

Ministry of Agriculture, Lands and Fisheries
Trinidad and Tobago

Vol. II]

[Part VIII

FLORA

OF

TRINIDAD AND TOBAGO

MULTIOVULATAE TERRESTRES

ARISTOLOCHIACEAE

(BY D. PHILCOX)

MICREMBRYAE

PIPERACEAE

(BY D. PHILCOX)

MYRISTICACEAE

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MONIMIACEAE

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Price : — — \$1.00 :

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NATIONAL HERBARIUM OF T&T LIBRARY

GROUP 3. MONOCHLAMYDEAE

SERIES III. MULTIOVULATAE TERRESTRES

FAMILY—ARISTOLOCHIACEAE

BY D. PHILCOX

Herbs or shrubs, the latter usually twining climbers; leaves alternate, petiolate, simple, entire or lobed, exstipulate but often with stipuliform bracts (pseudostipules) present; flowers axillary, solitary, clustered or racemose, actinomorphic or zygomorphic; perianth a petaloid calyx of 5 fused segments forming a regular 3-lobed tube or an irregular tube with either a 2-lipped or entire limb; stamens (5-) 6 or more, free or adnate to the style, anthers 2-locular opening lengthwise; ovary inferior 4-6 locular, style 1 with 3 or more stigmatic lobes, ovules several to numerous in each loculus; fruit capsular or indehiscent; seeds usually angled or flattened.

ARISTOLOCHIA *Linnaeus*

Aristolochia L., *Gen.*, ed.5: 410 (1754)

Vines; leaves entire or lobed; flowers zygomorphic, generally solitary, axillary; perianth 1-seriate, the tube usually inflated at the base, constricted or bent above into a tube with variously shaped limb sometimes finely tailed; stamens 6; capsule 6-locular.

Several spp of this genus have been cultivated at some time in Trinidad and Tobago. Specimens of *Aristolochia longifolia* Champ. ex Benth., a native of Hong Kong, and *A. odoratissima* L. from Jamaica were recorded from the Botanic Garden in the late 19th century, while *A. hians* Willd. from nearby Venezuela was cultivated at the St Clair Experimental Station. In 1911, W. E. Broadway (No. 3968) collected from cultivation *A. arborea* J. Linden, the erect Mexican shrub or small tree species, from the grounds of Government House. R. O. Williams (*Useful and Ornamental Plants of Trinidad and Tobago*, ed. 4: 73 (1969)) mentions

two other plants used in cultivation, *A. elegans* Mast. and *A. gigas* Lindl. var. *sturtevantii* W. Wats. The latter is doubtfully correctly identified, as the inadequate material deposited in the National Herbarium appears to represent true *A. grandiflora* Sw., although collected from St Clair in 1912 by J. A. Pinder.

Leaves deeply to scarcely palmately 3-lobed;

calyx limb without fimbriae 1. *A. trilobata*

Leaves not palmately lobed

Calyx limb fimbriate 2. *A. rugosa*

Calyx limb not fimbriate 3. *A. grandiflora*

1. *Aristolochia trilobata* L., *Sp. Pl.* 960 (1753); Griseb., *Fl. Brit. W. Ind.* 299 (1860); Duchr. in DC. *Prodr.* 15, 1:444 (1864); Fawc. & Rendle, *Fl. Jam.* 3: 105 (1914); Urb., *Symb. Ant.* 8: 191 (1920); Britt. & Wils. in *Sci. Surv. Porto Rico* 5: 262 (1924); Gooding & Loveless in Gooding et al., *Fl. Barbado.* 131 (1965); Pfeifer in *Ann. Mo. Bot. Gard.* 53: 144 (1966); Adams, *Fl. Pl. Jam.* 245 (1972) *Treff, Tref*

A. trifida Lam., *Encyc. Meth. Bot.* 1: 251 (1783)

A. triloba Salisb., *Prodr.* 214 (1796)

A. surinamensis Willd., *Sp. Pl.* 4: 151 (1805)

Stems glabrous, twining to 7m or more long; leaves deeply to scarcely 3-lobed, subtruncate to shallowly cordate at base, 4-10cm long, 4-13cm wide, glabrous above, minutely white crisped puberulent beneath, petioles 1.5-5cm long, pseudostipules present, suborbiculate to ovate, amplexicaul; perianth utricle ellipsoid 3.5-5cm long bending into tube 3.5-7.5cm long, limb 1-lobed cordate, narrowly triangular 1.5-3cm wide, 2-2.5cm long narrowing into a fine tape-like appendage up to 25cm long, the tube and limb resembling the pitcher and lid of certain *Nepenthes* spp; capsule cylindric to 9cm long, 2-3cm broad; seeds c. 8mm long and broad, flattened triangular.

Trinidad: without locality, Anderson ex Hb. Forsyth (K), Crueger (TRIN 2753), de Schack s.n. (K); road to Blue Basin, Diego Martin 12.5.1915, McLean (TRIN 7702); Belmont, 6.7.1921, McLean s.n. (TRIN); Siparia, 20.9.1912 (TRIN 7700).

Tobago: Scarborough, Old Fort, private garden, 27.9.1909, Broadway 3134 (K).

Thickets and woodlands.

Central America from Belize to Panama and the West Indies.

2. *Aristolochia rugosa* Lam., *Encyc. Meth. Bot.* 1: 252 (1783); Pfeifer in *Ann. Mo. Bot. Gard.* 53: 154 (1966)

A. obtusata Sw., *Prodr. Veg. Ind. Occ.* 126 (1788)

A. barbata Jacq., *Coll.* 3: 221 (1790)

A. dictyantha Duchr. in *Ann. Sc. Nat. sér. 4*, 2: 40 (1854)

Stems glabrescent, twining; leaves broadly ovate-oblong to subpandurate, apex rounded, obtuse, basally deeply cordate, 5-11cm long, (2-)-3-6cm wide, glabrous above, minutely puberulent beneath; petioles 1-3cm long; pseudostipules absent; perianth greenish, utricle subovoid, about 1cm long, tube trumpet-shaped 2.5-3cm long, limb 1-lobed, spatulate, fimbriate, 1-1.5cm long; capsule cylindric about 3.5cm long, 1.5cm broad; seeds flattened-turbinate about 4.5mm long, 3mm wide, pale brown.

Trinidad: Diego Martin, 25.2.1948, Baker (TRIN 14201); St Ann's, 18.1.1933, Broadway 9134 (BM, K), Crueger s.n. in 1845 (K); Government House Gardens, 16.10.1914, Broadway (TRIN 7074); Santa Cruz Valley, 29.5.1939, Cheesman 228 (TRIN); Maracas, road to the waterfall, 11.3.1927, Broadway 7385 (BM); St Augustine, I.C.T.A., 3.2.1959, Simmonds (TRIN 15706); Arima to Blanchisseuse road, mile-post 7, alt. 540m, 7.3.1964, Bhorai 839 (TRIN); Heights of Aripo road, between mile-posts 5½ and 5½, 9.4.1938, Cheesman & Baker 149 (TRIN); Siparia, 20.9.1912, McLean (TRIN 7701).

Limited to Antigua, Guadeloupe, Martinique and St Vincent in the Lesser Antilles and Trinidad.

3. *Aristolochia grandiflora* Sw., *Prodr. Veg. Ind. Occ.* 126 (1788), non Vahl (1791); Griseb., *Fl. Brit. W. Ind.* 299 (1860); Duchr. in DC., *Prodr.* 15, 1: 472 (1864); Fawc. & Rendle, *Fl. Jam.* 3, 1: 106 (1914); Pfeifer in *Ann. Mo. Bot. Gard.* 53: 164 (1966); Adams, *Fl. Pl. Jam.* 246 (1972)
Swan Flower

A. cordiflora Mutis ex H.B.K., *Nov. Gen. & Sp.* 2: 149 (1817)

A. gigas Lindl. in *Bot. Reg.* 28: t. 60, Misc. 51 (1842)

A. gigantea Hook. in *Bot. Mag.*: t. 4221 (1846)

Stems glabrescent, twining to 3m or more long; leaves broadly triangular-ovate, deeply cordate, acute-acuminate, glabrous above, puberulous to strigose beneath particularly on the veins, becoming glabrescent, 10-22cm long, 8-15cm wide; petioles 3-15cm long; pseudostipules absent; perianth broadly salver-shaped, coloured to various degrees with shades of purple, fawn and cream, strongly foetid, limb 6-12cm broad, 7-12(-20)cm long, narrowing into a tape-like appendage up to 22cm long; capsule oblong-cylindric to 6cm long, to 2.5cm broad; seeds about 10mm long, 8mm wide, flattened triangular, smooth, pale olive-fawn.

Trinidad: without locality, Crueger s.n. (K), Fendler 640 (BM, K); St Ann's, Mrs. Hart s.n. (TRIN), de Verteuil (TRIN 12985); St Ann's Valley, 12.12.1865, Finlay (TRIN 2752), 5.11.1931, Broadway 7848 (BM); St Ann's, Cascade, Miss Nicholson s.n. (TRIN); St Clair, Experimental Station, 22.6.1912, Pinder s.n. (TRIN); Aranguez, by St Joseph River, Senior-White (TRIN 14501).

Along streams and in secondary growth thickets in north Trinidad.

Tropical Mexico to Panama; West Indies.

GROUP 3. MONOCHLAMYDEAE

SERIES IV. MICREMBRYAE

- 1 Perianth absent, flowers hermaphrodite. Herbs, shrubs or small trees; flowers minute, inserted in leaf-opposed simple spikes, or these spikes arranged in racemose, paniculate or umbellate compound inflorescences on a common peduncle FAMILY 1.
Piperaceae
- 1 Perianth present, flowers unisexual
- 2 Trees; flowers small, dioecious, the female with a single ovary, the male with several connate anthers FAMILY 2.
Myristicaceae
- 2 Shrubs or small trees; perigynous flowers small, the female with numerous free carpels, the male with numerous stamens... FAMILY 3.
Monimiaceae

FAMILY 1. PIPERACEAE

By D. PHILCOX

Herbs, shrubs or small trees, terrestrial or epiphytic; leaves alternate, opposite or verticillate, simple, entire, petiolate or sessile, often aromatic when crushed; stipules absent, but petioles often sheathing with a stipule-like base; flowers minute, usually green, in terminal, axillary or leaf-opposed simple spikes, or these spikes arranged in racemose, paniculate or umbellate compound inflorescences on a common peduncle, the flowers when spicate usually densely crowded and subtended by a simple peltate, sessile or stipitate, adnate or concave bract; perianth absent; stamens mostly 2-6, the filaments short, free, the anthers erect, 2-celled; ovary sessile or rarely pedicellate, 1-locular, 1-ovulate; fruit drupaceous, very small.

KEY TO THE GENERA

- 1 Plants woody, rarely subherbaceous or succulent, more rarely truly epiphytic, the nodes usually thickened; leaves alternate, never opposite, whorled or basal; floral bracts various, usually pubescent or fimbriate, rarely totally glabrous; stigmas 2-5 (mostly 3-4); anthers usually 4
 - 2 Inflorescence leaf-opposed, solitary
 - 3 Fruit sessile; inflorescence spicate 1. *Piper*
 - 3 Fruit stalked; inflorescence racemose .. 2. *Ottonia*
 - 2 Inflorescence axillary; spikes several in umbellate clusters 3. *Pothomorphe*
- 1 Plants herbaceous, often succulent, usually epiphytic, the nodes rarely thickened; leaves alternate, opposite, whorled or basal; floral bracts usually round-peltate, glabrous, rarely puberulent or ciliate; stigma 1, though this may occasionally be cleft thus appearing as two; anthers 2..... 4. *Peperomia*

1. PIPER *Linnaeus**Piper* L., *Sp. Pl.* 28 (1753)

Shrubs or small trees, or rarely climbers (introduced Old World species), terrestrial, often nodose; leaves alternate, simple, entire, petiolate, frequently inequilateral at the base with one side attached to the petiole several millimetres lower than the other, often scabrous, glabrous or hairy, sometimes bullulate or rugose, pinnately nerved with the nerves arising from the lower half or two-thirds of the midrib or throughout, or occasionally palmately nerved; petiole commonly vaginate-grooved at least at the base and frequently to the lamina, the margins of the groove often winged; inflorescence of solitary, leaf-opposed spikes; flowers sessile, perfect, usually congested and in the axils of variously shaped bracts; bracts sometimes glabrous but most frequently pilose to fimbriate; stamens 2-5; ovary 1; stigmas 2-4, rounded to filiform, sessile or on a short and stout to elongated and slender style; fruit variously shaped, 1-seeded, drupe-like with a thin pericarp and somewhat hardened endocarp.

In addition to the twenty species of *Piper* occurring wild in Trinidad and Tobago, at least four others are known to have been cultivated here. Three of these viz. *P. nigrum* L., the source of commercial pepper, *P. sarmentosum* Roxb. and *P. belle* L. are recorded from collections made from the Botanic Garden. The fourth species is *P. christyi* C. DC. This was described by Casimir de Candolle (1902) from plants grown in the Garden from seed sent by Mr. T. Christy of London, in all probability originally of Old World source.

- 1 Leaves palmately nerved
- 2 Leaves 5-7 (rarely 9)-nerved
- 3 Leaves mostly less than 15cm long..... 1. *P. amalago*
- 3 Leaves mostly more than 15 cm long 2. *P. reticulatum*
- 2 Leaves 9-13-nerved 3. *P. marginatum*
- 1 Leaves pinnately nerved
- 4 Leaves 30-45cm long, base strictly cordate 4. *P. caracasenum*
- 4 Leaves less than 30 cm long
- 5 Principal nerves arising from below the upper third of the midrib
- 6 Spikes regularly strongly sickle-shaped; leaves scabrous 5. *P. aduncum*
- 6 Spikes not regularly sickle-shaped
- 7 Leaves glabrous
- 8 Fruit depressed at the apex; leaves gland-dotted 9. *P. glabrescens*
var. *caparoanum*
- 8 Fruit convex or truncate at the apex.. 6. *P. aequale*
- 7 Leaves hairy at least on the nerves beneath
- 9 Leaves coarsely scabrous; twigs hispid; fruit papillate 7. *P. hispidum*
- 9 Leaves only slightly scabrous at most; twigs not hispid
- 10 Nerves densely minutely puberulent beneath to subvillous
- 11 Nerves minutely adpressed puberulent to subvillous; fruit rounded, stylose 8. *P. crassinervium*
- 11 Nerves minutely crisped puberulent to glabrous; fruit depressed-globose, not stylose..... 9. *P. glabrescens*
- 10 Nerves not as above
- 12 Leaves glabrous above; petiole vaginate to the middle or above

- 13 Twigs glabrous; leaves 4-5cm wide.....10. *P. mornicola*
- 13 Twigs crisply subsilky; leaves 6-9cm wide11. *P. hostmannianum*
- 12 Leaves at least sparsely hairy above, sometimes only on the nerves; petiole vaginate towards the base
- 14 Leaves somewhat rhomboidal; fruit sparsely puberulent at the apex12. *P. dilatatum*
- 14 Leaves lanceolate or lanceolate-elliptic; fruit glabrous13. *P. guayranum*
- 5 Principal nerves usually arising throughout the length of the midrib, or occasionally from below the upper third
- 15 Leaves somewhat bullulate and glossy above with age, fruit hairy at the apex
- 16 Leaves 3.5-4.5cm wide; spikes 5cm long or less14. *P. rugosum*
- 16 Leaves 5-7.5cm wide; spikes up to 10cm long.....15. *P. kegelianum*
- 15 Leaves scarcely bullulate though may be rugescent with age
- 17 Leaves clearly unequal at the base with one side much shorter at the petiole; petiole vaginate-winged over the whole length or almost so
- 18 Leaves more or less puberulent beneath, particularly on nerves, apex abruptly acute16. *P. tuberculatum*
- 18 Leaves glabrous, apex acuminate.....17. *P. arboreum*
- 17 Leaves subequilateral at the base though one side may be up to 2mm shorter at the petiole

- 19 Fruit puberulent at the apex;
leaf-base cordulate18. *P. demeraranum*
- 19 Fruit glabrous
- 20 Leaves pubescent at least along the
nerves beneath.....19. *P. hartii*
- 20 Leaves glabrous
- 21 Mature fruit apex depressed;
leaves gland-dotted.....20. *P. saltuum*
- 21 Mature fruit apex convex..... 6. *P. aequale*

1. **Piper amalago** L., *Sp. Pl.* 29 (1753); C. DC. in DC., *Prodr.* 16: 248 (1869); Fawc. & Rendle, *Fl. Jam.* 3: 20 (1914); Britt. & Wils., *Sci. Surv. Porto Rico* 5: 220 (1924); Yun. in *Lilloa* 26: 245 (1953); Gooding & Loveless in Gooding et al., *Fl. Barbado.* 118 (1965); Burger in *Fieldiana* 35: 99 (1971); Adams, *Fl. Pl. Jam.* 211 (1972)

Shrub or small tree to 8m tall; stems and branches glabrous or less often puberulent mainly when young; leaves lance-elliptic to broadly ovate, 5-11(-15)cm long, 2-6(-8)cm wide, glabrous on both surfaces or occasionally puberulent beneath and on the veins above, apex acuminate, base obtuse to truncate or occasionally cordate, slightly inequilateral, (3-)5-7 palmately nerved; petiole 5-10mm long, vaginate only at the base; spikes 4-10cm long, 4-5mm thick; peduncle 5-18mm long; bracts obovate-concave, slightly papillate-pilose; stigmas 3 or 4, sessile; fruit ovoid, minutely papillate or glabrous.

Stems and leaves glabrous; leaves usually
5-11cm long, 2-6cm wide var. **amalago**

Stems and leaves somewhat puberulent;
leaves usually 8-11(-15)cm long, 3.5-6
(-10)cm wide var. **medium**

P. amalago var. **amalago**

Trinidad: Hort. Trin., "indigenous", 1895, Hart (TRIN 6011)

West Indies

P. amalago var. *medium* (Jacq.) Yun. in *Brittonia* 14: 189 (1962)

P. medium Jacq., *Icon. Pl. Rar.* 1:2 (1781)

P. plantagineum Lam., *Illustr. Ency. Meth.* 1:80 (1791)

P. sieberi C. DC. in DC., *Prodr.* 16: 248 (1869)

Trinidad: without locality, Sieber 224 (G, P, type of *Piper sieberi* C. DC.); San Fernando Hill, 5.4.1926, Broadway 6085 (BM, K).

West Indies, Central and South America.

In Yuncker's treatment of the family for Trinidad and Tobago (*Lilloa* 26 (1953)) he considered the possibility of *P. amalago* from the West Indies and Central America being conspecific with *P. medium* from the same area and also mainland South America. These he recalled were combined by Fawcett & Rendle (1914) while Casimir de Candolle (1902) and others had kept them as separate species by reason of the puberulence of the leaves and young stems and the contrasting size of the leaves. By 1962 Yuncker had further considered this problem and decided (*Brittonia* 14: 189) that the aforementioned characters did not warrant continuation of separation of these taxa at specific level but as varieties. It is with this view in mind that I here follow Yuncker and consider *P. medium* Jacq. to be a variety of *P. amalago* L.

The specimen cited above as representing var. *amalago*, although collected from the Botanical Garden, was described by the collector as "indigenous", and it being an excellent match for the glabrous examples of the typical variety from elsewhere in the Caribbean, I have no hesitation in upholding it in this work.

2. *Piper reticulatum* L., *Sp. Pl.* 1: 29 (1753); C. DC. in DC., *Prodr.* 16: 295 (1869); Trel. & Yun., *Pip. North. S. Amer.* 71 (1950); Yun. in *Lilloa* 26: 246 (1953); Burger in *Fieldiana* 35: 172 (1971)

P. smilacifolium H.B.K., *Nov. Gen. & Sp.* 1: 56 (1816)

P. latum H.B.K., *Nov. Gen. & Sp.* 1: 57 (1816)

Shrub or small tree, 4-6m tall, glabrous; branches slender, nodose; leaves elliptic, elliptic-ovate to broadly ovate, 15-25(-30)cm long, 8-15(-25)cm wide, apex acuminate, smooth and glabrous on both surfaces, base essentially equal, subacute, truncate or in the larger leaves shallowly cordate, prominently and palmately 5-7(-9) nerved, reticulate veined; petiole 1-2cm long, glabrous or obscurely puberulent-papillose, minutely vaginate at the base; spikes erect, 6-11(-15)cm long, 5-6mm thick; peduncle 1-2cm long; rachis ridges membranous, fimbriate; bracts peltately divided upwards, pedicel and margin bearded; stigmas 3 or 4, rounded; fruit obovoid somewhat tetragonous, papillose above with an apical, smooth disc-like area.

Trinidad: without locality, Finlay (TRIN 2626), Richard s.n. (P), von Rohr s.n. (BM), de Schack s.n. (K); St Ann's, Creuger s.n. (K), (TRIN 906).

West Indies and on the mainland through Central America to northern South America.

3. *Piper marginatum* Jacq., *Icon. Pl. Rar.* 2: 2, pl. 215 (1786); C. DC. in DC., *Prodr.* 16: 245 (1869); Yun. in *Ann. Mo. Bot. Gard.* 37: 15 (1950); Trel. & Yun., *Pip. North. S. Amer.* 73 (1950); Yun. in *Lilloa* 26: 247 (1953); Burger in *Fieldiana* 35: 151 (1971)

P. decumanum Aubl., *Pl. Guian.* 1:21 (1775) non Linn. 1760
nec Miller 1763

P. caudatum Vahl, *Eclog. Am.* 1: 3 (1796)

P. alare Ham., *Prodr. Pl. Ind. Occ.* 3 (1825)

Shrub to 3m tall, stems glabrous; leaves round-ovate, 10-20(-28)cm long, 7-15(-25)cm wide, tapering gradually to the short-acuminate apex, rounded and truncate to deeply cordate at the base with the lobes divergent to overlapping, smooth on both surfaces, totally glabrous except for densely and minutely ciliolate margins to puberulent on the veins above or beneath; petiole 3-5cm long, deeply vaginate-winged along almost the entire length, palmately 7-13 nerved with the veins slightly raised above, more

prominent beneath; spike erect at first becoming arched or pendulous later, 10–25cm long; peduncle 1–1.5(–2)cm long, 7–18mm thick; floral bracts triangular-peltate, marginally fringed; stigmas 3, linear, sessile; fruit obpyramidal, angular.

- 1 Leaves round-ovate, base moderately to shallowly cordate with wide sinus, the lobes more or less divergent
- 2 Leaves not pilose above, the nerves glabrous or puberulent
- 3 Nerves totally glabrous or scarcely puberulent..... *var. marginatum*
- 3 Nerves puberulent at least above *var. anisatum*
- 2 Leaves adpressed pilose above, at least towards the apex; nerves beneath puberulent *var. catalpifolium*
- 1 Leaves suborbicular, base deeply cordate with narrow sinus, the lobes approximated or overlapping *var. clausum*

P. marginatum* var. *marginatum

Trinidad: without locality, Lockhart s.n. (K); Cedros road at mile-post 70, 11.7.1973, Philcox, Wood & Kalloo 7436 (K, NY, TRIN).

West Indies, on the mainland of Central America and southward to Brazil and Ecuador.

P. marginatum var. *anisatum* (H.B.K.) C. DC. in Urb., *Symb. Ant.* 3: 172 (1902); Yun. in *Ann. Mo. Bot. Gard.* 37: 17 (1950); Trel. & Yun., *Pip. North. S. Amer.* 75 (1950); Yun. in *Lilloa* 26: 248 (1953)

P. anisatum H.B.K., *Nov. Gen. & Sp.* 1: 58 (1816)

Trinidad: without locality, Lockhart s.n. (K); St Augustine, I.C.T.A., Simmonds 125 (TRIN); Government House Grounds, 16.11.1907, Broadway 2379 (G); San Fernando, Finlay (TRIN 2627); Moruga, Britton & Broadway 2427 (US).

Distribution similar to var. *marginatum*

P. marginatum var. **catalpifolium** (H.B.K.) C. DC. in DC., *Prodr.* 16: 246 (1869), and in Urb., *Symb. Ant.* 3: 172 (1902); Yun. in *Ann. Mo. Bot. Gard.* 37: 17 (1950); Trel. & Yun. *Pip. North. S. Amer.* 76 (1950); Yun. in *Lilloa* 26: 248 (1953)
Lanier bois

P. catalpaeifolium H.B.K., *Nov. Gen. & Sp.* 1: 58 (1816)

Trinidad: without locality, Cartwright s.n. in 1890 (OXF), Lockhart s.n. (K), Fendler 672 (BM, K, P); Woodbrook, 21.10.1932, Broadway s.n. (BM); St Ann's, Tredholm s.n. in 1906 (TRIN); Cascade, 24.10.1924, Broadway 5454 (FHO); I.C.T.A., St Augustine, 9.1.1948, Simmonds 245 (TRIN); Five Rivers, Arouca, Broadway 6805 (BM, K); Lopinot Valley, 1.11.1947, Simmonds 193 (TRIN); Lopinot road, mile-post 5½, 16.7.1973, Philcox, Wood & Kalloo 7500 (K, NY, TRIN); Blanchisseuse road, mile-posts 6-7, 31.12.1926, Broadway 6451 (BM, K); Arima, Dannouse s.n. in 1904 (TRIN); Arima Valley road alt. 550m, 24.9.1959, Cowan & Simmonds 1213 (TRIN); Arima Valley to La Laja road, alt. 300m, 12.6.1973, Philcox & Wood 7086 (K, NY, TRIN); Arima Valley, Santa Isabella trail near Simla, 250-350m, Smith 10096 (K); Arima to Blanchisseuse road, mile-post 3, 17.8.1947, Simmonds 157 (TRIN); Aripo road, 17.12.1926, Broadway 6442 (BM, K); Heights of Aripo, 10.1.1922, Broadway (TRIN 9864).

Distribution similar to var. *marginatum*

P. marginatum var. **clausum** Yun. in *Ann. Mo. Bot. Gard.* 37: 17 (1950); Yun. in *Lilloa* 26: 248 (1953)

Trinidad: without locality, de Schack s.n. (K).

Trinidad and Panama.

This is the most easily distinguished of the varieties in this area, it having leaves with a markedly narrow sinus and the lobes clearly convergent to overlapping. Although the de Schack specimen at Kew is sterile it is a perfect match for the Panama specimens deposited in that herbarium.

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The four varieties that clearly make up this species in Trinidad are all very alike at first appearance. All have similarly shaped leaves but with a slight shortening and widening in var. *clausum*, and agree in the palmate nervation and densely pubescent leaf margins. These characters appear constant for the species throughout its range although larger leaved specimens have been collected from mainland South America. Trelease and Yuncker (*Pip. North. S. Amer.* (1950) also mention one specimen being recorded as "scandent" as distinct from the usual erect shrubby habit.

4. *Piper caracasenum* Bredem. in Link, *Jahrb.* 1, 3: 61 (1820); Trel. & Yun., *Pip. North. S. Amer.* 158 (1950); Yun. in *Lilloa* 26: 249 (1953)

Small tree 3-7m tall; young growth matted rufous-hirsute; leaves subelliptic-ovate, 30-45cm long, 17-26cm wide, apex gradually acute, base inequilaterally cordate, sinus narrowly open, or closed, the larger lobe equalling or longer than the petiole, glabrous to subglabrous above, brown subvillous beneath particularly on the nerves, pinnately nerved with 6-8 pairs of nerves arising from the lower two-thirds of the midrib; petiole 4-6cm long, vaginate-winged over the entire length; spikes 30-50cm long; peduncle 3-4(-5.5)cm long; bracts rounded-subpeltate or slightly concave-cucullate, subglabrous; stigmas 3, sessile; fruit obovoid, glabrous.

Tobago: above Hermitage River, 400m, 12.4.1959, Cowan 1543 (TRIN); Cremorne River, Eggers 5860 (AAH); Summit of Pigeon Hill, 22.10.1925, Freeman & Williams (TRIN 11358); Englishman's Bay, Broadway s.n. (US); Main Ridge, 11.4.1911, Broadway 3899 (BM).

Tobago, Venezuela and Colombia.

5. *Piper aduncum* L., *Sp. Pl.* 1: 29 (1753); C. DC. in DC., *Prodr.* 16: 285 (1869), and in Urb., *Symb. Ant.* 3: 84 (1902); Fawc. & Rendle, *Fl. Jam.* 3: 24 (1914); Britt. & Wils., *Sci. Surv. Porto Rico* 5: 221 (1924); Trel. & Yun., *Pip. North. S. Amer.* 247 (1950); Yun. in *Ann. Mo. Bot. Gard.* 37: 30 (1950), and in *Lilloa* 26: 249 (1953); Burger in *Fieldiana* 35: 95 (1971); Adams, *Fl. Pl. Jam.* 212 (1972)

Elder bush

P. celtidifolium H.B.K., *Nov. Gen. & Sp.* 1: 50 (1816)

Shrub or small tree 3-7(-8)m tall, nodose; young stems sparsely to densely pubescent to villous with yellowish hairs, becoming glabrous, internodes short, slender; leaves lanceolate to narrowly subelliptic or narrowly ovate, 12-24(-28)cm long, 4-8(-11)cm wide, tapering to short acuminate apex, base inequilaterally rounded or cordulate, scabrous above with minute hairs on veins, scabrous to smooth soft-villous beneath, pinnately nerved with 4-6(-8) pairs of nerves arising from the lower half of the midrib; petiole 2-5(-8)mm long, vaginate only at the base; spikes 6-16cm long, arching to falcately curved; peduncle 8-14(-20)mm long; bracts triangular or round subpeltate with a dense marginal fringe of white or yellowish hairs; stigmas 3, sessile; fruit small, obovoid, more or less tri- or tetragonous, glabrous.

Young stems sparsely pubescent; leaves

scabrous to glabrescent beneath var. **aduncum**

Young stems densely pubescent-villous;

leaves moderately to densely soft villous

beneath var. **brachyarthrum**

P. aduncum var. **aduncum**

Trinidad: without locality, Cusson 259 (P), Lockhart s.n. (K), Riedel 52 (P-JU), Sieber 259 (G, P); Blue Basin, Broadway (TRIN 5367); mile-post 4 $\frac{1}{2}$ Lopinot road, alt. 154m, 16.7.1973, Philcox, Wood & Kalloo 7499 (K, NY, TRIN); Arima Valley, alt. 300m, 24.3.1959, Cowan & Simmonds 1224 (TRIN); mile 3, Arima to Blanchisseuse road, alt. 150m, Simmonds 160 (TRIN), mile 11, alt. 570m, Simmonds 151 (TRIN); Aripo road end, 4.5.1947, Simmonds 97 (TRIN); mile 1 $\frac{1}{2}$, Valencia to Cumaca road, alt. 90m, 15.6.1973, Philcox & Kalloo 7148 (K, NY, TRIN); San Fernando, Finlay (TRIN 2612).

Tobago: Mount St George to Castara trace, alt. 400m, 10.4.1959, Cowan 1522 (P, TRIN); Louis d'Or, 5.5.1953, Baker (TRIN 14977).

Widely distributed in the West Indies and on the mainland through Central America and northern South America.

P. aduncum var. *brachyarthrum* (Trel.) Yun. in *Ann. Mo. Bot. Gard.* 37: 32 (1950); Trel. & Yun., *Pip. North. S. Amer.* 249 (1950); Yun. in *Lilloa* 26: 250 (1953)

P. elongatum Vahl var. *brachyarthrum* Trel. in *Contrib. U.S. Nat. Herb.* 26: 37 (1927)

Trinidad: without locality, Druce s.n. in 1911 (OXF), Lockhart s.n. (K), Fendler 666 (BM, K); Belmont road, Carr (TRIN 5552); Blue Basin, Diego Martin, 1.1.1926, Broadway 5877 (BM, FHO, K); Maraval, 15.2.1857, Crueger (TRIN 908); St Joseph, 26.12.1847, Crueger s.n. (K); Wallerfield, alt. c. 24m, 4.7.1973, Philcox 7362, 7363 (K, NY, TRIN); L'orange road, via Arima, 21.11.1924, Broadway 5495 (BM, K); mile $4\frac{1}{4}$, Valencia to Cumaca road, 210m, 18.6.1973, Philcox & Kalloo 7202 (K, NY, TRIN).

Tobago: without locality, Eggers 5612 (K, P); mile 3, Roxborough to Bloody Bay road, alt. 375m, 6.6.1973, Philcox 7055 (K); Culloden, 30.5.1910, Broadway 3666 (BM).

Distribution as for var. *aduncum*

6. *Piper aequale* Vahl, *Eclog. Am.* 1: 4, pl. 3 (1796); C. DC. in DC., *Prodr.* 16: 310 (1869), and in Urb., *Symb. Ant.* 3: 203 (1902); Trel. & Yun., *Pip. North. S. Amer.* 217 (1950); Yun. in *Ann. Mo. Bot. Gard.* 37: 47 (1950), and in *Lilloa* 26: 250 (1953); Burger in *Fieldiana* 35: 96 (1971)

P. caledonianum C. DC. in *Fedde, Repert.* 15: 1 (1917)

Shrub 1-3m tall, glabrous, nodose; leaves ovate, elliptic, oblong or lanceolate, 6-17(-22)cm long, 2.5-7(-9)cm wide, apex long-acuminate, commonly bluntly acuminate, base equilaterally acute to obtuse or rounded and occasionally truncate, pinnately nerved with 2-8 pairs of nerves arising throughout the length of the midrib; petiole 6-15(-20)mm long, vaginate at base or rarely to the middle or above; spikes erect (4-)5-10cm long; peduncle 5-12mm long; bracts rounded to triangular subpeltate, loosely fringed; stigmas 3, slender, sessile; fruit small, round to pyramidal-triangular, truncate or rounded at the apex.

Leaves elongate-elliptic to lanceolate-elliptic,
 never ovate, base generally acute var. *aequale*
 Leaves variously ovate, base rounded-obtuse
 to subcordate or truncate

Leaves broadly elliptic-ovate, 8–10cm
 long, 4–6cm wide var. *ovalifolium*
 Leaves elliptic subovate to broadly
 ovate, 15–22cm long, 6–12cm wide var. *schackii*

P. aequale* var. *aequale

Trinidad: without locality, Fendler 663 (BM, P), Prestoe (TRIN 1077); St Ann's, 17.5.1846, Crueger s.n. (K); Santa Cruz, Providence Mountains, 23.4.1908, Broadway 2772 (G); Blanchisseuse road, mile-posts 10½–11, 29.4.1927, Broadway s.n. (FHO); Tacarigua, road to Maracas Falls, alt. 150–240m, 15.8.1959, Webster, Ellis & Miller s.n. (TRIN); Maracas, near the falls, 27.2.1925, Broadway 5804 (BM, K), 6571 (BM); L'orange road via Arima, Broadway 5496 (BM); Tamana, 18.4.1920, Freeman (TRIN 9064); Plum Road, 30.6.1928, Williams & Freeman (K, TRIN 11987); Tabaguite, 25.8.1899, Dannouse s.n. (TRIN); Siparia Quarry, 8.4.1921, Britton & Broadway 2817 (K).

Tobago: Mount St George to Castara trace, alt. 305m, Cowan 1521 (P, TRIN); summit of Pigeon Hill, 22.10.1925, Freeman & Williams (K, TRIN 11370); Putney Hill, alt. 270m, Eggers 5779 (K, P); near Caledonia, 21.4.1913, Broadway 4453 (BM), 16.6.1913, Broadway 4645 (BM, G, G-DC, P, type of *Piper caledoniana* C. DC.).

West Indies, Panama and northern South America.

***P. aequale* var. *ovalifolium* C. DC. in DC., *Prodr.* 16: 311 (1869)**

Trinidad: without locality, Sieber 192 (G, P, type number).

Known only from the type specimen

***P. aequale* var. *schackii* (Miq.) Yun. in *Lilloa* 26: 251 (1953)**

Artanthe schackii Miq. in *Hook. Lond. Journ. Bot.* 4: 448 (1845)
Piper schackii (Miq.) C. DC. in DC., *Prodr.* 16: 288 (1869), and
 in *Urb., Symb. Ant.* 3: 183 (1902)

Trinidad: without locality, de Schack s.n. (K, type of *Artanthe schackii* Miq.); bottom of waterfall, Cascade, Diego Martin, 28.10.1933, Broadway 9269 (K); near Blue Basin, 31.5.1924, alt. 90m, Riley 219 (BM, K); between Piedra Blanca and Naranja, 18.8.1947, Simmonds 138 (TRIN); Maracas, near the falls, 7.11.1924, Broadway 5468 (BM, FHO, K), 25.2.1927, Broadway 6571 (BM, K); Arima Valley to La Laja road, alt. 495m, 12.6.1973, Philcox & Wood 7104 (K); Cedros, Stephen trace, Broadway (TRIN 8537).

Tobago: Trafalgar River, 8.4.1926, Williams & Cheesman (TRIN 11685, 11752); Caledonia, 11.10.1937, Sandwith 1724 (K); Englishman's Bay, 15.11.1912, Broadway 4272 (BM).

Trinidad and Tobago.

7. *Piper hispidum* Sw., *Prodr. Veg. Ind. Occ.* 15 (1788); C. DC. in DC., *Prodr.* 16: 276 (1869), and in *Urb., Symb. Ant.* 3: 187 (1902); Fawe. & Rendle, *Fl. Jam.* 3: 25 (1914); Britt. & Wils., *Sci. Surv. Porto Rico* 5: 221 (1924); Trel. & Yun., *Pip. North. S. Amer.* 271 (1950); Yun. in *Ann. Mo. Bot. Gard.* 37: 32, fig. 7 (1950) and in *Lilloa* 26: 252 (1953); Burger in *Fieldiana* 35: 142 (1971); Adams, *Fl. Pl. Jam.* 212 (1972)

P. scabrum Sw., *Fl. Ind. Occ.* 1: 59 (1797), non Lam. 1791

P. hirsutum Sw., *Fl. Ind. Occ.* 1: 60 (1797)

P. pilipedunculum C. DC. in *Fedde, Repert.* 15: 2 (1917)

Shrub 5-8m tall, rather nodose; young internodes slender, short, hispid with dense white or yellowish straight or curved hairs, to infrequently glabrescent; leaves ovate to elliptic or oblong, usually broadest below the middle, 11-18(-25)cm long, 4-11cm wide, apex acuminate, obtuse or obliquely rounded unequal base, scabrous and glabrous or sparsely pubescent above, sparsely to densely hispid-hirsute on the nerves beneath, pinnately nerved with 3-6 pairs of nerves arising from the lower half of the midrib;

petiole 4-10(-18)mm long, vaginate only at the base; spikes erect, 5-12(-14)cm long, about 3mm thick; peduncle up to 1cm long; bracts triangular subpeltate, marginally fringed; stigmas 3, small, sessile; fruit laterally compressed, truncate and sparsely to densely papillate-pubescent above.

Leaves mostly 12-15cm long, 4-8cm wide

Leaves elliptic, subovate to subobovate var. **hispidum**

Leaves ovate, base obliquely inequilateral

with one side strongly rounded-cordate var. **obliquum**

Leaves 20-25 cm long, 8-10cm wide..... var. **magnifolium**

P. hispidum var. hispidum

Trinidad: without locality, Broadway 3208 (G, G-DC), de Schack s.n. (K); Fort George, 28.2.1847, Crueger (TRIN 909, 2622); Maraval, Crueger s.n. (K); Broadway (TRIN 7827); Cascade, Diego Martin, near waterfall, 28.10.1933, Broadway 9275 (K); Macuripe [Maqueripe], Dannouse (TRIN 6693); Maracas, near the falls, 16.5.1947, Simmonds 103 (TRIN), 12.7.1973, Philcox & Wood 7458 (K, NY, TRIN); junction of Blanchisseuse and Las Lapas roads, 26.2.1926, Broadway 5983 (K); near Oropuche Cave, 1.2.1948, Simmonds 267 (TRIN); Arima Valley road, alt. 300m, Cowan & Simmonds 1218 (P, TRIN); 4 miles E. of Arima, 15.3.1920, Britton, Hazen & Mendelson 604 (K); Oropuche Local road *via* Valencia, mile-post 2½, 7.5.1926, Broadway 6163 (BM); 1 mile along Valencia to Cumaca road, alt. 60m, 15.6.1973, Philcox & Kalloo 7132 (K, NY, TRIN); 3 miles from Cumana on road to Saut Bay, 18.7.1973, Philcox, Wood & Gibbs 7526 (K, NY, TRIN); mile-post 70, Cedros road, Philcox, Wood & Kalloo 7435 (K, NY, TRIN); Mount Tamana, alt. 100m, Beard 139 (K); Four Roads, Tamana, 3.4.1932, Broadway 7983 (BM, G); Siparia Quarry, 8.4.1921, Britton & Broadway 2810 (K); foot of Brigand Hill, mile-post 3½, c. 105m, Philcox & Wood 7238 (K, NY, TRIN); Rio Claro to Mayaro, 1.5.1957, Simmonds (K, TRIN 15437); Mount Tamana, 18.4.1920, Freeman (TRIN 9068), Britton, Britton & Hazen 1930 (K); Aripo Savanna, Richardson 542 (K, TRIN); Aripo roadhead, alt. 300m, Simmonds 96 (TRIN), 99 (TRIN).

Tobago: between Hillsborough Dam and Mason Hall, alt. c. 225m, 4.6.1973, Philcox 7042 (K, NY, TRIN); near Caledonia, 2.6.1913, Broadway 4571 (BM, G, G-DC, P); foot of quarry East of Hillsborough road, c. mile-post 2½, alt. 180m, Philcox 7038 (K, NY, TRIN); mile 3¼, Roxburgh to Bloody Bay road, alt. 390m, 7.6.1973, Philcox 7057 (K, NY, TRIN); The Widow, near Easterfield, 11.3.1910, Broadway 3513 (BM, G); Englishman's Bay, Broadway 4701 (BM, G, G-DC, P, type of *Piper pilipedunculum* C. DC.); Great Dog River, Eggers 5762 (K); Mount St George to Castara trace, alt. 250m, Cowan 1532 (TRIN).

Common in the West Indies and on the mainland through Central America and much of northern South America.

P. hispidum var. **obliquum** Trel. & Yun., *Pip. North. S. Amer.* 273, fig. 236 (1950); Yun. in *Lilloa* 26: 253 (1953)

Trinidad: Oropuche road via Valencia, Broadway 6133 (AAH, US); Tamana forests, Broadway 9347 (K).

Trinidad and northern South America.

P. hispidum var. **magnifolium** C. DC. in DC., *Prodr.* 16: 276 (1869), and in Urb., *Symb. Ant.* 3: 188 (1902); Trel. & Yun., *Pip. North. S. Amer.* 274 (1950); Yun. in *Lilloa* 26: 253 (1953)

Trinidad: Cascade, Diego Martin, near bottom of waterfall, 28.10.1933, Broadway 9275 (BM); Maqueripe, Britton, Britton & Hazen 208 (US); Aripo Savanna, alt. 30m, 19.8.1959, Richardson 684 (K); Paria to Morne Bleu road, 26.3.1933, Broadway 9159 (BM); junction of Blanchisseuse and Las Lapas roads, 26.2.1926, Broadway 5983 (BM); Blanchisseuse road, 9¼-mile-post, 18.12.1924, Broadway 5506 (BM, K); Arima to Blanchisseuse road, alt. 600m, 27.5.1924, Riley 86 (BM, K); foot of Maracas Falls, 12.7.1973, Philcox & Wood 7459 (K, NY, TRIN); Rio Claro road to Princes Town, 18.12.1933, Broadway 9315 (BM); mile-post 67 along Cedros road, 27.3.1959, Cowan & Foster 1330 (TRIN).

Tobago: Cocoawattee, 31.8.1910, Broadway 3983 (BM, G-DC)

Distribution as for var. *hispidum*

8. *Piper crassinervium* H.B.K., *Nov. Gen. & Sp.* 1: 48(1816); C. DC. in DC., *Prodr.* 16: 323 (1869); Trel. & Yun., *Pip. North. S. Amer.* 43. fig. 34 (1950); Yun. in *Lilloa* 26: 244 (1953); Burger in *Fieldiana* 35: 120 (1971)

P. exserens C. DC. in DC., *Prodr.* 16: 261 (1869)

P. maravalanum Trel. in *Bull. Torr. Bot. Club* 51: 4 (1924)

Shrub or small tree, 2-5m tall; upper internodes short but soon lengthening, glabrous or evanescently pubescent when young; leaves ovate to elliptic-ovate, 12-22cm long, 6-12(-15)cm wide, apex acuminate, base rounded, or shallowly cordate in larger leaves, acute at the petiole, pinnately nerved in the lower half, glabrous above, (3-)4-5 pairs of nerves prominent, and adpressed pubescent to subvillous or minutely pubescent beneath; petiole 1.2-2.5(-3.8)cm long, vaginate-winged to the middle or above; spikes at first enclosed in the sheathing leaf-base, erect, 5-15cm long, peduncle stout, 5-18mm long, 1-2.5mm thick; bracts round or triangular with a marginal fringe of short yellow or white hairs; stigmas 3, recurved on a short style; fruit round, glabrous.

Leaves ovate; nerves beneath adpressed-

pubescent to subvillous var. **crassinervium**

Leaves oblong-elliptic to elliptic-ovate;

nerves sparsely minutely pubescent..... var. **tocotanum**

P. crassinervium var. **crassinervium**

Trinidad: without locality, Lockhart 140 (K); Macuripe [Maqueripe], Dannouse (TRIN 6693); Maraval, 30.12.1914, Broadway (TRIN 7829, type of *P. maravalanum* Trel.); Saut d'Eau, Dannouse 6704A (TRIN); Carapichaima, Dannouse s.n. in 1903 (TRIN); Arima, Dannouse in 1905 (TRIN).

From Costa Rica southwards to Ecuador, Peru and Brazil.

P. crassinervium var. *tocotanum* (C. DC.) Yun. in *Ann. Mo. Bot. Gard.* 37: 8 (1950); Trel. & Yun., *Pip. North. S. Amer.* 45 (1950); Yun. in *Lilloa* 26: 245 (1953).

P. exserens C. DC. var. *tocotanum* C. DC. in *Ann. Conserv. & Jard. Bot. Genève* 21: 239 (1920)

P. ovale C. DC. in *Journ. Bot.* 4: 166 (1866)

Trinidad: without locality, Fendler 668 (K).

Trinidad, Venezuela and Colombia.

9. *Piper glabrescens* (Miq.) C. DC. in DC., *Prodr.* 16: 271 (1869); Trel. & Yun., *Pip. North. S. Amer.* 215 (1950); Yun. in *Lilloa* 26: 254 (1953); Burger in *Fieldiana* 35: 136 (1971)

P. macrophyllum H.B.K., *Nov. Gen. & Sp.* 1: 46 (1816), non Swartz 1788

Arianthe glabrescens Miq. in *Hook. Lond. Journ. Bot.* 4: 461 (1845)

Piper treleanum Britt. & Wils., *Sci. Surv. Porto Rico* 5: 222 (1924)

Shrub 1-2.5m tall; upper internodes slender, short, glabrous to densely and minutely pubescent; leaves broadly elliptic 12-22 (-28)cm long, 5-14(-16)cm wide, apex short- or long-acuminate, base acute, obtuse or rounded, subequal, glabrous except for the minutely crisped-pubescent nerves beneath, glandular-punctate, pinnately nerved with 4-6 pairs of nerves arising from the lower two-thirds of the midrib; petiole 1-2cm long, vaginate throughout its length; spikes erect 5-6(-9)cm long, 3-6mm thick; peduncle (6-)10-15mm long; bracts obovate-truncate with a cucullate inflexed apex, glabrous or papillose; stigmas 3, short, sessile in an apical depression, fruit depressed globose or tetragonus.

Nerves minutely crisped-pubescent, glabrescent beneath; bracts glabrous or papillose var. *glabrescens*

Nerves glabrous beneath; bracts becoming densely brown pilose var. *caparoanum*

P. glabrescens* var. *glabrescens

Trinidad: Maraval, 15.2.1857, Crueger s.n. (K), 911b (TRIN); Laventille, 11.9.1894, Carr (TRIN 5551); St Joseph, Dannouse s.n. in 1904 (TRIN), 14.2.1848, Crueger (TRIN) 911a; Cumuto, South of railway station, 10.7.1925, Broadway 7073 (BM, G, K); near Maracas Bay, 28.3.1926, Broadway 6065 (BM, K), 18.4.1926, Broadway 6129 (BM); Heights of Aripo, 10.1.1922, Broadway (TRIN 9868), lower slopes, 29.3.1959, Cowan 1360 (P, TRIN), the caves trail by the river crossing, alt. 660m, 24.12.1947, Simmonds 227 (TRIN); Oropuche Cave, alt. 150m, 1.2.1948, Simmonds 264 (TRIN); Five Rivers, Arouca, 15.2.1928, Broadway 6806 (BM, K); Arima, 11.1.1905, Dannouse s.n. (TRIN); Oropuche Local road, via Valencia, near river, mile-post 2½, Broadway 6164 (BM); road to Matelot via Toco, Shark River forests, 23.10.1932, Broadway 9032 (BM, G, K); Mt Tamana, 18.4.1920, Freeman (TRIN 9068a), 3.4.1932, Broadway 7981 (BM, G); Beausejour, Cedros, 23.9.1915, Caroline King (TRIN 7111); Irois, 25.1.1928, Broadway 6720 (BM, K), 24.1.1928, Williams (TRIN 11921) (K); Siparia, 8.4.1921, Broadway s.n. (K, TRIN 2819), 31.5.1865, Finlay (TRIN 2618); Moruga, Lumy Trace, 10.2.1916, Broadway (TRIN 7577); Rio Claro to Mayaro, 1.5.1957, Simmonds (K, TRIN 15436).

West Indies and north-eastern South America.

***P. glabrescens* var. *caparoanum* ("onum") (C. DC.)**
Yun. in Maguire in *Bull. Torr. Bot. Club* 75: 287 (1948);
Trel. & Yun., *Pip. North. S. Amer.* 46 (1950); Yun. in *Lilloa*
26: 255 (1953); Burger in *Fieldiana* 35: 136 (1971)

P. caparorum C. DC. in Urb., *Symb. Ant.* 7: 183 (1912)

Differs from var. *glabrescens* in having more elliptic and more attenuately acuminate leaves, nerves glabrous beneath and bracts becoming densely brown pilose.

Trinidad: without locality, Broadway 3206 (G-DC); Caparo, 27.4.1908, Broadway 2553 (type of *P. caparorum*, G-DC, NY, TRIN), 3203 (G-DC); Brazil, via Guanapo, 4.9.1925, Broadway 5760 (BM, K).

Trinidad, Guyana and Venezuela.

10. *Piper mornicola* C. DC. in Urb., *Symb. Ant.* 3: 194 (1902); Yun. in *Lilloa* 26: 255 (1953)

P. mornicola var. *longifolium* C. DC. in Urb., *Symb. Ant.* 3: 194 (1902)

Small tree, 2-3m tall; internodes rather short, slender, glabrous; leaves lance- or elliptic-oblong, apex acuminate, base rounded, slightly inequilateral, one side longer and cordulate, 12-15cm long, 4-5cm wide, glabrous above, appressed pubescent on the nerves beneath, pinnately nerved with 4-5 pairs arising from below the middle of the midrib; petiole to about 8mm long, vaginate-winged to the lamina; spikes 4-5cm long; peduncle 2-4mm long, glabrous; bracts rounded-triangular-subpeltate, marginally fringed; stigmas 3, slender, sessile; fruit oblong.

Tobago: Easterfield, 14.7.1912, Broadway 4185 (G-DC); Great Dog River, 6.11.1889, Eggers 5789 (G-DC, type of vary *longifolium* C. DC.), 5843 (K, type of *P. mornicola* C. DC.); Caledonia. Forest Reserve, Broadway 3023 (G-DC).

Tobago.

11. *Piper hostmannianum* (Miq.) C. DC. in DC., *Prodr.* 16: 287 (1869); Trel. & Yun., *Pip. North. S. Amer.* 306 (1950); Yun. in *Lilloa* 26: 256 (1953)

Artanthe hostmanniana Miq. in *Hook. Lond. Journ. Bot.* 4: 465 (1845)

Shrub, sometimes scandent, generally crisply sub-silky except for the upper leaf surface; leaves elliptic, lance-elliptic or ovate, 13-18cm long, 6-9cm wide, apex acuminate, base obtuse, subtruncate-cordate, inequilaterally oblique, glabrous above, pinnately nerved with 4-6 pairs of nerves arising from below the upper third of the midrib, nerves below pubescent or substrigose; petiole rather stout, about 5-10mm long, 3-5mm thick, vaginate to the middle or above; spikes 10-12cm long, 2-3mm thick, pendulous; peduncle

about 10mm long; bracts triangular- or round-subpeltate, marginally fringed; stigmas 3, sessile; fruit oblong, 3 or 4 angular, glabrous or slightly puberulent at the apex.

Trinidad: Chaguanas, 19.4.1889, Broadway (TRIN 3755); Blanchisseuse road, mile-post 10½, Broadway 6111 (BM); Mt Harris, 11.11.1938, Alston 5168 (BM, K).

Trinidad and north-eastern South America.

12. *Piper dilatatum* L.C. Rich. in *Acta Soc. Hist. Nat. Paris* 105 (1792); C. DC. in DC., *Prodr.* 16: 314 (1869); C. DC. in Urb., *Symb. Ant.* 3: 197 (1902); Fawc. & Rendle, *Fl. Jam.* 3: 26, fig. 2 (1914); Trel. & Yun., *Pip. North. S. Amer.* 276 (1950); Yun. in *Lilloa* 26: 256 (1953); Gooding & Loveless, *Fl. Barbado.* 119 (1965); Burger in *Fieldiana* 35: 127 (1971); Adams, *Fl. Pl. Jam.* 212 (1972) Candle bush

P. corylifolium Kunth in *Linnaea* 13: 699 (1839)

Shrub 1-3m tall; upper internodes sparsely to densely minutely puberulent, subvillous, becoming glabrous; leaves broadly rhombic-elliptic to subovate or subobovate (11-)15-20cm long, (4-)7-10cm wide, tapering abruptly or gradually to the acute or acuminate apex, base inequilaterally obtuse, rounded or cordulate, pinnately nerved from below the middle of the midrib with 3-6 pairs of nerves, subsabrous or smooth, sparsely pubescent to puberulent on the veins on both surfaces; petiole 5-10(-15)mm long, vaginate near the base; spikes 5-10cm, erect; peduncle 8-15mm long; bracts round or triangular subpeltate with marginal fringe of white hairs; stigmas 3, sessile; fruit obpyramidal-trigonous, sparsely puberulent at top.

Trinidad: without locality, Sieber (distrib. no.) 18 (BM, G, K, OXF, P); Arima to Blanchisseuse road, mile-post 3, alt. 150m, 17.8.1947, Simmonds 159 (TRIN); Blanchisseuse, near the sea, 13.5.1908, Broadway 2261 (G, G-DC); Five Rivers, Laurel Hill, Arouca, 15.2.1928, Broadway 6804 (BM, K); Mt Aripo, 29.3.1959, Cowan 1362 (TRIN); Cumuto road, Aripo river side, near bridge No. 6, 26.7.1931, Broadway 7627 (BM, K); Toco, along sea shore, 2.9.1908, Broadway 2367 (G-DC); San Fernando Hill, 18.7.1926, Broadway 6412 (K).

West Indies and north-eastern South America.

13. *Piper guayranum* C. DC. in *Journ. de Bot.* 4: 397 (1890);
Trel. & Yun., *Pip. North. S. Amer.* 301, fig. 267 (1950);
Yun. in *Lilloa* 26: 257 (1953)
- P. seitzii* C. DC. in Urb., *Symb. Ant.* 3: 181 (1902)
- P. trinitatis* C. DC. loc. cit. 197
- P. tobagoanum* C. DC. loc. cit. 199
- P. angustilimbum* C. DC. loc. cit. 201
- P. margaritanum* C. DC. in *Proc. Amer. Acad. Arts & Sci.* 40: 68
(1905)
- P. tenuiamentum* C. DC. in Urb., *Symb. Ant.* 7: 184 (1912)
- P. lambeauense* C. DC. in *Fedde, Repert.* 15: 2 (1917)
- P. gracilispicum* C. DC. in *Ann. Conserv. & Jard. Bot. Geneve*
21: 234 (1920)

Shrub 2-5m tall, slender branched, subnodose; young internodes briefly pubescent; leaves lanceolate, lance-elliptic to ovate-lanceolate, 10-15(-20)cm long, 3-6(-9)cm wide, apex more or less falcately long acuminate, base usually rounded, obtuse, acute or subcordate, inequilateral, pinnately nerved from below the middle with 4-5 pairs of nerves, smooth or subscabrid above, sparsely adpressed hairy on both surfaces but especially on the nerves beneath, occasionally leaves glabrous above, petiole 5-10mm long, vaginate at base; spikes 7-8cm long, c. 3mm thick; peduncle about 10mm long; bracts round- or triangular-subpeltate, marginally fringed; stigmas 3, sessile; fruit obpyramidal-trigonal, glabrous.

Leaves usually 10-16(-20)cm long, 3-6(-7)cm

wide var. *guayranum*

Leaves mostly 15-20cm long, or longer,

7-10cm wide var. *humillior*

P. guayranum* var. *guayranum

Trinidad: without locality, Finlay (TRIN 2625); Hort. Trin. (G-DC, TRIN 6010, type of *Piper trinitatis* C. DC.), 1.8.1899, Preuss 1456 (G-DC, type of *Piper tenuimentum* C. DC.); Blue Basin, Broadway (TRIN 5187); Mount St Benedict, alt. 270m, 3.6.1973, Philcox 7025 (K); foot of Maracas Falls, 12.7.1973, Philcox & Wood 7460 (K); Maracas Bay, Druce s.n. in 1913 (OXF), trace to Tairico, alt. 60m, 15.11.1947, Simmonds 197 (TRIN); mile-post 5 $\frac{3}{4}$ on Lopinot road, near Lopinot village, alt. 210m, 16.7.1973, Philcox, Wood & Kalloo 7506 (K); Arima Valley to La Laja road, alt. 300m, 12.6.1973, Philcox & Wood 7099 (K); near mile-post 9 $\frac{1}{4}$, Blanchisseuse road, 18.12.1924, Broadway 5508 (BM, K); junction with Las Lapas road, Blanchisseuse road, 1.4.1927, Broadway 6607 (BM, K); Heights of Aripo, 10.1.1922, Broadway 9867 (K, TRIN), 2.4.1922, Broadway s.n. (TRIN); near mile-post 1 $\frac{3}{4}$, Caura road, 25.5.1928, Broadway 6954 (BM, K); San Fernando Hill, 25.3.1908, Broadway 2207 (G, G-DC), 5.4.1926, Broadway 6086 (K), 18.7.1926, Broadway 6415 (BM, K); Rio Claro to Mayaro, 1.5.1957, Simmonds (K, TRIN 15438); Mt Tamana, 27.3.1925, Broadway 5604 (K); Siparia Quarry, 8.4.1921, Britton & Broadway 2799 (K); Moruga, 5.6.1908, Broadway 2679 (G-DC), sea shore, 9.2.1916, Broadway 7596 (TRIN).

Tobago: near Bacolet River, Eggers 5673 (G-DC, K, P, syntype of *Piper tobagoanum* C. DC.); North end of Main Ridge above Hermitage River, 12.4.1959, Cowan 1545 (P, TRIN); French Hill, 9.10.1937, Sandwith 1691 (K); Montpelier, 19.11.1913, Broadway (K, TRIN 4849); Pigeon Hill, 7.4.1959, Cowan & Forster 1465 (TRIN); Les Coteaux, 9.11.1932, Broadway 9059 (BM, K); The Whin, 24.10.1909, Broadway 3104 (BM, G, G-DC, P); Lambeau, 12.11.1912, Broadway 4276 (BM, G-DC, type of *Piper lambeauense* C. DC.); King's Bay, alt. 60m, 26.4.1896, Seitz 48 (G-DC, type of *Piper seitzii* C. DC.); Morne d'Or, alt. 500m, Eggers 5870 (G-DC, type of *Piper angustilimbum* C. DC.).

Trinidad, Tobago and Venezuela.

***P. guayranum* var. *humilior* (C. DC.) Trel. & Yun.,
Pip. North. S. Amer. 302 (1950); Yun. in *Lilloa* 26: 258 (1953)**

P. tobagoanum var. *humilior* C. DC. in Urb., *Symb. Ant.* 3:199 (1902)

Differs from var. *guayranum* only insofar as the leaves are much longer, being 15–20cm long or even longer and 7–10cm wide.

Trinidad: near the sea, Blanchisseuse, 26.3.1933, Broadway 9150 (BM); Aripo road, near milepost 5, 19.2.1927, Broadway 6566 (BM); road to Matelot via Toco, 23.10.1932, Broadway 9033 (BM, G, K); Brigand Hill, Alston 5163 (BM, K); San Fernando Hill 5.4.1926, Broadway 6086 (BM); Siparia Quarry, 8.4.1921, Broadway s.n. (TRIN).

Tobago: Craig Hill, Great Courland River, alt. 400m, Eggers 5934 (?B, type of *Piper guayranum* var. *humilior* C. DC.), 5943 (P).

Trinidad, Tobago and northern Venezuela.

The author has not seen Eggers 5934, thought by Yuncker to be in the Berlin Herbarium, nor did he find it in the Geneva herbarium of De Candolle. Without consulting Eggers's itinerary it is thought that the Paris specimen of Eggers 5943 could represent a misrepresentation of De Candolle's cited type number.

14. *Piper rugosum* Lam., *Illustr.* 1: 81 (1791); C. DC. in DC., *Prodr.* 16: 373 (1869); Yun. in *Lilloa* 26: 258 (1953)

P. bullatum Vahl, *Enum.* 1: 313 (1805)

P. maraccasense Trel. in *Bull. Tor. Bot. Club* 53: 467 (1926)

Shrub; upper branches and internodes rather densely brown-pubescent; leaves elliptic-suboblong, apex acute or subacuminate, base subequilateral, acute, somewhat rounded and cordulate, 8–11 cm long, 3–4.5cm wide, glabrous above, somewhat bullulate and glossy with age, adpressed pubescent on the nerves beneath to generally short hispid between, pinnately nerved with 4–7 pairs of nerves arising from the lower two-thirds of the midrib; petiole 5–8mm long; spikes up to 5cm long, about 3mm thick, vaginate at the base; penduncle 5mm long, brown hairy; bracts triangular-subpeltate, marginally fringed; stigmas 3, sessile; fruit exserted, angular, apex depressed, hairy towards the apex.

Trinidad: Maracas, Finlay (NY, TRIN 2613, type of *Piper maraccasense* Trel.); Arima, 26.10.1845, Crueger 912 (K, TRIN); Mora forest, Toco road, 20.8.1940, Cheesman & Baker 359 (TRIN).

West Indies, but as yet not recorded from South America.

15. *Piper kegelianum* (Miq.) C. DC. in DC., *Prodr.* 16: 372 (1869); Trel. and Yun., *Pip. North. S. Amer.* 388, fig. 348 (1950); Yun. in *Lilloa* 26: 259 (1953)

Artanthe kegeliana Miq. in *Linnaea* 22: 77 (1849)

Shrub; upper internodes slender, densely brown-hirtellous; leaves elliptic-subovate or elliptic-suboblong, 11–17cm long, 5–7.5cm wide, apex acute, short acuminate, base subequilateral, obtuse to acute, glabrous above, somewhat glossy with age, hirtellous beneath especially along the nerves, glandular-punctate, pinnately nerved with 5–8 pairs of nerves arising below the upper third of the midrib; petiole 5mm long, brown-hirtellous, vaginate to above the middle; spikes 7–10cm long, about 3mm thick; peduncle 5mm long, hirtellous; bracts triangular-subpeltate, densely marginally fringed; stigmas sessile; fruit compressed-obovoid, apically depressed, hirtellous.

Trinidad: without locality, Fendler 665 (BM, K, P).

Trinidad, Guyana, Surinam, Brazil (Pará).

16. *Piper tuberculatum* Jacq., *Icon. Pl. Rar.* 2: 2, pl. 211 (1795); Griseb., *Fl. Brit. W. Ind.* 171 (1864); C. DC. in DC., *Prodr.* 16: 265 (1869); C. DC. in Urb., *Symb. Ant.* 3: 177 (1902); Fawc. & Rendle, *Fl. Jam.* 3: 22 (1914); Trel. & Yun., *Pip. North. S. Amer.* 364 (1950); Yun. in *Ann. Mo. Bot. Gard.* 37: 63 (1950); Yun. in *Lilloa* 26: 259 (1953); Burger in *Fieldiana* 35: 185, fig. 8 (1971); Adams, *Fl. Pl. Jam.* 212 (1972) *Cigarette plant*

P. macrourum H.B.K., *Nov. Gen. & Sp.* 1: 54 (1816)

Artanthe decurrens Miq., *Syst. Pip.* 402 (1844)

Shrub 2-3m tall or small tree 6-7m tall, very nodose; branches minutely puberulent or glabrous, often warty or minutely tubercular; leaves subelliptic to elliptic-oblong or subovate, (4-)7-14cm long, 2-6(-10)cm wide, glabrous or glabrescent above, puberulent on the nerves beneath, apex rather abruptly short-acute, base rounded, more or less lobed, one side 5-10mm shorter at the petiole, pinnately nerved with (4-)8-10 pairs of nerves arising to near the apex; petiole 1-10mm long, glabrous or densely and minutely puberulent, vaginate throughout; spikes erect, (4-)10-12cm long, 2-3.5mm thick; peduncle 10-15 (-18) [-35mm in Broadway 3806] mm long, 1-2(-4.5)mm thick; bracts triangular-subpeltate, marginally fringed; stigmas 3, sessile; fruit somewhat tetragonous, glabrous.

Trinidad: without locality, Cartwright s.n. in 1890 (OXF), Fendler 670 (BM, K, P), Hart (TRIN 5576), Lockhart s.n. (K), Richard s.n. (P), de Schack s.n. (K), Sieber (distrib. no. 17) 332 (BM, G, K, OXF, P); Hort. Trin., 29.10.1888, Broadway (G, TRIN 2235), 18.2.1889, Broadway (TRIN 3520), Finlay (TRIN 2624), Hart (TRIN 1308), (TRIN 6009); Botanic Gardens, 29.3.1924, Broadway 5252 (G); Woodbrook, 15.2.1926, Broadway 6272 (BM, FHO, K); near Four Roads, alt. 30m, 30.5.1924, Riley 211 (BM, K); Belmont, Hart s.n. (TRIN); behind Port-of-Spain, sea level to 360 m, 26.5.1924, Riley 61 (BM, K); River Estate, Diego Martin, 10.7.1947, Simmonds 120 (TRIN); St Joseph Stock Farm, alt. 15m, Purseglove 6091 (K, TRIN); Laventille, Grossourdy 13 (P); St Augustine, I.C.T.A., 28.7.1947, Simmonds 124 (TRIN); Tunapuna, 27.10.1915, Broadway (TRIN 7318); milepost 5½ on Lopinot Road, alt. 195m, 16.7.1973, Philcox, Wood & Kalloo 7501 (K); Tabaquite, 1913, Druce s.n. (OXF); foot of Brigand Hill, milepost 3½, alt. 105m, 21.6.1973, Philcox & Wood 7236 (K), 7237 (K); Siparia, 29.2.1948, Simmonds 289 (TRIN); Erin, 10.5.1920, Broadway s.n. (K, P), near the old Warden's office, 6.2.1908, Broadway 2597 (K).

Tobago: Bacolet, 27.2.1913, Broadway s.n. (BM, G, P); Bacolet River, Eggers 5558 (P), 5692 (P); milepost 2½ on road

from Mount St George to Hillsborough Dam, alt. c. 150m, 4.6.1973, Philcox 7035 (K); Cooks River near Scarborough, 12.3.1909, Broadway 2993 (G); Goldsborough, 5.5.1953, Baker (TRIN 14961); Queen's River, Meyer 12 (K); Charlotteville, 4.6.1925, Williams (TRIN 11092); Great Cumberland Bay, Greg s.n. (BM); Friends Field road, 6.6.1910, Broadway 3806 (BM).

West Indies, Central America and throughout northern South America.

17. **Piper arboreum** Aubl., *Pl. Guian.* 1: 23 (1775); Fawc. & Rendle, *Fl. Jam.* 3: 23 (1914); Trel. & Yun., *Pip. North. S. Amer.* 371, fig. 334 (1950); Yun. in *Ann. Mo. Bot. Gard.* 37: 63 (1950); Yun. in *Lilloa* 26: 261 (1953); Burger in *Fieldiana* 35: 100 (1971); Adams, *Fl. Pl. Jam.* 213 (1972)

P. macrophyllum Sw., *Prodr. Veg. Ind. Occ.* 15 (1788)

P. geniculatum Sw., loc. cit. 15

Shrub or tree 2-8(-11)m tall, glabrous; flowering internodes short, slender, more or less verrucose-warted; leaves lanceolate to narrowly ovate or oblong, 10-22(-25)cm long, 2-10(-14)cm wide, apex gradually tapering to acute or acuminate or rarely abruptly acuminate in the broader leaves, acute to obtuse at the inequilateral base, one side 5-10 mm shorter at the petioles, pinnately nerved with 6-11 pairs of nerves arising throughout the length of the midrib; petiole 5-12(-20)mm long, vaginate-winged throughout; spikes erect, up to 18cm long, 2-5mm thick; peduncle 5-10mm long, reasonably stout; bracts triangular-subpeltate, marginally fringed; stigmas 3, sessile; fruit round to elongate, truncate and with the stigmas in an apical depression.

Leaves ovate-oblong to elliptic-lanceolate, generally 14-21cm long, 5-10cm wide; apex acute or abruptly acuminate, base usually rounded, obtuse var. **arboreum**

Leaves narrowly oblong-lanceolate, 10-15(-17) cm long, 2-5cm wide; apex acuminate, base usually acute var. **falcifolium**

P. arboreum var. **arboreum**

Trinidad: without locality, Broadway 7325 (BM, K); Maraval, 30.12.1914, Broadway (TRIN 7828), 9.12.1928, Broadway 7066 (BM, G, K); Maracas, road to the bay, 26.6.1929, Broadway 7246 (BM, K); Maracas Bay road *via* Santa Cruz, 18.4.1926, Broadway 6128 (BM, G, K); Arima, 1903, Dannouse s.n. (TRIN); Heights of Aripo, 10.1.1922, Broadway (TRIN 9865).

West Indies, northern South America and Panama.

P. arboreum var. **falcifolium** (Trel.) Yun. in *Ann. Mo. Bot. Gard.* 37: 65 (1950); Trel. & Yun., *Pip. North. S. Amer.* 374 (1950); Yun. in *Lilloa* 26: 261 (1953)

P. falcifolium Trel. in *Contrib. U.S. Nat. Herb.* 26: 25 (1927)

Trinidad: without locality, Fendler 671 (BM, K), Lockhart 138 (K), de Schack s.n. (K); Maraval, 4.6.1849, Cruieger (TRIN 910), (TRIN 2623); road to O'Meara, 5.4.1866, Finlay (TRIN 2617); Aripo District, 21.3.1922, Broadway s.n. (TRIN); Arima to Blanchisseuse road, alt. 600m, 27.5.1924, Riley 87 (BM, K); near 7th milepost on Blanchisseuse road, 22.7.1927, Broadway 6645 (FHO, K); La Sieva, Valencia road, 30.3.1930, Broadway 7646 (BM, G, K); Mt Harris, 27.4.1930, Broadway 7572 (BM).

18. **Piper demeraranum** (Miq.) C. DC. in DC., *Prodr.* 16: 298 (1869); Trel. & Yun., *Pip. North. S. Amer.* 379, fig. 341 (1950); Yun. in *Lilloa* 26: 262 (1953)

Artanthe demeraranum Miq. in *Hook. Lond. Journ. Bot.* 4: 464 (1845)

Piper esmeraldanum Trel. in *Bull. Torr. Bot. Club* 58: 353 (1931)

P. cauranum Trel. in Ll. Williams, *Explor. Bot. Guyana, Venezuelana* 175 (1942)

P. aripoense Trel. in *Bull. Torr. Bot. Club* 51: 5 (1924)

Shrub 1-2m tall; upper internodes more or less crisped-pubescent with hairs somewhat spreading to reflexed; leaves 15-20 cm long, 5-9cm wide, elliptic, elliptic-lanceolate or oblanceolate, apex acuminate, base inequilaterally acute to obtuse, subcordulate, glabrous above, pubescent on nerves beneath, minutely puberulent between, pinnately nerved with 8-11 pairs of nerves arising throughout the length of the midrib; petiole 3-5mm long, vaginate throughout; spikes 3-4.5cm long, 3-4mm thick; peduncle 3-7mm long; bracts obovate-concave-cucullate, dorsally puberulent; stigmas elongated, sessile; fruit globose, puberulent above, rather deeply depressed at the apex.

Trinidad: without locality, Fendler 664 (BM, K); Chaguanas, 19.4.1889, Broadway (TRIN 3758); Naranja, alt. 660m, 8.8.1973, Philcox & Wood 7579 (K); Arima watershed, 27.5.1924, Riley 87 (K); Arima Valley, alt. 600m, 24.3.1959, Cowan & Simmonds 1191 (P, TRIN); Arima to Blanchisseuse road, near milepost 10, Broadway 6149 (BM, K), milepost 11, alt. 540m, Simmonds (coll. R.E.D. Baker) 153 (TRIN), 25.3.1953, Simmonds (K, TRIN 14918), 2.3.1928, Broadway 6831 (BM); summit of Morne Bleu, 30.4.1926, Freeman & Williams (K, TRIN 11557), 23.3.1928, Freeman & Williams (K, TRIN 11965); Aripo road near milepost 3½, 31.5.1927, Broadway (TRIN 9866), Britton & Freeman 2353 (K); Southern Guanapo road, milepost 9¼, 23.4.1926, Broadway 6234 (BM, K); Cumuto, 13.5.1927, Broadway 7327 (BM), near milepost 5½, 4.5.1928, Broadway 6915 (BM, K); Plum Road, 30.6.1928, Freeman & Williams (K, TRIN 11988); Quare River, near reservoir, 24.1.1930, Broadway 7542 (BM).

19. *Piper hartii* C. DC. in Urb., *Symb. Ant.* 3: 164 (1902); Yun. in *Lilloa* 26: 262 (1953)

Shrub; upper internodes subhirsute; leaves elliptic or ovate-elliptic, 8-14cm long, 5-7cm wide, apex short and abruptly acute, base subequilaterally rounded, obtuse or commonly cordulate, glabrous above, rugescent with age, villous beneath, pinnately nerved with 6-8 pairs of nerves; petiole up to 1.5cm long, vaginate-winged throughout its length; spikes up to 3cm long; peduncle 5-8mm long, stout, hirsute; bracts concave-inflexed, glabrous above, with the broad pedicel dorsally bearded; stigmas 3, sessile; fruit ovoid with slightly pointed apex.

Trinidad: Hort. Trin., Hart (TRIN 5574), (TRIN 6012), Broadway (TRIN 5662).

Known only from the Botanic Garden, Port-of-Spain, but accepted as being indigenous. All the three collections cited above are syntypes cited by C. De Candolle.

20. *Piper saltuum* C. DC. in Urb., *Symb. Ant.* 7: 185 (1912); Trel. & Yun., *Pip. North. S. Amer.* 401 (1950); Yun. in *Lilloa* 26: 263 (1953)

Shrub to about 2m tall, subsimple, glabrous, nodose; leaves lanceolate or lanceolate-ovate, 14–20cm long, 5–7cm wide, apex long acuminate, base subequilaterally acute, glabrous above, finely granular beneath, pinnately nerved with 6–7 pairs of nerves arising throughout the length of the midrib; petiole up to 1cm long; spikes 5–9cm long, 3–4mm thick; peduncle slender 10–12mm long; bracts triangular-subpeltate, the narrow pale margin fringed; stigmas 3, small, sessile; fruit subglobose, trigonous with depressed apex, glandular-granular.

Trinidad: without locality, Fendler 667 (BM, K, P); Maraval, Hart (TRIN 5529); Maracas, 14.3.1847, Finlay (TRIN 2620); El Tucuche, 15.5.1868, Finlay (TRIN 523b), 4.4.1920, Britton & Freeman (TRIN 9086a), 19.5.1920, Freeman (TRIN 9037); Heights of Aripo, 10.1.1922, Broadway (K, TRIN 9869), Alexander (TRIN 6940), near summit, alt. over 900m, 27.6.1961, Richardson 938 (K, TRIN); Arima, 3.4.1903, Dannouse s.n. (TRIN); Arima Valley, alt. 600m, 24.3.1959, Cowan & Simmonds 1192 (TRIN); Arima to Blanchisseuse road, near milepost 9, 25.3.1927, Broadway 8934 (BM, K), near milepost 10, 2.1.1925, Broadway 5520 (BM, K), 30.4.1926, Broadway 6148 (BM, K), 19.2.1926, Broadway 6273 (BM, K), alt. 600m, milepost 11, Simmonds (K, TRIN 14917), Simmonds (coll. R.E.D. Baker) 154 (TRIN), near junction with Las Lapas road, 26.2.1926, Broadway 6277 (BM, K); Las Lapas, 14.2.1930, Broadway 7541 (BM); Morne Bleu, 13.3.1921, Britton, Freeman & Bailey 2262 (K), summit, 30.4.1926, Freeman & Williams (K, TRIN 11555), Broadway 6206 (BM, K); Aripo road near bathing pool, 11.4.1933, Broadway 9179 (BM); Southern Guanapo road, milepost 9½, 23.4.1926, Broadway 1641 (BM, G, K); Oropouche local road via

Valencia, near the river, milepost $2\frac{1}{4}$, 7.5.1926, Broadway 6231 (K); Quare River *via* Valencia, 10.10.1924, Broadway 5422 (BM, K); Government forest, Arena, 26.2.1933, Broadway 9177 (BM, K); Cumuto, 10.8.1925, Broadway 5735 (K); Brazil *via* Cumuto, Broadway 5762 (BM); Brazil *via* Guanapo, 4.9.1925, Broadway 5672 (K); Mt Harris, 11.11.1938, Alston 5167 (BM, K).

Trinidad and Colombia.

2. OTTONIA Sprengel

Ottonia Spreng., *Neue Entdeck.* 1.: 225 (1820)

Shrubs; leaves alternate; inflorescence leaf-opposed, racemose; flowers pedicellate, somewhat laxly arranged; stamens 4-6; stigmas 3-4, sessile.

Ottonia ovata (Vahl) Trel. in *Proc. Amer. Phil. Soc.* 75: 711 (1935); Trel. & Yun., *Pip. North. S. Amer.* 420, fig. 379 (1950); Yun. in *Lilloa* 26: 264 (1953) *Poult, potte*

Piper ovatum Vahl, *Eclog. Am.* 1: 3, pl. 1 (1796)

Ottonia vahlii Kunth in *Linnaea* 13: 585 (1839)

Shrub, nodose, glabrous, upper internodes finely striate; leaves ovate-elliptic, 10-18cm long, 4.5-9cm wide, apex acuminate, base rounded, subequilateral, cordulate, pinnately nerved throughout, with 8-11 pairs of nerves, drying chartaceous; petiole 5-10 mm long, vaginate at the base; racemes 3-6.5cm long, to 8mm thick, peduncles 5-10mm long; bracts concave, glabrous; pedicels slender, as long as or slightly shorter than the ovary; stamens attached at the base of the ovary; stigmas 4, short; fruit ovoid, acute, sulcate-tetragonous, papillate.

Trinidad: without locality, Fendler 669 (K, P); Chaguanas, Bourne (TRIN 4334), 19.4.1889, Broadway (TRIN 3743); Maracas, Crueger (TRIN 2614), s.n. (K); St Augustine, I.C.T.A., 26.10.1958, Simmonds (K, TRIN 15693); Arima, 6.11.1905, Dannouse s.n. (TRIN), Purdie 24 (K); Southern Central road, Cedros, 28.9.1915, Broadway (TRIN 7165); Guayaguayare road, 17.10.1930, Marshall (K, TRIN 12442).

Trinidad and the adjacent coastal region of Venezuela.

3. POTHOMORPHE Miquel

Pothomorphe Miq. in *Bull. Sci. phys. nat. Neer.* 450 (1840)

Shrubs or large herbs; leaves alternate, large, broad, cordate at the base or peltate; inflorescence compound with simple spikes umbellately arranged on an axillary common peduncle; flowers sessile, similar to those of *Piper*, bisexual and subtended by puberulent peltate bracts; stigmas 3, minute, sessile, glabrous.

Leaves peltate; internodes generally glabrous

or sparsely and very minutely puberulent

..... 1. *P. peltata*

Leaves deeply to shallowly cordate; inter-

nodes generally villous to soft puberulent 2. *P. umbellata*

1. *Pothomorphe peltata* (L.) Miq., *Comm. Phyt.* 37 (1840); Griseb., *Fl. Brit. W. Ind.* 169 (1864); Yun. in *Ann. Mo. Bot. Gard.* 37: 72, fig. 16 (1950); Trel. & Yun., *Pip. North. S. Amer.* 435, fig. 394 (1950); Yun. in *Lilloa* 26: 265 (1953); Gooding & Loveless in Gooding et al, *Fl. Barbado.* 119 (1965); Burger in *Fieldiana* 35: 197 (1971); Adams, *Fl. Pl. Jam.* 213 (1972) Cow-foot, Jumbie candle

Piper peltatum L., *Sp. Pl.* 30 (1753), as *peltatum*

P. pruinatum H.B.K., *Nov. Gen. & Sp.* 1: 59 (1816)

P. speciosum H.B.K., *Nov. Gen. & Sp.* 1: 59 (1816)

Peperomia peltata (L.) A. Dietr., *Sp. Pl.* 1: 142 (1831)

Large herbaceous subshrub 0.5-2m tall; internodes glabrous or sparsely and minutely puberulent; leaves ovate to suborbicular, peltate, 18-30(-42)cm long, 15-26(-40)cm wide, glabrous on both surfaces except for a very minute puberulence on the nerves, apex acute or short acuminate, base subcordate to rounded, palmately nerved with 10-15 major nerves arising from the point of attachment of the petiole and one or two pairs arising from the midrib; glandular pellucid-dotted; petiole 10-20cm long, glabrous, vaginate-

winged in the lower half; spikes 3-20, umbellate, erect, 4-10cm long subtended by a narrowly triangular glabrous bract about 2cm long, on axillary common peduncles 3-8cm long, peduncle of the spikes 3-20mm long; bracts of flower triangular-peltate, marginally short-fringed; fruit obpyramidal-trigonal, truncate above, glabrous.

Trinidad: without locality, Cartwright s.n. (OXF), Fendler 673 (BM, K); Heights of St Ann, 17.3.1920, Britton, Hazen & Mendelson 660 (K); Laventille, 2.12.1889, Alexander (TRIN 4547); Naranjo River Valley, Maracas, Simmonds 157 (TRIN); Tucuche, 10.1.1922, Freeman & Williams (TRIN 10081); mile-post 10½ Blanchisseuse road, Snow s.n. in 1961 (K); Windbelt Reserve, 3.1.1954, Baker & Simmonds (TRIN 15057); Manzanilla, 12.8.1918, Broadway s.n. (K); Cunupia, Broadway s.n. (BM).

Tobago: Providence Main Road, 15.9.1927, Williams (K, TRIN 11798); French Hill, 9.10.1937, Sandwith 1692 (K); Green Hill, alt. 150m, Purselove 6249 (K, TRIN); near mouth of Doctor's River, Speyside, 2.8.1973, Philcox 7558 (K); Cocoawattee, 3.8.1910, Broadway 3973 (BM).

Throughout the West Indies and south from Mexico to the Guianas, Ecuador, Peru and Brazil.

2. *Pothomorphe umbellata* (L.) Miq., *Comm. Phyt.* 36 (1840); Griseb., *Fl. Brit. W. Ind.* 100 (1864); Yun. in *Ann. Mo. Bot. Gard.* 37: 74 (1950); Trel. & Yun., *Pip. North. S. Amer.* 438 (1950); Yun. in *Lilloa* 26: 266 (1953); Burger in *Fieldiana* 35: 198 (1971); Adams, *Fl. Pl. Jam.* 213 (1972)

Piper umbellatum L., *Sp. Pl.* 30 (1753)

Soft-wooded shrub or subshrub 1-3m tall; upper flowering internodes densely rusty-villous to soft puberulent or more rarely subglabrous; leaves broadly round-ovate or reniform, base cordate, deeply or shallowly cleft, apex short-obtuse or acute, 18-20(-40)cm

long, 20-25(-42)cm wide, glabrous or very minutely puberulent on both surfaces particularly on the nerves, glandular pellucid-dotted, palmately nerved with 7-15 major nerves arising from the petiole attachment, 1-5 secondary veins arising from the midrib; petiole 12-20(-30)cm long, densely puberulent to glabrous, subtended by a narrowly triangular bract about 2cm long, vaginate-winged to about the middle; spikes 2-6, umbellate, erect on axillary common peduncles 0.5-4cm long; peduncles of the spikes 2-20mm long, glabrous or minutely puberulent; floral bracts triangular-peltate, marginally white ciliate, fruit obpyramidal-trigonal, truncate above, glabrous.

Trinidad: Maracas, road to bay, North, 26.6.1929, Broadway 7237 (BM); forest below summit of El Tucuche, alt. 825m, 8.8.1973, Philcox & Wood 7576 (K); Aripo road end, 18.6.1947, Simmonds 111 (TRIN); Arima to Blanchisseuse road, mile-post 3, 17.8.1947, alt. 150m, Simmonds 156 (TRIN), mile-post 12, alt. 510m, 17.8.1947, Simmonds 163 (TRIN), 1.9.1929, Broadway 7400 (BM).

Through the West Indies and from Mexico to Peru and Brazil.

4. PEPEROMIA Ruiz & Pavon

Peperomia Ruiz & Pav., *Prodr.* 8 (1794)

Herbs up to 50cm tall, usually epiphytic, erect or creeping, less frequently terrestrial, stems often succulent; leaves alternate, opposite or verticillate, simple, entire and petiolate (except occasionally in *P. macrostachya*), glabrous or hairy, palmately or pinnately nerved, occasionally dark-punctate when dry; spikes terminal, axillary or leaf-opposed, single, paired or racemose-paniculate on a common peduncle; flowers sessile, subtended by a usually orbicular, peltate bract; stamens 2; stigma simple, sessile and apical or subapical on the abaxial side of the beak; fruit variously shaped.

- 1 Leaves palmately nerved
- 2 Leaves alternate
 - 3 Plant delicate, erect, usually terrestrial;
 - leaf base cordate; fruit ribbed 1. *P. pellucida*
 - 3 Plant stouter, prostrate or creeping,
 - usually epiphytic; leaf base never cordate; fruit not ribbed
 - 4 Leaves not densely black spotted
 - 5 Leaves 5mm or less wide; fruit
 - pedicellate 2. *P. emarginella*
 - 5 Leaves larger than 5mm wide; fruit not pedicellate
 - 6 Fruit not prominently beaked
 - 7 Fruit turbinate; stigma apical 3. *P. panamensis*
 - 7 Fruit ovoid with oblique apex;
 - stigma subapical..... 4. *P. rotundifolia*
 - 6 Fruit prominently beaked 5. *P. serpens*
 - 4 Leaves densely black spotted 6. *P. glabella*
- 2 Leaves opposite or verticillate
 - 8 Peduncles 2-4cm long; fruit apex pointed; stigma terminal
 - 9 Leaves mostly ternate; stems loosely villous 7. *P. trifolia*
 - 9 Leaves mostly opposite; stems minutely hirtellous..... 8. *P. quadrangularis*
 - 8 Peduncles 1-1.5cm long; fruit apex oblique, stigma subterminal 9. *P. blanda*
- 1 Leaves pinnately nerved
 - 10 Spikes 5cm or more long; inflorescence mostly simple

- 11 Fruit apex obliquely scutelliform, not
rostrate; leaves lanceolate- or
subovate-elliptic10. *P. macrostachya*
- 11 Fruit apex slenderly rostrate; leaves
elliptic- or round-obovate11. *P. obtusifolia*
- 10 Spikes about 1 cm long; inflorescence
racemose-paniculate.....12. *P. pernambucensis*

1. *Peperomia pellucida* (L.) H.B.K., *Nov. Gen. & Sp.* 1: 64
(1816); Griseb., *Fl. Brit. W. Ind.* 165 (1864); C. DC. in DC.
Prodr. 16: 402 (1869); C. DC. in Urb., *Symb. Ant.* 3: 244 (1902),
Fawc. & Rendle, *Fl. Jam.* 3: 5 (1914); Britt. & Wils., *Sci.*
Surv. Porto Rico 5: 226 (1924); Yun. in *Ann. Mo. Bot. Gard.*
37: 79 (1950); Trel. & Yun., *Pip. North. S. Amer.* 466, fig. 409
(1950); Yun. in *Lilloa* 26: 268 (1953); Gooding & Loveless
in Gooding et al., *Fl. Barbado.* 117 (1965); Burger in *Fieldiana*
35: 57 (1971); Adams, *Fl. Pl. Jam.* 204 (1972)

Shining bush, zeb courresse

Piper pellucidum L., *Sp. Pl.* 30 (1753)

P. concinnum Haw., *Rev. Pl. Succ.* 198 (1821)

Peperomia concinna (Haw.) A. Dietr., *Sp. Pl.* 1: 164 (1831)

Delicate, erect, pellucid, glabrous, usually terrestrial herb,
divergently branched, semi-succulent, to about 35cm tall; leaves
alternate, 10-25(-30)mm long, 10-25mm wide, broadly ovate, apex
bluntly acute, base truncate or subcordate, palmately 5-nerved;
petioles 0.5-2cm long; spikes leaf-opposed or terminal, or occasion-
ally axillary, simple, slender, 2-5(-8)cm long; peduncle 2-8mm
long; stigma apical; fruit globose-ovoid, longitudinally ribbed.

Trinidad: without locality, 1884, Bromfield s.n. (K), Cartwright
s.n. (OXF), Fendler 662 (BM, K, P), de Shack s.n. (K), Sieber
(Distrib. no.) 207 (G, OXF, P); Hort. Trin., 29.10.1888, Broadway
(TRIN 2236), 6.5.1889, Broadway 3780 (TRIN); Port-of-Spain,
ravine below Old Government House, 4.5.1947, Baldwin 5681 (K);
Woodbrook, 21.10.1923, Broadway 5082 (G); St Joseph Stock Farm,

12.2.1958, Purselove 6076 (K, TRIN); St Augustine, I.C.T.A., 23.8.1947, Simmonds 165 (TRIN); Blanchisseuse, alt. 7.5m, 11.9.1967, Wesley Wong 52B (TRIN); about mile-post 5 on road, from Redhead to Saut Bay, alt. 150m, 18.8.1973, Philcox, Wood & Gibbs 7532 (K); San Souci, among shaly rock debris by coast road 14.9.1947, Simmonds 175 (TRIN); Tabaguite, Druce s.n. (OXF); Cedros, 21.9.1915, Caroline King (TRIN 7145).

Tobago: Scarborough, Broadway 2545 (US).

Throughout the West Indies, tropical North and South America and also in the Old World tropics and Pacific islands.

2. **Peperomia emarginella** (Sw.) C. DC. in DC., *Prodr.* 16: 437 (1869); C. DC. in Urb., *Symb. Ant.* 3: 225 (1902); Fawc. & Rendle, *Fl. Jam.* 3: 6 (1914); Britt. & Wils., *Sci. Surv. Porto Rico* 5: 224 (1924); Trel. & Yun., *Pip. North. S. Amer.* 710, fig. 633 (1950); Yun. in *Lilloa* 26: 267 (1953); Burger in *Fieldiana* 35: 33 (1971); Adams, *Fl. Pl. Jam.* 204 (1972)

Piper emarginellum Sw. ex Wikström in *Vet. Akad. Handl. Stockh.* 1827: 56 (1828)

Peperomia exilis Griseb., *Fl. Brit. W. Ind.* 164 (1864)

P. minima C. DC. in DC., *Prodr.* 16: 399 (1869)

P. delicatissima Trel. in *Contrib. U.S. Nat. Herb.* 26: 191 (1929)

Delicate repent or procumbent epiphyte; stems filiform, glabrous; leaves alternate, ovate to orbicular or reniform, 2–8mm diam., glabrous or sparsely hairy, obtuse to rounded or emarginate at the apex, rounded and truncate to subcordate at the base, occasionally subpeltate, margin usually distantly ciliate, palmately 3-nerved; petiole 2–3mm long, glabrous or sparsely puberulent; spikes terminal or very occasionally axillary, 1–2(–3)cm long; peduncle up to 1cm long, glabrous; stigma apical; fruit ellipsoid or obpyriform, pedicellate on a slender pedicel.

Trinidad: without locality, Fendler 659 (K); Chaguanas, 16.8.1888, Broadway (K, TRIN 1428), 19.4.1889, Broadway (TRIN 3763); on rocks in stream at head of Maracas Waterfall, alt. 450m, 10.8.1947, Simmonds 136 (TRIN); on rocks near waterfall, Naranja, alt. 600m, 8.8.1973, Philcox & Wood 7582 (K); Naranja, alt. 660m,

8.8.1973, Phileox & Wood 7581 (K); Tucuche, 4.4.1920, Britton & Freeman (TRIN 9088), Sandwith 1936 (K), 9-10 mile-posts, 19.4.1929, Broadway 7131 (K), 10-11 mile-posts, 22.3.1930, Broadway s.n. (BM); Aripo road *via* Arima near 2½ mile-post, 16.10.1925, Broadway 5823 (BM, K); Irois, Crueger 1 (K).

Tobago: between mile-posts 8 and 9, forest reserve on Main Ridge, Roxborough to Parlatuvier road, alt. c. 300m, 25.10.1937, Sandwith 1918 (K).

Central America, northern South America and the West Indies.

3. *Peperomia panamensis* C. DC. in *Candollea* 1: 329 (1923), Yun. in *Ann. Mo. Bot. Gard.* 37: 82 (1950); Trel. & Yun.; *Pip. North. S. Amer.* 472, fig. 413 (1950); Yun. in *Lilloa* 26: 269 (1953); Burger in *Fieldiana* 35: 56 (1971)

Small creeping or climbing, stoloniferous, epiphytic herb, glabrous or very minutely hirtellous or puberulent; leaves alternate, 5-15(-20)mm long, 6-15(-20)mm wide, ovate to orbicular or elliptic, apex rounded, obtuse or rounded at the base, glabrous, palmately and somewhat obscurely 3-5 nerved; petiole 3-5(-10)mm long; spikes terminal and axillary, simple, 1-2.5cm long; peduncles 4-12(-18)mm long, glabrous; stigma apical; fruit turbinate or cylindrical, basally immersed eventually pseudo-pedicellate.

Trinidad: without locality, Finlay (TRIN 2605); Aripo Savanna, 21.4.1921, Britton (TRIN 9541); Aripo road, near the bathing pool, 19.3.1926, Broadway 6033 (K), end of forest near the river, 10.3.1929, Broadway 7126 (K).

Costa Rica to Colombia and Trinidad.

4. *Peperomia rotundifolia* (L.) H.B.K., *Nov. Gen. & Sp.* 1: 65 (1816); C. DC. in *Urb., Symb. Ant.* 3: 228 (1902); Fawc. & Rendle, *Fl. Jam.* 3: 12 (1914); Britt. & Wils., *Sci. Surv. Porto Rico* 5: 224 (1924); Yun. in *Ann. Mo. Bot. Gard.* 37: 96 (1950); Trel. & Yun., *Pip. North. S. Amer.* 622, fig. 546 (1950); Yun. in *Lilloa* 26: 273 (1953); Burger in *Fieldiana* 35: 68 (1971); Adams, *Fl. Pl. Jam.* 207 (1972) Moreau

Piper rotundifolium L., *Sp. Pl.* 1: 30 (1753)

Peperomia nummularifolia H.B.K., *Nov. Gen. & Sp.* 1: 66 (1816)

P. rotundifolia forma *ovata* Dahlst. in *Kgl. Sv. Vet. Akad. Handl.* 33: 101 (1900)

P. rotundifolia forma *obcordata* (Miq.) Dahlst. loc. cit. 101

Small creeping or climbing epiphyte; stems rooting at most nodes, glabrous or puberulent; leaves alternate, 0.5–1.5(–2.2)cm long, 0.3–1(–1.5)cm wide, orbicular to elliptic, ovate or obovate, apex rounded to obtuse, or obcordate to emarginate, base rounded or tapering to obtuse, puberulent to occasionally glabrous, palmately and obscurely 3-nerved; petiole 1–5(–12)mm long, glabrous or puberulent; spikes terminal, solitary, up to 2cm or more long; peduncle 1–10mm long, puberulent or glabrous; stigma subapical; fruit globose-ovoid, apex oblique.

Trinidad: without locality, Fendler 660 (BM, K), Sieber (Distrib. no.) 16 (K,P); Hort. Trin., Broadway (TRIN 4978); Chaguanas, 17.4.1889, Broadway (TRIN 3706); Maracas, 18.5.1845, Finlay (TRIN 2605), along road to the Falls, 12.5.1958, Yuncker 18780 (BM), near the waterfall, 11.3.1927, Broadway 6608 (BM, K), 18.3.1927, Broadway 7297 (BM), s.n. (K); Arima Valley to La Laja road, alt. 310m, 12.6.1973, Philcox & Wood 7068 (K); 4 miles E. of Arima, 15.3.1920, Britton, Hazen & Mendelson 602 (K); Oropouche Cave, 1.2.1948, alt. 150m, Simmonds 263 (TRIN), 28.2.1932, Broadway 7914 (K); milepost 7 on Valencia to Cumaca road, 18.6.1973, Philcox & Kalloo 7219 (K); Toco road, Valencia, 16.4.1920, Britton, Hazen & Mendelson 1802 (K, TRIN); about milepost 5 on road from Redhead to Saut Bay, alt. 150m, 12.6.1973, Philcox, Wood & Gibbs 7530 (K); Brazil, 6.3.1921, Britton, Hazen & Freeman 2129 (K, TRIN); near Monkey Town, 26.5.1865, Finlay (TRIN 2608); Mora forest via Sangre Grande, 26.6.1925, Broadway 5702 (K).

Tobago: Main Ridge above Parlatuvier, 24.10.1937, Sandwith 1908 (K); Morne d'Or, Eggers 5819 (K, type of *Peperomia rotundifolia* forma *ovata*); the Widow district, 24.2.1913, Broadway s.n. (BM).

West Indies, through Central America to northern South America.

5. *Peperomia serpens* (Sw.) Loud., *Hort. Brit.* 13 (1830), non C. DC. (1869); Fawc. & Rendle, *Fl. Jam.* 3: 11 (1914); Britt. & Wils., *Sci. Surv. Porto Rico* 5: 224 (1924); Yun. in *Ann. Mo. Bot. Gard.* 37: 106 (1950); Trel. & Yun., *Pip. North. S. Amer.* 668, fig. 584 (1950); Yun. in *Lilloa* 26: 275 (1953); Burger in *Fieldiana* 35: 70 (1971); Adams, *Fl. Pl. Jam.* 208 (1972)

Piper serpens Sw., *Prodr. Veg. Ind. Occ.* 16 (1788)

Peperomia scandens Ruiz & Pavon, *Fl. Peruv. & Chil.* 1: 32, pl. 51, fig. b (1798)

Piper bracteatum Thomps. in *Trans. Linn. Soc.* 9: 203, pl. 21 (1808)

Peperomia repens H.B.K., *Nov. Gen. & Sp.* 1: 65 (1816)

Creeping or climbing, crisp-pubescent, epiphytic or terrestrial herb; leaves alternate, 7-16(-20)mm long, 8-18(-24)mm wide, broadly ovate to round-subdeltoid, apex acute or obtuse, base rounded to truncate-subcordate, crisp-pubescent on both surfaces to subglabrous, palmately 3-5 nerved; petiole up to 3 cm long, puberulent; spikes axillary or terminal, usually solitary, up to 3cm long; peduncle 1-or 2-bracted, up to about 3cm long, crisp-pubescent; stigma subapical; fruit narrowly ellipsoid, prominently beaked.

Trinidad: without locality, Fendler 661 (BM, K), Finlay 121 (TRIN 2602); Caledonia Island, Broadway (TRIN 5435); Chaguanas, 19.4.1889, Broadway (TRIN 3754); Fort George, 28.9.1845, Crueger s.n. (K); Maracas, opposite falls, 7.11.1924, Broadway 5467 (BM, K), road to Bay, south, 8.7.1927, Broadway 6731 (BM); El Tucuche, 26.5.1924, Riley 65 (K); col between El Tucuche and Naranja, alt. 630m, 10.7.1947, Simmonds 135 (TRIN); col between Piedra Blanca and Naranja, alt. 540m, 10.8.1947, Simmonds 134 (TRIN); Caura, 24.6.1934, Broadway s.n. (K); Heights of Aripo, 10.1.1922, Broadway 9863 (TRIN), 11.4.1922, Broadway s.n. (TRIN); Blanchisseuse Road, Yuncker 18770 (BM); Las Lapas Trace,

Blanchisseuse Saddle forest, alt. 510m, 1.6.1962, Purselove 6428 (TRIN); Arima Valley Road, on vertical rock wall on north side of crest, alt. 500m, Cowan & Simmonds 1181 (P, TRIN), alt. 300m, 24.3.1959, Cowan & Simmonds 1225 (TRIN); Guanapo, 27.9.1912, McLean s.n. (TRIN); Arena, near Government forests, 21.12.1923, Broadway 5186 (G, K); Heights of Oropouche, 23.4.1914, Freeman (TRIN 7766); about milepost 5 on road from Redhead to Saut Bay, alt. c. 150m, 18.7.1973, Philcox, Wood & Gibbs 7529 (K); Mt Tamana, 18.4.1920, Freeman (TRIN 9063); Biche, towards Nariva Swamp, 1.6.1934, Broadway 9396 (K).

Nicaragua southwards to Brazil and Peru, West Indies.

6. *Peperomia glabella* (Sw.) A. Dietr., *Sp. Pl.* 1: 156 (1831); Griseb., *Fl. Brit. W. Ind.* 165 (1864); C. DC. in DC., *Prodr.* 16: 417 (1869); C. DC. in Urb., *Symb. Ant.* 3: 235 (1902); Fawc. & Rendle, *Fl. Jam.* 3: 14 (1914); Britt. & Wils., *Sci. Surv. Porto Rico* 5: 226 (1924); Yun. in *Ann. Mo. Bot. Gard.* 37: 97 (1950); Trel. & Yun., *Pip. North. S. Amer.* 587, fig. 511 (1950); Yun. in *Lilloa* 26: 272 (1953); Gooding & Loveless in Gooding et al., *Fl. Barbado.* 116 (1965); Burger in *Fieldiana* 35: 37 (1971); Adams, *Fl. Pl. Jam.* 207 (1972)

Piper glabellum Sw., *Prodr. Veg. Ind. Occ.* 16 (1788)

Small creeping, ascending or erect, stoloniferous, black-punctate, usually epiphytic herb to 15cm or more tall, glabrous except for ciliate petioles and small hairs near the nodes; leaves alternate or occasionally opposite at the flowering nodes, 1.5-3.5(-8) cm long, 0.6-1.5(-3)cm wide, elliptic, ovate-lanceolate to lanceolate, acute to acuminate or long attenuate at both ends, palmately 3-5 nerved, black-punctate on both surfaces; petiole 0.5-1cm long, ciliate; spikes terminal, axillary or occasionally leaf opposed, 3-5(-12) cm long; peduncle 1-1.5cm long; stigma subapical; fruit globose-ovoid, apex oblique.

Leaves ovate to elliptic-lanceolate, 1.5-3.5

cm long, 0.6-1.5cm wide var. *glabella*

Leaves lanceolate, 3-8cm long, 1-3cm wide ... var. *nervulosas*

P. glabella var. **glabella**

Trinidad: without locality, Fendler 656 (BM, K, P), Sieber 354 (P); Tabaquite, Britton, Freeman & Nowell 2600 (TRIN); Port-of-Spain, 2.3.1921, Britton 2080 (K); Morne Coco Road, 9.4.1920, Britton & Hazen 1606 (K); Caroni, Crueger in 1846 (K); Cumuto, 1-2 miles from railway, south, 10.7.1925, Broadway s.n. (K), near 5½ milepost, 13.5.1927, Broadway 7326 (BM); Santa Cruz, Crueger s.n. (K), 905 (TRIN); Santa Cruz to Cyril Bay trail, alt. 210m, 14.2.1948, Simmonds 278 (TRIN); San Rafael to Talparo road, milepost 4, west along trace, Wood 1703 (TRIN); Brazil to Arena road, at ICTA cacao plantation, 3.3.1959, Cowan & Simmonds 1408 (P, TRIN); near Oropuche Cave, 28.2.1932, Broadway 7912 (BM, K); Oropuche local road *via* Valencia, near the river, 13.3.1925, Broadway 5571 (BM), milepost 2½, 7.5.1926, Broadway 6174 (BM, K); Valencia, road near the Oropuche River, 30.3.1930, Broadway, 7573 (BM, G); Las Hermanas, 29.4.1958, Simmonds (K, TRIN 15482); Toco road, Valencia, 16.4.1920, Britton, Hazen & Mendelson 1783 (TRIN); Guaico-Valencia reserve, 8.4.1949, Simmonds (K, TRIN 14370); Mt Tamana, near the base, 3.4.1932, Broadway 7986 (BM, K); Moruga, 19.3.1921, Britton & Broadway 2441 (K); near Monkey Town, Crueger (TRIN 2607); foot of Brigand Hill, on road from Manzanilla to Plum, milepost 3, alt. 90m, 21.6.1973, Philcox & Wood 7231 (K).

P. glabella var. **nervulosa** (C. DC.) Yun. in *Ann. Mo. Bot. Gard.* 37: 98 (1950); Trel & Yun., *Pip. North S. Amer.* 588 (1950); Yun in *Lilloa* 26: 273 (1953)

Micropiper melanostigma Miq., *Comm. Phyt.* 51 (1840)

Peperomia melanostigma (Miq.) Miq., *Syst. Pip.* 90 (1843)

P. melanostigma var. *nervulosa* C. DC. in DC., *Prodr.* 16: 409 (1869)

P. glabella var. *melanostigma* (Miq.) Dahlst. in *Kgl. Sv. Vet. Handl.* 33: 122 (1900)

Trinidad: back of Government House, Broadway (TRIN 5478).

Both varieties occur throughout the West Indies, Central America and northern South America.

7. *Peperomia trifolia* (L.) A. Dietr., *Sp. Pl.* 1: 173 (1831); Griseb., *Fl. Brit. W. Ind.* 168 (1864); C. DC. in DC., *Prodr.* 16: 462 (1869); C. DC. in Urb., *Symb. Ant.* 3: 267 (1902); Trel. & Yun., *Pip. North. S. Amer.* 512 (1950); Yun. in *Lilloa* 26: 269 (1953)

Piper trifolium L., *Sp. Pl.* 30 (1753)

Peperomia ovalifolia Hook., *Exot. Fl.* 3, pl. 165 (1835)

Small, somewhat loosely villous, scandent herb; stem about 1mm thick; leaves below opposite, the upper in whorls of 3, or rarely 4, suborbicular or elliptic to subobovate, 1.5–2cm long, 8–12mm wide, apex blunt and slightly notched, base acute, glabrous above, somewhat villous beneath along the nerves, obscurely palmately 3-nerved, ciliate; petiole about 3mm long; spikes terminal, 3–5cm long, closely flowered; peduncle loosely villous 2.5–3cm long; stigma apical; fruit oblong-ovoid, apex pointed.

Trinidad: without locality, Sieber 229 (G, P).

West Indies and possibly northern South America.

8. *Peperomia quadrangularis* (Thomps.) A. Dietr., *Sp. Pl.* 1: 169 (1831); Griseb., *Fl. Brit. W. Ind.* 168 (1864); C. DC. in DC., *Prodr.* 16: 446 (1869); C. DC. in Urb., *Symb. Ant.* 3: 265 (1902); Yun. in *Ann. Mo. Bot. Gard.* 37: 85 (1950); Trel. & Yun., *Pip. North. S. Amer.* 509, fig. 450 (1950); Yun. in *Lilloa* 26: 270 (1953)

Piper quadrangularis Thomps. in *Trans. Linn. Soc.* 9: 202, pl. 21, fig. 1 (1808)

Peperomia angulata H.B.K., *Nov. Gen. & Sp.* 1: 66 (1816)

P. carlo-wrightii Trel. in *Fedde, Repert.* 23: 23 (1926)

P. allenii Trel. in *Ann. Mo. Bot. Gard.* 25: 825 (1938)

Small repent epiphytic herb, occasionally on rocks; stem quadrangular, 1–2mm thick, minutely hirtellous to glabrous; leaves opposite but occasionally one leaf of a pair replaced by roots, rarely 3 at a node, obovate, elliptic-obovate or orbicular,

12-30mm long, 10-22mm wide, apex obtuse or very slightly pointed, base acute to rounded, sparsely hirtellous or glabrous, palmately 3-nerved; petiole 2-4mm long, hirtellous; spikes axillary or occasionally terminal, 2-3cm long; peduncles 2-4cm long, 2-bracteate near the middle; stigma apical; fruit ovoid, apex pointed.

Trinidad: Hort. Trin. in 1892, Hart (TRIN 5808); Cedros Cruieger s.n. in 1852 (K).

West Indies, Panama and northern South America.

9. *Peperomia blanda* (Jacq.) H.B.K., *Nov. Gen. & Sp.* 1: 6 (1816); C. DC. in DC., *Prodr.* 16: 458 (1869); C. DC. in Urb., *Symb. Ant.* 3: 266 (1902); Fawc. & Rendle, *Fl. Jam.* 3: 16 (1914); Trel. & Yun., *Pip. North. S. Amer.* 556, fig. 487 (1950); Yun. in *Lilloa* 26: 271 (1953); Adams, *Fl. Pl. Jam.* 207 (1972)

Piper blandum Jacq., *Collect.* 3: 211 (1789)

Peperomia dissimilis H.B.K., *Nov. Gen. & Sp.* 1: 67, pl. 13 (1816)

Ascending herb to 30(-50)cm or more tall, simple or branching, more or less dark-granular; stem 2-3mm thick, loosely to rather densely villous with subfuscous hairs up to 1mm long; leaves opposite or occasionally 3 at a node particularly above, elliptic-lanceolate to obovate, frequently subrhombic, 2.5-5(-10)cm long, 1-2.5(-4)cm wide, apex acute, base acute or obtuse, moderately to densely villous on both surfaces when young, ciliate with long hairs, palmately 3(-5)-nerved, villous at least near the base or along the nerves when mature, usually dark-spotted when dry; petiole 5-10mm long, villous; spikes terminal and axillary, usually several, slender, (3-)6-12(-14)cm long; peduncle slender, 1-1.5cm long, villous-glabrescent; stigma subapical; fruit globose-ovoid; apex oblique.

Plants up to 30cm tall; leaves 2.5-5cm long,

1-2.5cm wide var. *blanda*

Plants up to 50cm or more tall; leaves

4-10cm long, 2-4cm wide var. *langsдорffii*

P. blanda var. *blanda*

Trinidad: without locality, Crueger s.n. (K), Finlay (TRIN 2602); Carrera Island, Hart in 1891 (TRIN 5946); Teteron Bay, in rocky places close to sea, 12.7.1927, Broadway 6744 (K), 15.4.1928, Broadway s.n. (K); Staubles to Teteron Bay, 12.7.1927, Williams (TRIN 11663).

West Indies, Mexico (*vide* Dahlstadt) and northern South America.

P. blanda var. **langsдорffii** (Miq.) Hensch. in *Nova Acta R. Soc. Sci. Ups.* Ser. 3, 8: 39 (1873); C. DC. in DC., *Prodr.* 16: 443 (1869); C. DC. in Urb., *Symb. Ant.* 3: 266 (1902); Trel. & Yun., *Pip. North. S. Amer.* 558 (1950); Yun. in *Lilloa* 26: 271 (1953)

Micropiper langsдорffii Miq., *Comm. Phyt.* 2: 52 (1840)

Peperomia langsдорffii (Miq.) Miq., *Syst. Pip.* 116 (1843)

Trinidad: without locality, Crueger (TRIN 2606), Finlay (TRIN 2601); western end of Monos Island, 4.4.1921, Britton, Britton & Brown 2725 (K).

West Indies, Venezuela, Colombia and Brazil.

A very fragmentary specimen closely resembling this species was collected from Chacachacare by Broadway in 1921 and deposited in the herbarium of the British Museum (Natural History), London. This specimen probably represents *P. blanda* as Chacachacare is a likely locality for it when one considers the very western distribution of the species in Trinidad. A similarly annotated specimen is deposited at New York, and Yuncker (*Lilloa* 26: 271) considered this to represent var. *langsдорffii*. However on the evidence of the BM material and without seeing the New York specimen, I prefer not to cite either specimen here.

Since studying the type of *Peperomia ciliata* H.B.K., Humboldt & Bonpland 385 in the herbarium at Paris, I have chosen to exclude this species from Yuncker's earlier synonymy. This specimen has long-petioled, opposite, obovate-oblong leaves which are generally glabrous except on the main nerves on both surfaces and have ciliate margins. The young stems are truly glabrous except at the nodes where they are loosely hirsute. This combination of characters

is not a good match for Jacquin's original description of *Piper blanda* which does however fit the type specimen of *Peperomia dissimilis* H.B.K., also seen at Paris and duly included here in synonymy.

10. *Peperomia macrostachya* (Vahl) A. Dietr., *Sp. Pl.* 1: 149 (1831); C. DC. in DC., *Prodr.* 16: 439 (1869); Trel. & Yun., *Pip. North. S. Amer.* 660, fig. 578 (1950); Yun. in *Lilloa* 26: 274 (1953); Burger in *Fieldiana* 35: 48 (1971)

Piper macrostachyon Vahl, *Enum.* 1: 341 (1804)

Peperomia parkeriana Miq. in *Hook. Lond. Journ. Bot.* 4: 427 (1845)

Succulent climbing or trailing epiphyte becoming creeping and pendulous, glabrous or sparsely and minutely puberulent at the nodes; leaves alternate, (3-)6-12cm long, 1.5-5(-6)cm wide, narrow to broad elliptic, apex obtuse, acute or acuminate, base obtuse to cuneate, frequently obliquely uneven, glabrous or slightly puberulent, often minutely ciliate especially on the margins of younger leaves, obscurely pinnately nerved with 3-6 pairs of nerves arising from the lower half of the midrib; petiole 0-12(-20)mm long; spikes slender, terminal or leaf-opposed, solitary or sub-panicled to 12cm long; peduncle about 1-3.5cm long; stigma central; fruit cylindric, apex obliquely scutellate.

Trinidad: without locality, Fendler 655 (BM, K), 657 (K); Cumuto, 5.6.1925, Hombersley s.n. (K); Irois, 3.7.1861, Crueger 108 (TRIN 2604).

Trinidad, Mexico to northern South America.

11. *Peperomia obtusifolia* (L.) A. Dietr., *Sp. Pl.* 1: 154 (1831); Griseb., *Fl. Brit. W. Ind.* 166 (1864); C. DC. in DC., *Prodr.* 16: 429 (1869); C. DC. in Urb., *Symb. Ant.* 3: 254 (1902); Fawc. & Rendle, *Fl. Jam.* 3: 9 (1914); Britt. & Wils., *Sci. Surv. Porto Rico* 5: 225 (1924); Yun. in *Ann. Mo. Bot. Gard.* 37: 108 (1950); Trel. & Yun., *Pip. North. S. Amer.* 678, fig. 594 (1950); Yun. in *Lilloa* 26: 276 (1953); Burger in *Fieldiana* 35: 51 (1971); Adams, *Fl. Pl. Jam.* 210 (1972)

Piper obtusifolium L., *Sp. Pl.* 30 (1753)

P. magnoliifolium Jacq., *Collect.* 3: 210 (1789)

Peperomia magnoliifolia (Jacq.) A. Dietr., *Sp. Pl.* 1: 153 (1831)

P. amplexicaulis (Sw.) A. Dietr. var. *magnoliifolia* (Jacq.) Griseb.,
Fl. Brit. W. Ind. 167 (1864)

P. talinifolia sensu Griseb., *Fl. Brit. W. Ind.* 167 (1864) non
H.B.K. (1816)

Fleshy epiphytic or terrestrial herb up to 20cm tall; stems erect or ascending, stoloniferous, glabrous; leaves alternate, 6-15 cm long, 3-8cm wide, oblanceolate, obovate, obovate-elliptic to subspatulate, apex rounded, obtuse, base cuneate, sometimes rounded, glabrous on both surfaces or minutely puberulent beneath, pinnately nerved with 3-5 pairs of nerves, usually arising from below the middle of the midrib; petiole 1-4cm long, glabrous, somewhat winged at the base; spikes up to 18cm long, solitary, paired or occasionally 3 on a terminal, axillary or leaf-opposed, 1-bracted common peduncle up to 10cm long; peduncles to the individual spikes 1.5-3cm long, glabrous or sparsely and minutely pubescent; fruit ellipsoid, rostrate, the beak slender, recurved to hooked at the apex; stigma anterior at the base of the beak.

Trinidad: without locality, Fendler 658 (BM, K, P), Sieber 343 (G, P), 365 (G, P); Staubles to Teteron Bay, on rocks near sea, 12.7.1927, Williams (TRIN 11664); Teteron Bay, 15.4.1928, Broadway 6928 (BM, K); Beausejour, road to Blue Basin, Diego Martin, McLean (TRIN 7742); Hort. Trin., 12.10.1866, Finlay (TRIN 2609); Maracas Waterfall, 10.4.1920, Britton, Hazen & Mendelson 1637 (K), Simmonds 54 (TRIN), 141 (TRIN), 18.3.1927, Broadway s.n. (BM); road to Maracas Bay, Finlay (TRIN 2611); Maracas, 16.2.1845, Crueger s.n. (K); near milepost 10½, Blanchisseuse road, 11.5.1925, Broadway 5667 (BM, K); Aripo road near bathing pool, 19.3.1926, Broadway s.n. (K), near milepost 4, 15.1.1926, Broadway 6269 (K); Long stretch via Arima, 5.12.1924, Broadway s.n. (BM), mileposts 23-24, 4.2.1927, Broadway 7381 (BM); Mount Tamana, 21.5.1868, Finlay (TRIN 1344); Mayaro, 19.9.1893, Broadway (TRIN 5749); Mayaro to Point Radix, 9.3.1962, Richardson 2043 (TRIN); Erin, 2.5.1928, Broadway 6936 (K).

Throughout the West Indies and from Mexico, through Central America to northern South America.

12. *Peperomia pernambucensis* Miq. in Hook. Lond. Journ. Bot. 4:420 (1845); Griseb., Fl. Brit. W. Ind. 167 (1864); C. DC. in DC., Prodr. 16: 405 (1869); C. DC. in Urb., Symb. Ant. 3: 245 (1902); Trel. & Yun., Pip. North. S. Amer. 743, fig. 667 (1950); Yun. in Lilloa 26: 277 (1953); Burger in Fieldiana 35: 60 (1971)

Peperomia paniculata Regel in Bull. Soc. Nat. Moscou 31: 542, pl. 3 (1858)

P. longifolia C. DC. in DC., Prodr. 16: 405 (1869)

Erect, succulent, epiphytic or terrestrial herb; stems to 10cm tall, glabrous; leaves alternate, 15-30cm long, 4-12cm wide, narrowly elliptic, elliptic-oblong or lanceolate, apex acute or short-acuminate, or occasionally obtuse, base attenuate or acute, glabrous, obscurely and pinnately nerved with 3 to 6 pairs of nerves arising throughout the length of the midrib; petiole 3-5cm long; spikes about 1cm long, verticillately arranged in a loose, terminal or axillary, racemose-paniculate inflorescence up to 8cm long on a densely but minutely velvety puberulent common peduncle 4-8cm long; peduncles of the individual spikes to 3mm long; stigma apical; fruit subcylindric, slightly obliquely truncate at the apex.

Trinidad: Irois, 4.12.1858, Crueger 89 (K).

Nicaragua to Colombia and the Guianas; Trinidad.

FAMILY 2. MYRISTICACEAE

BY D. PHILCOX

Trees or shrubs with aromatic wood; leaves alternate, simple, entire, pinnately-nerved, exstipulate; inflorescence paniculate or racemose, terminal or axillary; flowers unisexual, dioecious, apetalous, often fasciated at the ends of the inflorescence branches; perianth 3(-4)-lobed, valvate; anthers 3 or more, dorsally adnate to the central staminal column; ovary superior, 1-locular with 1 basal anatropous ovule; fruit 2-valved, fleshy; seed enclosed in a fleshy aril.

In addition to the one native representative of the family, the handsome Asiatic *Myristica fragrans* Houtt., or nutmeg, is commonly cultivated here. It is native to the Moluccas and is also the source of mace, the spice produced by the red aril enclosing the seed.

VIOLA Aublet

Viola Aubl., *Pl. Guian.* 904 (1775)

Trees; inflorescence paniculate

Viola surinamensis (Rol.) Warb. in *Nova Acta Acad. Leop.-Carol.* 68: 208, tabs. 1 & 6 (1897); Pulle, *Enum.* 179 (1906); van Oostroom in Pulle, *Fl. Surin.* 2: 120 (1934)
Cajuca, *Wild nutmeg*, *Muscadier sauvage*

Myristica surinamensis Rol. in *Acta Lit. Univ. Hafn.* 1: 281 (1778)

M. fatua Sw., *Prodr. Veg. Ind. Occ.* 96 (1788) non Houtt.

Tree up to 24m tall, branches spreading, yellow-brown stellate-tomentose when young, glabrescent, striate when dry; leaves 8-25 cm long, 1.5-5.5cm wide, petiolate, linear-oblong to oblong-lanceolate, parallel-margined, apex short-acuminate to acute, base rounded, subcordate, obtuse or rarely acute, stellate-tomentose beneath, glabrescent, subcoriaceous; pinnately-nerved with up to 30 pairs of lateral nerves, impressed above, prominent beneath; petiole 2-9mm long, tomentose to glabrous, deeply channelled above, striate beneath; male inflorescences axillary, paniculate, 8-13cm long, lower branches usually subopposite, often compressed, soft

stellate-tomentose, flowers in small clusters of 4-20, pedicels slender, up to 4mm long, perianth 3-lobed almost to the base, funnel-shaped, lobes obtuse, 1.5-2.5mm long; anthers shorter than the slender staminal column; female inflorescences axillary, to 9cm long, similar in outline and indumentum to the male but flowers in clusters of 3-6, pedicels up to 2mm long; ovary tomentose, style short, stigma 2-lobed, deeply cleft; fruit globose to ellipsoid, 13-20mm long, 11-16mm broad; aril lacerate nearly to the base.

Trinidad: without locality, Alexander (TRIN 5727), 19.10.1926, Durity (TRIN 11603); Finlay s.n. (TRIN 3042); Laventille, 1.8.1847, Crueger s.n. (TRIN 1767); Caroni, Eggers 1410 (K), 1472 (K); Maracas, road to the Bay, north, 16.5.1932, Broadway s.n. (BM); Maracas Bay, Hart (K, TRIN 6754); Piarcó Savanna, 25.3.1893 (TRIN 5275); Arouca, 3.5.1905, Dannouse s.n. (TRIN); Arima, Dannouse s.n. (TRIN); road to Aripo Savanna, 18.4.1932, Hunter (TRIN 12639); Cunaripa, via Cumuto road, 2.12.1931, Broadway 7800 (BM); near Cumuto railway, 17.2.1921, Broadway s.n. (TRIN); Long Stretch forest, 2.11.1947, Baker (TRIN 14138), 9.2.1948, Baker (TRIN 14160); Guaico, 2.9.1916, Freeman (TRIN 8403); Matura, milepost 11 $\frac{3}{4}$, 1.9.1925, Williams, Freeman & Cheesman (TRIN 11325); Chaguanas, Alexander (TRIN 4401), (TRIN 4697); near La Brea, Purdie 78 (K).

Tobago: without locality, Anderson s.n. in 1787 (BM); in woods, Great Dog River, Eggers 5834 (K).

Guadeloupe to Grenada, Trinidad and Tobago, the Guianas and coastal Brazil to Ceara.

FAMILY 3. MONIMIACEAE

BY D. PHILCOX

Shrubs or trees; stems, young leaves and flowers usually pubescent with simple or stellate hairs; leaves simple, opposite; flowers actinomorphic, unisexual, monoecious or dioecious, receptacle without appendages except in the case of some genera with a velum, this being a membrane covering the stamens or ovaries and having a central opening; perianth lobes usually 4; stamens few to many inserted on the receptacle; 1-ovulate ovaries numerous either inserted on or enclosed by the receptacle, where inserted on the receptacle fruits drupaceous and when enclosed the pseudo-fruits opening with slits.

Stamens more than 20; anthers opening with slits; leaves denticulate; indumentum simple-hairy; flowers dioecious; velum lacking 1. *Mollinedia*

Stamens 6-12; anthers opening by valves; leaves entire; indumentum stellate-pubescent; flowers monoecious; velum present 2. *Siparuna*

1. MOLLINEDIA Ruiz & Pavon

Mollinedia Ruiz & Pav., *Prodr.* 83 (1794)

Shrubs or small trees; inflorescence terminal or axillary of 3-flowered dichasia occurring singly or in racemes; flowers usually small, dioecious; receptacle of male flowers usually pilose, perianth lobes 4, stamens (10-)20-50, anthers opening with slit; receptacle of female flowers as for the male, perianth lobes 4, connate, deciduous, ovaries 6-40, styles short; ovule pendulous, anatropous; drupes sessile or short stalked.

Mollinedia laurina Tul. in *Ann. Sc. Nat.* Ser. 4, 3: 43 (1855); Tul. in *Fl. Bras.* 4, 1: 318 (1857); Griseb., *Fl. Brit. W. Ind.* 9 (1859); A. DC. in DC., *Prodr.* 16, 2: 664 (1868); Perkins & Gilg in Engl., *Pflanzenreich* 4: 44 (1901); Pulle, *Enum.* 182 (1906); Petter in Pulle, *Fl. Surin.* 2: 108 (1932)

Shrubs or small trees 4–10m tall; young stems silky becoming glabrous with age; leaves lanceolate to ovate-lanceolate, 6–18cm long, 2–7 cm wide, apex acute to short-acuminate, base acute to subobtuse, pubescent on both surfaces with adpressed simple hairs when young, glabrescent, laxly denticulate particularly in the upper half, pinnately nerved with 4–7 pairs of lateral nerves, petiolate; petiole 4–8(–10)mm long; simple dichasia 1.5–3cm long, racemose inflorescences 2.5–4.5cm long, densely pubescent; male flowers yellow, very fragrant, up to 6mm diam., receptacle densely silky-pubescent, 2 exterior perianth lobes entire, obtuse, narrower than the 2 interior; stamens about 25–30 opening with a horse-shoe shaped split; fruit ovoid, dark brown, glabrous, about 18mm long, 10mm diam. (from dried herbarium specimens).

Trinidad: without locality, Fendler 426 (BM, K), 437 (K); Hort. Trin. in 1892 (TRIN 5816); Maraval, Crueger s.n. (K), (TRIN 915), Broadway (TRIN 7823), 17.6.1928, Williams (K, TRIN 11981); near Caroni River, Eggers 1433 (K); Maracas trail, Baker (K, TRIN 14653), (TRIN 14715); Maracas, near the falls, 12.3.1926, Broadway 6018 (BM, K), 3.4.1893, Broadway (TRIN 5354), 6.11.1924, Williams & Freeman (TRIN 10831); 25.2.1927, Broadway 6572 (BM), 29.11.1931, Broadway 7806 (BM), 12.7.1973, Philcox & Wood 7461 (K, TRIN); road to Maracas Bay *via* Santa Cruz, 18.4.1926, Broadway 6125 (BM, K), 6126 (BM, K); summit of Morne Bleu, 30.4.1926, Freeman and Williams (TRIN 11560); Arima, 3.4.1904, Dannouse s.n. (TRIN); Arima Valley road, North side of crest, alt. 500m, 24.3.1957, Cowan & Simmonds 1184 (TRIN 16107); Arima to Blanchisseuse road, 11–14 mileposts, 24.3.1922, Williams 10106 (TRIN); Heights of Aripo, 16.3.1921, Britton & Freeman 2342 (K, TRIN), 16.3.1921, Britton (TRIN 9546), 10–26.1.1922, Broadway (K, TRIN 9870), (K, TRIN 9871); between Arima and Mt Tamana, 3.4.1828, Purdie 20 (K); near Tamana, 20.5.1868, Finlay (TRIN 2991); Valencia Road Forest, 8.6.1949, Simmonds (TRIN 14364).

Tobago: summit of Pigeon Hill, 22.10.1925, Freeman and Williams (TRIN 11362), (K 11361).

Trinidad, Tobago, the Guianas and Venezuela (Paria).

2. SIPARUNA Aublet

Siparuna Aubl., *Pl. Guian.* 2: 864, t. 333 (1775)

Shrubs or trees; inflorescence axillary, racemose or cymose; flowers usually monoecious; receptacle of male flowers globose or cupulate, hairy, perianth lobes 4-6, velum present or lacking; stamens 1-60*, anthers opening with valves; receptacle of female flowers as in the male, perianth lobes 4, occasionally connate; ovaries 2-20 usually with connate styles; ovule basal, erect; pseudo-fruits opening with 4-6 slits.

Siparuna guianensis Aubl., *Pl. Guian.* 2: 865, t. 333 (1775);
A. DC. in DC., *Prodr.* 16, 2: 654 (1868); Petter in Pulle,
Fl. Surin. 2: 110 (1932)

Citriosma guianensis (Aubl.) Tul. in *Arch. Mus. Paris* 8: 361
(1855-56); Tul. in *Fl. Bras.* 4, 1: 306 (1857)

Shrubs or small trees to 10m tall; young stems yellow stellate-pubescent becoming glabrous with age; leaves ovate, lanceolate to oblong, 8-20cm long, 3.5-8cm wide, entire, apex short-acuminate or obtuse, base acute or obtuse, pinnately nerved with 8-11 pairs of lateral nerves, stellate pubescent on both surfaces when young, particularly beneath, becoming subglabrous, petiolate; petiole 5-7(-10)mm long; inflorescence usually monoecious, cymose or racemose, densely stellate-pubescent; receptacle of male flowers calyciform, subpubescent, perianth lobes 4-6, small, obtuse, velum sometimes lacking, stamens 10-12, unequal, exserted; receptacle of female flowers globose to ovoid, perianth lobes small, obtuse, velum small, conical; styles connate, column exserted; fruits globose, about 7-8mm diam., reddish-purplish when mature.

Trinidad: without locality, Fendler 497 (BM, K); St Ann's, 9.5.1930, Broadway 7556 (K), 21.6.1846, Finlay (TRIN 2634), Purdie 7 (K); Diego Martin, Cameron Valley, 2.7.1907, Nurse s.n. (TRIN); Mt St Benedict, 2.7.1939, Cheesman & Baker 240, 245 (TRIN 13392); Arima, Alexander s.n. (TRIN), Crueger (TRIN 913),

*Throughout the genus, not Trinidad.

Dannouse s.n. (TRIN); Arima Valley to La Laja road, alt. 360m, 12.6.1973, Philcox & Wood 7083 (K, TRIN); Aripo district, 21.3.1922, Broadway (TRIN 10483); about 2.8 miles along Heights of Aripo road, alt. 105m, 6.7.1973, Philcox, Kalloo & Jurawan 7379 (K, TRIN); forest border, Valencia, 25.2.1920, Britton, Britton & Hazen 1021 (K); 1 mile along Valencia to Cumaca road, alt. 60m, 15.6.1973, Philcox & Kalloo 7124 (K, TRIN); Cumuto, near the Aripo savanna, 28.11.1932, Broadway s.n. (BM, K); Long Stretch, Sangre Grande, 12.7.1925, Williams & Freeman (TRIN 11271); Mora Forest, 29.5.1924, Riley 207 (BM); Guayaguayare, 15.6.1949, Baker (K, TRIN 14305).

Trinidad, Panama, Venezuela, Brazil, Bolivia, Colombia and the Guianas.