchlets glabrous; leaves mostly obovate; dichasium usually 3-flowered; Venezuela... *M. compressa*.

Peduncles glabrous, appressed-pubescent or appressed-silky.

Flowers 3 in a dichasium, all sessile; hypanthium and outer surface of the calyx-lobes whitened, silky; Santa Marta region, Colombia..... *M. sessilis*.

Flowers 3-7 or -15, the lateral ones on definite slender branches; calyx-lobes glabrous or essentially so without.

Hypanthium rather densely silky-strigose at least at base, often whitened by the dense covering of hairs; inflorescence in general somewhat strigose or hispidulous, sometimes glabrate.

Flowers usually 3; peduncle mostly 2 cm. long or less, 1.5-2.5 mm. wide at summit; style 7-8.5 mm. long; southern Colombia and Ecuador. . . . . *M. hallii*.

Flowers often 7, sometimes 3; peduncle 2-4 (-6) cm. long, 1.2-1.5 mm. wide at apex; style mostly 5-6.5 mm. long; often in lowlands, West Indies and northern Colombia and Venezuela to Mexico and Florida. . . . . vars. of *M. fragrans*.

Hypanthium glabrous, or sparingly appressed-pubescent especially at base; peduncles glabrous; highlands, Costa Rica, Colombia and Venezuela; Ecuador.

Peduncles 1-flowered; southern Colombia and Ecuador.

*E. orthostemon*.

Peduncles mostly 3-7- (-15) flowered.

Peduncles mostly 7-flowered, 3-4 cm. long; Colombia to western and northern Venezuela; see also *E. rondonensis*.

*M. dugandii*.

Peduncles mostly 3-flowered, 2.5 cm. long or less.

Costa Rica. . . . . *M. storkii*.

Colombia (region of Bogotá). . . . . *M. leucoxyla*.

Plants of Argentina (including southern Bolivia).

Flowers solitary; hypanthium whitened without by the dense covering of hairs; calyx-lobes 4; style 5-8 mm. long. . . . . *M. mato*.

Flowers 3 (occasionally 1 or 7) in a dichasium; hypanthium glabrous or sparingly stiff-hairy without.

Calyx-lobes 5; style 3.5-5.5 mm. long. . . . . *M. cisplatensis*.

Calyx-lobes 4; style 7-8 mm. long. . . . . *M. pseudo-mato*.

***Eugenia alaternifolia*** [sphalm. *alternifolia*] Benth. Pl. Hartw. 175. 1845. Colombia. Cf. *M. rhopaloides* (see Flora of Peru, 13, pt. 4: 773).

***Eugenia andina*** Berg, Linnaea 27: 274. 1856. Peru. Unknown (see Flora of Peru, l.c. 774).

***Eugenia aromatica*** Berg, Linnaea 27: 263. 1856. Venezuela, Caracas, *Moritz 792* (Berlin). Unknown.

***Myrcianthes borealis*** McVaugh, sp. nov.

Arbor rufo-tomentosa, ramulis inflorescentiisque, et foliis juvenilibus, dense pilis contortis usque ad 0.5-1.3 mm. longis obtectis; folia elliptica vel obovata, 5-9 cm. longa, 2.5-7 cm. lata, petiolis 9-17 mm. longis, marginibus callosis,



aliquantum revolutis; flores 3 (-7), pedunculo 3-5 cm. longo, 2.5-3 mm. crasso; alabastra ut videtur 10 mm. longa; calycis lobi 4, utraque superficie tomentulosi, 4-5 mm. lati; discus 6.5-7.5 mm. latus; stylus 7 mm. longus, pilosus; stamina ca. 300, filamentis 10-12 mm. longis; ovula quoque loculo ca. 30.

Tree 2.5-3.5 m. high, the young leaves, branchlets and inflorescence rusty-tomentulose, the crisped, curled hairs often more than 0.5 mm. long, some to 1.3 mm.; leaves elliptic or obovate, rounded or retuse, rounded to the base or somewhat acutely narrowed and the margins finally cuneately decurrent on the stout channeled petiole 2-2.5 mm. thick, 9-17 mm. long; blades 2.5-7 cm. wide, 5-9 cm. long, 1.3-2 times as long as wide, lustrous and glabrate above except the hairy sulcate midvein, paler and somewhat pilose beneath; lateral veins 7-9 on each side, somewhat impressed above and prominent beneath, diminishing distally to a slightly less prominent marginal vein 2-7 mm. from the margin, and arched between the laterals; glands inconspicuous; margins callose, somewhat revolute; flowers usually 3 (-7), the peduncle 3-5 cm. long, 2.5-3 mm. wide near the apex, the branches 6-16 mm. long; central flower sessile, or the axis extended 8-11 mm. above the fork; bracts narrowly triangular, acute, 1.8 mm. wide at base, 6 mm. long; bracteoles linear, 2 mm. long, deciduous, with the bracts, at anthesis; buds probably about 10 mm. long; hypanthium cup-shaped, 5 mm. long, 6 mm. wide at mouth; calyx-lobes 4, broadly rounded, tomentulose on both sides, 2-3 mm. long, 4-5 mm. wide; disk 6.5-7.5 mm. wide, the staminal ring velutinous, the glabrous center 3 mm. wide; style 7 mm. long, pilose; stamens about 300, the filaments 10-12 mm. long; locules 2, the ovules about 30 in each locule, radiate in a subcapitate group affixed to the central dissepiment.—Univ. of Mich. Negs. 1331, 1347.

COLOMBIA: Norte de Santander: Eastern Cordillera, road from Pamplona to Toledo, on the Maracaibo-Orinoco drainage, alt. 2500-2800 m., thickets along stream, 28 Feb. 1927, *Killip & Smith 19882* (US, type; A; GH).

### ***Myrcianthes callicoma* McVaugh, sp. nov.**

Arbor 6-8-metralis, rufo-tomentosa; folia elliptica vel ovata, 5-10 cm. longa, 1.5-5 cm. lata, obtusa vel obscure acuminata, glabrata, petiolis 6-10 mm. longis; venis utroque latere 10-12, supra inconspicuis, subtus paullo elevatis, venulis nec incrassatis; dichasio 3-floro (vel floribus solitariis), pedunculo 1-2.5 cm. longo, 2-2.5 mm. crasso, floribus in dichotomis sessilibus, alabastris 7-9 mm. longis; calycis lobis 5, utrinque tomentosis, 5-9 mm. latis; stylo 8 mm. longo; disco 8 mm. lato; stamina ca. 300, filamentis 10-14 mm. longis; ovula quoque loculo ca. 15-20.

A tree 6-8 m. high, 35 cm. in diameter, the young growth and the inflorescence densely tomentose with soft crisped rusty-red hairs, these very short or on the margins of the calyx up to 1 mm. long; leaves and branchlets glabrate or with some minute crisped hairs persisting; leaves elliptic or ovate, (1.5-) 2.5-5 cm. wide, (3-) 5-10 cm. long, 1.6-2.5 times as long as wide, bluntly pointed or obscurely acuminate, rounded to the base, the markedly cartilaginous and revolute margins narrowly prolonged and long-decurrent on the compressed sulcate petiole 1.5-2 mm. wide, 6-10 mm. long; midvein impressed above, prom-

inent beneath; lateral veins 10-12 pairs with some additional weaker intermediate veins, inconspicuous above, somewhat raised beneath; marginal vein weaker than the laterals, irregularly and asymmetrically arched between them, 1-5 mm. from the margin; blades smooth on both surfaces, concolorous, slightly more glossy above, obscurely and finely gland-dotted; inflorescence an axillary dichasium, 3-flowered (or often 1-flowered), the peduncle 1-2.5 cm. long, compressed and enlarged distally and there 2-2.5 mm. wide; flowers sessile, or the lateral ones in the dichasium on pedicels up to 8 mm. long; bracts and bracteoles deciduous before anthesis; buds 7-9 mm. long, broadly obovoid or subglobose; hypanthium broadly obconic with straight sides 4-5 mm. long; calyx lobes 5, unequal (1 or 2 smaller than the others), tomentose on both sides, broadly rounded and often narrowed just above the base, 3-6 mm. long, 5-9 mm. wide; disk 8 mm. wide, the staminal ring hairy, the glabrous or pubescent central portion 4 mm. wide; style 8 mm. long; stamens about 300, 10-14 mm. long, the anthers 0.7-0.8 mm. long; petals obovate, about 7 mm. wide, 12 mm. long, pubescent near the tips; ovary bilocular, the ovules about 17 (15-20?) in each locule, radiate in a sub-capitate group attached above the middle of the central partition; fruit not seen. —Univ. of Mich. Neg. 1345.

ARGENTINA: Tucumán: Dept. Tafi, Cerro de Taficillo, 1600 m. elevation, in quebradas, Dec. 7, 1929, *S. Venturi* 9859 (GH, type); same locality, *Venturi* 10038, Jan. 1930 (GH).

***Myrtus coccolobaefolia*** HBK. Nov. Gen. & Sp. 6: 139 [folio ed. 110]. 1823. Colombia. Referred in *Flora of Peru*, pt. 4: 772 to *Myrcianthes rhopaloides*.

***Myrcianthes compressa*** (HBK.) McVaugh, Field Mus. Bot. 13, pt. 4: 754. 1958. *Myrtus compressa* HBK. Nov. Gen. & Sp. 6: 135 (folio ed. p. 107). 1823.

Often nearly glabrous, the young shoots finely pale-strigose, the peduncles minutely bristly pubescent (sometimes glabrate), the petals and calyx-lobes ciliate, the hypanthium sometimes sparsely strigose; leaves obovate, up to 4 cm. wide and 6 cm. long, obtuse or rounded at the tips (on flowering branchlets often acute at both ends and more or less elliptic), the base cuneate and the margins decurrent on the channeled petiole 3-4 mm. long; blades lustrous above, smooth, finely gland-dotted especially beneath; inflorescence 3-flowered (rarely 7-flowered), the peduncle 2-3.5 cm. long, 1-1.7 mm. wide near summit, often compressed and 2-edged; style 6-7 mm. long; stamens about 175; ovules 15-20 (-25) in each locule.

The plant described above bears considerable resemblance to the inclusive *Myrcianthes fragrans*, differing chiefly in the usually 3-flowered dichasium, the nearly glabrous inflorescence (except that the peduncle is usually minutely bristly-pubescent), the cuneate obovate leaves. With some doubt I refer this to *M. compressa*, originally described from near Cajamarca, Peru. Nothing like the type has since been found in Peru, but a number of collections from the moun-

tains near Caracas, Venezuela, appear to represent the same species and are cited below. A photograph of the type (Field Mus. Neg. 36879) shows the characteristic leaf-outline, and my notes on the type of *Myrtus compressa*, made in Paris in 1954, indicated that this specimen has the same minutely bristly peduncle, a feature unusual in *Myrcianthes*. I have never seen any plants from the Ecuadorean-Peruvian region that resembled Venezuelan plants in this respect. It is entirely possible that the type of *Myrtus compressa* came from somewhere in Venezuela and was later mistakenly supposed by Kunth to have come from Peru.

VENEZUELA: Márgen de la selva de las Flores, 1619 m., *L. Williams* 10095 (A, F); between Agua Negra and El Junquito, 1900 m., *Pittier* 13822 (F, US); Galipan bei Caracas, 6000 ft., *O. Kuntze* 1575 (US); Caracas, *H. M. Curran & M. Haman* 1124 (NY, US), *Karsten* s.n. (F, GH).

COUNTRY UNKNOWN: Páramo de Cisne, *André* 4307, 29 Oct. 1876 (F, GH).

***Myrcianthes crebrifolia*** (Steयरम.) McVaugh, comb. nov. *Eugenia crebrifolia* Steयरम. Fieldiana, Bot. 28: 1011. 1957.

As suggested by Steयरम, and as indicated in the key above, this species is to be compared with *Eugenia ternifolia* Berg. It is also strikingly similar in most respects to *M. rhopaloides*, from which it seems to differ chiefly in the ternate arrangement of the leaves and in the very short fleshy petioles 2–4 mm. long and about as thick.

In addition to the two collections cited by Steयरम, I should refer to this species the following:

COLOMBIA: Santander: Vicinity of La Baja, 3200 m., *Killip & Smith* 18154 (US).—Norte de Santander: Between Mutiscua and Pamplona, 3100 m., *Killip & Smith* 19743 (GH).

***Myrcianthes dugandii*** (Standl.) McVaugh, comb. nov. *Eugenia dugandii* Standl. Trop. Woods 52: 28. 1937.

Nearly glabrous, the young herbage somewhat appressed-pubescent, the hypanthium glabrous or minutely appressed-pubescent, the calyx-lobes densely appressed-silky within, the disk hairy; leaves rigidly coriaceous, smooth and glossy above, 2–4.5 cm. wide, 3.5–7.5 cm. long, 1.3–2 times as long as wide, obovate or elliptic, rarely ovate, rounded or retuse at tip or obtusely pointed, the base abruptly or gradually rounded, the margins finally often cuneately decurrent on the stout petiole 1–2 mm. thick, 3–8 mm. long; inflorescence mostly 7-flowered, varying to 3-flowered or 15-flowered on the same plant; peduncles (1.5–) 3–4 (–5)

cm. long, 1-1.7 (-2) mm. wide near summit, the lateral branches up to 1 cm. long (or nearly 2 cm. long in 15-flowered dichasia); calyx-lobes 4; disk about 3 mm. wide; style 6.5 mm. long; locules 2; ovules (12-) 15-20 (-25); fruit orange; cotyledons 2, plano-convex; plumule present.—Univ. of Mich. Neg. 1334.

Few specimens that can definitely be referred to *Myrcianthes fragrans* have been collected in South America. Many specimens from the Andes of Colombia and Venezuela, however, are similar to *M. fragrans* except that they are glabrous or essentially so throughout, and the dichasia tend to be 7- or 15-flowered, rather than 3-7-flowered as in most populations of *M. fragrans*. This glabrous and rather abundantly flowered plant is *Eugenia dugandii* Standl. It is known mostly at middle elevations, from 1500 to 2200 meters.

COLOMBIA: Antioquia: Medellín, *A. Dugand* G. 904 (F, type); Bello, *W. A. Archer* 233 (US); Copacabana, *Bro. Daniel* 269 (US).—Tolima: Río Páez, *Lehmann* 5818 (GH, US).—Huila: Cordillera Oriental, 25 km. southeast of La Bodega, *E. L. Little* 9056 (MICH).

VENEZUELA: Mérida: *Aristeguieta* 3332 (MICH), *Bernardi* 283 (NY), *Jahn* 708 (US), 1049 (GH, US), *Steyermark* 55955 (F), *Tamayo* 2431 (US).—Sucre: Headwaters of Río de Amana, *Steyermark* 62734 (F).—Monagas: Cerro Guácharo, *Steyermark* 62338 (F). In the specimens from Sucre and Monagas, the leaves are thinner and more ovate than usual, in these features suggesting West Indian specimens of *M. fragrans*.

***Myrcianthes fragrans* (Sw.) McVaugh, comb. nov., var. *fragrans*.** *Myrtus fragrans* Sw. Prodr. 79. 1788. *Eugenia punctata* Vahl, Symb. 3: 65. 1794 (type from Santa Cruz, *von Rohr, West*). *E. fragrans* (Sw.) Willd. Sp. Pl. 2: 964. 1800. *Anamomis fragrans* (Sw.) Griseb. Fl. Brit. W. Ind. 240. 1860. *E. triflora* Sessé & Moc. Naturaleza II. 1: app. 83. 1888 (type from Cuernavaca, Morelos). *M. biflora*, sensu Sessé & Moc. Fl. Mex. ed. 2. 125. 1894 (from Córdoba, Veracruz). *Myrcia seleriana* Donn.-Sm. Bot. Gaz. 27: 332. 1899 (type from Chaculá, Guatemala, *Seler* 3169). *E. steyermarkii* Standl. Field Mus. Bot. 22: 360. 1940 (type from Guatemala near Volcán de Tacaná, *Steyermark* 36210). *E. lopeziana* A. Molina, Ceiba 3: 170. 1953 (type from Honduras, *Molina* 3007).

Leaves nearly glabrous, elliptic to ovate or obovate, 2.5-6.5 cm. long, usually about twice as long as wide, short-petioled; inflorescence more or less appressed-pubescent, the hypanthium often densely white-hairy and contrasting with the green glabrous calyx-lobes; dichasia 3- or often 7-flowered, the peduncles 2-4 (-6)



cm. long, (0.7-) 1.2-1.5 mm. wide at apex; flowers small (buds 3-4.5 mm. long, styles 6.5 mm. long or less, disk 3-3.5 mm. wide, calyx-lobes 2.5-3.5 mm. wide at base).

What appears to comprise a single species, *Myrcianthes fragrans*, is centered geographically in the Caribbean region. The nomenclatural type was from Jamaica. Members of the complex occur naturally on all the Greater Antilles, and to a lesser extent on other islands farther east; in the Bahamas and Florida; rather abundantly in eastern Mexico from Tamaulipas to Veracruz and in the Yucatan peninsula, in Central America and in northern Venezuela. A few collections from western and southwestern Mexico (state of Mexico to Durango) apparently belong to the same species-complex but are hard to classify because of the small number of specimens available. Additional small populations in eastern Mexico (San Luis Potosí and Tamaulipas), in Florida (*Eugenia dicrana* Berg, *Anamomis simpsonii* Small), in the Bahamas (*Anamomis lucayana* Britton), and larger populations in the Greater Antilles, are evidently inter-related in a way not yet understood. It would seem premature to assign varietal or subspecific names to most of these populations until their taxonomy can be more adequately worked out. Urban said of this species many years ago, "Typus polymorphus in futuro in varietates dividendus nec vix in species distinctas disjungendus."

In accordance with the letter of the nomenclatural Code, a pedant may argue that *Myrtus fragrans* Sw. must be rejected because it was superfluous when published and therefore illegitimate. It is true that in the *Prodromus* Swartz cited in the synonymy of *M. fragrans*, without any question or qualification, "*Eugenia montana* Aubl. guian. 495. t. 195." In a later publication, however (Fl. Ind. Occ. 2: 914. 1800), Swartz included *Eugenia montana* Aubl. in the synonymy of *M. fragrans* with a query, and with the statement on p. 916: "*Eugenia montana* Aubl. (l.c.) meae [i.e. to *Myrtus fragrans*] simillima est; quam vero color fructus hujus mihi sit ignotus, nihil pro certo affirmare possum." I think it may be reasonably argued that Swartz never was really sure of the identity of *Eugenia montana* Aubl., and that even in the *Prodromus* his intention was merely to compare with his own new species an Aublet species that he thought *might* be the same. Limitations of space in the *Prodromus* presumably precluded the full explanation given later in the *Flora*. I do not see any indication that Swartz intended to *replace* Aublet's name by a new one; his early judgment, and also his more matured opinion, was that the Jamaican *Myrtus fragrans* was an independent species. I do not think that a well-established name should be upset on a

legalistic interpretation of a technicality, perhaps merely because Swartz, in ignorance of the International Code of Nomenclature, neglected in 1788 to insert the question-mark that he included in 1800.

Among the insular populations in the West Indies, it seems there are two principal tendencies: One toward a 3-flowered dichasium and smooth, elliptic, broad and obtusely pointed leaves with short petioles (e.g. in Jamaica), and another toward a 7-flowered dichasium and glandular-verrucose, oblong-obovate, obtuse or rounded or re-tuse leaves with longer petioles (e.g. *Eugenia granulata* Berg, in Cuba and Hispaniola). Many exceptions to these generalizations may be observed, and it is evident that a revision of West Indian *Myrcianthes* is still to be desired. Most specimens of the *fragrans* group from Central America or Mexico, however, can be referred to one or the other of the above types.

A majority of the specimens from the continent of North America, and a few from northern South America, bear a strong resemblance to the plant of Jamaica (i.e., *M. fragrans* var. *fragrans*) except the petioles are longer (often 4–6 mm. as against 2–4 mm. in the Jamaican plant) and the dichasia are often 7-flowered (usually 3-flowered in the Jamaican plant); the leaf-blades in Central American plants may be narrower than those of Jamaica, where the blades are often 1.3–2 times as long as wide.

The following specimens are of the general type of *M. fragrans* var. *fragrans*:

MEXICO: Veracruz: Rancho La Palmilla, *Purpus* 16350 (A, F); Zacuapán, *Purpus* 7518 (A); Mirador, *Liebmann* 3971 (US).—Chiapas: Mt. Pasitar [Paxtal], *Matuda* 468 (MICH, US); Pinabeto, Motozintla, *Matuda* 15481 (F, an exceptionally lanose form).

BRITISH HONDURAS: Guatemala boundary, Camp 33, *Schipp* 1240 (A, F, GH, MICH).

GUATEMALA: Huehuetenango: Maxbal, *Steyermark* 48904 (A, F); Chaculá, *Seler* 3169 (a narrow-leaved form, type of *Myrcia seleriana*; US).—San Marcos: Volcán Tacaná, *Steyermark* 36210 (F, type of *E. steyermarkii*).

HONDURAS: Comayagua, *Edwards* P592 (A, F, US).—Morazán: Río Guarabuqui, *Molina* 3007 (F; US, type of *E. lopeziana*; Univ. of Mich. Negs. 1326, 1327).

NICARAGUA: Near Granada, summit Mt. Mombacho, *Grant* 835 (A, F).

COSTA RICA: Alajuela: Zarcero, *Austin Smith* 608, 2687, 4173, 4185 (all F); Zapote, *Smith* NY579 (A, F); Llano Bonito, *Smith* P2391 (UC, A). Copey, *Tonduz* 11741 (GH). Piedra Blanca, Iscasú, *F. Solís R.* 480 (F).

COLOMBIA: Sta. Marta, near Escalera de los Indios, *H. H. Smith* 434 (GH); near Masinga, *Smith* 402 (A, F, GH, MICH, PH, US).—Norte de Santander: Pamplona-Toledo, on divide, *Killip & Smith* 19917 (A, GH, US).

VENEZUELA: Paraguana Peninsula, Cerro Sta. Ana, *Curran & Haman* 703 (GH, NY, US).

Plants resembling *Eugenia granulata* Berg (i.e. like many specimens from Cuba and Hispaniola) are not commonly found in continental North America. A few collections, however, are noteworthy, for their resemblance to the many-flowered West Indian populations with oblong-obovate glandular-verrucose leaves:

MEXICO: Quintana Roo: Cozumel Island, *Steere* 2976 (MICH).—Tres Mariás: María Madre, *Nelson* 4306 (F, US), *Maltby* 147 (F, US).

In Costa Rica and Panama there has been some confusion between what I take to be *M. fragrans* in the broad sense, and an endemic species, *Myrcianthes (Eugenia) storkii*. After the publication in 1930 of *Eugenia storkii*, Standley routinely referred to that species all specimens of "cymosely flowered" eugenias from Costa Rica and Panama. Miss Amshoff, in her treatment of the Myrtaceae of Panama (*Ann. Missouri Bot. Gard.* 45: 182. 1958), referred all the Panamanian material to *E. fragrans*, and relegated *E. storkii* to synonymy without comment. Some comment seems necessary.

Most specimens from both Costa Rica and Panama, at least from elevations up to 1650–1700 meters, I should refer to *Myrcianthes fragrans* in the broad sense. Two principal races, however, are distinguishable. One of these is like typical *fragrans* of Jamaica, and specimens of it are cited above under *M. fragrans* var. *fragrans*; the pubescence in this race is usually appressed, and the hypanthium rather strongly and noticeably white-hairy. In the second race the pubescence on the branchlets and inflorescence is bristly rather than appressed, but the hypanthium is only sparingly strigose. This is var. *hispidula*, described below. At higher elevations (1900–2850 meters) in Costa Rica, *Myrcianthes fragrans* is apparently replaced by another species, with somewhat larger flowers, stouter glabrous inflorescence, and broader and more obtuse leaves; this is *Eugenia storkii* Standl., q.v. below.

**Myrcianthes fragrans**, var. **hispidula** McVaugh, var. nov.

Ramuli inflorescentiaeque hispiduli; hypanthium basi sparsim vel vix sericeo-strigosum; folia elliptica vel obovata, 2.5–6 cm. longa, (1.6–) 2–3-plo longiora quam latiora, apice obtusa vel rotundata, basi acuta vel cuneata; pedunculus 2–3 (–4) cm. longus, ad apicem 1.2–1.5 (–1.7) mm. crassus, flores 3–7 gerens; alabastra 3–4.5 mm. longa; discus diametro 2.5–3 mm., hirsutus; ovula ovarii quoque locula 16–20.—Univ. of Mich. Neg. 1351.

Costa Rica and Panama, in woods, savannahs and pastures, at middle elevations (1000–1700 meters), flowering March–June, fruiting July–August.

COSTA RICA: San Ramón, vicinity of La Palma, *A. M. Brenes* 5497 (F), 5503 (F), 5659 (F), 15142 (A; F, type), 16194 (F); Cerro Jucosal, *H. E. Stork* 1228 (F, paratype of *Eugenia storkii*); Las Con-cavas, *C. H. Lankester* K99 (F, paratype of *E. storkii*); Navarrito–Cartago, *R. Torres R.*, 18 Oct. 1926 (US); Prov. Cartago, Dulce Nombre, *Standley* 35929 (US).

PANAMA: Chiriquí: Between El Boquete and Caldera, *H. Pittier* 3326 (US); Boquete, *M. E. Davidson* 460 (A, F, US), 774 (A, F, US), 821 (F), 1062 (F); valley of Río Chiriquí Viejo, *G. White* 108 (F, GH); valley of Río Chiriquí Viejo near El Volcán, *P. White* 211 (F, GH), 217 (F, GH).

**Myrcianthes irregularis** McVaugh, sp. nov.

Arbor velutina vel sparse hirsuta, pilis fulvo-flavidis usque ad 0.8 mm. longis instructa; folia rigide coriacea, suborbicularia, ovalia vel obovata, 2–5.5 (–11) cm. longa, 1.5–5 (–9) cm. lata, apice rotundata retusave, basi rotundata truncata vel subcordata, petiolis hirsutis 4–8 mm. longis, venis lateralibus utroque latere 5–6, subtus prominiisculis, inter se arcuatis sed venam marginalem vix formantibus; inflorescentia irregulariter 2–3-dichotoma, pedunculo 2.5–3.5 cm. longo, 2–2.5 mm. lato; discus 4–5 mm. latus, annulo staminali molliter pubescente; stamina ca. 150; ovarium biloculare, loculis intus hirsutis, ovulis quoque loculo 10–11, e marginibus placentae erectae hipocrepiformis radiantibus.

A tree, densely velutinous or sparsely hirsute with yellowish-brown bristly hairs up to 0.8 mm. long; leaves rigidly coriaceous, glabrate above (at first bristly along the broadly sulcate midvein), suborbicular to broadly oval or obovate, 1.5–5 (–9) cm. wide, 2–5.5 (–11) cm. long, rounded or retuse, rounded truncate or subcordate at base, the margins abruptly narrowed to stout short hirsute petioles 1–2.5 mm. thick, 4–8 mm. long; lateral veins on each side 5–6 in addition to some intermediate ones, inconspicuous above in mature leaves, prominent and somewhat elevated beneath, diminishing distally, not forming a strong marginal vein but each over-arching 2–6 mm. from the margin and joining the adjacent lateral; glandular dots inconspicuous; immature leaves conspicuously reticulate-veined in drying; inflorescence irregularly forked 2 or 3 times; peduncle 2.5–3.5 cm. long, 2–2.5 mm. wide near summit, compressed, the flowers usually 3 in small dichasia at the tips of



the 2-3 branches; central flowers sessile; hypanthium subglobose, thinly hirsute, 2.5 mm. wide, somewhat contracted to a neck; calyx-lobes 4, nearly equal, fleshy, concave, rounded or obscurely triangular, 1.5-1.9 mm. long, 3-3.5 mm. wide, glabrous or essentially so within; disk quadrate, 4-5 mm. wide, the staminal ring soft-hairy; style soft-hairy at base (not seen complete); stamens about 150; petals broad-clawed, finely pubescent near base, about 4 mm. broad and long; ovary bilocular, the locules hirsute on the inner surfaces, the ovules 10-11 in each locule, radiating in one plane from an axile horseshoe-shaped placenta; fruit "round, yellow," according to Acosta-Solís, not seen. "Mate-mate."

ECUADOR: Loja: Bosque de "La Mira," Hda. La Hamaca, Catacocha, alt. 2400-2600 m., 17 Apr. 1944, *Acosta-Solís 7923* (F, type).

The generic position of this species may be questioned by some. The disposition of the ovules and the irregularly forked flowering branches are somewhat suggestive of *Psidium*, but against this are the bilocular ovary and the 4-parted calyx. If the fruit is actually yellow, as stated by the collector, this may indicate a relationship to *Psidium*. Fruiting specimens should be sought for final disposition of this species.

***Myrcianthes karsteniana*** (Berg) McVaugh, comb. nov. *Eugenia karsteniana* Berg, *Linnaea* 27: 277. 1856. *Myrcia karsteniana* (Berg) Steyermark, *Fieldiana, Bot.* 28: 1017. 1957.

A recent collection, *García 94*, is the first-known specimen in the fruiting condition. In the slightly immature fruit the beanlike embryo separates easily into 2 plano-convex plump cotyledons; the radicle is short and erect, the plumule immature but perceptible. On the basis of this embryo-structure, the species is to be referred to *Myrcianthes* as I understand it. In two flowering specimens, *Fendler 2321* and *Allart 413*, the ovules are 15-20 in each of two locules, radiate in a subcapitate group affixed to the central dissepiment; this seems to rule out any possibility that the species belongs with *Myrcia*. I have not seen the syntypes (*Karsten, Moritz* in herb. Berlin), but duplicates photographed in Vienna (Field Mus. Negs. 31578, 31579) certainly are the same species as the Fendler, Allart and García specimens.

The inflorescence in this species is not exactly like that of other species of *Myrcianthes*; it is in fact a myrcioid panicle (see *Fieldiana, Bot.* 29: 158-160. 1956) 6-11 cm. long, each main branch with 5-6 decussate nodes from which arise shorter branches, the strongly compressed internodes 2.5-5 mm. wide or the distal ones narrower, the flowers numerous, mostly in 3- or 7-flowered dichasia at the tips of the branches.

In *Eugenia pycnantha* Benth., a species of western Ecuador and southern Colombia (also erroneously referred to *Myrcia* by Steyermark, l.c. 1018), the inflorescences are corymbosely aggregated toward the ends of the branches, the individual dichasia are 3 or 4 times dichotomously forked with flat joint-like more or less appressed internodes 1 cm. long or less. This is probably also best referred to *Myrcianthes*, but certain disposition of it must await the discovery of fruiting material. The ovules are 10–15 in each of two locules, definitely excluding this species from the Myrciinae.

***Myrcianthes leucoxylla*** (Ort.) McVaugh, comb. nov. *Myrtus leucoxylla* Ort. Dec. 129. t. 17, fig. 2. 1800. *Myrtus foliosa* HBK. Nov. Gen. & Sp. 6: 134 (folio ed. p. 106). 1823. *Myrcianthes foliosa* (HBK.) McVaugh, Field Mus. Bot. 13, pt. 4: 758. 1958.

The name *Myrtus leucoxylla* Ort. seems to have been overlooked both by DeCandolle and by Berg in their general revisions of the American Myrtaceae. The type-locality according to Ortega was "in novo Regno Granatensi cum *Hopea terniflora*" [i.e. "in Sanctae-fidensi Australis Americes Regno, ad urbem principem, aliisque passim locis," or in other words near Bogotá, Columbia, where the local name was said to be *palo blanco*]. Ortega's plate is a very good representation indeed of the plant long known as *Myrtus foliosa* or as *Eugenia foliosa* (HBK.) DC., a species common in the mountains about Bogotá. The description calls for a glabrous plant with short-petiolate, ovate, subcordate leaves with short-acuminate tip; 3-flowered axillary peduncles and short-pedicellate flowers; four-parted calyx with subrotund concave ciliate lobes reflexed in flower, and subglobose fruit. There can be little doubt that *Myrtus foliosa* HBK. and *M. leucoxylla* Ort. are conspecific.

***Eugenia mariquitensis*** Berg, Linnaea 27: 267. 1856.

This was based on a specimen from Mariquita, Colombia, *Linden* 1102. I have seen isotypes in the herbaria of Harvard University and the Naturhistorisches Museum in Vienna, and I should refer this species to the synonymy of *Myrcianthes rhopaloides* (HBK.) McVaugh.

***Myrcianthes mato*** (Griseb.) McVaugh, comb. nov. *Eugenia mato* Griseb. Abh. Kgl. Ges. Wiss. Goett. 24: 125. 1879.

I have not seen authentic material of this species, but Legrand studied a "cotype" (*Lorentz & Hieronymus* 880), and on the basis

of this and other material published a detailed description and an illustration contrasting this species with another previously undescribed, *E. pseudo-mato* (Legrand, D., Contribución al conocimiento de tres árboles argentinos de la familia de las mirtáceas. Lilloa 10: 471-482, with plate. 1944). The embryo of *E. mato* is described by Legrand as follows (l.c., p. 476): "... cotiledones grandes, algo convexos, separados, con radícula diminutas exserta."

This plant is very like *Eugenia* [*Myrcianthes*] *pseudo-mato* and other undoubted species of *Myrcianthes*, except that the peduncles are one-flowered. This is apparently not a particularly fundamental character, as one-flowered peduncles may be found occasionally in various species of *Myrcianthes* that are normally 3-flowered (see the key in *Flora of Peru*, 13, pt. 4: 747-749).

In addition to the specimens cited by Legrand, the following may be mentioned:

ARGENTINA: Tucumán: *Venturi* 1991 (A), 10035 (A, GH).

***Myrcianthes minimifolia*** (McVaugh) McVaugh, comb. nov.  
*Eugenia minimifolia* McVaugh, Fieldiana, Bot. 29: 213. 1956.

This was treated in the *Flora of Peru*, 13, pt. 4: 764-765, as a species of *Myrcianthes*, but the formal nomenclatural transfer was not made because this species has one-flowered peduncles and at that time I had seen none except flowering specimens. In 1959 Dr. Ramón Ferreyra sent me fruiting specimens; in the somewhat immature embryo there are two large fleshy separate cotyledons and a short radicle. This would appear to justify the transfer made above. The following additional specimens have been seen:

PERU: Arequipa: Prov. Caravelí, Lomas de Pongo cerca de Acarí, 700-750 m., *Ferreyra* 13423 (MICH), 13481 (MICH).

***Eugenia orthostemon*** Berg, Linnaea 27: 179. 1856.

This was based on *Linden* 807, from near Fusagasugá, Colombia. Because of the one-flowered peduncles it was placed by Berg in his large group *Biflorae*, not with the *Dichotomae*. On the basis of most of its morphological characteristics, I believe it belongs with the other Andean species of *Myrcianthes*, but fruit is needed to confirm this. It may be related to such species as *Eugenia puniceifolia* (HBK.) DC.

***Myrcianthes prodigiosa*** McVaugh, sp. nov.

Arbor glabra 5-15-metralis; folia rigide coriacea, elliptica vel elliptico-ovata vel -obovata, 10-23 cm. longa, 5-10 cm. lata, brevi-acuminata, basi rotundata

usque ad acuta, petiolis 1.5–2.5 cm. longis, nervo medio supra impresso, venis lateralibus numerosis inconspicuis; inflorescentia crassa, plerumque triflora, pedunculo compresso 3–8 cm. longo, versus apicem 4–5 mm. lato; alabastra turbinata 1.7–2 cm. longa; calycis lobi 4 (–5), suborbiculares, 5–10 mm. longi latique; discus 12–15 mm. latus; stylus 2.5 cm. longus; stamina ca. 250; ovarium triloculare, loculis duobus minoribus, ovulis quoque loculo 10–20; fructus globosus oblatiusve, diametro 4–5 cm.; semina 2 (–1), cotyledonibus 2, plano-convexis inaequalibus.

A tree 5–15 meters high, 20–30 cm. in diameter, glabrous except for stiff sordid hairs on the vegetative buds, and for the bristly staminal ring; leaves rigidly coriaceous, elliptic or elliptic-ovate or -obovate, 5–10 cm. wide, 10–23 cm. long, 2–2.5 times as long as wide, abruptly short-acuminate at tip, the base unequal-sided and rounded to acute, the revolute margins decurrent on the narrow inner angles of the stout petioles 2–3 mm. thick, 1.5–2.5 cm. long; midvein narrowly impressed above, elevated most of its diameter beneath; lateral veins numerous, 12–20 pairs including some intermediate ones, inconspicuous on both sides or somewhat elevated above when dry; marginal vein like the lateral ones and somewhat arched between them, 2–5 mm. from the margin; blades lustrous above and finely resinous-dotted (sometimes impressed-punctate), dull below, opaque and nearly featureless; inflorescences in leaf-axils, or a pair opposite at the lowermost (bracteate) nodes of a short terminal branch; peduncles stout, 3-flowered or by reduction 2-flowered, 3–8 cm. long, compressed toward the summit and there 4–5 mm. wide; terminal flower sessile or its pedicel 3–5 mm. long, the lateral pedicels 5–15 mm. long; bracteoles falling before the buds mature; buds turbinate, 1.7–2 cm. long; calyx 4- to 5-merous, the lobes 4 or 5 and subequal, or 4 with one additional smaller lobe; lobes suborbicular, fleshy with thin hyaline short-ciliate margins, 5–10 mm. long and wide, soon reflexed at anthesis; hypanthium 1 cm. long, attenuate to the base; disk 12–15 mm. wide (10–12 mm. wide in fruit), the glabrous center 6–8 mm. wide; style 2.5 cm. long; stamens about 250, about as long as the style; petals white; ovary trilocular (one locule sometimes about as large as the other two combined), the ovules 10–20 in each locule, in compact somewhat elongate groups radiating from the central axis; fruit green, globose or oblate, 4–5 cm. in diameter; seeds 1 (–2), up to 4 cm. long, with leathery testa wrinkled in drying, and 2 unequal plano-convex cotyledons.

BRITISH GUIANA: Kaieteur Plateau, savanna and savanna forest, Kaieteur Falls to Mure-Mure Savanna, elev. 1400 ft., 12 Mar. 1962 (fr.), *R. S. Cowan & T. R. Soderstrom 2147* (MICH).

SURINAM: Tafelberg, near summit, margin of North Ridge Creek, mixed high forest, 8 Sep. 1944 (bud & fl.), *B. Maguire 24657* (MICH, type); Tafelberg, 5 km. northeast of Savanna No. 2, mixed high forest, 1850 ft., 13 Sep. 1944 (old fl.), *Maguire 24711* (MICH).

This extraordinary species can hardly be referred to any genus except *Myrcianthes*, but it is unique in that genus by virtue of its very large flowers and fruits and its trilocular ovary.

***Myrcianthes pseudo-mato*** (Legrand) McVaugh, comb. nov.  
*Eugenia pseudo-mato* Legrand, Lilloa 10: 477. 1944. *Pseudomyrcianthes pseudo-mato* (Legrand) Kausel, Ark. Bot. II. 3: 505. 1956.



I have not seen the type, but from the photograph of it published by Legrand, and from his excellent description and illustration, there can be no doubt of its identity. It is clearly a species of *Myrcianthes*; actually some Argentinian and Bolivian material can scarcely be distinguished from *M. discolor* of the Peruvian Andes. In West's no. 8312, cited below, the cotyledons are distinct, plano-convex, the radicle half as long, the plumule evident, silky, 1.5 mm. long. The following specimens have been seen:

BOLIVIA: Tarija: Rincón de la Victoria, 15 km. southwest of Tarija, *J. West 8312* (GH).

ARGENTINA: Tucumán: Dept. Chichigasta, Estancia Las Pavas, *P. Jörgensen 13* (GH; this number also cited by Legrand). Dept. Monteros, Quebrada de Caspiuchango, *Schreiter 5765* (Herb. Lillo 6672) (F, GH), *Venturi 9595* (A, GH, US). Dept. Taft, Cerro de Taficillo, *Venturi 9723* (A, GH), *9998* (US).

The genus *Pseudomyrcianthes* was distinguished by Kausel because it was said to have the placenta arising near the apex of the locule, the embryo sub-homogeneous ("Embryo homogeneous later-aliter paullo retusus, fissuram interembryonariam longitudinalem praebens") and splitting only partially. My observations on specimens of what I take to be *Myrcianthes pseudo-mato* do not confirm those of Kausel on the structure of the embryo as described for *Pseudomyrcianthes*. I cannot attest to the importance of apical versus central placentation, but the distinction between these would seem to be somewhat subjective.

**Eugenia pycnantha** Benth. Pl. Hartw. 174. 1845. Colombia (the type from the province of Popayán, *Hartweg 976*) and Ecuador.

This is probably a species of *Myrcianthes*, in general appearance not unlike *M. bifurcata*, and *M. osteomeloides* (see *Flora of Peru*, 13, pt. 4: 750, 752, 768, 773), and somewhat suggesting *M. karsteniana* (q.v. above). Fruiting material is needed for proper generic disposition.

**Eugenia rigidissima** Cufodontis, Archivio Bot. 9: 198. 1933. Costa Rica, the type from Volcán de Turrialba at 2500 m., *Porsch 758*.

Standley (Field Mus. Bot. 18: 774. 1937) referred this species to the synonymy of *E. storkii* Standl. I have not seen the type of *E. rigidissima*, but it may be a distinct species. Amshoff (Ann.

Missouri Bot. Gard. 45: 184. 1958), in writing of *P. H. Allen 1563*, from Cerro Punta at 2000 m., Chiriquí, Panama, refers this specimen to *E. fragrans* but says: “. . . a rather distinct looking specimen with suborbiculate, very rigid leaves with impressed nerves agreeing with *Eugenia rigidissima* Cuf. . . .”

Allen's specimen (F, US) may be described as follows:

Tree 30 m.; young growth with silky-matted hairs, the year-old branchlets strigose; leaves very broadly rounded, 1.5–2.8 cm. wide, 1.8–3 cm. long, rounded or obtuse at both ends, very coriaceous, 3–5 pairs of the lateral veins impressed above, stronger than any intermediate veins and prominent beneath; buds glabrous, 5–6 mm. long; inflorescence glabrous, the peduncles 3-flowered, 1–2 cm. long, 2–2.5 mm. wide at apex; disk glabrous, 3.5–4.5 mm. wide; stamens 175–200; ovules about 30 in each locule.

On the basis of characteristics used elsewhere in separating species of *Myrcianthes*, this would deserve recognition as a distinct species.

***Eugenia rondonensis*** Steyerf. Fieldiana, Bot. 28: 1013. 1957. Venezuela, the type from Mt. Roraima, *Steyermark 58956* (F).

This is a nearly glabrous ample-leaved plant looking superficially like some form of *M. fragrans* or *M. dugandii*. The type is a specimen in very immature bud (Univ. of Mich. Neg. 1337). The peduncles are relatively long and very slender (5–6 cm. long), all 3-flowered, the hypanthium glabrous like the rest of the inflorescence, the ovules about 12 in a subcapitate group in each of two locules. In the key above, this specimen would be identified as *M. dugandii*, except that the peduncles are 3-flowered and unusually long and slender. It does not appear to be a very distinctive species, but the available material is too immature to permit a judgment.

### ***Myrcianthes sessilis* McVaugh, sp. nov.**

Arbor 12-metralis, innovationibus gemmisque, et petiolis, pilis appressis sericeis, pallidis, usque ad 0.5 mm. longis, rare praeditis; hypanthio et lorum calycis superficie exteriori similiter sed densiuscule sericeis; foliis 4–8 cm. longis ellipticis obtusis vel obtuse acuminatis, venis inconspicuis; dichasio 3-floro, pedunculo 2–3 cm. longo, apicem versus 2–2.5 mm. lato, floribus sessilibus; stylo 7–8 mm. longo.

A tree to 40 feet high (Smith), the youngest branchlets and petioles, and the leaf-buds thinly appressed-silky with white hairs up to 0.5 mm. long; hypanthium and the outer surface of the calyx-lobes similarly but conspicuously and densely pubescent; leaves coriaceous, lustrous above, elliptic, 2–3.5 cm. wide, 4–8 cm. long, 1.8–2.2 times as long as wide, the tip obtuse to acute or bluntly acuminate, the base acute, the margins decurrent on the sulcate petiole 1–1.5 mm. thick, 8–10 mm. long; midvein impressed above, prominent beneath; lateral veins 10–12 pairs, in-

definite in number with some intermediate veins, in drying raised a little on both surfaces; marginal vein about equaling the laterals and arched between them, 1–2 mm. from the margin; inflorescence an axillary dichasium, 3-flowered, the flowers all sessile, the peduncle 2–3 cm. long, compressed and enlarged distally, where 2–2.5 mm. wide; bracts and bracteoles deciduous before anthesis; buds 5–6 mm. long, obovoid; hypanthium 3 mm. long, funnelform or somewhat rounded at the base; calyx-lobes in 2 nearly equal pairs, rounded, glabrous or silky on the inner surface, 3–5 mm. wide, 2.5–3.5 mm. long; disk 4–5 mm. wide, the broad staminal ring hairy, the style-base conic, 1 mm. wide; style 7–8 mm. long; stamens 150–175, to 8–9 mm. long, the anthers 0.7–0.8 mm. long; petals oblong-obovate, ciliate-fringed and silky on outer surface near base, 6 mm. wide and 10 mm. long; ovary bilocular, the ovules 8 in each locule, somewhat biseriate on a centrally affixed placenta; fruit not seen.

COLOMBIA: Masinga, [Sierra de] Santa Marta, rare below 1500 feet, generally in wooded valleys, Dec. 22 [1898–1901], *Herbert H. Smith* 776 (A; F; GH, type; MICH; PH; US); Santa Marta, *Smith* 1735 (F; PH; US).

Apparently a most distinctive species, easily recognized from the limited material now available by the abundant silky pubescence, the sessile flowers and the long-petiolate, lustrous, and coriaceous leaves.

***Myrcianthes storkii*** (Standl.) McVaugh, comb. nov. *Eugenia storkii* Standl. Field Mus. Bot. 8: 143. 1930.

Young growth thinly silky-strigose, the 1-year-old branchlets thinly strigose or glabrate; leaves obovate or rounded to broadly elliptic, 1.5–3.5 cm. wide, 2–5 cm. long, 1–1.7 (–2.5) times as long as wide [on shoots up to 2.5–4.5 cm. wide, 4.5–7 cm. long, 1.5–1.75 times as long as wide]; blades coriaceous, rounded or bluntly pointed at apex, cuneate to obtuse (or rounded) at base, the veins not impressed above but 3–7 pairs of the laterals much stronger than the intermediate ones and prominent beneath; buds 4–6 mm. long, glabrous; inflorescence glabrous, the peduncle 3-flowered, 2–2.5 cm. long, 1.5–1.7 mm. wide at the apex; disk hirsute, 3.5–4 mm. wide; stamens ca. 150; ovules ca. 20 in each of 2 locules.

Costa Rica, in *potreros* and about edges of woodlands, 1900–2850 m., flowering in April and May.

COSTA RICA: *Potrero* below Poás, *H. E. Stork* 2501 (F, type); east of Irazú, *Stork* 2074 (F, paratype; MICH); Alajuela, south slope of Volcán Poás, *Austin Smith* P2401 (A, UC); Alajuela, Palмира, *Smith* NY676 (A), H676 (F), P2627 (F); El Tablazo, *Echeverría* 377 (F, UC); Prov. Heredia, Cerro de las Caricias, *Standley & Valerio* 52193 (US).

Of the four paratype collections of *E. storkii*, only one (*Stork* 2074) can be confidently referred to this species. Two (*Stork* 1228

and *Lankester K99*) are cited above under *M. fragrans* var. *hispidula*. The fourth paratype (*Standley & Torres 47426*, from Fraijanes, Alajuela, at 1500–1700 m.) is sterile (F, US) and indeterminable. Two other collections from the same general locality (*Standley and Torres 47619, 47725*, both US) are similarly sterile and are likewise indeterminable.

For discussion of the taxonomic position of this species, see above under *M. fragrans* var. *hispidula*.

***Myrcianthes ternifolia*** (Berg) McVaugh, comb. nov. *Eugenia ternifolia* Berg, *Linnaea* 27: 246. 1856. Venezuela, the type “in montibus Sierra Nevada,” *Moritz 1183*.

A little-known species of the mountains of northeastern Colombia and adjacent Venezuela. The leaves are sometimes partly opposite, usually ternate; the flowers in all the specimens I have seen are aggregated near the tips of the branches in abundantly produced but 3-flowered stout axillary dichasia; the total effect is that of a series of small corymbose panicles suggesting the inflorescences of *Eugenia pycnantha*, q.v.

Berg distinguished this species from *Eugenia triquetra* by the spatulate leaves and the “pedunculis saepissime 3-floris.” A photograph of a presumed isotype, however, *Moritz 1183* (G–DEL), shows the peduncles chiefly 1-flowered (Field Mus. Neg. 23594). Possibly *Moritz 1183* was a mixture. Berg described the ovary as bilocular and many-ovulate.

***Eugenia triquetra*** Berg, *Linnaea* 27: 141. 1856. Colombia and Venezuela, the syntypes from “inter Pamplona et Tapagua,” *Linden 726* and “in montibus Sierra Nevada, in Venezuela,” *Moritz 1184*.

A poorly understood species, treated in the *Flora of Peru*, 13, pt. 4: 774 with *Myrcianthes*. It seems to be still unknown in the fruiting condition.

***Eugenia turumiquirensis*** Steyerm. *Fieldiana*, Bot. 28: 1015. 1957. Venezuela, the type from Sucre, Cerro Turumiquire, *Steyermark 62548*.

The type is in young bud. It suggests a moderately or perhaps more than ordinarily pubescent form of *Myrcianthes fragrans*. If it had come from Jamaica or Central America I should have referred it without question to *M. fragrans*.—Univ. of Mich. Neg. 1338.



## 6. CERTAIN EUGENIOID GENERA

There is need for some clarification of generic lines among certain taxa that seem to represent specialized lines of evolution among the Eugeniinae. In these the flowers are morphologically racemose but the axis of the raceme is usually so much reduced in length that the flowers appear to be in small axillary fascicles or glomerules; the number of ovules in each locule of the ovary is reduced at least to 4 and usually to 2; the hypanthium is prolonged into a tube or cylinder extending well above the level of the summit of the ovary; and the combined structures of the calyx and hypanthium are otherwise specialized: The calyx is closed or nearly closed in the bud, and usually splits irregularly down toward the summit of the ovary at flowering time, and in many species the tubular part of the hypanthium is circumscissile and cleanly dehiscent from the summit of the ovary.

In recent years explorations in northern South America have brought to light a number of species, mostly as yet unstudied and undescribed, that according to current interpretations might be assigned (and sometimes have been assigned) to *Marlierea*, *Myrciaria*, *Plinia* or *Siphoneugena*. A considerable number of flowering specimens is available, but fruiting specimens are poorly represented in herbaria, and it has not often been possible to associate flowering and fruiting material of the same species. Characters of the embryo are especially important in the delimitation of the genus *Plinia* as understood by Amshoff (Fl. Suriname 3: 97-99. 1951) and McVaugh (Flora of Peru, 13, pt. 4: 775-780. 1958). As a result of the incompleteness of material now available, it is sometimes impossible to assign flowering specimens to genus. As I understand the genera listed above, they may be distinguished as follows (*Marlierea* not included, as its relationships are with the Myrciinae; it resembles the other genera only in having 2 ovules. The key that follows is particularly applicable to plants of northern South America; the numerous West Indian species of *Plinia* described by Urban have not been considered, as they are mostly vegetatively very different and few of them are known except from sterile specimens):

Hypanthium circumscissile at base, cleanly deciduous (with the perianth and androecium) at about the time of anthesis, leaving a circular scar on the ovary and fruit; calyx shortly four-lobed, the lobes ciliate, probably always imbricate but often obscurely so.

Ovary below the deciduous part of the hypanthium prolonged, fusiform or campanulate, usually contracted into a neck in bud and in flower; bracteoles scarcely connate, much shorter than the ovary; embryo as far as known

with 2 distinct plano-convex cotyledons; ovules usually 4 in each locule; flowers mostly pedicellate; wet mountain forests, known chiefly from the Guayana region of Venezuela; Guadeloupe. . . . . *Siphoneugena*.

Ovary broadened from the base upward, not contracted below the line of dehiscence of the hypanthium; after dehiscence broad and flat, scarcely longer than the involucre formed by the broad connate bracteoles; pedicels almost none, or very stout and scarcely longer than the bracteoles; embryo as far as known undivided ("eugenioid"); ovules usually 2 in each locule; widespread. . . . . *Myrciaria*.

Hypanthium not circumscissile; calyx closed in bud or sometimes lobed, in anthesis splitting by irregular longitudinal fractures down to the summit of the ovary, some remnants usually persisting in fruit; embryo, as far as known, with 2 free plano-convex cotyledons, one above and one below; ovules 2 in each locule. . . . . *Plinia*.

### REVISION OF MYRCIARIA BERG, IN NORTH AMERICA AND NORTHERN SOUTH AMERICA

The genus typified by *Myrciaria tenella* (DC.) Berg (cf. Taxon 5: 143. 1956) is a very natural and closely related group, more easily recognized as a distinct genus than any other American group of the Eugeniinae. Berg, unfortunately, included in the genus as he first characterized it a number of species that obviously were unrelated to the rest—in fact, mostly species of *Myrcia*—and this error on the part of Berg may have led Bentham and Hooker to disregard the very distinct and homogeneous generic group that remains after these anomalous species have been removed. At any rate these authors, in the *Genera Plantarum*, relegated *Myrciaria* to the synonymy of *Eugenia*. Niedenzu, in the *Natürlichen Pflanzenfamilien*, accepted *Myrciaria* as a distinct genus but apparently did not understand it well, delimiting it more or less in the original sense of Berg to include several species of *Myrcia*. Beginning with the work of Chodat and Hassler on the Myrtaceae of Paraguay (Bull. Herb. Boiss. II. 7: 807–808. 1907), in which the authors recognized 11 species of *Myrciaria*, the genus has been rather generally accepted by students of the American flora.

The following key is intended to be applicable to all known species of *Myrciaria* in South America north of the Amazon River, in Central America and Mexico, and in the West Indies.

Plants glabrous except the ciliate-margined bracts and bracteoles, and the inner faces of the perianth-parts; bracts membranous, ovate, sometimes nearly concealing the buds; bracteoles membranous, distinct, orbicular or sometimes pointed, 1.5–2.5 mm. wide and about as long; leaves elliptic-oblong or -ovate,

2–4.5 cm. wide, 5.5–13.5 cm. long, acuminate and acutely attenuately pointed, broadly rounded at base, on stout terete petioles 4.5–8 mm. long; glands inconspicuous or not seen in mature leaves; veins apparent but inconspicuous above, the lower surface opaque, the veins obscure; northern Venezuela; Panama; Costa Rica. . . . . *M. vezator*.

Plants sometimes glabrous, usually at least the petioles (ventrally) and the youngest branchlets pubescent; bracts inconspicuous, much shorter than the bracteoles; bracteoles somewhat fleshy or coriaceous, usually wrinkled in drying like the hypanthium, connate by the basal margins and forming an involucre-like cupule beneath the flower; leaves various.

Leaves cordate or subcordate at base, the sinus between the basal auricles definite but sometimes shallow; blades ovate to oblong, 4–8 cm. long.

Leaves rounded or obtusely pointed at tips, prominently cordate, subsessile, the very stout petioles 2–2.5 mm. thick, 2–4 mm. long from the basal sinus of the blade to the base of the petiole; midvein about equally convex on both surfaces; plants as far as known quite glabrous; style more than 7 mm. long; Mt. Roraima. . . . . *M. cordata*.

Leaves gradually acuminate, the tip attenuate and acutely pointed; blades broadly subcordate; petioles pubescent, 1 mm. thick, 2–3 mm. long; midvein flat or somewhat convex above, convex beneath; styles probably 6–7 mm. long (ex Berg); British Guiana; Suriname. . . . *M. rismeifolia*.

Leaves acute or cuneate or sometimes slightly rounded to base, sometimes with minute auricle-like folds at the summit of the petiole, never cordate; blades various, often elliptic to lanceolate.

Leaves at apex acute (usually not prominently acuminate), mostly 6–10 cm. long; blades when dry often discolorous, the lower surface smooth and opaque, the upper dotted with large convex dark or amber-colored resinous glands; lateral veins near the base of the blade leaving the midvein at an angle less than 45°; small anastomosing veinlets almost none, the small veins all nearly parallel and ascending; margins at the base of the blade abruptly incurved into the petiole, often forming a pair of slightly raised auricle-like folds; style (8–) 10–11 mm. long; plants glabrous or the petioles (ventrally) and the youngest branchlets pubescent; widely distributed in the Amazon basin and the upper Orinoco drainage, from eastern Peru to Pará (Santarem), north to southern Venezuela. . . *M. dubia*.

Leaves at apex mostly prominently and often caudately acuminate, inconspicuously if at all glandular above, concolorous or essentially so; margins at the base of the blade cuneately decurrent or at least narrowly acute (except in *M. ibarrae* with style 5–6 mm. long); style in all species (as far as known) 7 mm. long or less.

Leaves (1.5–) 2.5–5 cm. wide, (4.5–) 7–14 cm. long, gradually long-acuminate; plants glabrous or the petioles ventrally pubescent; glands inconspicuous or scarcely apparent on both surfaces of the leaves; lateral veins near the base of the blade leaving the midvein at an angle of 45° or more; small irregular anastomosing veinlets frequent; open flowers unknown; Pará, Brazil, near the mouth of the Amazon. . . *M. amazonica*.

Leaves 0.7–2 (–3) cm. wide, 2–6 (–8) cm. long; branchlets and petioles usually abundantly and finely pubescent; glands inconspicuous, or small convex glands rather prominent beneath; lateral veins near the base of the blade varying in direction, the small veinlets few or very inconspicuous; style 4.5–6 mm. long.

Leaves of an ovate type, mostly 2–2.5 times as long as wide, sharply acuminate and often cuspidate, broadly rounded at base, the margins little if at all decurrent on the petiole; branchlets and petioles coarsely and rather sparsely hispidulous; flowers sessile; bracteoles very broadly rounded and imbricate, connate at very base only, 1.5–2 mm. long and wide, much exceeding the ovary; Guatemala (Petén).....*M. ibarrae*.

Leaves of a lanceolate type, mostly 2.5–3 times as long as wide, variously acuminate but the very tip usually blunt or merely acute, the base of the blade somewhat rounded below the middle, finally usually acute or cuneate with the margins cuneately decurrent on the splayed summit of the petiole; branchlets and petioles finely pubescent or rarely glabrous; pedicels usually 0.5–1 mm. long; bracteoles not imbricate (or very slightly so in the bud stage), united by their proximal margins into an oval bilobed or finally explanate involucre 2 mm. long; West Indies; eastern Mexico and Central America; Colombia; lowlands of the Guianas; Orinoco and Amazon lowlands from southern Venezuela to Peru and eastern Brazil (Maranhão).

*M. floribunda*.

**Myrciaria amazonica** Berg, in Mart. Fl. Bras. 14, pt. 1: 374. 1857.

An imperfectly known species, known to me from two nearly sterile specimens only, both of these from Brazilian Amazonia: Pará: Belem, *B. E. Dahlgren* & *E. Setta* 398 (F); Insula Colares, *Poeppig s.n.* (W, type). The leaves seem to be distinctive as indicated in the key.

**Myrciaria cordata** Berg, Linnaea 27: 337. 1856.

Apparently known only from the original collections by Schomburgk. The type was seen by Berg at Berlin, and was cited by him as from "Guiana Anglica (Rich. Schomburgk, coll. no. 957)"; another collection, not cited by Berg, is from Mt. Roraima, *Schomburgk* 608 (F, W).

**Myrciaria dubia** (HBK.) McVaugh, comb. nov. *Psidium dubium* HBK. Nov. Gen. & Sp. 6: 152 [folio ed. p. 121]. 1823. *M. parensis* Berg, in Mart. Fl. Bras. 14, pt. 1: 364. 1857. *M. caurensis* Steyererm. Fieldiana, Bot. 28: 1020. 1957.

The type of *Psidium dubium* HBK., from near Atures on the Orinoco, is surely a *Myrciaria*. This is indicated by the description ("bracteis . . . ovarium subaequantibus eique adpressis. . . Calyx superus, hemisphaericus, glaber, glanduloso-punctatus, margine quadrilobus. . . Stamina . . . calyci medium versus inserta . . . ovarium



. . . biloculare; . . . ovula duo in quolibet loculo, apposita . . . fructus . . . edulis"), and is apparent from a photograph (Field Mus. Neg. 36872). The species is not identifiable from the plate (*t. 547bis*) accompanying the original description of *P. dubium*.

The type of *P. dubium* appears to represent a relatively narrow-leaved race, frequent in the Orinoco drainage, of a species found also in the Amazon drainage. The type of *M. paraensis* Berg has the somewhat broader leaves characteristic of most specimens from the Amazon basin, but I believe *M. dubia* and *M. paraensis* are conspecific. The following may be cited as representing the species in the Orinoco drainage or at its upper limits.

VENEZUELA [possibly COLOMBIA]: Prope Atures (Misiones del Orinoco), *Bonpland* (P, not seen).—Bolívar: La Prisión, Medio Caura, *L. Williams 11691* (F, type of *M. caurensis*); Cerro Guaiquinima, Río Paragua, *Maguire 33135, 33139* (both MICH).—Amazonas: Río Sanariapo, *H. M. Curran 1833* (NY); Capibara, Canal del Casiquiare, *Holt & Gehrig 289* (NY).

***Myrciaria floribunda* (Willd.) Berg, Linnaea 27: 330. 1856.**

This, the most widely distributed species of the genus, has a considerable synonymy. The principal synonyms are listed by Urban (Bot. Jahrb. 19: 657–658. 1895) and by Amshoff (Fl. Suriname 3: 108–109. 1951, and Ann. Missouri Bot. Gard. 45: 177. 1958). An additional synonym is apparently *M. maragnanensis* Berg, in Mart. Fl. Bras. 14, pt. 1: 372. 1857, of which I have seen an isotype (*Gardner 6023*, W).

Two species described by Berg, *Myrciaria verticillata* Berg and *M. divaricata* (Benth.) Berg, were based entirely or in part on *Schomburgk 958*. This collection seems actually to have been a mixture. A sheet of no. 958 (MICH) has the leaves apparently of *M. floribunda* and is presumably to be referred to that species, although the styles are about 7 mm. long. This is presumably the plant described by Berg as *M. verticillata* ("foliis . . . utrinque angustatis, apice longissime lineari-acuminatis, basi elongato-acutis. . ."). Another sheet of no. 958 (F) has the leaves of *M. dubia* (HBK.) McVaugh, but the flowers are smaller than usual in that species; I have not seen the type of *Eugenia divaricata* Benth., but the leaves are described as being rounded at base, i.e., therefore more like *dubia* than *floribunda*. Apparently Berg had the same plant, for he de-

scribed *M. divaricata* as with "foliis . . . ovatis v. ovato-oblongis, . . . acute acuminatis, basi rotundatis v. breviter acutis. . . ."

The plant from Jamaica described as *Eugenia polyneura* Urb. Symb. Antill. 5: 446. 1908 (*E. pycnoneura* Urb. Symb. Antill. 6: 25. 1909, not *E. polyneura* Koord. & Val. 1855) is apparently not specifically different from *M. floribunda*. I have seen an isotype (F) or perhaps the actual type (Jamaica below Vinegar Hill, *W. Harris* 7448, ex herb. Krug et Urb.). The specimen is nearly glabrous, with but traces of pubescence on the petioles; the petioles themselves are 7–8 mm. long on the mature leaves; the blades are 1.5–2.5 cm. wide, elliptic-ovate and mostly acutely long-acuminate. The combination of nearly complete lack of pubescence, broad sharp-tipped leaves and long petioles is most unusual in *M. floribunda*, but the individual features are matched in many other South American and West Indian specimens.

I have not seen specimens of *Eugenia asa-grayi* Krug & Urb. [*Plinia asa-grayi* (Krug & Urb.) Urb.], nor of *E. l'heritieriana* DC., both of which species were associated by Urban (1895) with his *Eugenia floribunda*. The former was from eastern Cuba (*Wright* 1610) and the latter supposedly from the island of Tobago.

***Myrciaria ibarrae* Lundell, Wrightia 2: 213. 1961.**

This recently described species is known to me only through the original specimens cited by Lundell. It seems to be abundantly distinct from *M. floribunda*, which is known from the same general area.

***Myrciaria phillyraeoides* Berg, Linnaea 27: 326. 1856.**

This plant, based on a collection by Humboldt in "America meridionali," and seen by Berg in the Willdenow herbarium (No. 9574), I do not recognize from the description. It may not be a *Myrciaria*. If it belongs to that genus, I suspect it is *M. dubia*.

***Myrciaria vexator* McVaugh, sp. nov. *M. pittieri* Burret ex Badillo in Pittier *et al.* Cat. Fl. Venez. 2: 198, *nomen*. 1947. *Eugenia palmarum* Standl. & L. O. Williams ex Allen, Rain For. Golfo Dulce 201, *nomen*. 1956.**

Arbor 10 m. alta, bracteis bracteolisque, et perianthii segmentis, ciliatis, perianthii segmentis intus tomentulosis; folia elliptico-oblonga vel ovata, 2–4.5 cm. lata, 5.5–13.5 cm. longa, acuminata, apicibus attenuatis acutis; lamina basi rotundata, marginibus plusminusve decurrentibus, petiolis teretibus crassis anguste

profundeque sulcatis 4.5–8 mm. longis; glandulae vix prominulae; bractee ovatae, membranaceae, usque ad 3 mm. latae, usque ad 4–4.5 mm. longae, saepe alabastratae fere occultantes; bracteolae rotundae, distinctae, membranaceae, 1.5–2.5 mm. longae lataeque; hypanthium supra germen 2 mm. productum; discus 1.3–1.5 mm. latus, glaber; stylus 8 mm. longus; calycis lobi 2 mm. lati, 1.5 mm. longi; petala ovalia 2 mm. longa lataeque; stamina ca. 50, antheris 0.6–0.8 mm. longis; fructus globosus, atropurpureus, carnosus, diametro 2.5 cm.

Attributed to Burret by Badillo, as a new species, but quite without description; described in English by Allen, under the name of *Eugenia palmarum*.

This species is known mostly from cultivation, but has apparently been collected in the wild both in Costa Rica and in northern Venezuela. Specimens examined are:

COSTA RICA: Puntarenas, forested hills above Palmar Norte, alt. 450 m., *P. H. Allen 6331* (F).

PANAMA: Summit Gardens, C. Z., *J. E. Higgins 287* (type, US); Summit, *J. Zetek 3520* (F; MO, sterile, probably this species; see below).

VENEZUELA: Lara: Bosques de Chirgua, entre Nonavana y Barquisimeto, *José Saer 515* (F). Carabobo: Valencia, in gardens, *Pittier 8154* (US); Valencia, often cultivated, *Pittier 8899* (US).

### ***Myrciaria vismeifolia* (Benth.) Berg, Linnaea 27: 336. 1856.**

The type was from British Guiana; Amshoff cites a number of collections from Suriname. In the *Flora of Panama* (Ann. Missouri Bot. Gard. 45: 179. 1958) Miss Amshoff refers to this species a single specimen from the Canal Zone, *Zetek 3520*, remarking at the same time that this differs from the typical plant of the Guianas by its "firmer leaves which are never(?) cordate at the base, its longer petioles and its slightly larger flowers." The *Zetek* specimen, which I have seen (MO), is sterile, but can hardly be referred to *M. vismeifolia*. In that species the petioles are 3–4 mm. long, ventrally somewhat pubescent and flat or shallowly sulcate; the blades are definitely cordate-auriculate, the auricles extending mostly 1–1.5 mm. beyond the sinus at the insertion of the petiole. In the *Zetek* specimen the petioles are 5–8 mm. long, quite glabrous (like the rest of the specimen), nearly terete but with a narrow sharply indented ventral furrow; the blades are rounded at base, but not auriculate. The leaves are in fact strikingly similar to those of *Myrciaria vexator*, and the specimen probably belongs to that species. In any event *M. vismeifolia* should be excluded from the known flora of Panama.

A NEW SPECIES OF *PLINIA* L., FROM COSTA RICA

There seem to be no reports of any species of this genus from continental North America. A few species are known in South America, and a number have been reported from the West Indies.

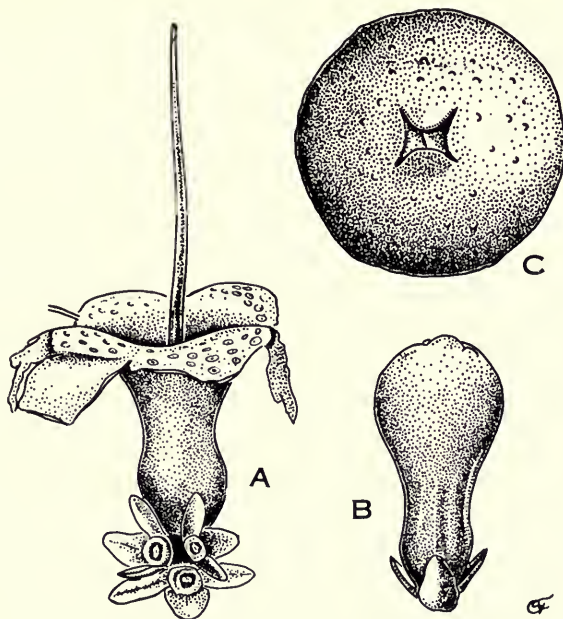


FIG. 13. *Plinia salticola*, from the type. A, Open flower; B, Bud ( $\times 2.5$ ); C, Enlarged tip of bud, seen from above ( $\times 5$ ). The open flower is seen from the adaxial side; the observer is looking down at the tip of the raceme-axis. Opposite the open flower may be seen the bract and bracteoles of the other flower of the proximal pair; at right angles to this may be seen the bracts and bracteoles of the second (distal) pair of flowers. The small bud is seen from the abaxial side, with bract at base and the bracteoles at the sides. In the enlarged terminal view of the bud the outer calyx-lobes are shown above and below the central opening; the inner lobes overlap and are concealed; compression of the tissues in the young bud has given rise to curved ridges at right and left of the outer lobes.

The following species resembles in many respects such South American species as *P. duplipilosa* McVaugh, Fieldiana, Bot. 29: 224. 1956, but differs in detail from that and all other species known to me.

***Plinia salticola* McVaugh, sp. nov.**

Arbor vel frutex puberula, foliorum nervo medio subtus ad basin copiose pilis pallidis appressis 1-2 mm. longis obsito; folia elliptica, 3.5-5 cm. lata, 11-17 cm.



longa, acute acuminata, basi subrotundata, petiolis 8–10 mm. longis, nervo medio supra convexo, nervis lateralibus utrinque 7–12; inflorescentia abbreviata, glomerulis 4-floris, sessilibus, bracteatis; bracteis 2-seriatis, bracteolis membranaceis obtusis ciliatis 3 mm. longis; alabastra pyriformia 9–10 mm. longa, basi sericeo-strigosa, apice breviter 4-lobata, hypanthio supra germen 5–7 mm. producto, stylo 16 mm. longo, staminibus ca. 150; ovarium biloculare, ovulis quoque loculo duobus.

A tree or shrub, the branchlets and petioles thickly puberulent with short pale ascending hairs 0.3–0.5 mm. long; hairs at the base of the midvein on the lower leaf-surface appressed and longitudinally oriented, up to 2 mm. long; leaves elliptic, 3.5–5 cm. wide, 11–17 cm. long, 2.5–3 times as long as wide, about equally narrowed and rounded to a slenderly and sharply acuminate tip 8–10 mm. long and to the obtusely rounded base, the curved margins meeting at about right angles and passing abruptly to the nearly terete petiole 8–10 mm. long, 1–1.3 mm. thick; midvein broadly convex above, persistently puberulent; lateral veins 7–12 on each side including some intermediate ones, inconspicuous and sometimes inscribed above, more prominent beneath, the proximal ones arcuate-ascending, those toward the middle of the blade straight, connected by asymmetrical arches 5–8 mm. from the margin, a distinct but weaker submarginal vein 1–3 mm. from the margin; blades dark green and somewhat lustrous above, paler and finely dark-dotted beneath; inflorescence at leafless axils on old wood, the flowers in 4's, in sessile bracteate decussate pairs; bracts membranous, scarious, ciliate, ovate, blunt, 1.5–2 mm. wide, 2.5–3 mm. long; bracteoles like the bracts, ellipsoid-oblong, blunt, 1 mm. wide, 3 mm. long, probably deciduous after anthesis; buds 9–10 mm. long, pyriform, silky-strigose at base, rounded and obscurely 4-lobed at apex, the fusiform-ellipsoid base 2 mm. thick, 3 mm. long, the distal part turbinate, 7 mm. long and about 5 mm. in diameter, formed by the much-prolonged tube of the hypanthium; hypanthium at anthesis splitting irregularly between the calyx-lobes, and the divisions recurving and bearing out the petals and portions of the staminal ring; calyx-lobes in the bud short and broadly rounded, about 1 mm. long, appressed, the inner ones relatively shorter, 2 mm. wide, the outer ones bluntly ovate, 1.5 mm. wide at base; style 16 mm. long, much exserted; stamens about 150, borne in a zone about 1.5 mm. wide at the summit of the hypanthium, strongly incurved in the bud, the anthers 1–1.5 mm. long; petals 4, broad-based, subrotund, about 4 mm. long and wide; ovary bilocular, the ovules collateral, 2 in each locule.

COSTA RICA: Cataratas de San Ramón, 21 Feb. 1931, A. M. Brenes 13443 (F; NY, type).

At the present time I should refer to *Plinia* any eugenioid species having 2 or 4 ovules in each locule of the ovary, the hypanthium somewhat prolonged beyond the ovary but not circumsessile, and the additional features outlined in the key above. The inflorescence is usually, but not invariably, glomerate with relatively large bracts and bracteoles simulating an involucre (cf. Amshoff in Rec. Trav. Bot. Néerl. 42: 11. 1950). More complete data on fruit-types, embryo-structure, and number of ovules per locule are needed before the limits of the genus can be firmly established. The species now

assigned to *Plinia* on the basis of flower-characters seem to represent a somewhat heterogeneous assemblage, as I have pointed out (Field Mus. Bot. 13, pt. 4: 775. 1958), and it may be that some reconsideration of generic lines will be indicated when new data become available.

#### THE GENUS SIPHONEUGENA BERG

The type species of *Siphoneugena* is *S. densiflora* Berg, described from somewhere in southeastern Brazil (cf. Taxon 5: 146. 1956; see also Field Mus. Neg. 31474). According to Berg the genus was distinguished from *Myrciaria* by having the locules of the ovary multiovulate, and from other multiovulate genera with a prolonged hypanthium by the circumscissile nature of that structure. The three original species were all Brazilian in origin, one from Minas Gerais and the others from unspecified localities. All three species have at one time or another been transferred to other genera; the genus *Siphoneugena*, as a matter of fact, hardly became known to botanists and was given short shrift. By Bentham and Hooker it was united with *Eugenia*; these authors regarded it as a connecting link between *Eugenia* and *Myrciaria*. By Niedenzu it was merged with *Calycorectes* and given the rank of a subgenus. No new taxa in the genus were described for a little more than a century following the work of Berg, until in 1957 Steyermark reported the discovery of what he took to be a new variety of *Siphoneugena densiflora* from the mountains of Venezuela. It now transpires that members of the same taxon occur on a number of the high mountains (*tepui*s) of Venezuela; in similar ecological situations in northern Venezuela; and in the Lesser Antilles. All the specimens from northern South America and the West Indies, specimens of the newly described *S. reitzii* Legrand (a native of southern Brazil; cf. Sellowia 8: 78. 1958), and the specimens shown in the type-photograph of *S. densiflora* Berg, are so similar in general appearance and in structural details that they could all belong to the same species. Surely they are congeneric. The affinities of the taxon appear to be with *Myrciaria* rather than with *Plinia* or with *Eugenia* as a whole. In view of the distinctive morphological features of *Siphoneugena*, and in view of its distinctive geographical distribution as now demonstrable, I suggest that it is best regarded as an independent genus, representing an evolutionary offshoot from eugenioid stock, parallel to *Myrciaria* but in some respects less specialized. It is interesting phyto-geographically that *Myrciaria* is primarily a lowland genus, wide-

spread both north and south of the Amazon Basin, whereas *Siphoneugena* is exclusively a montane genus, occupying a disjunct range that spans the Amazon lowland.

Although *Siphoneugena densiflora* was reported by Berg as multi-ovulate, this is open to question. Modern specimens of the genus usually have 3 or 4 ovules in each of the two locules of the ovary. The locules vary from 1 to 3 or possibly 4; the ovules may be as few as 2, or occasionally as many as five. It is suggested that this variation in the number of ovules reflects a less specialized condition than that in *Myrciaria*, in which the number of ovules is consistently two.

There would appear to be little real affinity between this very homogeneous and relatively invariable taxon, and the more heterogeneous assemblage that is called *Plinia*. The two have little in common except that in each the number of ovules is reduced. The South American species of *Plinia*, at least, are superficially dissimilar to those of *Siphoneugena*, and perhaps are more closely related to *Calycorectes* and to some of the larger-flowered species of *Eugenia*, differing from the former in the reduced number of ovules, and from the latter in the closed or nearly closed calyx. This feature of the closed or nearly closed calyx has led some workers to confuse the buds of *Plinia* with those of *Siphoneugena*. In the latter genus the distinctive feature of the flower is the circumscissile hypanthium, which in most species terminates in four small but definite calyx-lobes. These lobes are in unequal pairs, closely incurved in bud so that to the casual observer the bud may appear closed. The lobes in the opening flower are usually not perceptibly imbricate, but the difference in the form and position of the inner and outer pairs makes it clear that they are not valvate. The inner pair are somewhat broadly rounded, with membranous, long-ciliate margins that are appressed to the opening petals; the outer pair are smaller, deltoid-ovate, with thicker, often nearly erect and poorly fringed apex. These differences are subtle, in lobes that may be no more than half a millimeter long, but to one familiar with the imbricate calyx of *Myrciaria* it is apparent that in this feature there are strong similarities between the two genera.

In 1895 Krug and Urban described from the mountains of Guadeloupe a species they called *Marlierea dussii*. Urban later transferred this to *Plinia*. An isotype (*Duss 2750*, K) is in my judgment conspecific with the Venezuelan *Plinia fruticosa* Steyermark, described from the States of Sucre (*Steyermark 62611*, F, type) and Anzoátegui

(*Steyermark 61658 & 61620*, both F). Neither species has anything to do with the other species of *Plinia*, and both are typical members of *Siphoneugena*.

The question of specific limits in *Siphoneugena* is a difficult one, complicated by the peculiar isolation of individual small populations on the *tepals* of Venezuela, on other similarly isolated mountain ranges in northern South America, and in the West Indies. Leaves vary from plant to plant: from small to large, from ovate to elliptic or obovate, from rounded to acute at apex, from rounded to acute to cuneate at base. A few specimens, like those of *Marlierea dussii* and *Plinia fruticosa*, have sparingly pubescent branchlets and/or young foliage. Pedicels and buds vary somewhat in length from plant to plant. These features make the assemblage of specimens superficially diverse, but, as indicated in the description below, the specimens have so many—and such specialized—features in common that their relationship is apparent. I believe these isolated but not excessively varied populations comprise a single species as indicated below:

***Siphoneugena densiflora*** Berg, in Mart. Fl. Bras. 14, pt. 1: 379. 1857. *Calycorectes densiflorus* (Berg) Ndzu. in Nat. Pflanzenfam. 3, Abt. 7: 82. 1893. *Marlierea dussii* Krug & Urb. ex Urb. Bot. Jahrb. 19: 590. 1895. *Plinia dussii* (Krug & Urb.) Urb. Repert. Sp. Nov. 15: 413. 1919. *Paramitranthes densiflora* (Berg) Burret, Notizbl. Bot. Gart. Berlin 15: 541. 1941. *Plinia fruticosa* Steyermark, Fieldiana, Bot. 28: 1023. 1957. *Siphoneugena densiflora* var. *tepuensis* Steyermark, l.c. 1024.

A shrub up to 3 m. high (rarely a tree up to 12–13 m. high), nearly glabrous, the branchlets and petioles (and seldom the pedicels) sometimes strigose or pubescent; inner faces of the petals and calyx-lobes silky tomentose with crisped matted nearly white hairs; bracts and bracteoles ciliate, the inflorescence otherwise glabrous; leaves coriaceous, rigid when dry, lustrous and dark green above, dull and paler beneath; blades mostly elliptic-ovate, short-petiolate, opaque and nearly featureless except that the midvein is prominently convex above and somewhat less so beneath; upper surface sometimes obscurely impressed-punctate, the lower often with small convex translucent glands; lateral veins close and parallel, the number indefinite, mostly 15–20, visible as fine convex lines on the lower surface of dry leaves; blades up to 10 cm. long, mostly 3–5 cm., mostly about twice as long as wide but sometimes as wide as long, or up to 2.7 times as long as wide; petioles fleshy, dorsiventrally compressed, (1.5–) 3–4 (–6) mm. long, ventrally concave, 1.5–2.5 mm. wide; inflorescence a much abbreviated raceme, the axis up to about 7 mm. long, usually much shorter, bearing up to 5 approximate decussate pairs of flowers; bracts broadly ovate-rounded, persistent, scarious; pedicels up to 5 mm. long, sometimes much shorter, strongly dorsiventrally compressed



or even 2-edged, up to 1 mm. wide; bracteoles persistent, scarious, distinct, ovate, blunt or acute, convex on the back, 0.7 mm. long, much shorter than the fusiform, urceolate or campanulate ovary; hypanthium prolonged 1.5–2.5 mm. above the ovary, usually notably flaring above the summit of the ovary and then contracted to the mouth; bud as a whole 3.5–4.5 mm. long; calyx-lobes in unequal pairs, scarcely imbricate, the outer pair deltoid-ovate, scarcely fringed, more erect, the inner lying flatter, broadly rounded, copiously fringed, the free parts 1 mm. wide or a little more, 0.5–0.7 mm. long; hypanthium funnellform at anthesis, splitting two-thirds of its length on one side, or into 3–4 irregular lobes, its margins finally rolled back (including most of the staminal ring) so the calyx and petals are reflexed, the whole ultimately circumscissile at base; style 4–6 mm. long; stamens 75–100, borne on the margin of the hypanthial tube; petals white, obovate, small; locules of the ovary 2 (rarely 1 or 3), the ovules usually 4 (sometimes 3 or 5) in each locule, ascending from near the base of the locule; fruit globose or nearly so, purplish-black, soft and edible, probably 1 cm. in diameter or less; seed reniform, the 2 cotyledons distinct or fused along the margins only, the radicle very small.

The type of *Siphoneugena densiflora* (as shown in Field Mus. Neg. 31474) is a flowering specimen with leaves 2–3.2 cm. wide, 5–7 cm. long; the pedicels are up to about 5 mm. long, and the styles 7 mm. long. The species was described by Berg as glabrous. In most of its parts this plant is larger than the majority of plants from north of the Amazon. The following, however, may be compared with it except that the pedicels are shorter:

VENEZUELA: Amazonas: Serranía Yutaje, *Maguire 35397, 35477* (both MICH); Cerro Sipapo (Paráque), *Maguire & Politi 28228* (MICH, fr. only).—Dist. Federal: Cordillera del Avila, *Steiermark 55604* (F; leaves as above, flowers smaller).

Specimens in the groups listed below conform to the general description given above for this species, but are divided into groups characterized primarily by features of the leaves.

The following are glabrous; the leaves are elliptic or obovate, mostly obtuse, occasionally obscurely acuminate, 2.5–5 cm. long:

VENEZUELA: Bolívar: Chimantá massif, *Steiermark & Wurdack 729, 857, 1061* (all MICH); Ptari-tepuí, *Steiermark 59711* (F, type of var. *tepuiensis*); Sororopán-tepuí, *Steiermark 60157* (F).

The following are somewhat pubescent; the leaves resemble those of the preceding group but include some specimens with more ovate leaves and some in which acuminate leaves are not rare; the flowers tend to be nearly sessile, often with a few on each plant pedicellate:

GUADELOUPE: *Duss 2750* (K, isotype of *Marlierea dussii*; most leaves acuminate).

VENEZUELA: Anzoátegui: Cerro Peonía above Santa Cruz, *Steyermark* 61658 (F; paratype of *Plinia fruticosa*; leaves mostly acuminate), *Steyermark* 61620 (F; paratype of *P. fruticosa*; leaves mostly obtuse).—Sucre: Cerro Turumiquire, *Steyermark* 62611 (F; type of *P. fruticosa*; leaves broader, ovate, obtuse to acuminate).

The above data support the hypothesis that there are regional populations, and perhaps local populations within these, of a wide-ranging species.

## 7. PIMENTA Lindl.

The allspice of commerce, *Pimenta dioica* (L.) Merrill, is supposed by some authors to be confined to the West Indies. There is some evidence that the West Indian plants have smaller flowers and more slender panicles, and smaller fruits with a greater proportion of volatile oil, than do those of Central America. Because of these differences, Standley proposed to recognize the Central American plant as a variety [*P. dioica* var. *tabasco* (Schlecht. & Cham.) Standl. *Ceiba* 3: 172. 1953], and Lundell recognized it as a species distinct from *P. dioica* [*P. tabasco* (Schlecht. & Cham.) Lundell, *Wrightia* 2: 58. 1960]. Both of these names are based nomenclaturally on *Myrtus tabasco* Schlecht. & Cham. *Linnaea* 5: 559. 1830, presumably with the assumption that the name *M. tabasco* was based also on a Central American plant. Examination of the protologue of *M. tabasco*, however, shows that this was not the case.

In reporting on the Mexican plants collected by Schiede and Deppe, Schlechtendal and Chamisso described a number of new species; most of these naturally enough were Mexican in origin. The protologue of *Myrtus tabasco*, however, begins as follows:

“542 [the serial number under which Schiede’s collections were reported]. *Myrtus Tabasco* H[erb.] W[illd.] n[o.] 9580. (Specimen Humb. ‘Thermidor an 7. Cumana. n. 113. *Myrtus Pimenta. Tabasco*’).—*Myrtus Pimenta*, *Pimenta de Tabasco* Hispano-Mexicanorum Schiede in schedula.”

It seems clear that Schlechtendal was merely taking up a name by Willdenow based on a Humboldt specimen from Venezuela, and identifying with this the new specimens from Mexico. Schiede’s collection cannot be regarded as the type of *Myrtus tabasco*, and until and unless the identity of the Humboldt specimen can be determined, it should not be assumed that Central American populations of allspice are members of the taxon to which the specimen belongs. Berg, who seems to have seen both the Humboldt speci-

men and those of Schiede and Deppe, regarded them as varietally different (cf. *Linnaea* 27: 424–425. 1856). His *Pimenta officinalis*  $\beta$  *cumanensis*, which he saw in Willdenow's herbarium, was presumably based on the very Humboldt specimen that formed the basis for *Myrtus tabasco* Schlecht. & Cham., and *P. officinalis*  $\epsilon$  *tabasco* (Schlecht. & Cham.) Berg was based nomenclaturally, but not knowingly, on the same specimen. Berg described the Venezuelan plant as having petioles 3–4 lines long; the Central American 9–12 lines; his diagnoses are not otherwise very comparable. The leaves of *cumanensis* are described as "approximato-tenuissime venosis," a characterization that seems unlikely for the Central American population.

## 8. PSIDIUM L.

### DELIMITATION OF THE GENUS

As discussed in an earlier article (*Fieldiana*, Bot. 29: 172–173. 1956), the two large pimentoid genera *Psidium* and *Myrtus* have been separated traditionally upon the basis of calyx morphology. The two have in common a C-shaped or uncinat embryo and hard, bony seeds. The delimitation of *Myrtus* is particularly difficult, as pointed out by Bentham in an important paper many years ago (*Jour. Linn. Soc. Bot.* 10: 101–166. 1868), because the concepts of earlier authors included numerous species-groups now known to belong to distinct genera (even members of other sub-tribes); because fruits and seeds are unknown in many supposed species of *Myrtus*; and because there is no sharp distinction between the number of locules in the ovary of *Myrtus* (2–3) and in that of the closely related *Psidium* (3–5 or sometimes only 2). Since the time of Bentham, taxonomic opinion has favored the continuing dismemberment of *Myrtus*, which at the time of the publication of the *Genera Plantarum* of Bentham and Hooker (1865) included more than 100 species in South America, tropical North America, Australia, New Zealand, and one (the type species) in the Mediterranean region.

As defined by Berg in his classic papers on the American Myrtaeae (*Linnaea* 27: 397. 1856; *Mart. Fl. Bras.* 14, pt. 1: 413. 1857), the genus *Myrtus* was impossibly heterogeneous by modern standards. The Chilean species, approximately one-third of the total, have all been transferred to other genera. About half the remainder were South American species that have recently been transferred by Burret to *Psidium* (*Notizbl. Bot. Gart. Berlin* 15: 483–485. 1941).

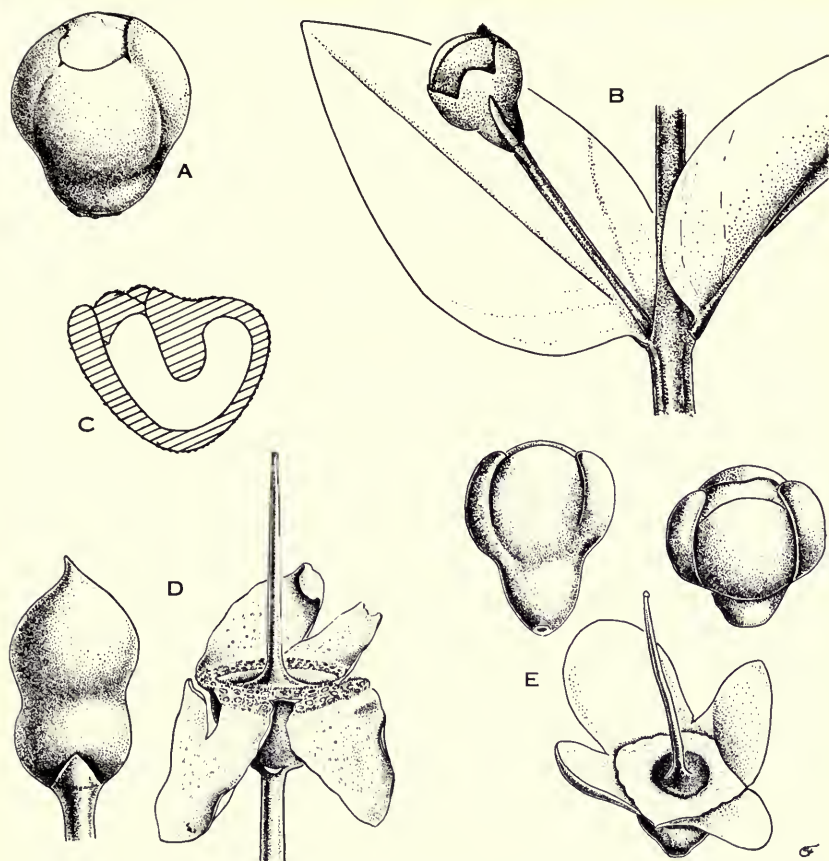


FIG. 14. Floral morphology in *Psidium*. A, Bud of *P. mouririoides*, Gentle 4142, type ( $\times 5$ ). B, Axillary flower of *P. salutare*, showing open lobed calyx, Haught 2602 ( $\times 2.5$ ). C, Diagrammatic section of seed of *P. guineense*, showing curved embryo unshaded in center ( $\times 10$ ). D, Bud and old flower of *P. anglo-hondurens*, Bartlett 13060 ( $\times 5$ ). E, Lateral and terminal views of bud and old flower of *P. biloculare*, Gentle 3382 ( $\times 5$ ).

According to Burret, *Myrtus* is represented in the American flora by about 14 species only, these in Florida and the Greater Antilles. The type species of *Myrtus*, *M. communis* of Europe, has a 3- or sometimes 2-locular ovary, and most of the known West Indian species seem to have the ovary 2- or sometimes 3-locular. The generic limits of *Myrtus* are by no means agreed upon even yet, but the number of locules in the ovary, in the genus approximately as understood by Burret, appears usually to be 2 or 3, as against 3 or more in *Psidium*. Species having bi- or trilocular ovary, therefore, cannot



be assigned forthrightly to one genus or the other on this character alone. Bentham reached essentially this conclusion nearly a century ago (Jour. Linn. Soc. Bot. 10: 152. 1868).

The generic limits of *Myrtus* being somewhat uncertain, at least in the American flora, it seems more profitable to concentrate upon *Psidium*, to determine what limits, if any, can be assigned to it, and to set forth criteria by which it may be distinguished from *Myrtus* or *Myrtus*-like plants. There are apparently several diverse evolutionary lines represented in the large American genus *Psidium*, and morphological variation among the species is extreme.

Many species of *Psidium* known to the earlier authors had conspicuously large flowers, the calyx closed or nearly closed in bud, and the ovary 3- to 5-locular. The best example of this is the common guava, *P. guajava*, widespread in tropical regions through cultivation from the earliest times following the discovery of America by Europeans. The earliest concepts of the genus were based upon this species and a few others like it. Unfortunately none of the above characteristics is consistent in the genus, and none is distinctive. The range in size of flowers in *Psidium* is about the same as it is in other large genera (e.g., *Eugenia*, *Syzygium*, *Calypttranthes*); the calyx is perhaps more often open than closed; and a bilocular ovary occurs in a considerable number of species.

Too much taxonomic importance has apparently been attributed to the most "unusual" feature of *Psidium* flowers, the completely closed calyx which opens at anthesis by irregular longitudinal splits. This prejudice seems to stem in part from the original concepts of Linnaeus and his contemporaries, but chiefly from the work of Berg, who (perhaps inadvertently) emphasized this one morphological feature (Linnaea 27: 347 et seq. 1856; Mart. Fl. Bras. 14, pt. 1: 382 et seq. 1857). Although more than two-thirds of the species of *Psidium* known to Berg (58 out of 84 in his treatment of 1856) were assigned by him to infrageneric groups having the calyx *open* and normally *toothed* or *lobed* in bud, he nevertheless in his keys to genera omitted all mention of toothed or lobed calyces, saying without any qualification: "Calyx ante anthesin *omnino clausus v. apice pertusus*." [italics mine]. By thus highlighting unduly the characteristic of the closed calyx, Berg seems to have biased the interpretations of later authors. Bentham, for example, 20 years after the work of Berg (Gen. Pl. 1: 694, 716, 720. 1865), groups *Psidium* in his key with those genera having the "calycis limbus in alabastro clausus v. subimbricato-lobatus"; after this concession to the species with open

calyx, however, he describes *Calycorectes* and *Marlierea* as having "*Calyx Psidii*." His idea of the "calyx of a *Psidium*" may be ascertained from the descriptions of the individual genera: Of *Calycorectes* he says later "*Calycis limbus in alabastro clausus*"; of *Marlierea* he says "*Calycis tubus . . . in alabastro clausus v. apice brevissime apertus*." It may be inferred that Bentham thought of *Psidium* as a genus having the calyx typically closed in bud, even though he included in the genus some species with lobed or toothed calyx.

A similar bias seems apparent in the work of Niedenzu (Natürl. Pflanzenfam. 3, pt. 7: 64, 67. 1893), who describes the calyx of *Psidium* as gamosepalous ["*verwachsenblättrig*"], and who separates *Psidium* from *Myrtus* in the key because the calyx-lobes of the former are united ["*verwachsen*"] in the bud, as against "already free in the bud." Like Berg, however, Niedenzu stressed the feature of the *closed* calyx, and then assigned a large group of species to an intra-generic group (in this instance a new section, *Apertiflora*), characterized by having an *open* calyx. It seems clear that this one feature of the calyx is not to be thought of as having diagnostic significance in the determination of generic limits.

A second characteristic of the calyx (or hypanthium), however, provides the single most dependable feature by means of which species of *Psidium* can be recognized. This feature was known to Berg, and mentioned by Bentham and by Niedenzu, but has perhaps been insufficiently emphasized. Berg's descriptions, not his keys, provide the following distinctions between *Psidium* and *Myrtus*:

- Hypanthium (calycis tubus auct.) supra germen productum . . . , in calyce abiens. . . . Calyx ante anthesin indivisus claususque v. apice pertusus v. 4-5-dentatus, demum longitudinaliter usque ad verticem germinis 2-5-partitus, ex margine hypanthii libero oriundus. . . . *Psidium*.
- Hypanthium (calycis tubus auct.) supra germen . . . inferum vix productum; sepala 4-5, ex margine angusto, libero hypanthii oriunda, in alabastro globo petalorum incumbientia, . . . sinu acuto separata, serius non profundius partita. . . . *Myrtus*.

The important point here is not the difference between a closed calyx and a calyx with 4-5 sepals, as has often been assumed, but (in *Psidium*) the initial prolongation of the hypanthium or calyx-tube beyond the ovary, and the subsequent irregular longitudinal splitting of these tissues down to or beyond the staminal ring and often to the very summit of the ovary. In *Myrtus*, on the other hand, the calyx-lobes are separate from the beginning, develop at about the level of the summit of the ovary, and fail to separate farther at anthesis, remaining contiguous so that the entire calyx

may persist as a unit on the fruit. Berg's words as quoted above may now be paraphrased:

Hypanthium produced beyond the summit of the ovary, the stamens borne on the inner wall of the tube; calyx (whether closed or open at tip in bud) appearing tubular at base, in anthesis splitting longitudinally to the summit of the ovary into 2-5 somewhat irregular divisions, the individual lobes usually rather widely separated and often deciduous after anthesis. . . . . *Psidium*.

Hypanthium hardly if at all produced beyond the summit of the ovary, the stamens borne on a perigynous disk; calyx-lobes 4-5, distinct, fully formed in the bud, separated by acute sinuses, but not separating farther at anthesis or in fruit, the calyx not splitting between the lobes and often persisting as a unit at the summit of the fruit. . . . . *Myrtus*.

The validity of the above distinction seems to have been accepted by Bentham, who in the *Genera Plantarum* used it in combination with other calyx-characters to separate the principal groups of genera in the Myrteae. The same distinction was apparently familiar to Urban, who, after Berg, had perhaps the best knowledge of the American Myrtaceae as a whole. In describing *Psidium leiophloeum*, for example, Urban wrote (Symb. Antill. 9: 460. 1928): "Ad seriem earum specierum pertinens, quae calyce ab initio aperto et lobis liberis sub anthesi dirumpendo paullo profundius separatis gaudent ideoque a *Myrto* vix v. ne vix quidem discernendae sunt." In another place (Symb. Antill. 9: 78. 1923) Urban stressed the importance of the same feature: "*Myrtus et Psidium* . . . inter sese arcte affinia nec nisi aut calycis lobis ab initio liberis aut sub anthesi (supra basin saltem) diruptis in speciebus nonnullis antillanis discernenda sunt."

As Urban points out in the same place, species of *Eugenia* may be confused with *Myrtus* or with *Psidium* in the absence of seeds. The last two genera are quite different from *Eugenia* in the structure of the testa and that of the embryo, but in vegetative characters and those of the flowers, including those of the placentation, there may be no discernible differences. This brings us to the matter of the importance, if any, of the number of locules in the ovary of *Psidium* and related genera.

The three principal groups of American Myrtaceae differ among themselves in the constancy of the number of locules. In two of the subtribes, the Myrciinae and the Eugeniinae, the number of locules is almost always 2, occasionally 3 or 4. In the Pimentinae, to which belong *Psidium* and *Myrtus*, the number is far more variable and often more than 2. Some genera, according to Berg, are indeed always bilocular (e.g., *Blepharocalyx*). In others (e.g., *Caly-*

*colpus*, *Abbevillea*, *Campomanesia*, *Acrandra*, *Britoa* and various small genera), the number of locules is said to be always 4 or more, sometimes as many as 11. In the two large genera having bony seeds and an uncinately-curved embryo, namely *Psidium* and *Myrtus*, the number of locules is said to vary from 2 to 7, and 2 to 4, respectively. In most of the species of *Psidium* known to Berg the ovary was said to be 3- or 4-locular (about 50 species); about twelve species were described as sometimes or always with more than 4 locules; and eight species as having but 2, 2-3, or 2-4 locules. Berg apparently knew but four species of *Psidium* having consistently a bilocular ovary (cf. Linnaea 27: 359, 376. 1856; Mart. Fl. Bras. 14, pt. 1: 604, 605. 1857). He seems not to have regarded these species as in any way atypical. Among the species of *Psidium* described more recently by Urban are several with bilocular ovary. The number of locules in *Psidium* may thus be stated as usually 3 or 4, occasionally as few as 2 or as many as 7.

Perhaps correlated with the number of locules in the ovary (i.e., with respect to 2- and 3-locular ovaries) is the type of placentation. Altogether too little is known of the details of placentation in the American Myrtaceae, but in analyzing nearly 600 Australian species Bentham found that the "best generic characters" were afforded by the modifications of the ovules and their placentation, "provided too much weight be not attached to the precise form of the placenta." (Jour. Linn. Soc. Bot. 10: 119. 1868.)

Berg seems to have attached little importance to the details of placentation in the subtribes Myrciinae and Eugeniinae, in which the ovary is generally bilocular. Usually he did not mention placentation in his descriptions of genera. Of *Eugenia* he said merely: "ovula sporophoris centralibus affixa." He was impressed, however, by what he considered to be the parietal origin of the ovule-bearing structures ["sporophora"] among the Pimentinae. In *Psidium* he described these as "parietal, 2-7, reaching the axis, there connate or discrete and bilamellate, the lamellae reflexed, more or less produced [i.e., radially into the locule, away from the axis], ovule-bearing on the inner surface ["intus"], connate in pairs, simulating central bilamellate sporophores."

These structures were illustrated by Berg, for species having respectively 3-, 4- and 5-locular ovary (Mart. Fl. Bras. 14, pt. 1: pls. 41, 41a, 42. 1857). Similar structures, apparently derived in the way described by Berg, can be seen in various species with multilocular



ovary. Even in some species with bilocular ovary (e.g., *Psidium pedicellatum*; see Flora of Peru, pt. 4: 799) the ovules occur in a double incurved row about the margins of an apparently peltate placenta.

In other genera of the Pimentinae (e.g., *Blepharocalyx*) having bilocular ovary, Berg made no attempt to demonstrate a parietal origin for the sporophores. In the description of *Blepharocalyx* in the *Flora Brasiliensis* he said merely "ovula sporophoro centrali affixa" (p. 420). Berg's concept of the placentation in *Psidium* (and in the Pimentinae as a whole) seems to have been based primarily upon study of species with 3-locular or multilocular ovary. As pointed out above, he seems to have known few species of *Psidium* with bilocular ovary, and these from few specimens. In his descriptions of *P. moritzianum* and *P. cordatum* (both described as bilocular), he described the sporophores as "bilamellate," but did not elaborate upon this.

The ovules of *Myrtus* were described by Berg as "saepissime plurima, sporophoris bilamellatis, spurie centralibus affixa" [italics mine]. This seems to me to point up the question of the difference between the type of placentation in *Psidium* and in *Myrtus*, and between 2- and 3-locular ovaries. I suppose Berg meant that in *Myrtus* (especially in the 3-locular types) the sporophores were actually parietal in origin, as in *Psidium*, but seemed to arise directly from the central axis. Nowhere did he specifically say, however, that the centrally attached placenta in the bilocular ovary was parietal in origin. We still do not have the information that will permit us to speculate upon the derivation of the placentae when these structures, even if bilamellate, seem to arise directly from the central dissepiment of a bilocular ovary. Comparative developmental studies are much needed. In the absence of such studies, variation in placental structure must be interpreted with caution. No correlation has been demonstrated between characters of the placenta and other characters in the *Psidium-Myrtus* complex, except that in species having a bilocular ovary the ovules are often attached in a single close sessile group near the middle of the central dissepiment, exactly as in many species of *Eugenia*.

In summary, the genus *Psidium* may be recognized by its pimentoid C-shaped or uncinat embryo; hard or bony seeds; calyx (whether originally open or closed) splitting between the lobes at anthesis; ovary 3-4- (rarely 2-7-) locular; placentae usually bilamellate but in bilocular ovaries the ovules often in a single cluster.

ADDITIONS TO THE GENUS *PSIDIUM*

The above review of the generic character of *Psidium* was occasioned by the discovery in Central America, in the region bordering the Gulf of Honduras, of a group of five species that are surely members of the Pimentinae, although all were originally described as species of *Eugenia*. These five species are vegetatively similar, with moderately large, coriaceous, glabrous or glabrate subsessile or short-petiolate leaves; the flowers are sessile or short-pedicellate, borne in small axillary clusters at leafless (or sometimes leafy) nodes on old wood; the calyx varies from completely closed in the bud to somewhat prominently lobed, but the lobes in all species separating at anthesis, the base of the calyx splitting down to the ovary, which is bilocular (or in one species trilocular and in another unilocular); the ovules are attached in a subcapitate group to the central dissepiment (or a bilamellate placenta in the trilocular ovary); the seeds (known in three species only) are reniform, compressed, osseous, the embryo curved into a nearly complete ring.

These plants, evidently very closely interrelated, are quite unlike any other species known from Central America, superficially suggesting in appearance some species of *Psidium* from the West Indies. They combine in a unique way several features that perhaps suggest evolutionary tendencies in the Pimentinae. The production of flowers at leafless nodes may be regarded as a character more specialized than the production of leafy or bracteate inflorescences on young shoots. In these five species, otherwise so similar, may be seen an almost completely closed calyx (in *anglohondurense*); the calyx-lobes united their whole length but not closing the bud (*mouririoides*); or the calyx-lobes about half as long as the tube (*biloculare*). The ovary is trilocular (in *anglohondurense*), or bilocular (in the other species), or sometimes unilocular (in *mouririoides*). It may be supposed that the bilocular condition is more specialized than the trilocular; the unilocular condition, if normally developed in this species, is presumably even more specialized. The unilocular condition is well known in Old World Myrtaceae, perhaps having resulted from a reduction series (cf. Bentham, Jour. Linn. Soc. Bot. 10: 119. 1868). It is of interest to note that the placentae are bilamellate in *anglohondurense*, associated with a trilocular ovary; in the other species the closely grouped ovules are associated with a bilocular ovary. Any generic distinction based on these characters, among species that are otherwise so strikingly alike, would seem to be specious.

The above five Central American species, which are apparently properly transferred to *Psidium*, may be separated as follows:

Branchlets acutely 4-angled, the angles becoming winglike in the distal parts of the internodes and terminating in the stipular positions at the sides of the petioles; flowers sessile or nearly so, the pedicels 1 mm. long or less; ovary bilocular.

Plants, including the inflorescence, glabrous or essentially so.

Leaves subsessile, rounded to acute at base, 3-7 (-12) cm. long, mostly 1.6-2.3 times as long as wide; style 6-8 mm. long; stamens 60-75.

*P. biloculare*.

Leaves on petioles 3-5 mm. long, rounded or subauriculate at base, 12-20 cm. long, 3-3.5 times as long as wide; style 9-10 mm. long; stamens about 200.

*P. musarum*.

Young leaves and branchlets, and the inflorescence, coarsely silky- or velutinoustomentose; leaves subsessile, abruptly rounded or subcordate at base, 6-10 cm. long, 2-3 times as long as wide; style 9-10 mm. long; stamens about 125.....*P. apodanthum*.

Branchlets terete or compressed, the nodes enlarged; plants glabrous; flowers pedicellate; calyx closed in the bud or with a small apical opening; style 5.5-7 mm. long.

Petioles 3-6 mm. long; pedicels 10-18 mm. long; buds 5-6 mm. long, apiculate, closed except a minute subapical pore; locules of the ovary 3 (-2), the ovules about 20 (-45) in each locule.....*P. anglohondurense*.

Petioles 1-3 mm. long; pedicels 3-4 mm. long; buds 3-4.5 mm. long, subglobose or pyriform, the calyx-lobes united their whole length but leaving an apical opening 1.5-2 mm. across; locules 2 (-1), the ovules about 50 in each locule.

*P. mouririoides*.

***Psidium apodanthum*** (Standl.) McVaugh, comb. nov. *Eugenia apodantha* Standl. Field Mus. Bot. 17: 380. 1938.

HONDURAS: Comayagua: Known only from the type collection, near Siguatopeque, *Yuncker et al. 5766* (F, type; MICH).

***Psidium biloculare*** McVaugh, nom. nov. *Eugenia gentlei* Lundell, Carneg. Inst. Wash. Publ. 478: 216. 1937. Not *Psidium gentlei* Lundell, 1943.

GUATELAMA: Izabal: Río Chacón, *Harry Johnson 1191* (F, US).

BRITISH HONDURAS: Belize Dist., Gracie Rock, Sibun River, *P. H. Gentle 1684* (MICH, type). Known also from several other localities: Stann Creek Dist., *W. A. Schipp S-141* (F), *Gentle 1887, 3382, 8552*; Belize Dist., *Gentle 9479, O'Neill 8761*; Toledo Dist., *Gentle 4062B, 4157, 4200, 4719*. A specimen from Toledo Dist., near Condemned Branch Pine Ridge, *Gentle 5358* (LL), is apparently this species but the calycine lobes are pubescent on the inner sur-

face and the styles are 8–9 mm. long, almost as in *P. apodanthum*. An imperfect specimen, Montaña del Mico, Dept Izabal, Guatemala, *Steyermark 38544*, is similar (F).

***Psidium anglohondurense*** (Lundell) McVaugh, nom. nov. *Eugenia schippii* Standl. Field Mus. Bot. 11: 137. 1932. Not *Psidium schippii* Standl., 1931. *Eugenia anglohondurensis* [sphalm. *anglohonduransis*] Lundell, *Wrightia* 2: 123. 1961.

BRITISH HONDURAS: Stann Creek Dist.: Seine Bight, *W. A. Schipp 669* (F, type of *E. schippii*; MICH); Commerce Bight, *P. H. Gentle 8354* (LL, isotype of *E. anglohondurensis*).—El Cayo Dist.: Little Mountain Pine Ridge, *H. H. Bartlett 13060* (F, MICH).—Toledo Dist.: Monkey River, Jenkins Creek, *Gentle 4063* (F, LL, MICH).

The type of *Eugenia schippii* was a specimen with half-grown fruit; *Gentle 4063* and *8354* include mature fruit, and the latter has flowers as well; Bartlett's collection has flowers only. It is noteworthy that Gentle gives the common name "Wild Guava" for both his collections.

***Psidium mouririoides*** (Lundell) McVaugh, comb. nov. *Eugenia mouririoides* Lundell, *Am. Midl. Nat.* 29: 480. 1943.

BRITISH HONDURAS: Toledo Dist.: Monkey River, Jenkins Creek, *Gentle 4142* (MICH, type). The one known specimen of this species is in some ways intermediate between *P. biloculare* and *P. anglohondurense*; e.g., the pedicels are of intermediate length and the calyx is in some ways intermediate (fig. 14). In view of the fact that all three species were collected by Gentle at the same locality within a period of about a month, they presumably grow together or in associated habitats, and it may be that *P. mouririoides* is a hybrid.

***Psidium musarum*** (Standl. & Steyererm.) McVaugh, comb. nov. *Eugenia musarum* Standl. & Steyererm. Field Mus. Bot. 22: 358. 1940.

GUATEMALA: Izabal: Río Juyamá, about 15 miles southwest of Bananera, *Steyermark 39165* (F, type). Known also from Alta Verapaz.

The only known specimens of *P. musarum* are sterile, or bear flowers just past anthesis. Confirmation of the generic status of



this species must await the discovery of fruiting specimens, but I believe a transfer to *Psidium* is justified on the basis of general similarity to the three species in which fruits and seeds are known.

#### SPECIES DESCRIBED BY STANDLEY FROM BRITISH HONDURAS

Four species of *Psidium* described by Standley in 1931, from a single locality near the coast of British Honduras, were all based on fruiting specimens. Their author, in differentiating them, emphasized their differences in leaf-form, but did not compare them with *P. guineense*, to which they all bear more than a casual resemblance. Perhaps the most distinctive is the following, which seems to be known only from the type collection, *Schipp 596* (F!).

***Psidium chrysobalanoides*** Standl. Field Mus. Bot. 8: 319. 1931.

Plant nearly glabrous, the leaves and the strongly 4-angled branchlets merely sparingly pale-strigose; blades mostly obovate, abruptly deltoid-acuminate with acute tip, mostly cuneate at base, 2.5–5 cm. wide, 4–7.5 cm. long, 1.25–2 times as long as wide, on petioles 2 mm. long; midvein convex above; lateral veins 4–6 on each side, strongly ascending, forming with the small veinlets a prominent elevated reticulum on both surfaces; peduncles 1- or 3-flowered, 1.5–2 cm. long; immature fruit 1 cm. long, probably pyriform.

In an area that has been rather well collected, it seems odd that this plant has not been found again. It is conceivable that it represents some complex hybrid involving principally *P. guineense* and perhaps also *P. guajava* and even *P. salutare*. In the absence of better material, any disposition of it can be little better than a guess.

***Psidium schippii*** Standl. Field Mus. Bot. 8: 319. 1931.

This species, also apparently known from the type collection only, seems to have been based on a vigorous shoot of *P. guineense* Sw. The leaves in the type (*Schipp 595*, F!) are obovate and somewhat elongated toward the tip of the shoot. A 3-flowered and apparently normal inflorescence near the base of the specimen seems typical of *P. guineense*.

***Psidium rotundifolium*** Standl. Field Mus. Bot. 8: 318. 1931.

Standley noted in the protologue of *P. rotundifolium* that the distinctive leaves were "usually large, rounded and nearly as broad as long." In his own later travels in Central America from 1940

to 1951, Standley collected (or annotated for others) approximately 30 specimens of what he took to be *P. rotundifolium*. Most of these were from Honduras; others came from Guatemala, Nicaragua, or Costa Rica. All tended to have large stiff leaves (Standley noted in one instance that the leaves were used as spoons). The blades are very broadly elliptic or obovate, up to 10–12 cm. wide and 12–16 cm. long, resembling superficially those of *P. guineense* but the red pubescence not obscuring the lower surface and the small veins forming an elaborate raised reticulum. Specimens with the smallest leaves look much like *guineense*, and the young growing tips when present are indistinguishable from those of *guineense*. Most significantly, to my mind, all the specimens that Standley called *rotundifolium* appear to be vigorous shoots, i.e., shoots bearing large fast-growing leaves; of the 35 sheets so named by Standley, 24 are sterile terminal shoots; 3 of the others seem to be ordinary flowering specimens of *P. guineense*; the other 8, including the type of *P. rotundifolium* (Schipp S85, F!), bear nothing that may be considered a normal inflorescence, but only scattered axillary peduncles. In the absence of distinctive flowering and fruiting specimens *P. rotundifolium* can hardly be recognized as a valid species; the evidence suggests that it is a vegetative form of *P. guineense*.

***Psidium* × *hypoglaucum*** Standl. Field Mus. Bot. 8: 320, pro. spec. 1931. *P. guineense* Sw. × *P. guajava* L. (?).

Most individuals of this so-called species bear a strong superficial resemblance to *P. guineense*, seeming to differ from it chiefly in the gray pubescence of the lower leaf-surface, and in the thinly pubescent, angled branchlets. Each of these latter features can be matched precisely in some individual specimens of *P. guajava*.

The usual habitat of *P. ×hypoglaucum* is in disturbed places where other species of *Psidium* are growing. At one locality in Honduras, for example (Las Mesas, Dept. Morazán, at an elevation of about 900 meters), *P. ×hypoglaucum* was collected with *P. guineense* (Williams & Molina 10074 includes both) at a spot where *P. guajava* also grew, and where the collectors obtained the so-called *P. rotundifolium*, *P. salutare*, and a pubescent form of *P. salutare* that bears some resemblance to *P. guineense*.

The hybrid nature of *P. ×hypoglaucum* is suggested by its usual habitat and by its morphological intermediacy between two species that often grow together.

Specimens examined:

BRITISH HONDURAS: All Pines, W. A. Schipp S99 (F, type).

GUATEMALA: Jutiapa: Cerro Colorado just west of Jutiapa, Standley 76173, 76190 (both F).

HONDURAS: Morazan: Standley 846, 12148, 22187, 22198, 22251, J. Valerio R. 520 (all F).

#### MISCELLANEOUS NOTES ON PSIDIUM

**Psidium** × **oerstedeum** Berg, Linnaea 27: 360, pro. spec. 1856. *P. chiapasense* Lundell, Wrightia 2: 204. 1961.

The type locality of *P. oerstedeum* was given as "In provincia Guanacarte [sic], floret Martio (Dr. Oersted), nec non in monte Rincon in Guatemala (Friedrichsthal, coll. no. 1226)." The Friedrichsthal specimen, according to Standley (MSS.), probably came from Volcán Rincón de la Vieja, Guanacaste, Costa Rica, not from Guatemala.

Central American plants referred to *P. oerstedeum* by Standley and others seem to differ from *Psidium salutare* (HBK.) Berg chiefly in having slightly broader and sometimes obovate or elliptic leaves, strongly pubescent stems and somewhat pubescent leaves, canescent buds and strongly pubescent peduncles, and somewhat more prominent veins in the mature leaves. Presumably the material upon which Berg based *P. oerstedeum* was all of this white-pubescent plant. The Oersted specimen cited by Berg ("in hb. Oersted. no. 16"), which I have seen through the kindness of the authorities at Copenhagen, is of this description and so apparently is the specimen of *Friedrichsthal* 1226 at Vienna (Field Mus. Neg. 31430). I find no significant differences between the type of *P. chiapasense* Lundell (*Matuda* 5769, an isotype, kindly lent by Dr. Lundell) and the syntype specimens of *P. oerstedeum*.

Very few specimens in herbaria resemble the original ones of *Psidium oerstedeum*; the ones that do have the open calyx of *oerstedeum* and *salutare*, and the canescent herbage and buds of *oerstedeum*, are otherwise so diverse they can hardly represent an independent species. Two Mexican specimens from near Comitán, Chiapas (*Matuda* 15769, *Carlson* 1892) suggest by their appearance small-leaved gray-pubescent forms of *P. guineense*, a supposition strengthened by the reddish color of the pubescence of immature shoots. Lundell noted that the peduncles of his *P. chiapasense*

were sometimes 2-flowered, a feature that also suggests some connection with *P. guineense*.

A clue to the origin of the so-called *Psidium oerstedeanum* seems to lie in its frequent close association with *P. salutare*, a species inhabiting lowland savannahs from Mexico to the Guianas. Ordinarily *P. salutare* is glabrous, with mostly lanceolate or lance-ovate narrowly pointed leaves. In various localities in Central America and southern Mexico, however, the plants are somewhat pubescent, but otherwise seemingly unchanged. At some localities, moreover, the narrow-leaved glabrous plants and narrow-leaved pubescent plants grow intimately associated with canescent plants that have even broader leaves (i.e. the "*oerstedeanum*" type). The type of *Psidium gentlei* Lundell, for example (British Honduras, Monkey River, Jenkins Creek, *Gentle 4062*, MICH), is a narrow-leaved plant with glabrous leaves and with but scanty pubescence on the branches; I should refer it without hesitation to *P. salutare*. Two other collections from the same locality and taken apparently at the same time, *Gentle 4062C* and *4062D*, have quite a different aspect, viz. that of small-leaved specimens of *P. guineense*; they are pubescent and broad-leaved and would be referred to *P. oerstedeanum* if that species were to be recognized.

Two collections from Honduras (*Standley 21236* and *Williams & Molina 10484*) are similarly mixed; each collection includes one branchlet with narrow glabrous leaves and glabrous twigs, and one or more with broader, pubescent leaves and pubescent inflorescence. These are from a disturbed pastured area to which allusion has already been made above (under *P. ×hypoglaucum*), where natural hybridization is suspected.

It seems likely that the broad-leaved, somewhat variable but always densely pubescent or canescent plants called *Psidium oerstedeanum* have resulted from hybridization between *P. salutare* and some other species, perhaps *P. guineense*, which is common and weedy and variable throughout Central America.

***Psidium sartorianum*** (Berg) Ndzu. in Engl. & Prantl, Natürl. Pflanzenfam. 3, Abt. 7: 69. 1893. *Mitranthes sartoriana* Berg, Linnaea 29: 248. 1858.

At the time of the publication of the genus *Mitranthes* it was assigned by Berg to the subtribe Eugenioideae. One wonders why such an astute student of the Myrtaceae as Berg did not suspect some relationship between *Mitranthes* and *Psidium*, in view of his



descriptions of the several species of *Mitranthes* as having a closed, circumscissile and operculate calyx, a multiovulate 3-locular ovary, and the "ovulis sporophoris bilamellatis affixis." Apparently, however, he never saw fruits or seeds of any of the original eight species of *Mitranthes*, and thus could never have been entirely sure of the systematic position of the genus (see *Linnaea* 29: 248-249. 1858, for the complete list of these species, including *M. sartoriana*).

Most recent authors have agreed that *Mitranthes* belongs taxonomically with *Psidium* rather than with *Eugenia*, but there has been no general agreement as to the exact generic status of the group. Niedenzu (in the *Natürlichen Pflanzenfamilien*) proposed a revised classification of *Psidium* and related genera, erecting a new infra-generic group, *Psidium* sect. *Calyptripsoidium* (Berg) Ndzu., to include the one species referred by Berg to the genus *Calyptripsoidium*, and five species, including *P. sartorianum*, that Berg had referred to *Mitranthes*.

Urban (*Bot. Jahrb.* 19: 571. 1895) re-established *Calyptripsoidium* as a genus, and transferred to it *Mitranthes sartoriana*. Standley, in the *Trees and Shrubs of Mexico* (*Contr. U. S. Nat. Herb.* 23: 1035. 1924), followed Niedenzu in treating this species as a *Psidium*, and in this he has been followed by most recent American workers. Burret, however, in 1941 (*Notizbl. Bot. Gart. Berlin* 15: 486), created a new genus, *Mitropsidium*, based primarily on *Psidium* sect. *Calyptripsoidium* (Berg) Ndzu. but including three additional species with operculate calyx, and excluding the type species of *Calyptripsoidium* Berg, *C. friedrichsthalianum*, on the grounds that in that species the calyx opens irregularly and not by a true calyptra. Burret argued that *Mitropsidium* constituted a taxon closely related to *Psidium*, the two genera perhaps not entirely monophyletic, and separated somewhat artificially by the one character of the calyx; he used for support of his argument the universally recognized genera *Calyptranthes* and *Marlierea*, separated artificially by the same character.

The most recent student of this particular group, Miss G. J. H. Amshoff, pointed out that the character of the circumscissile calyx "has to be used with circumspection as e.g. in *Psidium* (*Calyptripsoidium*) *Friedrichsthalianum* (Berg) Ndz. the calyx is sometimes calyptrate and sometimes vertically dehiscent" (*Act. Bot. Néerl.* 5: 277. 1956). In the *Flora of Panama* (*Ann. Missouri Bot. Gard.* 45: 198. 1958) Miss Amshoff treated *Mitranthes-Calyptripsoidium-Mitropsidium sartorianum* as a species of *Psidium*, with no comment as

to its generic position but noting in her description that the calyx usually splits irregularly, "with 1 large more or less lid-like deciduous segment and 2-3 other minute persistent segments," and stating specifically that a neatly circumscissile calyx is exceptional.

It seems probable that too much emphasis has been placed upon this one feature of the calyx in determining generic lines. It is at best a variable feature, even in individual species; furthermore it has not been shown that the species having in common the circumscissile calyx have also other shared attributes to set them apart from *Psidium*. There seem to be no sharp distinctions in *Psidium* between groups of species with closed buds and those with open buds. Two Amazonian species, for example, *P. guianensis* Pers. and *P. densicomum* DC., are essentially indistinguishable except that the former has a closed bud and the latter an open, shallowly lobed calyx.

The specific limits of *Psidium sartorianum* are somewhat in doubt also. Several so-called species have been distinguished from it; most of these have been based partly upon features of the calyx, but in part also on leaf-characteristics. The entire species-complex should be reviewed. The leaves are usually elliptic and short- or obtusely pointed, but in some parts of the range, particularly in Mexico from Jalisco to Guerrero, in the Yucatan Peninsula, and in Honduras, many or most individuals have long-acuminate or at least long-acute leaves, often of a lanceolate type. This local population may be appropriately designated as follows:

***Psidium sartorianum* (Berg) Ndzu., var. *yucatanense* McVaugh, var. nov.**

A var. *sartoriano* foliis lanceolatis vel ovato-lanceolatis longiuscule acutis acuminatisve differt.

This variety is typified by a specimen from British Honduras, *P. H. Gentle 9* (MICH), which is also the type of *Psidium yucatanense* Lundell (Contr. Univ. Mich. Herb. 7: 35. 1942). I cannot distinguish specimens of *P. yucatanense* from Cuban specimens described as *Calycorectes protractus* Griseb., the type a specimen collected by Charles Wright (isotype, US!) (Griseb. Cat. Pl. Cub. 284. 1866). If these Cuban and Central American plants together constitute a distinct species, it will be necessary to provide a new specific epithet in the genus *Psidium*, the name *Calycorectes protractus* having 76 years' priority over *P. yucatanense*. If, as in the present paper, this taxon is regarded as a variety of *P. sartorianum*, the name var.

*yucatanense* may be used. It should be noted that in accordance with the International Code of Botanical Nomenclature (Art. 60, 72) this is to be treated as a new varietal name, not a new combination based on *P. yucatanense* Lundell, which is regarded as a taxonomic (not nomenclatural) synonym of *Calycorectes protractus* and therefore undesirable as a basis for a name in a new status.

Dr. Lundell contrasted his new species with *P. sartorianum*, emphasizing especially the point that in *P. yucatanense* the basal part of the calyx "above the ovary splits into five irregular lobes at anthesis." I do not find this feature of diagnostic value, for in most specimens of undoubted *P. sartorianum* the calyx splits in a similar fashion at or after anthesis. There is no doubt, however, that all specimens from the Yucatan Peninsula have a distinctive appearance because of the slender-pointed lanceolate or lance-ovate leaves. The following belong here:

CUBA: Santa Clara: Dist. Cienfuegos, Cieneguita, *Combs 201* (F).

YUCATAN: Chichén Itzá, *Steere 1293*; Tizimin, *Swallen 2502*; Yakdzonoot, *Lundell 7494* (all MICH).

BRITISH HONDURAS: Belize Dist., Belize-Sibun Road, *P. H. Gentle 9* (F; MICH, type, and type of *P. yucatanense* Lundell).

GUATEMALA: Petén: Tikal National Park, *E. Contreras 1340* (LL, MICH).

This local population of the Yucatan Peninsula hardly seems specifically different from *P. sartorianum* of the Mexican mainland. A paratype of *P. yucatanense*, for example (*Steere 1293*), is a good match for a Karwinsky specimen identified by Berg as *Mitrantes sartoriana* (Field Mus. Neg. 19745). In western Mexico, moreover, where *P. sartorianum* is abundant, individual plants of the "yucatanense" type, i.e., with acute and more or less lanceolate leaves, are frequent but do not seem to differ otherwise from the plants with more obtuse elliptic leaves. Some specimens are cited below:

MEXICO: Jalisco: Near Bahía de Tenacatita, *McVaugh 20965* (MICH); 4 miles north of Bahía Navidad, *McVaugh 20832* (MICH).—Guerrero: Acapulco, *Palmer 357* (F), *MacDaniels 149* (F).

Another plant that seems to have close affinities with *P. sartorianum* is *P. molinae* Amsh. (Act. Bot. Néerl. 5: 277. 1956) (Honduras, the type from Dept. Morazán, *Standley 21255*, F!). This was contrasted by its author with *P. sartorianum*, with the statement that the latter species is at once distinguishable "from our new one by its calyptrate calyx and shortly acuminate leaves"

(*P. molinae* having "alabastra . . . apice minute aperta, brevissime 4-loba. Calyx . . . in flore adulto irregulariter 4-fissus," and the leaves obtuse). The type of *P. molinae* bears a few buds that open in the way described by Amshoff, i.e., the calyx is 4-lobed, open at the tip, with thick incurved-deltoid lobes 1 mm. long. One other specimen, *Williams & Molina 14143* (F), also in bud, is similar to the type. The other specimens cited by Amshoff are sterile or in the fruiting condition, and apparently were selected on the basis of leaf-shape only. The leaves are indeed somewhat obtuse, but not more so than in about half the available specimens throughout the range of *P. sartorianum*. Miss Amshoff points out that a specimen from Oaxaca (*Makrinius 609*) has "the flowers of *P. molinae* and the leaves of *P. sartorianum*."

A plant similar to *P. molinae* is *P. microphyllum* Britton (Sci. Surv. P. R. & Virgin Is. 6: 555. 1930), based on a cultivated plant from the Agricultural Experiment Station at Mayaguez, Puerto Rico (*J. B. McClelland*, July 1930, NY, type!). The leaves are relatively obtuse, and the buds apparently are never fully closed; there is an apical pore about 0.3 mm. in diameter, and minute lobe-like hairy appendages surround the pore; the calyx in anthesis splits irregularly, one lobe often much larger than the others but not forming a calyptra.

I do not know how much importance is to be attached to the single feature of the calyptrate vs. non-calyptrate calyx. Superficially the two seem very different, but, as pointed out above, the calyx in a normally calyptrate species may sometimes open by irregular longitudinal splits. Superficial examination of a number of specimens of *P. sartorianum* shows a great deal of individual variation in the "neatness" with which the calyptra is cut off; sometimes it is very irregular, resembling a large calyx-lobe opposing the smaller irregular lobes around the circumference of the hypanthium. I think it probable that this calyx-character is not a very stable one, genetically speaking, and that a form with open calyx might well appear in a large population like *P. sartorianum*. Additional series of specimens of plants in bud and in flower are needed to establish the taxonomic position of *P. molinae* and *P. microphyllum*.



## INDEX

New names in **bold-face** type

*Ananomis fragrans*, 485

*Calycorectes densiflorus*, 509

*Calyptranthes apoda*, 412

aromatica, 411

costa-ricensis, 408

chytraculia, 403

var. **americana**, 404

var. chytraculia, 403

δ pauciflora, 407

euryphylla, 405

**hernandezii**, 404

**johnstonii**, 405

mexicana, 409

millspaughii, 405

pallens, 406

var. **mexicana**, 409

var. pallens, 407

var. **williamsii**, 408

**paxillata**, 410

schiedeana, 411

schlechtendaliana, 411

**tenuipes**, 411

tovarensis, 412

**vexata**, 412

williamsii, 408

zuzygium, 412

*Eugenia acapulcensis*, 421

alaternifolia, 481

**alnifolia**, 425

andina, 481

anglohondurensis, 521

antiquae, 421

apodantha, 520

argyrea, 426

aromatica, 481

asa-grayi, 503

avicenniae, 427

axillaris, 428

bartlettiana, 421

baruensis, 421

**basilaris**, 464

biflora, 428

bonplandiana, 421

bracteolosa, 421

buxifolia, 441

calciophila, 468

campechiana, 421

capuli, 432

carthagenensis, 421

β baruensis, 421

casearioides, 433

chepensis, 434

chinajensis, 449

choapamensis, 435

cocquericotensis, 446

colipensis, 436

comitanensis, 421

contrerasii, 432

conzattii, 446

crassifolia, 467

crebrifolia, 434

crenularis, 436

**culminicola**, 437

deltoides, 421

dissitiflora, 467

divaricata, 502

doubledayi, 470

dugandii, 484

egensis, 466

escuintlensis, 421

fameoides, 439

fieldingii, 428

fiscalensis, 454

flavida, 467

flavifolia, 439

flavoviridis, 467

florida, 446

foetida, 453

β maleolens, 454

γ rhombea, 453

fragrans, 485

gaumeri, 469

gentlei, 520

granulata, 487

guadalupensis, 421

guanacastensis, 465

guatemalensis, 439

hintonii, 436

hiraefolia, 455, 457

hondurensis, 467

hypargyrea, 439

inconspicua, 440

itzana, 425

jutiapensis, 465

karsteniana, 490

karwinskyana, 440

koepperi, 449

laevis, 468

var. **gaumeri**, 469

var. laevis, 468

- ledophylla**, 430, 440  
 leptopa, 453  
 l'heritieriana, 503  
 liebmännii, 441  
 lindeniana, 442  
 lopeziana, 485  
 lundellii, 469  
 macrocarpa, 442  
 mariquitensis, 491  
 maritima, 421  
 mato, 491  
 mexiae, 455  
 mexicana, 442  
 michoacensis, 443  
 micrantha, 433  
 minimifolia, 492  
 mirandae, 444  
 monticola, 432  
     var. *latifolia*, 432  
 mosquitensis, 421  
 mouririodes, 521  
 musarum, 521  
 nicaraguensis, 467  
 oaxacana Berg, 445, 455, 456, 458  
 oaxacana Standl., 455, 456, 458  
 octopleura, 470  
 oerstedeana, 446  
 oreinoma, 465  
 origanoides, 448  
 orthostemon, 492  
 ovatifolia, 421  
 pallens, 406  
 palmarum, 503  
 paplensis, 465  
 periplocifolia, 471  
 petenensis, 446  
 pittieri, 433  
 pleurocarpa, 449  
 polyneura, 503  
**praeterita**, 450  
**principium**, 451  
 pseudo-mato, 493  
 pueblana, 452  
 punctata, 485  
 purpusii, 455, 456  
 pycnantha, 494  
 pycnoneura, 503  
 rekoi, 453  
 rhombea, 453  
 rigidissima, 494  
 roepperi, 470  
 rondonensis, 495  
 rubella, 449  
 salamensis, 455  
     var. *hiraefolia*, 457  
     var. *rensoniana*, 456  
     var. *salamensis*, 455  
 schiedeana, 432  
 schippii, 521  
 sibunensis, 421  
 sinaloae, 457  
**standleyi**, 458  
 steyermarkii, 485  
 storkii, 496  
 subverticillaris, 468  
**symphoricarpos**, 458  
 tabascensis, 429  
**teapensis**, 459  
 tenuissima, 434  
 ternifolia, 497  
 tikalana, 435  
 tomentulosa, 455  
 triflora, 485  
 triquetra, 497  
 truncata, 465  
 trunciflora, 460  
**turneri**, 460  
 turumiquirensis, 497  
 vincentina, 446  
 xalapensis, 461  
**xilitlensis**, 462  
 yautepecana, 463  
 yucatanensis, 429  
 Marlierea dussii, 509  
 Mitrantes sartoriana, 525  
 Myrcia aromatica, 411  
     *belizensis*, 472  
     *costa-ricensis*, 471  
     *discolor*, 471  
     *fallax*, 472  
     *karsteniana*, 490  
     *longicaudata*, 471  
     *melanoclada*, 471  
     *mollis*, 471  
     *oerstedeana*, 471  
     *plicato-costata*, 471  
     *rufidula*, 470  
     *sartoriana*, 471  
     *saxicola*, 431  
         *β grandifolia*, 431  
     *schippii*, 471  
     *seleriana*, 485  
     *splendens*, 470  
     *tovarensis*, 412  
 Myrcianthes biflora, 485  
     *borealis*, 481  
     *callicoma*, 482  
     *compressa*, 483  
     *crebrifolia*, 484  
     *dugandii*, 484  
     *foliosa*, 491  
     *fragrans*, 485  
         var. *fragrans*, 485  
         var. *hispidula*, 489  
     *irregularis*, 489  
     *karsteniana*, 490  
     *leucoxyla*, 491  
     *mariquitensis*, 491  
     *mato*, 491  
     *minimifolia*, 492  
     *prodigiosa*, 492  
     *pseudo-mato*, 493  
     *rhopaloides*, 481, 483  
     *sessilis*, 495  
     *storkii*, 496

- ternifolia**, 497  
*Myrciaria amazonica*, 501  
   *caurensis*, 501  
   *cordata*, 501  
   *divaricata*, 502  
   **dubia**, 501  
   *floribunda*, 502  
   *ibarrae*, 503  
   *maragnanensis*, 502  
   *paraensis*, 501  
   *phillyraeoides*, 503  
   *pittieri*, 503  
   *verticillata*, 502  
   **vexator**, 503  
   *vismeifolia*, 504  
*Myrteola acerosa*, 431  
   *microphylla*, 432  
*Myrtus acerosa*, 430  
   *axillaris*, 428  
   *biflora*, 428  
   *casearoides*, 433  
   *capuli*, 432  
   *chytraculia*, 403  
   *coccolobaefolia*, 483  
   *compressa*, 483  
   *ehrenbergii*, 442  
   *fragrans*, 485  
   *foliosa*, 491  
   *ledophylla*, 430  
   *leucoxylla*, 491  
   *maritima*, 421  
   *micrantha*, 433  
   *oaxacana*, 458  
   *splendens*, 470  
   *trunciflora*, 460  
   *xalapensis*, 461  
   *zuzygium*, 412  
*Paramitranthes densiflora*, 509  
*Pimenta dioica*, 511  
   *tabasco*, 511  
*Plinia asa-grayi*, 503  
   *dussii*, 509  
   *fruticosa*, 509  
   **salticola**, 505  
*Pseudomyrcianthes pseudo-mato*, 493  
*Psidium apodanthum*, 520  
   *anglohondurenses*, 521  
   **biloculare**, 520  
   *chiapasense*, 524  
   *chrysobalanoides*, 522  
   *dubium*, 501  
   *gentlei*, 520  
   *guajava*, 523  
   *guineense*, 523  
   *hypoglaucum*, 523  
   *molinae*, 528  
   **mouririodes**, 521  
   **musarum**, 521  
   *oerstedeum*, 524  
   *rensonianum*, 455, 456, 457  
   *rotundifolium*, 522  
   *sartorianum*, 525  
     *var. yucatanense*, 527  
   *schippii*, 522  
   *yucatanense*, 527  
*Siphoneugena densiflora*, 509  
   *var. tepuiensis*, 509  
   *reitzii*, 507





























UNIVERSITY OF ILLINOIS-URBANA

580.5FB C001  
FIELDIANA, BOTANY\$CHICAGO  
29



3 0112 009379105