

THE PIPERACEAE OF TRINIDAD AND TOBAGO

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RESUMEN

Las Piperáceas de Trinidad y Tobago. — El autor hace un estudio crítico de las Piperáceas de las Islas de Trinidad y Tobago en base de las importantes colecciones de D. Lockhart, W. Purdie, H. Cruieger y A. Fendler, como asimismo de las colecciones de N. L. Britton y colaboradores depositadas en New York Botanical Garden y de las colecciones más recientes realizadas por W. E. Broadway, N. Y. Sandwith y otros.

Agrega claves de géneros y de especies, citas del material estudiado y de su distribución geográfica.

The islands of Trinidad and Tobago, with a combined area of 1868 square miles, lie near the Venezuelan coast of South America. Floristically, their affinities are more South American than Carribean. More than 2000 species of phanerogams are known to occur on the islands with an estimated endemism of about 7 %.

Study of the flora and the establishment of a government herbarium was begun over 125 years ago. Important collections were made last century, especially by D. Lockhart, W. Purdie, H. Cruieger, and A. Fendler. About 30 years ago N. L. Britton and his associates at the New York Botanical Garden made extensive collections in the islands and, more recently, also W. E. Broadway, N. Y. Sandwith, and others.

Casimir de Candolle in 1902 presented, in Urban's *Symbolae Antillanae*, all species of Piperaceae then known from the islands. Trelease & Yuncker in their *Piperaceae of Northern South America* in 1950 cited a number of collections from the islands when the species also occurred on the adjacent Venezuelan mainland.

In the present paper an attempt is made to include all species of the family now known from the islands. Important synonyms also

are indicated together with the citation of publications which treat the various species. The study is based on collections at the Government Herbarium in Trinidad, Kew, U. S. National Museum, New York Botanical Garden, University of Illinois, together with a small number from Arnold Arboretum and from Paris. Thanks are expressed to those in charge of the collections for the loan of their specimens.

Family PIPERACEAE

Herbs, shrubs, or small trees; leaves commonly alternate, sometimes opposite or verticillate, entire; stipules none or adnate to the petiole; flowers minute, usually green, perfect or unisexual, in spikes or racemes, these pedunculate, terminal or opposite the leaves, sometimes axillary, solitary or several on a common peduncle, the flowers usually densely crowded when spicate, sometimes annulately or spirally arranged, in the axils of usually peltate, sessile or stipitate, sometimes adnate or concave bracts; perianth none; stamens mostly 2-6, the filaments free, the anthers terminal, erect, 2-celled; ovary sessile or stipitate, 1-celled, 1-ovulate; fruit drupaceous, very small.

KEY TO THE GENERA

- Stigmas 2-5 (mostly 3-4); floral bracts various, often more or less pubescent or fimbriate; plants woody or rarely subherbaceous
- Inflorescence leaf-opposed, solitary
- Fruit sessile; inflorescence spicate 1. *Piper*
- Fruit stalked; inflorescence racemose 2. *Ottonia*
- Inflorescence axillary; spikes several, on a common peduncle 3. *Pothomorphe*
- Stigmas 1 (may occasionally be cleft to simulate 2); stamens 2; floral bracts mostly round-peltate, glabrous (rarely ciliate); plants herbaceous and comparatively small 4. *Peperomia*

1. PIPER Linnaeus

Mostly shrubs or small trees, often nodose; leaves alternate, simple, mostly entire, frequently inequilateral at the base with one side attached to the petiole several millimeters lower than the other, often scabrous, glabrous or hairy, sometimes rugose or bullate, palmately nerved or more commonly pinnately nerved from the lower

half or two-thirds of the blade, or throughout; petiole commonly more or less vaginate-grooved, at least at the base and often to the blade, the margins of the groove often wing-margined; spikes leaf-opposed; flowers sessile, perfect (American species) or imperfect (Old World species); usually densely congested in the axils of variously shaped bracts, the bracts sometimes glabrous but more commonly pilose or fimbriate; stamens 2-5; ovary 1; stigmas 2-4, rounded to filiform, sessile or on a short and thick to elongated and slender style; fruit variously shaped, one-seeded, drupe-like with a thin pericarp and somewhat hardened endocarp.

Trinidad vernacular for *Piper* is « Candle bush » or « Candle tree ».

KEY TO THE SPECIES

- Flowers imperfect (introduced species); main lateral nerves arising off the midrib within the lowermost one-fourth of the blade
- Spikes mostly 2 cm. or less long 1. *P. sarmentosum*
- Spikes mostly much longer
- Leaf base commonly acute or subacute; fruit rounded 2. *P. nigrum*
- Leaf base obtuse to cordate
- Leaves 10-17 cm. long, nerves arising within the lower one-fourth of the blade 3. *P. Belle*
- Leaves 7-8 cm. long, subpalmate within the lowermost 5 cm. 4. *P. Christyi*
- Flowers perfect (native species)
- Fruit stylose
- Leaves pinnately nerved from the lower half; nerves pubescent beneath 5. *P. crassinervium*
- Leaves pinnately nerved to the upper one-fourth or throughout; nerves glabrous beneath 25. *P. saltum*
- Fruit not stylose
- Leaves palmately nerved
- Leaves 5-7 (rarely 9)-nerved
- Leaves mostly less than 15 cm. long; rachis puberulent
- Twigs and leaves glabrous 6. *P. Amalago*
- Twigs and leaves usually somewhat puberulent 7. *P. medium*
- Leaves mostly more than 15 cm. long 8. *P. reticulatum*
- Leaves 9-13-nerved 9. *P. marginatum*
- Leaves pinnately nerved
- Leaves 30-45 cm. long, base cordate 10. *P. caracasum*
- Leaves mostly less than 20 cm. long
- Principal branches of the midrib arising from below the upper one-third

- Spikes regularly strongly sickle-shaped; peduncle longer than the petiole; leaves scabrous 11. *P. aduncum*
 Spikes not regularly sickle-shaped
- Leaves glabrous
 Fruit depressed at apex; leaves glandular-dotted 14. *P. glabrescens* var. *caparonum*
 Fruit convex at apex 12. *P. aequale*
- Leaves hairy, at least on the nerves beneath
 Leaves coarsely scabrous; twigs hispid; fruit papillate 13. *P. hispidum*
 Leaves only slightly scabrous at most; twigs not hispid
 Nerves beneath densely minutely puberulent, fruit depressed-globose 14. *P. glabrescens*
 Nerves not as above
 Leaves glabrous above; petiole vaginate to the middle or above
 Twigs glabrous; leaves 4-5 cm. wide 15. *P. mornicola*
 Twigs crisply sub-silky; leaves 6-9 cm. wide 16. *P. Hostmannianum*
 Leaves at least sparsely hairy above; petiole vaginate toward the base
 Fruit somewhat hairy at the apex; leaves somewhat rhomboidal 17. *P. dilatatum*
 Fruit glabrous; leaves lanceolate or lance-elliptic. 18. *P. guayranum*
- Midrib more or less equally branched to the upper one-fourth or throughout
 Leaves somewhat bullulate and glossy above in age; fruit hairy at apex
 Leaves 3.5-4.5 cm. wide; spikes 5 cm. or less long. 19. *P. rugosum*
 Leaves 5-7.5 cm. wide; spikes up to 10 cm. long 20. *P. Kegelianum*
- Leaves scarcely bullulate (may be rugescent in age)
 Leaves strongly unequal at the base with one side much shorter at the petiole; petiole vaginate-winged to the blade
 Leaves more or less puberulent beneath, apex abruptly acute 21. *P. tuberculatum*
 Leaves glabrous, apex acuminate 22. *P. arboreum*
 Leaves subequilateral at the base (one side may be 1-2 mm. shorter)
 Fruit puberulent at the apex; leaf base cordulate 23. *P. demeraranum*

Fruit glabrous

Leaves pubescent, at least along the nerves beneath 24. *P. Hartii*

Leaves glabrous

Mature fruit apex depressed; leaves glandular-dotted 25. *P. saltuum*

Mature fruit apex convex

12. *P. aequale*

1. ***P. sarmentosum*** Roxb. *Fl. Ind.* 1: 160. 1820: Miq. *Syst. Pip.* 242. 1843- as *Chavica sarmentosa*: C.DC. in DC. *Prodr.* 16¹: 352. 1869.

A scandent, at most puberulent, dioecious shrub; leaves round-cordate below, elliptic upward, somewhat abruptly short-acuminate, base acute to cordate, 4-10 cm. wide \times 10 cm. long, 5- or 7-plinerved from near the base; petiole 1-3 or on the lower leaves up to 6 cm. long, not winged-vaginate; spikes ellipsoid-oblong, 5 mm. thick \times 15 mm. long; peduncle about 1 cm. long; bracts round-peltate; fruit sunken in the glabrous rachis.

Tobago: cultivated, W. E. Broadway s. n. (Paris).

Old World tropics; cultivated (and escaping?) in Tobago, Jamaica, etc.

2. ***P. nigrum*** L. *Sp. Pl.* 1: 28. 1753: Miq. *Syst. Pip.* 308. 1844: C.DC. in DC. *Prodr.* 16¹: 363. 1869: C.DC. in Urb. *Symb. Ant.* 3: 214. 1902: Trel. & Yun. *Pip. Northern S. Amer.* 81. 1850.

Glabrous vine; leaves elliptic to round-ovate, commonly 5-9 cm. wide \times 8-13 cm. long, apex sharply acuminate, base inequilaterally subacute to acute, 7-nerved from the lower one-fourth; petiole up to 3 cm. long, vaginate to near the middle; spikes monoecious to dioecious, as long as the leaves, pendulous; peduncle about as long as the petiole; bracts concave, adnate to the rachis with margin and apex free; fruit sessile, not crowded, globose, peppery.

Source of commercial pepper. Cultivated in the Old World tropics and generally in botanical gardens.

3. ***P. Betle*** L. *Sp. Pl.* 1: 28. 1753: Miq. *Syst. Pip.* 228. 1843 — as *Chavica Betle*: C.DC. in DC. *Prodr.* 16¹: 359. 1869: C.DC. in Urb. *Symb. Ant.* 3: 213. 1902: Trel. & Yun. *Pip. Northern S. Amer.* 81. 1950.

A glabrous, dioecious vine; leaves oblong-ovate to ovate, the lower round-ovate, mostly 5-10 cm. wide \times 10-17 cm. long, apex acute to sharp-acuminate, base obtuse to rounded, or cordate, 7-9-nerved from the lower fourth; petioles 1-2 or on lower leaves up to 4 cm. long, pistillate spikes up to 8 cm. long, staminate spikes somewhat longer; peduncles 1.5-3.5 cm. long; bracts sessile, glabrous, peltate; fruit embedded in the rachis.

Botanical Garden, Trinidad. Widely cultivated in the tropics.

4. **P. Christyi** C.DC. in Urb. *Symb. Ant.* 3: 215. 1902.

An essentially glabrous, scarcely scandent shrub; leaves ovate or round-ovate, apex abruptly short-acuminate, base rounded, or the broader leaves shallowly and openly cordate, 4-7 cm. wide \times 7-8.5 cm. long, subpalmately 7-nerved, the innermost pair of nerves united to the midrib in the lowermost 5 mm.; petiole 1-2 cm. long, vaginate to the middle or above, minutely hirtellous, also slightly so at the nodes; spikes dioecious (?), opposite the leaves, the staminate slender, up to 13 cm. long, sometimes proliferaceous with numerous, short, lateral, branch spikes; peduncle slender, 1.5 cm. long; bracts elongated, obovate, somewhat imbricated, glabrous; fruit unknown.

Trinidad: Hort. Trin., Herb. Trin. 5009 (Kew; NY); 5528 (NY; Trin.), 5663 (Trin.).

Cultivated in the botanic garden. Doubtless from the Old World tropics.

5. **P. crassinervium** H. B. K. *Nov. Gen. & Sp.* 1: 48. 1815: Miq. in Mart. *Fl. Bras.* 4¹: 31. pl. 5. 1852: Trel. & Yun. *Pip. Northern S. Amer.* 43. f. 34. 1950.

P. exserens C.DC. in DC. *Prodr.* 16¹: 261. 1869.

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

Shrub or small tree, 2-5 m. tall, twigs glabrate or evanescently pubescent when young; leaves ovate, 5-13 cm. wide \times 13-20 cm. long, or occasionally up to 15 \times 25 cm., apex acuminate, base rounded, or in large leaves shallowly cordate, acute at the petiole, pinnately nerved from the lower half, the nerves 4 or 5 on each side, prominent and appressed-puberulent to subvillous beneath; petiole about 1.5 cm. long, vaginate-winged to the middle or above; spikes up to 12 or 15 cm. long but mostly shorter; peduncle stout, up to

1.5 cm. long; bracts round- or triangular-subpeltate, marginally fringed; fruit rounded; stigmas 3, recurved, on a short style.

Trinidad: Saut d'Eau, Herb. Trin. 6704 a (Trin.); Maraval, W. E. Broadway 7829 (NY.; Trin.); Arouca, J. Dannouse in 1905 (Trin.); Macuripe, Herb. Trin. 6693 (Trin.); Carapichaima, J. Dannouse in 1903 (Trin.).

Trinidad, Colombia, Ecuador, Peru and Brazil.

5 a. **P. crassinervium** var. **tocotanum** (C.DC.) Yun. in *Ann. Mo. Bot. Gard.* 37: 8. 1950: Trel. & Yun. *Pip. Northern S. Amer.* 45. 1950.

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

Piper ovale C.DC. in *Journ. of Bot.* 4: 166. 1866.

Leaves oblong-elliptic to elliptic-ovate, base subequilateral, glabrous or the nerves beneath sparsely minutely puberulent.

Trinidad: without locality, A. Fendler 668 (Kew).

Trinidad, Venezuela and Colombia.

6. **P. Amalago** L. *Sp. Pl.* 1: 29. 1753.

A glabrate shrub or small tree; leaves lance- to ovate-elliptic, 2-6 cm. wide \times 5-11 cm. long apex acuminate, base suboblique, acute or somewhat rounded, sometimes more or less minutely revolute-subauriculate at the very base, palmately 5-7-nerved; petiole 5-10 mm. long, vaginate near the base, mostly glabrous; spikes 6-7 cm. long; peduncle 1-1.5 cm. long; rachis puberulent; bracts obovate-concave, dorsally slightly papillate-pilose; fruit ovoid, glabrous; stigmas 3-4, rounded, sessile.

Trinidad: Hort. Trin., Herb. Trin. 6011 (Trin.).

West Indies.

This species is closely related to, if not the same as, *P. medium* Jacq. It also very closely approximates *P. unguiculatum* R. & P. from Peru which is now cultivated in botanical gardens. The specimen cited above appears to be typical of the glabrous *P. Amalago*. It grew in the botanical garden but is labelled «indigenous».

7. *P. medium* Jacq. *Icon. Pl. Rar.* 1: 2. 1781: Yun. in *Ann. Mo. Bot. Gard.* 37: 19. 1950: Trel. & Yun. *Pip. Northern S. Amer.* 68. f. 60. 1960.

P. plantagineum Lam. *Illustr. Ency. Meth.* 1: 80. 1791.
P. Sieberi C.DC. in DC. *Prodr.* 16: 248. 1869.

A shrub; stems and branches glabrous or commonly slightly puberulent when young; leaves lance- to round-elliptic or subrhombically obovate, 3.5-6 cm. wide \times 8-11 cm. long, or rarely occasional leaves up to 10 \times 14 cm., apex acuminate, base sometimes oblique, acute or somewhat rounded, more or less auriculate at the very base or lowermost leaves somewhat cordate, glabrous or commonly puberulent along the nerves beneath, palmately 5- to 7-nerved, reticulate-nervulose, drying membranous and minutely pellucid-dotted; petiole 5-10 mm. long, vaginate near the base, puberulent; spikes 4-5 mm. thick \times 6-7 cm. long, peduncle 10-15 mm. long, puberulent or glabrous; rachis puberulent; bracts obovate-concave, somewhat papillate-pilose; fruit ovoid, minutely papillate or glabrous; stigmas 3 or 4, rounded, sessile.

Trinidad: San Fernando, W. E. Broadway 6085 (Kew).

West Indies, Central and South America.

There is some question whether the West Indian *P. Amalago* L. and *P. medium* Jacq., which is common on the mainland, are not to be considered as one strongly variable species. They have been treated as the same by Fawcett & Rendle in their *Flora of Jamaica* (1914), and also by Britton & Wilson in their *Scientific Survey of Porto Rico and Virgin Islands* (1924). On the other hand, they are maintained as distinct by de Candolle in Urban's *Symb. Ant.* (1902) and in his *Clavis* (1923); Trelease in *Fedde's Repert.* (1926); and Stehle in *Bull. Agric. Martinique* (1940). No attempt is made here to untangle the rather extensive and involved synonymy.

8. *P. reticulatum* L. *Sp. Pl.* 1: 29. 1753: Miq. *Syst. Pip.* 365. 1844 — as *Enckea reticulata*: Griseb. *Fl. B. W. I.* 169. 1864 — as *Enckea smilacifolia*: C.DC. in *Urb. Symb. Ant.* 3: 170. 1902: Yun. in *Ann. Mo. Bot. Gard.* 37: 15. 1950: Trel. & Yun. *Pip. Northern S. Amer.* 71. f. 63. 1950.

Piper smilacifolium H. B. K. *Nov. Gen. & Sp.* 1: 56. 1815.
Piper latum H. B. K. *Nov. Gen. & Sp.* 1: 57. 1815.

A glabrous shrub or small tree, up to 6 m. tall; branches slender, nodose; leaves elliptic, elliptic-ovate, or broadly ovate, 8-20 cm. wide \times 15-28 cm. long, apex acuminate, base more or less acute, truncate, or in large leaves shallowly cordate, palmately 5-9-nerved, the nerves prominent beneath, reticulate-veiny with rather prominent cross-connecting nervules; petiole 1-2 cm. long, vaginate near the base, glabrous or obscurely puberulent-papillate; spikes up to 12 or 15 cm. long; peduncle 1-2 cm. long; rachis ridges membranous, fimbriate; bracts peltately dilated upward, pedicel and margin bearded; fruit obovoid, somewhat tetragonous, papillate above with a smooth, apical, disc-like area; stigmas 3 or 4, rounded.

Trinidad: without locality, B. de Schack s. n. (Kew); Herb. Trin. 2626 (Trin.; US); St. Ann's, H. Crueger, Herb. Trin. 906 (Trin.); s. n. (Kew); woods near Mt. Pleasant, Herb. Trin. 524 (Trin.).

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

9. *P. marginatum* Jacq. *Icon. Pl. Rar.* 2: 2. pl. 215. 1786: Miq. *Syst. Pip.* 380. 1844 — as *Artanthe caudata*: Griseb. *Fl. B. W. I.* 170. 1864 — as *Schilleria caudata*: C.DC. in DC. *Prodr.* 16: 245. 1869: C.DC. in *Urb. Symb. Ant.* 3: 171. 1902: Brit. & Wils. *Sci. Surv. Porto Rico & Virg. Isls.* 5: 222. 1924: Yun. in *Ann. Mo. Bot. Gard.* 37: 15. 1950: Trel. & Yun. *Pip. Northern S. Amer.* 73. 1950.

Piper decumanum Aubl. *Pl. Guian.* 1: 21. 1775 — not L. 1760, nor Miller 1763.

Piper caudatum Vahl, *Eclog. Am.* 1: 3. 1796.

Piper alare Ham. *Prod. Pl. Ind. Occ.* 3. 1825.

A shrub or small tree, glabrous except for slight ciliation and submarginal silkiness of the leaves; leaves round-ovate, 7-15 cm. wide \times 10-20 cm. long, or rarely somewhat larger, apex acuminate, base openly cordate, palmately 9-11-nerved; petiole up to 4 cm. or more long, vaginate-winged to near the blade; spikes up to 13 cm. long, or occasionally somewhat longer; peduncle about 1-1.5 cm. long; bracts triangular-peltate, marginally fringed; fruit obpyramidal, angular; stigmas 3, linear, sessile.

Trinidad: without locality, Herb. Trin. 4600 (Trin.); D. Lockhart (Kew).

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

- 9 a. **P. marginatum** var. **anisatum** (H. B. K.) C.D.C. in Urb. *Symb. Ant.* 3: 172. 1902: Yun. in *Ann. Mo. Bot. Gard.* 37: 17. 1950: Trel. & Yun. *Pip. Northern S. Amer.* 75. 1950.

Piper anisatum H. B. K. *Nov. Gen. & Sp.* 1: 58. 1815.

The nerves on both sides of the leaf more or less puberulent, at least above.

Trinidad: without locality D. Lockhart (Kew); Herb. Trin. 2627 (Trin.); Hort. Trin. J. H. Hart 6008 (NY; Trin.); Moruga, N. L. Britton & W. E. Broadway 2427 (US); ICTA, St. Augustine, N. W. Simmonds 125 (Trin.).

With the species.

- 9 b. **P. marginatum** var. **catalpaefolium** (H. B. K.) C.D.C. in DC. *Prodr.* 16¹: 246. 1869: Miq. *Versl. en Medel. Kon. Nederl. Inst.* «1842». 197. 1843: C.D.C. in Urb. *Symb. Ant.* 3: 172. 1902: Yun. in *Ann. Mo. Bot. Gard.* 37: 17. 1950: Trel. & Yun. *Pip. Northern S. Amer.* 76. 1950.

Piper catalpaefolium H. B. K. *Nov. Gen. & Sp.* 1: 58. 1815.

Leaves appressed pilose above and pubescent along the nerves beneath.

Trinidad: without locality, Herb. Trin. 907 (Trin.); A. Fendler 672 (Kew); s. n. (Kew); W. E. Broadway in 1932 (AA); 6803 (ILL); Aripo Road, W. E. Broadway 6442 (ILL; NY; US); J. E. B. Warming s. n. (ILL; US); N. L. Britton & T. E. Hazen 139 (NY; US); Heights of Aripo, W. E. Broadway 9864 (Trin.); Arima-Blanchisseuse Road, mile 3, N. W. Simmonds 157 (Trin.); Arima J. Dannouse in 1904 (Trin.); St. Ann's, N. Tredholm in 1906 (Trin.); Hort. Trin., Herb. Trin. 5530 (Trin.); Lopinot Valley, N. W. Simmonds 193 (Trin.); ICTA, St. Augustine, N. W. Simmonds 245 (Trin.).

With the species.

- 9 c. **P. marginatum** var. **clausum** Yun. in *Ann. Mo. Bot. Gard.* 37: 17. 1950.

Leaves suborbicular, base deeply cordate with narrow sinus, the lobes approximated or overlapping.

Trinidad: without locality, B. deSchack s. n. (Kew) — this is a sterile specimen but it agrees well in leaf characters with those seen from Panama.

Trinidad and Panama.

10. **P. caracasenum** Bredem. in Link, *Jahrb.* 13: 61. 1820: Miq. *Syst. Pip.* 398. 1844 — as *Artanthe caracasana*: C.D.C. in DC. *Prodr.* 16¹: 306. 1869; C.D.C. in Urb. *Symb. Ant.* 3: 173. 1902: Trel. & Yun. *Pip. Northern S. Amer.* 158. f. 137. 1950.

Small tree, 3-7 m. tall; young growth matted rusty-hairy; leaves subelliptic-ovate, 17-26 cm. wide × 30-45 cm. long, apex gradually acute, base inequilaterally cordate, sinus narrowly open, or closed, the longer lobe equaling or longer than the petiole, pinnately nerved from below the upper third, the nerves 6-8 on each side, with shorter intermediates, brown-subvillous beneath, glabrous above; petiole 4-6 cm. long, vaginate-winged to the blade; spikes up to 50 cm. long; peduncle 3-4 cm. long; bracts round-subpeltate, or slightly concave-cucullate, subglabrate; fruit obovoid; stigmas 3, sessile.

Tobago: Cremorne River, H. F. A. Eggers 5860 (AA); Englishman's Bay, W. E. Broadway s. n. (US); Summit of Pigeon Hill, W. G. Freeman & R. O. Williams, Herb. Trin. 11358 (Trin.).

Tobago, Venezuela and Colombia.

11. **P. aduncum** L. *Sp. Pl.* 1: 29. 1753: Miq. *Syst. Pip.* 449. 1844 — as *Artanthe adunca*: Griseb. *Fl. B. W. I.* 171. 1864 — as *Artanthe adunca*: C.D.C. in DC. *Prodr.* 16¹: 285. 1869: C.D.C. in Urb. *Symb. Ant.* 3: 84. 1902: Britt. & Wils. *Sci. Surv. Porto Rico & Virg. Isls.* 5: 221. 1924: Yun. in *Ann. Mo. Bot. Gard.* 37: 30. 1950: Trel. & Yun. *Pip. Northern S. Amer.* 247. f. 215. 1950.

P. celtidifolium H. B. K. *Nov. Gen. & Sp.* 1: 50. 1815.

Shrub or small tree, up to 7 m. tall, nodose, young growth sparsely pubescent glabrescent; leaves lanceolate to subelliptic, 4-8 or scarcely 10 cm. wide × 12-24 cm. long, apex sharp-acuminate, base inequilaterally rounded or cordulate, one side commonly 3-4 mm. shorter at the petiole, pinnately nerved to the middle or upper third, the nerves 6-8 on each side, scabrous, commonly somewhat tardily rugulose, pubescent on both sides; petiole 3-8 plus 3-4 mm. long,



vaginate at the base; spikes up to 15 cm. long, falcately curved or hooked; peduncle 8-20 mm. long; bracts triangular- or round-subpeltate, marginally fringed; fruit small, obovoid; stigmas 3, sessile.

Trinidad: without locality, Herb. Trin. 5577 (Trin.); D. Lockhart s. n. (Kew); Maracas, road to the bay, W. E. Broadway s. n. (US); 11th mile of Arima-Blanchisseuse Road, N. W. Simmonds 151 (Trin.); 3rd mile, N. W. Simmonds 160 (Trin.); Aripo Road end, N. W. Simmonds 97 (Trin.); San Fernando, Herb. Trin. 2612 (Trin.; US); Blue Basin, Herb. Trin. 5367 (Trin.).

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

11 a. *P. aduncum* var. *brachyarthrum* (Trel.) Yun. in *Ann. Mo. Bot. Gard.* 37: 32. 1950: Trel. & Yun. *Pip. Northern S. Amer.* 249. 1950.

P. aduncum f. b C.D.C. in Urb. *Symb. Ant.* 3: 185. 1902 — in part.

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

Stems densely pubescent-villous when young; leaves moderately to densely softvillous beneath.

Trinidad: without locality, D. Lockhart 215 (Kew); s. n. (Kew); A. Fendler 666 (Kew); H. Crueger in 1847 (Kew); Belmont Road, T. W. Carr 5552 (Trin.); Maraval, Herb. Trin. 908 (Trin.).

Tobago: H. F. A. Eggers 5612 (AA; Kew; US).

With the species.

There is considerable variation in the degree of pubescence ranging from subglabrous to densely villous. From field observations, it has been noted that differences in pubescence are sometimes correlated with differences in altitude at which the specimens grow. This is one of the commonest and most wide-spread species of *Piper*.

12. *P. aequale* Vahl, *Eclog. Am.* 1: 4. pl. 3. 1796: Miq. *Syst. Pip.* 511. 1844 — as *Artanthe aequalis*: Griseb. *Fl. B. W. I.* 172. 1864 — as *Artanthe aequalis*: C.D.C. in Urb. *Symb. Ant.* 3: 203. 1902: Yun. in *Ann. Mo. Bot. Gard.* 37: 47. 1950: Trel. & Yun. in *Pip. Northern S. Amer.* 217. f. 180. 1950.

A glabrous, nodose shrub, 1-3 m. tall; leaves elongated-elliptic, lance-elliptic, or ovate, 3.5-7 or sometimes 9 cm. wide \times 12-17 cm.

long; apex attenuately and commonly bluntly acuminate, base equilaterally acute, or obtusish, or occasionally with one side 1-3 mm. shorter at the petiole, pinnately nerved to the upper third or nearly throughout, nerves 4-6 on each side, with fainter intermediates, commonly with 2 or 3 pairs approximated near the base and one or two pairs above the middle of the blade; petiole mostly 1-1.5 cm. long or somewhat longer on larger lower leaves, mostly vaginate near the base or occasionally to the middle or above; spikes up to 10 cm. long; peduncle commonly about as long as the petiole; bracts rounded to triangular-subpeltate, loosely fringed; fruit small, obpyramidal-trigonal, convex at the top, stigmas slender; 3, sessile.

Trinidad: without locality, Herb. Trin. 1557 (Trin.; US); 2616 (NY; Trin.); 1077 (Trin.); St. Ann's, H. Crueger in 1846 (Kew); Mount Tamana, N. L. Britton, E. G. Britton & T. E. Hazen 1942 (NY; US); W. G. Freeman 9064 (Trin.); Maracas Waterfall, N. L. Britton, T. E. Hazen & W. Mendelson 1640 (NY; US); W. E. Broadway 5804 (AA); 6571 (AA); Tabaquite, J. Dannouse in 1899 (NY; Trin.); Santa Cruz, Providence Mountains, W. E. Broadway 2772 (NY); Plum Road, R. O. Williams & W. G. Freeman, Herb. Trin. 11987 (Trin.); Siparia Quarry, N. L. Britton & W. E. Broadway 2817 (NY); Siparia Woods, W. E. Broadway in 1921 (Trin.).

Tobago: summit of Pigeon Hill, W. G. Freeman & R. O. Williams, Herb. Trin. 11370 (Trin.); Cremorne River, H. F. A. Eggers 5851 (AA); Great Dog River, H. F. A. Eggers 5779 (AA; Kew); near Caledonia, W. E. Broadway 4645 (US).

West Indies, Panama, and Northern South America.

12 a. *P. aequale* var. *ovalifolium* C.D.C. in DC. *Prodr.* 16¹: 511. 1869.

Leaves broadly elliptic-ovate, 4-6 cm. wide \times 8-10 cm. long, apex acuminate, base rounded; petiole about 5 mm. long; spikes 4 cm. long; peduncle 1 cm. long.

Trinidad: without locality, F. W. Sieber 192 (Geneva; Paris).
Trinidad.

12 b. *P. aequale* var. *Schackii* (Miq.) Yun. n. comb.

Artanthe Schackii Miq. in *Hook. Lond. Journ. Bot.* 4: 448. 1845.

Piper Schackii C.D.C. in DC. *Prodr.* 16¹: 288. 1869: C.D.C. in Urb. *Symb. Ant.* 3: 183. 1902.

Leaves from elliptic-subovate to broadly ovate, 6-12 cm. wide \times 15-22 cm. long. apex sharply acuminate, base equilaterally acute on narrower leaves to rounded obtuse or subcordate on wider leaves but abruptly acute at the petiole, drying rather thin and membranous, dull, pale glandular-dotted beneath; petiole 1-2 cm. or occasionally as much as 4 or 5 cm. long.

Trinidad: without locality, B. deSchack s. n. (Kew); D. Lockhart s. n. (Kew); between Piedra Blanca and Naranja N. W. Simmonds 138 (Trin.); Cedros, Stephen Trace, W. E. Broadway 8537 (Trin.); near Blue Basin, L. A. W. Riley 219 (Kew; NY); Cascade, Diego Martin, W. E. Broadway 9269 (AA; Kew).

Tobago: Trafalgar River, R. O. Williams & E. E. Cheesman, Herb. Trin. 11685 (Trin.); 11752 (Trin.); Caledonia, N. Y. Sandwith 1724 (Kew; NY).

Trinidad and Tobago.

Variety *Schackii* appears to be intermediate in leaf size between *P. aequale* and *P. grande* of South America. Some of the specimens cited under the variety exhibit considerable variation in leaf size with some leaves closely resembling those of *P. aequale*. On the evidence shown by the available material, it does not seem advisable to maintain *P. Schackii* completely distinct from *P. aequale*.

13. ***P. hispidum*** Sw. *Prodr. Veg. Ind. Occ.* 15. 1788: *Miq. Syst. Pip.* 446. 1844 — as *Artanthe hirsuta*: Griseb. *Fl. B. W. I.* 171. 1864 — as *Artanthe scabra*: C.DC. in *DC. Prodr.* 16¹: 276. 1869: C.DC. in *Urb. Symb. Ant.* 3: 187. 1902: Britt. & Wils. *Sci. Surv. Porto Rico & Virg. Isls.* 5: 221. 1924: Yun. in *Ann. Mo. Bot. Gard.* 37: 32, f. 7. 1950; Trel. & Yun. *Pip. Northern S. Amer.* 271. 1950.

Shrub, up to 8 m. or more tall; young internodes mostly hispid, or infrequently glabrescent, hairs erect to reflexed; leaves elliptic or elliptic-ovate, 4-11 cm. wide \times 11-19 cm. long. apex acuminate, base obliquely rounded, or somewhat narrowed downward and acute, one side 2-5 mm. shorter at the petiole, pinnately nerved from the lower half, the nerves 5 or 6 on each side, slightly rugescent in age, lepidote-scabrous and more or less hirtellous along the nerves above, the nerves beneath hispid-hirsute, mostly glandular-dotted; petiole 5-10 plus 2-5 mm. long, vaginate at the base; spikes up to 14 cm. long; peduncle rather stout, scarcely 1 cm. long; bracts triangular-

subpeltate, marginally fringed; fruit rather small, oblong-subobpyramidal-trigonous, laterally compressed, papillate-puberulent at the apex; stigmas 3, small, sessile.

Trinidad: without locality, B. deSchack s. n. (Kew); Herb. Trin. 6385 (Trin.); junction of the Blanchisseuse and Las Lapas Roads, W. E. Broadway 5983 (AA); Caura Trail, 1/2 mile west of 11th mile of the Arima-Blanchisseuse Road, N. W. Simmonds 86 (Trin.); 4 miles east of Arima, N. L. Britton, T. E. Hazen & W. Mendelson 604 (NY; US); Mount Tamana, N. L. Britton, E. G. Britton & T. E. Hazen 1930 (NY; US); Tamana, W. E. Broadway 7983 (AA); J. S. Beard 139 (AA); W. G. Freeman 9068 (Trin.); Maracas Waterfall, N. L. Britton, T. E. Hazen & W. Mendelson 1642 (NY; US); Maracas valley near the falls, N. W. Simmonds 103 (Trin.); Cascade Diego Martin, W. E. Broadway 9275 (AA); Maraval, H. Crueger s. n. (Kew); W. E. Broadway 7827 (Trin.); Macuripe, Herb. Trin. 6693 (Trin.); Arouca, J. Dannouse in 1902 (Trin.); Fort George, Herb. Trin. 909 (Trin.); 2622 (Trin.); Aripo Road head, N. W. Simmonds 96 (Trin.); 99 (Trin.); south edge of Tumpuna Reserve near Four Roads, N. W. Simmonds 250 (Trin.); near the Oropuche Cave, N. W. Simmonds 267 (Trin.); Siparia Quarry, N. L. Britton & W. E. Broadway 2810 (NY).

Tobago: Englishman's Bay W. E. Broadway 4701 (US); Great Dog River, H. F. A. Eggers 5762 (Kew).

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

- 13 a. ***P. hispidum* var. *obliquum*** Trel. & Yun. *Pip. Northern S. Amer.* 272. f. 236. 1950.

Leaves obliquely ovate with one side at the base much larger, rounded, obtuse, or cordate.

Trinidad: Oropuche Road via Valencia W. E. Broadway 6133 (AA; US); Tamana forests, W. E. Broadway 9347 (AA).

Trinidad and northern South America.

- 13 b. ***P. hispidum* var. *magnifolium*** C.DC. in *DC. Prodr.* 16¹: 276. 1869; C.DC. in *Urb. Symb. Ant.* 3: 188. 1902: Trel. & Yun. *Pip. Northern S. Amer.* 274. 1950.

Leaves mostly 8-10 cm. wide \times 20-25 cm. long.

Trinidad: Maquiripe, N. L. Britton, E. G. Britton & T. E. Hazen 208 (US); Arima, Blanchisseuse Road, L. A. W. Riley 86 (Kew).

With the species,

14. *P. glabrescens* (Miq.) C.DC. in DC. *Prodr.* 16¹: 271. 1869: C.DC. in Urb. *Symb. Ant.* 3: 149. 1902 — as *P. macrophyllum*: Trel. & Yun. *Pip. Northern S. Amer.* 215. f. 178. 1950.

Piper macrophyllum H. B. K. *Nov. Gen. & Sp.* 1: 46. 1815 — not Swartz 1788.

Artanthe glabrescens Miq. in *Hook. Lond. Journ. Bot.* 4: 461. 1845.

P. Treleasanum Britt. & Wils. *Sci. Surv. Porto Rico & Virgin Isls.* 5: 222. 1924.

Shrub; upper internodes glabrate; leaves broadly elliptic, 7-14 cm. wide \times 15-23 cm. long, apex acuminate, base acute, obtuse, or large leaves cordulate, essentially equilateral at the petiole, pinnately nerved from somewhat more than the lower half, the nerves 5 or 6 on each side, glabrous except for the minutely crisp-puberulent glabrescent nerves beneath, glandular-dotted; petiole 1-2 cm. long, vaginate to the blade; spikes 5-6 cm. long; peduncle 1-15 cm. long; bracts obovate-truncate with cucullate inflexed apex, glabrous or papillate; fruit compact, depressed-globose or subtetragonous; stigmas 3, sessile in an apical depression.

Trinidad: without locality, W. E. Broadway 720 (AA); Herb. Trin. 911 (US); 5028 (Trin.); Cumuto forests, 1-1/2 mile south of railway station, W. E. Broadway 7073 (Kew; US); Heights of Aripo, W. E. Broadway 9868 (NY; Trin.; US); caves trail by the river by last stream in forest, N. W. Simmonds 227 (Trin.); Mount Tamana, N. L. Britton, E. G. Britton & T. E. Hazen 1939 (US); W. E. Broadway 7891 (AA); W. G. Freeman 9068 a (US); W. E. Broadway 7891 (AA); W. G. Freeman 9068 a (Trin.); Maquiripe, E. G. Britton, D. Coker & W. R. Rowland 206 (NY; US); Shark River forests road to Matelot, W. E. Broadway 9032 (AA; Kew): near Maracas Bay, W. E. Broadway 6065 (AA); Siparia W. E. Broadway in 1921 (Trin.); Siparia, Finlay Herb. Trin. 2618 (Trin.); Oropuche Cave, N. W. Simmonds 264 (Trin.); St. Joseph, J. Dannouse in 1904 (Trin.) Herb. Trin. 911 a (Trin.); Laventille, T. W. Carr 5551 (Trin.) Maraval, Herb. Trin. 911 b (Trin.); H. Cruieger s. n. (Kew); Cumuto W. E. Broadway in 1925 (Kew); Irois Forest, R. O. Williams, Herb. Trin. 11921 (Trin.); Beausejour, Cedros, C. King 7111 (NY; Trin.);

Moruga, Lumy Trace, W. E. Broadway 7577 (Trin.); Arima, J. Dannouse in 1905 (Trin.); Siparia Quarry, N. L. Britton & W. E. Broadway 2819 (NY).

West Indies and northeastern South America.

- 14 a. *P. glabrescens* var. *caparonum* (C.DC) Yun. in *Bull. Torr. Bot. Club* 75: 287. 1948: Trel. & Yun. *Pip. Northern S. Amer.* 216. 1950.

P. caparonum C. DC. in Urb. *Symb. Ant.* 7: 183. 1912.

Differs from the species in having somewhat more elliptic and more attenuately acuminate leaves, nerves glabrous beneath, and bracts becoming densely brown-pilose.

Trinidad: Caparo, W. E. Broadway 2553 (NY; Trin.).

Trinidad, British Guiana, and Venezuela.

De Candolle obviously named this entity from the type locality, Caparo. The spelling of the name, therefore, preferably should be *caparoanum*.

15. *P. mornicola* C.DC. in Urb. *Symb. Ant.* 3: 194. 1902.

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

Small tree, 2-3 m. tall; internodes rather short and slender, glabrous; leaves lance- or elliptic-oblong, apex acuminate, base rounded, one side 1-2 mm. longer at the petiole and cordulate, 4-5 cm. wide \times 12-15 cm. long, pinnately nerved from below the middle, the nerves 4 or 5 on each side, glabrous above, appressed pubescent on the nerves beneath; petiole about 8 plus 2 mm. long, appressed pubescent or glabrescent, vaginate-winged to the blade; spikes 4-5 cm. or more long; peduncle 2-4 mm. long, as represented, glabrate; bracts rounded-triangular-subpeltate, marginally fringed; fruit oblong; stigmas 3, slender, sessile.

Tobago: Great Dog River, H. F. A. Eggers 5843 (Kew).

Tobago.

This species is closely related to *P. guayranum* from which it differs because of its glabrous stems, shorter peduncles, and especially the fully vaginate petioles.

16. **P. Hostmanniana** (Miq.) C.DC. in DC. *Prodr.* 16¹: 287. 1869: Trel. & Yun. *Pip. Northern S. Amer.* 306. f. 272. 1950.

Artanthe Hostmanniana Miq. in *Hook. Lond. Journ. Bot.* 4: 465. 1845.

Shrub, generally crisply sub-silky except for the upper leaf surface; leaves elliptic, lance-elliptic, or ovate, 6-9 cm. wide × 13-18 cm. long, or occasionally somewhat larger, apex acuminate, inequilaterally obliquely obtuse-based, or subtruncate-cordate, one side 3-5 mm. shorter at the petiole and sometimes acute, pinnately nerved from below the upper third, the nerves 4-6 on each side, with intermediates, drying chartaceous and somewhat glossy; petiole rather stout, mostly 5-10 mm. long, vaginate to the middle or above; spikes up to 10-12 cm. long; peduncle 1 cm. long, bracts triangular or round-subpeltate, marginally fringed; fruit oblong, angular, somewhat exerted, glabrate or slightly puberulent at the apex; stigmas 3, sessile.

Trinidad: Chaguanas, W. E. Broadway 3755 (Trin.); Mt. Harris, A. H. G. Alston 5168 (Kew).

Trinidad and northeastern South America.

17. **P. dilatatum** L. C. Rich. in *Act. Soc. Hist. Nat. Par.* 105. 1792: Miq. *Syst. Pip.* 472. 1844; C.DC. in DC. *Prodr.* 16¹: 314. 1869: C.DC. in Urb. *Symb. Ant.* 3: 197. 1902: Trel. & Yun. *Pip. Northern S. Amer.* 276. f. 238. 1950.

Piper corylifolium Kunth in *Linnaea* 13: 699. 1839.

Artanthe ulmifolia Miq. *Syst. Pip.* 472. 1844.

Shrub 2-3 m. tall; upper internodes sparsely to moderately crisp-pubescent, subvillous, or sometimes glabrous; leaves broadly rhombic-elliptic-subovate, occasional leaves subobovate, mostly 7-9 cm. wide × 15-20 cm. long, apex acuminate, base inequilaterally rounded, obtuse, or cordulate with one side 3-4 mm. shorter at the petiole, pinnately nerved from below the middle, the nerves mostly 5-6 on each side, somewhat scabrous, or smooth, sparsely pubescent on both sides; petiole 5-10 plus 3-4 mm. long, or rarely up to 3 cm., vaginate at the base; spikes 7-8 cm. long; peduncle 5-10 mm. long; bracts round or triangular-subpeltate, marginally fringed; fruit obpyramidal-trigonal, loosely and somewhat sparsely puberulent at the top; stigmas 3, sessile.

Trinidad: without locality, F. W. Sieber 18 (Kew); Cumuto Road, Aripo River side, near N° 6 bridge, W. E. Broadway 7627 (Kew); San Fernando Hill, W. E. Broadway 6412 [sterile] (Kew); Five Rivers, W. E. Broadway 6804 (Kew); mile 3 of Arima-Blanchisseuse Road, N. W. Simmonds 159 (Trin.).

West Indies and northeastern South America.

The comparatively large, 5-sided leaves and puberulent fruits distinguish this species.

18. **P. guayranum** C.DC. in *Journ. de Bot.* 4: 397. 1890: Trel. & Yun. *Pip. Northern S. Amer.* 301. f. 267. 1950.

P. Seitzii C.DC. in Urb. *Symb. Ant.* 3: 181. 1902.

P. trinitatis C.DC. in Urb. *Symb. Ant.* 3: 197. 1902.

P. tobagoanum C.DC. in Urb. *Symb. Ant.* 3: 199. 1902.

P. angustilimbium C.DC. in Urb. *Symb. Ant.* 3: 201. 1902.

P. margaritanum C.DC. in *Proc. Amer. Acad. Arts. & Sci.* 40: 685. 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. Genève* 21: 234. 1920.

A slender-twigged, subnodose shrub, mostly 2-5 m. tall; young internodes transiently pubescent; leaves lanceolate or lance-elliptic, 3-6 or 7 cm. wide × 10-17 or 20 cm. long, apex long-acuminate, commonly subfalcate, base usually somewhat rounded, acute, obtuse, or subcordulate, one side 2-3 mm. shorter at the petiole, pinnately nerved from below the middle, the nerves 4 or 5 on each side, the lowermost nerves short and slender, smooth or subscabrous above and sparsely appressed hairy on both sides, especially on the nerves beneath, or occasional leaves glabrate above, glandular-dotted beneath; petiole 5-10 plus 2-3 mm. long, vaginate at the base; spikes up to 7 cm. long; peduncle about 1 cm. long, rather slender; bracts round or triangular-subpeltate, marginally fringed; fruit obpyramidal-trigonal; stigmas 3, small, sessile.

Trinidad: without locality, Herb. Trin. 2625 (US); San Fernando Hill, W. E. Broadway 6086 (US); 6415 (US); Heights of Aripo, W. E. Broadway in 1922 (Trin.); 9867 (NY; Trin.; US); Siparia Quarry, W. E. Broadway 2679 (US); N. L. Britton & W. E. Broadway (NY; US); Monos Island, N. L. Britton & W. Mendelson 573 (NY; US); Penal Rock Road, N. L. Britton, T. E. Hazen & W. Mendelson 1083 (NY; US); Matchepoorie, N. L. Britton & E. G. Britton 2218

(NY); Hort. Trin., J. H. Hart 6010 (NY; Trin.); Moruga, sea shore, W. E. Broadway 7596 (Trin.); Blue Basin, W. E. Broadway 5187 (Trin.); Caura Road, near 1-3/4 mile post, W. E. Broadway 6954 (Kew); Blanchisseuse Road, near 9-1/4 mile post, W. E. Broadway 5508 (Kew); junction with Las Lapas Road, W. E. Broadway 6607 (Kew); Maracas Bay, N. W. Simmonds 197 (Trin.).

Tobago: Cradley, H. F. A. Eggers 5673 (AA; Kew); Montpellier, H. F. A. Eggers 5753 (US); W. E. Broadway 3104 (US); 4849 (Trin.; US); District of Les Coteaux, W. E. Broadway 9059 (AA; Kew; US); Putney Hill, H. F. A. Eggers 5843 (AA; Kew); French Hill, N. Y. Sandwith 1691 (Kew).

Trinidad, Tobago, and Venezuela.

18 a. ***P. guayranum*** var. ***humilior*** (C.DC.) Trel. & Yun. *Pip. Northern S. Amer.* 302. 1950.

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

Leaves mostly 7-9 cm. wide \times 15-20 cm. long, or rarely slightly longer, mostly 5-nerved on each side with the lowermost nerves slender and short.

Trinidad: Aripo River, W. E. Broadway 7627 (NY; US); road to Matelot, W. E. Broadway 9033 (AA; Kew); Blanchisseuse, W. E. Broadway 9150 (AA); Siparia Woods, W. E. Broadway in 1921 (Trin.); Maquiripe, coastal hillsides, N. L. Britton, E. G. Britton & T. E. Hazen 208 (NY); Aripo Road, near 5 mile post, W. E. Broadway 6566 (NY); Brigand Hill, A. H. G. Alston 5163 (Kew).

Trinidad and northern Venezuela.

Only slight and variable differences have been noted between the specimens representing the several species listed as synonyms. It is believed that they represent slightly varying forms of the same species, as here treated.

19. ***P. rugosum*** Lam. *Illustr.* 1: 81. 1791: Miq. *Syst. Pip.* 489. 1844: Griseb. *Fl. B. W. I.* 171. 1864 — as *Artanthe rugosa*: C.DC. in *DC. Prodr.* 16¹: 373. 1869: C.DC. in *Urb. Symb. Ant.* 3: 181. 1902 — as *P. citrifolium* Lam., in part.

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

P. maraccasense Trel. in *Bull. Torr. Bot. Club* 53: 467. 1926.

Shrub; upper internodes rather densely brown-pubescent; leaves elliptic-suboblong, apex gradually acute or subacuminate, base essentially equilateral, acute or somewhat rounded and cordulate, 3.5-4.5 cm. wide \times 8-11 cm. long, pinnately nerved to the upper third, or nearly throughout, the nerves rather prominent, 5-7 on each side, with conspicuous cross-connecting anastomosing nervules, glabrous, somewhat glossy and bullulate above, the nerves beneath appressed-pubescent, drying firm, brown; petiole 5-8 mm. long, densely brown-hairy, vaginate at the base; spikes up to 5 cm. long; peduncle 5 mm. long, brown hairy; bracts triangular-subpeltate, marginally fringed; fruit exserted, angular, hairy toward the top, apex depressed; stigmas 3, sessile.

Trinidad: Maracas, Herb. Trin. 2613 (NY; Trin.); Mora Forest, Toco Road, E. E. Cheesman & Baker, Herb. Trin. 13847 (Trin.); Arima, H. Crueger in 1845 (Kew); Herb. Trin. 912 (Trin.).

West Indies and (?) northern South America.

This species is closely related to *P. Kegelianum* C.DC. of northern South America but differs because of its smaller leaves, shorter spikes, and less hairy fruit.

20. ***P. Kegelianum*** (Miq.) C.DC. in *DC. Prodr.* 16¹: 372. 1869: Trel. & Yun. *Pip. Northern S. Amer.* 388. f. 348. 1950.

Artanthe Kegeliana Miq. in *Linnaea* 22: 77. 1849.

Shrub; upper internodes slender, rather densely brown-hirtellous; leaves elliptic-subovate or subobovate, 5-7.5 cm. wide \times 11-17 cm. long, apex short acuminate, base subequilaterally obtusish to acute, glabrous and somewhat glossy above, hirtellous beneath especially along the nerves, subglose in age, pinnately nerved throughout, the nerves 6-8 on each side, with shorter intermediates, submarginally loop-connected, glandular-dotted beneath; petiole scant 5 mm. long, brown-hirtellous, vaginate to above the middle; spikes 2-3 mm. thick \times 7-10 cm. long; peduncle scant 5 mm. long, hirtellous; bracts triangular-subpeltate, rather densely fringed; fruit compressed-obovoid, apex truncate or depressed; hirtellous; stigmas sessile.

Trinidad: without locality, A. Fendler 665 (Kew).

Trinidad, Guiana, and Brazil. Not common.

21. ***P. tuberculatum*** Jacq. *Icon. Pl. Rar.* 2: 2. pl. 211. 1786: Miq. *Syst. Pip.* 497. 1844 — as *Artanthe tuberculata*: Griseb. *Fl. B.*

W. I. 171. 1864: C.DC in DC. *Prodr.* 16¹: 265. 1869: C.DC. in Urb. *Symb. Ant.* 3: 177. 1902: Yun. in *Ann. Mo. Bot. Gard.* 37: 63. 1950: Trel. & Yun. *Pip. Northern S. Amer.* 364. f. 330. 1950.

P. macrourum H. B. K. *Nov. Gen. & Sp.* 1: 54. 1815.

P. nutans Opiz in Presl *Rel. Haenk.* 1: 156. pl. 28. f. 2. 1830.

Artanthe decurrens Miq. *Syst. Pip.* 402. 1844.

A very nodose shrub or small tree, sometimes up to 6 or 7 m. tall; twigs slightly puberulent when young; leaves subelliptic, subovate, or more commonly elliptic-oblong, 3-6 or sometimes up to 8 cm. or more wide \times 7-16 cm. long, apex rather abruptly short-acute, base rounded, commonly somewhat lobed, one side 5-10 mm. shorter at the petiole, the shorter side often slightly wider, pinnately nerved to near the apex, the nerves 8-10 on each side, with intermediates, mostly somewhat puberulent at least beneath; petiole 5-10 plus 5-10 mm. long, vaginate-winged with the wings acutely protracted at the blade; spikes up to 12 cm. long; peduncles mostly 1-1.5 cm. long; bracts triangular-subpeltate, marginally fringed; fruit somewhat tetragonous; stigmas 3, sessile.

Trinidad: without locality, B. deSchack s. n. (Kew); D. Lockhart s. n. (Kew); F. W. Sieber 17 (Kew); A. Fendler 670 (Kew); Hort. Trin., W. E. Broadway 1308 (Kew; Trin.; US); 2235 (NY; Trin.; US); 3520 (Trin.); Herb. Trin. 2624 (Trin.; US); 5576 (Trin.); 6009 (Trin.); Caroni, along Caroni River, W. E. Broadway s. n. (US); N. L. Britton & T. E. Hazen 52 (NY; US); St. Joseph, N. L. Britton s. n. (US); 992 (NY; US) Woodbrook, W. E. Broadway 6272 (AA; US); River Estate, Diego Martin, N. W. Simmonds 120 (Trin.); ICTA, St. Augustine, N. W. Simmonds 124 (Trin.); Tunapuna, W. E. Broadway 7318 (Trin.); Belmont, Herb. Trin. s. n. (Trin.); Port-of-Spain, L. A. W. Riley 61 (Kew; NY); near Siparia, N. W. Simmonds 289 (Trin.); Four Roads, L. A. W. Riley 211 (Kew; NY); Santa Cruz, hb. O. Kuntze 643 (NY); Erin, W. E. Broadway in 1920 (NY); St. Augustine, E. A. Friend 91 (NY).

Tobago: without locality, H. F. A. Eggers 558 (AA); 5692 (AA); Bacolet, W. E. Broadway s. n. (US); Charlotteville, R. D. Williams, Herb. Trin. 11092 (Trin.); Queen's River, G. L. Meyer 12 (Kew).

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

22. ***P. arboreum*** Aubl. *Pl. Guian.* 1: 23. 1775: Miq. *Syst. Pip.* 493. 1844 — as *Artanthe geniculata*: Griseb. *Fl. B. W. I.* 172. 1864 — as *Artanthe geniculata*: C.DC. in DC. *Prodr.* 16¹: 266. 1869 — as *P. geniculatum*: C.DC. in Urb. *Symb. Ant.* 3: 178. 1902 — as *P. geniculatum*: Yun. in *Ann. Mo. Bot. Gard.* 37: 63. 1950: Trel. & Yun. *Pip. Northern S. Amer.* 371. f. 334. 1950.

P. macrophyllum Sw. *Prodr. Veg. Ind. Occ.* 15. 1788.

P. geniculatum Sw. *Prodr. Veg. Ind. Occ.* 15. 1788.

A glabrous, somewhat nodose shrub or small tree, mostly 2-7 m. tall; leaves elliptic-ovate, oblong, or lance-elliptic, mostly 6-11 cm. wide \times 10-25 cm. long, apex abruptly short-acuminate, rounded at base or narrow leaves acute, one side 5-10 mm. shorter at the petiole, pinnately nerved throughout, the nerves 8-10 on each side, with intermediates; petiole 5-10 plus 5-10 mm. long, vaginate-winged with the wings protracted at the blade; spikes up to 15 cm. long; peduncle 5-10 cm. long; bracts triangular-subpeltate, marginally fringed; fruit strongly flattened laterally; stigmas 3, sessile.

Trinidad: without locality, D. Lockhart s. n. (Kew); W. E. Broadway 7325 (NY); Maracas, W. E. Broadway 9865 (NY; Trin.); Maraval, W. E. Broadway 7828 (Trin.); Arima, J. Dannouse in 1903 (Trin.).

West Indies, northern South America, and Panama.

- 22 a. ***P. arboreum*** var. ***falcifolium*** (Trel.) Yun. in *Ann. Mo. Bot. Gard.* 37: 65. 1950: Trel. & Yun. *Pip. Northern S. Amer.* 374. f. 335. 1950.

P. falcifolium Trel. in *Contr. U. S. Nat. Herb.* 26: 25. 1927.

Leaves oblong-lanceolate, 3-5 cm. wide \times 15-20 cm. long, apex acuminate, base inequilateral, rounded, obtuse or acute.

Trinidad: without locality, B. deSchack s. n. (Kew); A. Fendler 671 (Kew); Herb. Trin. 910 (Trin.); W. E. Broadway 6645 (US); Valencia Road, La Seiva, W. E. Broadway 7646 (NY; US); Road to O'Meara Savanna, Herb. Trin. 2617 (Trin. US); Aripo District, W. E. Broadway in 1922 (Trin.); Maraval, H. Cruieger, Herb. Trin. 2623 (NY; Trin.); Arima-Blanchisseuse Road. L. A. W. Riley 87 (Kew; NY).

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

23. **P. demeraranum** (Miq.) C.DC. in DC. *Prodr.* 16¹: 298. 1869: Trel. & Yun. *Pip. Northern S. Amer.* 379. f. 341. 1950.

Artanthe demerarana Miq. in Hook. *Lond. Journ. Bot.* 4: 464. 1845.

P. esmeraldanum Trel. in *Bull. Torr. Bot. Club* 58: 353. 1931.

P. cauranum Trel. in Ll. Williams, *Explor. Bot. Guyana, Venezuelana* 175. 1942. [Servic. bot. Minist. Agr. & Cria].

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

Shrub, mostly 1-2 m. tall; twigs more or less crisp-pubescent, hairs somewhat reflexed; leaves elliptic, elliptic-lanceolate, or oblanceolate, 5-9 wide \times 15-20 cm. long, apex acuminate, base inequilaterally cordulate with the slightly larger auriculate lower lobe mostly covering the petiole, pinnately nerved throughout, the nerves 8-11 on each side, with shorter intermediates, glabrate above, crisp-pubescent beneath; petiole 3-5 mm. long, vaginate to the blade; spikes 2.5-4.5 cm. long; peduncle 3-7 mm. long; bracts obovate-concave-cucullate, dorsally puberulent; fruit globose, puberulent at the depressed apex; stigmas elongated, sessile.

Trinidad: without locality, W. E. Broadway 6149 (AA; US); Herb. Trin. 2619 (Trin.); A. Fendler 664 (Kew); Arima-Blanchisseuse Road, to mile 11, R. E. D. Baker, Herb. Trin. 13850 (Trin.); Arima waterwhed, L. A. W. Riley 87 bis (Kew); forest, Plum Road, W. G. Freeman & R. O. Williams, Herb. Trin. 11988 (NY; Trin.); Morne Bleu, W. G. Freeman & R. O. Williams, Herb. Trin. 11557 (NY; Trin.); 11965 (Trin.); Chaguanas, Herb. Trin. s. n. (Trin.); W. E. Broadway 3758 (Trin.); Heights of Aripo, W. E. Broadway 9866 (NY; Trin.); N. L. Britton & W. G. Freeman 2353 (NY); Ortoire River, Guayaguayare Road, N. L. Britton & W. Nowell 2526 (NY); Cumuto, 7327 (NY); near 5-1/2 mile post, W. E. Broadway 6915 (Kew); southern Guanapo Road, Government forests, 9-1/2 mile post, W. E. Broadway 6234 (Kew).

Trinidad and northern South America.

24. **P. Hartii** C.DC. in Urb. *Symb. Ant.* 3: 164. 1902.

Shrub; upper internodes somewhat hirsute; leaves elliptic or ovate-elliptic, apex short and abruptly acute, base subequilaterally rounded, obtuse or commonly cordulate, 5-7 cm. wide \times 8-14 cm. long, pinnately nerved to the upper one-fourth or throughout, the

rather prominent nerves 6 to 8 on each side, with shorter intermediates, glabrous, somewhat glossy and rugescent above in age, villous beneath; petiole up to 1.5 cm. long, rather stout, vaginate-winged to the blade, villous; spikes up to 3 cm. long, mucronate; peduncle 5-8 mm. long, stout, hirsute; bracts concave-inflexed, glabrous above, the broad pedicel dorsally bearded; fruit ovoid with a slightly pointed apex; stigmas 3, sessile.

Trinidad: Hort. Trinidad, Herb. Trin. 5574 (NY; Trin.); 6012 (Trin.); W. E. Broadway 5662 (NY; Trin.).

Trinidad. Reported only from the botanic garden but said to be indigenous.

25. **P. saltuum** C.DC. in Urb. *Symb. Ant.* 7: 185. 1912: Trel. & Yun. *Pip. Northern S. Amer.* 401. 1950.

A glabrous, nodose shrub, about 2 m. tall; leaves lanceolate or lance-ovate, 5-7 cm. wide \times 14-21 cm. long, apex long-acuminate, base subequilaterally acute, pinnately nerved to the upper one-fourth or nearly throughout, the nerves some 6-8 on each side, finely glandular-granular beneath; petiole scant 10 mm. long; spikes up to 9 cm. long but mostly somewhat shorter; peduncle slender, about 1 cm. long; bracts triangular-subpeltate, ciliolate; ovary pointed, substylose; fruit subglobose-trigonous, apex depressed when mature, glandular-granular; stigmas 3, small, sessile.

Trinidad: without locality, A. Fendler 667 (Kew); Caparo, W. E. Broadway 3207 (Geneva); Government forest, W. E. Broadway 6141 (AA; US); 9177 (AA; Kew); 9179 (AA); Brazil, N. L. Britton, E. G. Britton & W. G. Freeman 2135 (NY; US); Tucuche, N. L. Britton, T. E. Hazen & W. Mendelson 1260 (NY; US); W. G. Freeman 9037 (Trin.); Herb. Trin. 523 a (Trin.); 523 b (Trin.); N. L. Britton & W. G. Freeman 9086 a (Trin.); Aripo, A. Alexander 6940 (Trin.); Heights of Aripo, W. E. Broadway 9869 (NY; Trin.); Maracas, Herb. Trin. 2620 (Trin.); Mt. Harris, A. H. G. Alston 5167 (Kew); Maraval, J. H. Hart 5529 (Trin.); Morne Bleu, N. L. Britton, W. G. Freeman & L. H. Bailey 2262 (NY); summit of Morne Bleu, W. G. Freeman & R. O. Williams, Herb. Trin. 11555 (Trin.); Arimar, J. Dan-nouse in 1903 (Trin.); Arima-Blanchisseuse Road, mile 11, N. W. Simmonds 154 (Trin.); Ortoire River, Guayaguayare Road, N. L. Britton, W. G. Freeman & W. Nowell 2529 (NY); Oropuche local road, via Valencia, 2-1/2 mile post, W. E. Broadway 6231 (Kew);

Blanchisseuse Road, top of Morne Bleu, W. E. Broadway 6206 (Kew).

Trinidad and Colombia.

2. OTTONIA Sprengel

Shrubs; leaves alternate; inflorescence racemose, leaf-opposed; flowers pedicellate; stamens 4-6; ovary somewhat angled; stigmas 3-4, sessile; fruit a small, somewhat flask-shaped drupe.

1. *O. ovata* (Vahl) Trel. in *Proc. Amer. Phil. Soc.* **75**: 711. 1935: Trel & Yun. *Pip. Northern S. Amer.* **420**. f. 379. 1950.

Piper ovatum Vahl, *Eclog. Am.* **1**: 3. pl. 1. 1796: C.DC. in DC. *Prodr.* **16**¹: 253. 1869: C.DC. in Urb. *Symb. Ant.* **3**: 174. 1902.

Ottonia Vahlia Kunth in *Linnaea* **13**: 585. 1839: Miq. *Syst. Pip.* **542**. 1844: Griseb. *Fl. B. W. I.* **172**. 1864.

A nodose, glabrous shrub; upper internodes finely striate; leaves ovate-elliptic, 5-9 cm. wide × 15-18 cm. long, apex acuminate, base slightly inequilateral, cordulate, pinnately nerved throughout, the nerves 8-10 on each side, with intermediates, submarginally loop-connected; petiole 5-10 mm. long, vaginate at the base; racemes 5-6 cm. long; peduncle about 10 mm. long; bracts concave, glabrous; pedicels slender, about as long as the ovary; stamens attached at the base of the ovary; fruit ovoid, acute, sulcate-tetragonous, papillate or smooth; stigmas 4, short.

Trinidad: without location, J. Ryan s. n. (Copenhagen); W. Purdie s. n. (Kew); A. Fendler 669 (Kew); Guayaguayare Road, R. C. Marshall, Herb. Trin. 12442 (NY; Trin.); Tucker Valley, Herb. Trin. 5713 (Trin.); Chaguanas, G. F. Bourne, Herb. Trin. 4334 (NY; Trin.); W. E. Broadway 3743 (Trin.); Maracas, Herb. Trin. 2614 (Trin.); H. Crueger s. n. (Kew); Arima, W. Purdie in 1848 (Kew); J. Dannouse in 1903 (Trin.); in 1905 (Trin.); southern central road, Cedros, W. E. Broadway 7165 (Trin.); St. Ann's Hills, Herb. Trin. 2615 (Trin.).

Trinidad and the adjacent coastal region of Venezuela.

It is reported as a remedy for snake bite. The smelling powers of a dog are said to be improved if its head is bathed in a decoction of the leaves and leaves soaked in rum or lime juice are thrust up its nostrils.

3. POTHOMORPHE Miquel

Shrubs or large herbs; leaves large, broad, cordate at the base, or peltate; inflorescence of long, slender, densely flowered spikes umbellately arranged on axillary peduncles; flowers sessile, similar to those of *Piper*.

KEY TO THE SPECIES

Leaves peltate
Leaves scarcely peltate

1. *P. peltata*
2. *P. umbellata*

1. *P. peltata* (L.) Miq. *Comm. Phyt.* **37**. 1840: Miq. *Syst. Pip.* **203**. 1843: Griseb. *Fl. B. W. I.* **169**. 1864: Britt. & Wils. *Sci. Surv. Porto Rico & Virg. Isls.* **5**: 229. 1924: Yun. in *Ann. Mo. Bot. Gard.* **37**: 72. f. 16. 1950: Trel. & Yun. *Pip. Northern S. Amer.* **435**. f. 394. 1950.

Piper peltatum L. *Sp. Pl.* **1**: 30. 1753. sphalm. *pelatum*: C.DC. in DC. *Prodr.* **16**¹: 331. 1869: C.DC. in Urb. *Symb. Ant.* **3**: 208. 1902.

Piper pruinatum H. B. K. *Nov. Gen. & Sp.* **1**: 59. 1815.

Piper speciosum H. B. K. *Nov. Gen. & Sp.* **1**: 59. 1815.

Peperomia peltata A. Dietr. *Sp. Pl.* **1**: 142. 1831.

Heckeria peltata Kunth in *Linnaea* **13**: 565. 1839.

Shrub or subshrub, commonly 1-2 m. tall; internodes glabrous; leaves rounded-cordate, 16 cm. wide × 18 cm. long or up to twice as large, apex acute, peltate 1/4 to 1/3 the length above the base, mostly with 13-15 nerves radiating from the base of the petiole and with one or two pairs arising of the midrib below the middle, glabrous except for short-hairy, submarginal nerves, yellow-glandular-pellucid-dotted; petiole up to 20 cm. long, vaginate-winged in the lower half; spikes several, up to 10 cm. long, umbellate on axillary stalks up to 7 cm. long; peduncles 10-15 mm. long; bracts triangular-peltate, marginally fringed; fruit small, obpyramidal-trigonous.

Trinidad: without locality, Herb. Trin. 2628 (Trin.); Herb. Trin. 5531 (Trin.); A. Fendler 673 (Trin.); Naranjo River Valley, Maracas, N. W. Simmonds 137 (Trin.); Manzanilla, W. E. Broadway s. n. (NY); French Hill, N. Y. Sandwith 1692 (Kew); Tucuche, W. G. Freeman & R. O. Williams, Herb. Trin. 10081 (Trin.); Laventille, Alexander, Herb. Trin. 4547 (Trin.); Cunupia, W. E. Broadway in 1918 (Trin.; US); in 1932 (AA; Trin.); Heights of St. Anne, N. L. Britton, T. E. Hazen & W. Mendelson 660 (NY; Trin.; US).

Tobago: without locality, H. F. A. Eggers 5719 (Trin.; US); Providence main road, R. O. Williams, Herb. Trin. 11798 (Trin.); French Hill, N. Y. Sandwith 1692 (Kew).

Trinidad and Tobago and throughout the West Indies and on the mainland from western Mexico to the Guianas, Brazil, Ecuador and Bolivia.

2. *P. umbellata* (L.) Miq. *Comm. Phyt.* 36. 1840: Miq. *Syst. Pip.* 208. 1843: Griseb. *Fl. B. W. I.* 169. 1864: Britt. & Wils. *Sci. Surv. Porto Rico & Virg. Isls.* 5: 229. 1924, as *P. pellata*: Yun. in *Ann. Mo. Bot. Gard.* 37: 74. 1950: Trel. & Yun. *Pip. Northern S. Amer.* 438. 1950.

Piper umbellatum L. *Sp. Pl.* 1: 30. 1753: C.DC. in DC. *Prodr.* 16: 332. 1869: C.DC. in Urb. *Symb. Ant.* 3: 210. 1902.

Peperomia umbellata Kunth, *Synops. Pl. Aequin.* 1: 124. 1822. fide *Index Kewensis*.

Heckeria umbellata Kunth in *Linnaea* 13: 569. 1839.

Pothomorphe sidaefolia Miq. *Comm. Phyt.* 36. 1840.

Soft-wooded shrub, commonly about 2-3 m. tall; upper internodes densely and usually lineately rusty-villous to soft-puberulent; leaves round-ovate or reniform, 20-25 cm. wide \times 18-20 cm. long or sometimes much larger, apex subacute, base openly cordate, about 15-nerved the midrib with 2 or 3 branches within the lowermost 3 cm. puberulent or pubescent on both sides at least along the nerves, yellow-glandular-pellucid-dotted; petiole up to 20 cm. long, vaginate-winged to about the middle; spikes several, up to 10 cm. long, umbellate on axillary, puberulent branches; peduncles scarcely 1 cm. long; bracts triangular-peltate, marginally ciliate; fruit small, obpyramidal-trigonal.

Trinidad: Arima-Blanchisseuse Road, 3rd mile, N. W. Simmonds 156 (Trin.); 12th mile, N. W. Simmonds 163 (Trin.); Aripo Road, end, N. W. Simmonds 111 (Trin.).

Trinidad and throughout the West Indies and on the mainland from Mexico to Brazil and Peru.

4. PEPEROMIA Ruiz & Pavon

Terrestrial or epiphytic herbs; stems succulent, creeping to erect; leaves alternate, opposite, or verticillate; spikes axillary, leaf-opposed,

or terminal; flowers numerous, each composed of a simple pistil and two lateral stamens in the axil of a glabrous, rounded, peltate bract, arranged in fleshy spikes; fruit minute, drupe-like, mostly glandular-viscid, sessile or in a few species pedicellate, apex rounded, with a terminal stigma, obliquely scutelliform, or slenderly rostrate with subapical stigma.

KEY TO THE SPECIES

- Leaves opposite or verticillate
 Peduncles 2-4 cm. long; fruit apex pointed, stigma terminal
 Leaves mostly ternate; stems loosely villous 4. *P. trifolia*
 Leaves mostly opposite; stems minutely hirtellous 5. *P. quadrangularis*
 Peduncles 1-1.5 cm. long; fruit apex oblique, stigma subterminal 6. *P. blanda*
- Leaves alternate
 Leaf base cordate; fruit ribbed 2. *P. pellucida*
 Leaf base not cordate; fruit not ribbed
 Leaves densely black-dotted; petioles ciliate 7. *P. glabella*
 Leaves not densely black-dotted
 Leaves less than 2 cm. long
 Leaves 2-5 mm. wide; fruit pedicellate 1. *P. emarginella*
 Leaves mostly larger; fruit not pedicellate
 Fruit prominently beaked (rostrate) 10. *P. serpens*
 Fruit not prominently beaked
 Fruit turbinate, stigma apical 3. *P. panamensis*
 Fruit ovoid with oblique apex, stigma subapical 8. *P. rotundifolia*
- Leaves 5 cm. or more long
 Spikes 5 cm. or more long; inflorescence mostly simple
 Fruit apex obliquely scutelliform, not rostrate; leaves lance- or subovate-elliptic 9. *P. macrostachya*
 Fruit apex slenderly rostrate; leaves elliptic or round-obovate
 Fruit beak slender, abruptly hooked; peduncle commonly minutely hirtellous 11. *P. obtusifolia*
 Fruit beak awl-shaped, tapering to a wider base, not markedly hooked; peduncle glabrous 12. *P. magnoliaefolia*
 Spikes about 1 cm. long; inflorescence racemose-paniculate 13. *P. pernambucensis*

1. *P. emarginella* (Sw.) C.DC. in DC. *Prodr.* 16: 437. 1869: Dahlst. *Stud.* 22. 1900: C.DC. in Urb. *Symb. Ant.* 3: 225. 1902: Britt. & Wills. *Sci. Surv. Porto Rico & Virg. Isls.* 5: 224. 1924: Yun.

in *Rev. Soc. Cub. Bot.* 6: S. f. 2. 1949: Trel. & Yun. *Pip. Northern S. Amer.* 710. f. 633. 1950.

Piper emarginellum Sw. ex Wikström in *Vet. Akad. Handl. Stockh.* 56. 1828.

Peperomia exilis Griseb. *Fl. B. W. I.* 164. 1864.

Peperomia andinacea C.DC. in *Journ. of Bot.* 4: 134. 1866.

Peperomia minima C.DC. *Prodr.* 16: 399. 1869.

Peperomia delicatissima Trel. in *Contrib. U. S. Nat. Herb.* 26: 191. 1929.

A very delicate, creeping herb; stems filiform, glabrous; leaves alternate, round-obovate, obovate, or broader than long, mostly 2-5 mm. in diameter, commonly slightly peltate, palmately 3-nerved with the midrib branched upward, glabrous or with a few, scattered, seta-like hairs, margin usually distantly setose-ciliate; petiole mostly 2-3 mm. long; spikes terminal on short, erect, fruiting branches, 1-2 cm. long; peduncle filiform, up to 1 cm. long; fruit ellipsoidal or obpyriform, on a slender, subequilong pedicel, apex obliquely scutelliform; stigma apical.

Trinidad: without location, A. Fendler 659 (Kew); Tucuche, N. Y. Sandwith 1936 (Kew); W. E. Broadway 7131 (Kew); N. L. Britton & W. G. Freeman 9088 (Trin.); N. L. Britton, D. Coker & W. R. Rowland 1283 (NY; US); Irois, H. Orueger 1 (Kew); Heights of Aripo, N. L. Britton & W. G. Freeman 2350 (US); Chaguanas, W. E. Broadway 1428 (Trin.); 3763 (Trin.); head of Maracas Waterfall, N. W. Simmonds 136 (Trin.).

Tobago: Roxborough-Parlatuvier Road, Sth-9th mile post, N. Y. Sandwith 1918 (Kew).

Trinidad and Tobago, West Indies, Central America and northern South America.

2. ***P. pellucida*** (L.) H. B. K. *Nov. Gen. & Sp.* 1: 64. 1815: Miq. *Syst. Pip.* 79. 1843: Griseb. *Fl. B. W. I.* 165. 1864: C.DC. in DC. *Prodr.* 16: 402. 1869: Dahlst. *Stud.* 16. 1900: C.DC. in Urb. *Symb. Ant.* 3: 244. 1902: Britt. & Wils. *Sci. Surv. Porto Rico & Virg. Isls.* 5: 226. 1924: Yun. in *Rev. Soc. Cub. Bot.* 6: 10. f. 3. 1949: Yun. in *Ann. Mo. Bot. Gard.* 37: 79. 1950: Trel. & Yun. *Pip. Northern S. Amer.* 466. f. 409. 1950.

Piper pellucidum L. *Sp. Pl.* 1: 30. 1753.

Piper concinnum Haw. *Rev. Pl. Succ.* 198. 1821.

Peperomia concinna A. Dietr. *Sp. Pl.* 1: 164. 1831.

A delicate, erect, glabrous, pellucid, branched herb; leaves alternate, round-deltoid-ovate, mostly 15-25 mm. wide, apex acute, base subtruncate-cordate, palmately 5-nerved, drying very thin; petiole mostly 1-2 cm. long; spikes terminal, axillary or leaf-opposed, slender, up to 5 cm. long; peduncle about 5 mm. long; fruit ellipsoidal, longitudinally somewhat sulcately striate, apex pointed; stigma apical.

Trinidad vernacular name is «shiny bush».

Trinidad: without locality, Herb. Trin. 1420 (Trin.; US); 2603 (Trin.; US); W. A. Bromfield in 1844 (Kew); B. deSchack s. n. (Kew); A. Fendler 662 (Kew); Hort. Trin., W. E. Broadway 2236 (Trin.; US); 3780 (Trin.; US); Port-of-Spain, F. C. Almandoz 12 (NY); Imperial College, St. Augustine, N. W. Simmonds 165 (Trin.); shaly rock debris by coast road, Sans Souci, N. W. Simmonds 175 (Trin.); Cedros, Caroline King, Herb. Trin. 7145 (Trin.); Cocorite, N. L. Britton & T. E. Hazen 34 (NY; US).

Tobago: Scarborough, W. E. Broadway 2545 (US).

A weedy species common throughout the West Indies and tropical North and South America. It also occurs in the Old World tropics and Pacific islands.

3. ***P. panamensis*** C. DC. in *Candollea* 1: 329. 1923: Yun. in *Ann. Mo. Bot. Gard.* 37: 82. 1950: Trel. & Yun. *Pip. Northern S. Amer.* 472. f. 413. 1950.

A small, spreading, stoloniferous, branching, more or less minutely hirtellous epiphytic herb; leaves alternate, suborbicular, round-obovate, or occasionally elliptic-subovate, 6-14 mm. wide \times 8-20 mm. long, apex rounded, acute at the very base, palmately 3-5-nerved; petiole mostly about 5 mm. long; spikes terminal and axillary, 1-1.5 cm long; peduncles mostly 5-8 cm. long; fruit subturbinate-cylindrical, apically mammiform, basally immersed or eventually pseudopedicellate; stigma apical.

Trinidad: without location, Herb. Trin. 2605 (Trin.); Aripo Savanna, W. E. Broadway 2944 (NY; Trin.); Aripo Road, W. E. Broadway 6033 (Kew); end of forest, near river, on tree, W. E. Broadway 7126 (Kew; US).

Panama, Trinidad, and northern South America.

4. ***P. trifolia*** (L.) A. Dietr. *Sp. Pl.* 1: 173. 1831: Miq. *Syst. Pip.* 148. 1843; Griseb. *Fl. B. W. I.* 168. 1864: C.DC. in DC. *Prodr.*

16¹: 462. 1869: C.DC. in Urb. *Symb. Ant.* 3: 267. 1902: Trel. & Yun. *Pip. Northern S. Amer.* 512. 1950.

Piper trifolium L. *Sp. Pl.* 1: 30. 1753.

Peperomia ovalifolia Hook. *Exot. Fl.* 3: pl. 165. 1825.

A small, somewhat loose-villous, scandent herb; stem about 1 mm. thick; leaves opposite below, the upper in whorls of 3 or exceptionally 4, suborbicular or elliptic to subobovate, 8-12 mm. wide \times 1.5-2 cm. long, apex blunt and slightly notched, base acute, obscurely palmately 3-nerved, ciliate, somewhat villous beneath along the nerves, glabrate above; petiole about 3 mm. long; spikes terminal, 3-5 cm. long; fruit oblong-ovoid, pointed; stigma apical.

Trinidad: without locality, F. W. Sieber 229 (Geneva; Paris; Urban).

West Indies and (?) French Guiana. Apparently rare in Trinidad.

5. **P. quadrangularis** (Thomps.) A. Dietr. *Sp. Pl.* 1: 169. 1831: Miq. *Syst. Pip.* 135. 1843: Griseb. *Fl. B. W. I.* 168. 1864: C.DC. in DC. *Prodr.* 16¹: 446. 1869: Dahlst. *Stud.* 156. 1900: C.DC. in Urb. *Symb. Ant.* 3: 265. 1902: Yun. in *Rev. Soc. Cub. Bot.* 6: 11. f. 4. 1949: Yun. in *Ann. Mo. Bot. Gard.* 37: 85. 1950: Trel. & Yun. *Pip. Northern S. Amer.* 509. f. 450. 1950.

Piper quadrangulare Thomps. in *Trans. Linn. Soc.* 9: 202. pl. 21, f. 1. 1808.

Peperomia angulata H. B. K. *Nov. Gen. & Sp.* 1: 66. 1815.

Peperomia Carlo-Wrightii Trel. in *Fedde, Repert.* 23: 23. 1926.

Peperomia Alleni Trel. in *Ann. Mo. Bot. Gard.* 25: 825. 1938.

A comparatively small, repent herb; stem quadrangular, minutely hirtellous to glabrate; leaves opposite, obovate, elliptic-obovate, or orbicular, 10-22 mm. wide by 12-30 mm. long, apex obtuse or slightly pointed, base acutish, palmately 3-nerved, drying coriaceous, sparsely hirtellous, or glabrate; petiole 2-3 mm. long; spikes axillary or occasionally terminal, 2-3 cm. long; peduncles 2-4 cm. long, 2-bracteate near the middle; ovary ovoid, somewhat immersed in rachis pits; stigma apical.

Trinidad: Hort. Trin., J. H. Hart, Herb. Trin. 5808 (Trin.); Cedros, H. Crueger in 1852 (Kew).

West Indies, Panama, and northern South America. Apparently uncommon in Trinidad which is the type locality. Thompson says of the type: «I observed this plant nowhere but on the trunk of an old tree, on the road between St. Joseph's and the Caroni River».

6. **P. blanda** (Jacq.) H. B. K. *Nov. Gen. & Sp.* 1: 67. 1815: Miq. *Syst. Pip.* 115. 1843: Griseb. *Fl. W. I.* 168. 1864 — as *Peperomia ciliata*: C.DC. *Prodr.* 16¹: 336. 1869: C.DC. in Urb. *Symb. Ant.* 3: 266. 1902: Trel. & Yun. *Pip. Northern S. Amer.* 556. f. 487. 1950.

Piper blandum Jacq. *Collect.* 3: 211. 1789.

Peperomia dissimilis H. B. K. *Nov. Gen. & Sp.* 1: 67. pl. 13. 1815.

Peperomia ciliata H. B. K. *Nov. Gen. & Sp.* 1: 68. 1815.

A moderate-size, assurgent, more or less dark-granular herb, up to 30 cm. or more tall, loosely to rather densely villous; leaves opposite or sometimes ternate upward, rarely alternate, elliptic, elliptic-lanceolate, oblanceolate, or obovate, 1-2.5 cm. wide \times 2.5-5 cm. long, often more or less rhombic, acute at both ends or base sometimes obtusish, palmately 3-5-nerved, villous at least near the base or along the nerves, ciliolate; petiole 5-10 mm long, densely villous; spikes terminal and axillary, usually several, slender, loosely flowered, up to 14 cm. long; peduncle mostly about 1-1.5 cm. long; fruit globose-ovoid, apex oblique; stigma subapical.

Trinidad: without locality, H. Crueger s. n. (Kew); Herb. Trin. 2602 (Trin.); Tetron Bay, near the sea, W. E. Broadway in 1928 (Kew); Carrera Island, J. H. Hart, Herb. Trin. 5946 (Trin.); Stauble's to Tetron's Bay, R. O. Williams, Herb. Trin. 11663 (Trin.); Tetron Bay, W. E. Broadway 6744 (Kew); Chacachare Island, N. L. Britton 513 (NY; US).

West Indies, Venezuela, Colombia, and Brazil.

6a. **P. blanda** var. **Langsdorffii** (Miq.) Henschen in *Nova Acta R. Soc. Sci. Upsal. Ser. 3.* 8: 39. 1873: Miq. *Comm. Phyt.* 2: pl. 8, f. F. 1840: *Syst. Pip.* 116. 1843: C.DC. in DC. *Prodr.* 16¹: 443. 1869: C.DC. in Urb. *Symb. Ant.* 3: 266. 1902: Trel. & Yun. *Pip. Northern S. Amer.* 558. 1950.

P. Langsdorffii Miq. *Syst. Pip.* 116. 1843.

P. blanda var. *magnifolia* C.DC. in *Ann. Conserv. & Jard. Bot. Genève* 21: 245. 1920.

Plants up to 50 cm. or more tall; leaves 2-4 cm. wide \times 4-10 cm. long. *Trinidad*: without locality, Herb. Trin. 2601 (Trin.); Herb. Trin. 2606 (Trin.); Chacachare, W. E. Broadway in 1921 (NY); western end of Monas Island, on shaded hillside, N. L. Britton, E. G. Britton & S. Brown 2725 (NY; US).

With the species.

7. *P. glabella* (Sw.) A. Dietr. *Sp. Pl.* 1: 156. 1831: Griseb. *Fl. B. W. I.* 165. 1864: C.DC. in DC. *Prodr.* 16: 417. 1869: Dahlst. *Stud.* 121. 1900: C.DC. in Urb. *Symb. Ant.* 3: 235. 1902: Britt. & Wils. *Sci. Surv. Porto Rico & Virg. Isls.* 5: 226. 1924: Yun. in *Rev. Soc. Cub. Bot.* 6: 51. f. 28. 1949: Yun. in *Ann. Mo. Bot. Gard.* 37: 97. 1950: Trel. & Yun. *Pip. Northern S. Amer.* 587. f. 511. 1950.

Piper glabellum Sw. *Prodr. Veg. Ind. Occ.* 16. 1788.

Peperomia caulibarbis Miq. *Syst. Pip.* 98. 1843.

Peperomia lineatipila A. Rich. in La Sagra, *Fl. Cub.* 11: 229. 1850.

Peperomia chagalana C.DC. in *Engl. Bot. Jahrb.* 40: 259. 1908.

Peperomia similis Britt. in *Mem. Torr. Bot. Club* 16: 61. 1920.

A black-glandular-dotted, stoloniferous-assurgent herb, glabrous except for the ciliate petioles and lines decurrent from their margins below the nodes; leaves ovate to ovate-elliptic-lanceolate, 6-13 mm. wide \times 1.5-3.5 cm. long, or occasionally somewhat larger, mostly acute to acuminate at both ends, palmately 3-5-nerved, or-plinerved within the lowermost 5-7 mm.; petiole 5-10 mm. long, clasping-decurrent; spikes terminal and axillary, slender, up to 8-12 cm. long; peduncle 1-1.5 cm. long; fruit globose-ovoid, apex oblique; stigma subapical.

Trinidad: without locality, A. Fendler 656 (Kew); Toco Road, Valencia, N. L. Britton, T. E. Hazen and W. Mendelson 1783 (NY; Trin.) [this number in herb. Illinois is var. *nervulosa*]; Moruga, Lance Mettan, N. L. Britton & W. E. Broadway in 1921 (Trin.); on a palm tree in garden, Government House, W. E. Broadway in 1910 (Trin.); Santa Cruz-Cyril Bay trail, N. W. Simmonds 278 (Trin.); near Oropuche River, Guaico-Valencia Reserve, N. W. Simmonds 381 (Trin.); Oropuche local road, via Valencia, 2-1/2 mile post, W. E. Broadway 6174 (Kew); Oropuche River, W. E. Broadway 7573 (NY); Curans' Woods, Herb. Trin. 905 (Trin.); woods near Monkey Town, Herb. Trin. 2607 (Trin.); Tabaquite, N. L. Britton, W. G. Freeman & W. Nowell 2600 (ILL; NY; Trin.; US); Morne Cocoa Read, N. L. Britton & T. E. Hazen 1606 (NY; US); Port-of-Spain, N. L. Britton 2080 (NY); N. L. Britton & W. E. Broadway 2441 (ILL; NY); Mount Tamana, W. E. Broadway 7986 (Kew); Santa Cruz, H. Cruieger s. n. (Kew); Caroni, H. Cruieger in 1846 (Kew); Cumuto, 1-2 miles south of railway, W. E. Broadway in 1905 (Kew).

West Indies, Central America and northern South America.

- 7a. *P. glabella* var. *nervulosa* (C.DC.) Yun. in *Ann. Mo. Bot. Gard.* 37: 98. 1950: Trel. & Yun. *Pip. Northern S. Amer.* 588. 1950.

Micropiper melanostigma Miq. *Comm. Phyt.* 51. 1840.

Peperomia melanostigma Miq. *Syst. Pip.* 90. 1843.

Peperomia melanostigma var. *nervulosa* C.DC. in DC. *Prodr.* 16: 409. 1860.

Peperomia glabella var. *melanostigma* (Miq.) Dahlst. in *Kongl. Sv. Vet. Handl.* 33: 122. 1900: Yun. in *Rev. Soc. Cub. Bot.* 6: 55. f. 29. 1949.

Plants mostly larger than in the typical form; leaves lanceolate or elliptic-lanceolate, apex acute to sharp-acuminate, base acute to cuneate, 1-3 cm. wide \times 3-8 cm. long.

Trinidad: back of Government House, W. E. Broadway 5478 (Trin.).

With the species.

This species shows considerable variation in the size of the leaves with some specimens intermediate between the species and variety *nervulosa*.

8. *P. rotundifolia* (L.) H. B. K. *Nov. Gen. & Sp.* 1: 65. 1815: Dahlst. *Stud.* 99. 1900: C.DC. in Urb. *Symb. Ant.* 3: 228. 1902: Britt. & Wils. *Sci. Surv. Porto Rico & Virg. Isls.* 5: 224. 1924: Yun. in *Rev. Soc. Cub. Bot.* 6: 35. f. 19. 1949: Yun. in *Ann. Mo. Bot. Gard.* 37: 96. 1950: Trel. & Yun. *Pip. Northern S. Amer.* 622. f. 546. 1950.

Piper rotundifolium L. *Sp. Pl.* 1: 30. 1753.

Peperomia nummularifolia H. B. K. *Nov. Gen. & Sp.* 1: 66. 1815: Griseb. *Fl. B. W. I.* 164. 1864: C.DC. in *Prod.* 16: 420. 1869.

A small, repent, or scandent herb; stem filiform, with short, erect, fruiting branches, moderately crisp-puberulent or somewhat villous glabrescent; leaves alternate, round, about 5 mm. in diameter, or round-elliptic or subobovate and up to 10 mm. wide \times 12 mm. long, apex obtuse, base rounded-subpeltate with the lower margin scarcely continuous over the petiole, or sub-acute, moderately crisp-pubescent, loosely villous, or commonly glabrescent, obscurely palmately 3-nerved; petiole mostly 1-5 mm. long; spikes solitary, mostly about 2 cm., long, terminating short fruiting branches; peduncle mostly about 5 mm. long; fruit globose-ovoid, apex oblique; stigma subapical.

Trinidad: without locality, A. Fendler 660 (Kew); F. W. Sieber 16 (Kew); W. E. Broadway in 1915 (Trin.); W. E. Broadway, Hort.

Trin. 4978 (Trin.); woods near Monkey Town, Herb. Trin. 2608 (Trin.); Toco Road, Valencia, N. L. Britton, T. E. Hazen & W. Mendelson 1802 (NY; Trin.; US); N. L. Britton, D. Coker & W. R. Rowland 1802 (NY; US); Brazil, N. L. Britton, E. G. Britton & W. G. Freeman 2129 (NY; Trin.; US); Chaguanas, W. E. Broadway 3706 (Trin.); summit of Mount Tucuche, E. A. Friend 42 (NY); Oropuche Cave, N. W. Simmonds 263 (Trin.); Maracas, Hort. Trin. 2605 (Trin.); W. E. Broadway 6608 (Kew); forest, 4 miles east of Arima, N. L. Britton, T. E. Hazen & W. Mendelson 602 (NY; US).

West Indies and on the mainland through Central America to Brazil and Peru. Said to be of some use medicinally.

8a. *P. rotundifolia* var. *ovata* (Dahlst.) C.D.C. in Urb. *Symb. Ant.* 3: 230. 1902.

Peperomia rotundifolia f. *ovata* Dahlst. *Stud.* 101. 1900.

Leaves elliptic, apex obtuse, base acutish, up to 10 mm. wide \times 18 mm. long.

Tobago: Morne d'Or, H. F. A. Eggers 5819 (Kew); forests of main ridge above Parlatuvier, N. Y. Sandwith 1908 (Kew).

Tobago.

There is considerable variation in the shape of the leaves of this species. Characteristically, they are nearly round. Because of the variability of the leaf shape there is some question regarding the validity of var. *ovata*. The specimens cited for the variety represent the extreme in variation.

9. *P. macrostachya* (Vahl) A. Dietr. *Sp. Pl.* 1: 149. 1831: C.D.C. in Urb. *Symb. Ant.* 3: 253. 1902, as *P. nematostachya*, in part: Trel. & Yun. *Pip. Northern S. Amer.* 660. f. 578. 1950.

Piper macrostachyon Vahl *Enum.* 1: 341. 1804.

Peperomia myosuroides A. Dietr. *Sp. Pl.* 1: 157. 1831, sphalm *myosuroides*.

Peperomia Parkeriana Miq. in *Hook. Lond. Journ. Bot.* 4: 427. 1845.

A trailing or pendent, essentially glabrous herb; leaves alternate, subovate-elliptic, 1.5-5 cm. wide \times 6-10 cm. long, apex attenuately acuminate, base rounded or somewhat narrowed, acutish, obtuse, or rarely cordulate, somewhat ciliate, 7-9-plinerved below the middle; petiole 5-20 mm. long; spikes slender, up to 20-30 cm. long, subpanicled

on bracted branches opposite the leaves, or terminal; peduncle mostly about 1 cm. long; fruit cylindrical, apex obliquely scutellate; stigma central.

Trinidad: without locality, A. Fendler 655 (Kew); 657 (Kew); Cunupia Woods, Herb. Trin. 5704 (NY); Cumuto, A. Hornbersley in 1925 (Kew); Irois, H. Cruieger, Herb. Trin. 2604 (Trin.) this is a poor specimen which is questionably referred here. De Candolle referred it to *P. myriocarpa* which is now considered a synonym of *P. elongata*, a closely related species which differs in having ciliate petioles.

Northern South America and rather infrequent in Trinidad.

10. *P. serpens* (Sw.) Loud. *Hort. Brit.* 13. 1830: Britt & Wils. *Sci. Surv. Porto Rico & Virg. Isls.* 5: 224. 1924: Yun. in *Rev. Soc. Cub. Bot.* 6: 65. f. 37. 1949: Yun. in *Ann. Mo. Bot. Gard.* 37: 106. 1950: Trel. & Yun. *Pip. Northern S. Amer.* 668. f. 584. 1950.

Piper serpens Sw. *Prodr. Veg. Ind. Occ.* 16. 1788.

Peperomia scandens Ruiz & Pavon, *Fl. Peruv. & Chil.* 1: 32. pl. 51, f. b. 1798: C.D.C. in DC. *Prodr.* 16: 434. 1869: C.D.C. in Urb. *Symb. Ant.* 3: 248. 1902.

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

Peperomia repens H. B. K. *Nov. Gen. & Sp.* 1: 65. 1815: Griseb. *Fl. B. W. I.* 165. 1864: Dahlst. *Stud.* 79. 1902.

A comparatively small, creeping or scandent, crisp-pubescent herb; leaves alternate, round-subdeltoid, mostly 1-2 cm. wide, apex obtuse or acute, base truncate-cordulate, palmately 3-5-nerved; petiole up to 3 cm. long; spikes axillary or sympodially terminal, up to 3 cm. long; peduncle 1- or rarely 2-brated, about as long as the spike; fruit ellipsoidal, rostrate; stigma at the base of the slender, pointed beak.

Trinidad: without locality, A. Fendler 661 (Kew); J. H. Hart in 1893 (Trin.); Herb. Trin. 13435 (Trin.); hb. O. Kuntze 1067 (NY); 817 (NY); Heights of Aripo, W. E. Broadway in 1922 (Trin.); 9863 (NY; Trin.); N. L. Britton & W. G. Freeman 2330 (NY); H. Bruins-Lieb, Herb. Trin. 12989 (Trin.); Guanapo, P. McLean in 1912 (Trin.); Mora Forest, east of Sangre Grande, N. L. Britton & W. Nowell 2848 (NY); Marper Estate, E. E. Cheesman, Herb. Trin. 13435 (Trin.); Mt. Tucuche, E. A. Friend 13 (NY); L. A. W. Riley 65 (Kew); Heights of Oropuche, W. G. Freeman 7766 (Trin.); between

Piedra Blanca and Naranja, N. W. Simmonds 134 (Trin.); Fort George, H. Crueger in 1845 (Kew); between Tucuche and Naranja, N. W. Simmonds 135 (Trin.); Chaguanas, W. E. Broadway 3754 (Trin.); Tamana, W. G. Freeman 9063 (Trin.); Caura, W. E. Broadway in 1934 (Kew); Caura River Valley, N. L. Britton 1547 (NY; US); Caledonia Island, W. E. Broadway 6731 (US); Biche, W. E. Broadway 9396 (Kew).

West Indies and on the mainland southward from Central America to Brazil and Bolivia.

11. *P. obtusifolia* (L.) A. Dietr. *Sp. Pl.* 1: 154. 1831: Miq. *Syst. Pip.* 194. 1843: Miq. in Martius, *Fl. Bras.* 4: 24. 1852: Griseb. *Fl. B. W. I.* 166. 1864: C. DC. in DC. *Prodr.* 16¹: 429. 1869: Dahlst. *Stud.* 64. 1900: C. DC. in Urb. *Symb. Ant.* 3: 254. 1902: Britt. & Wils. *Sci. Surv. Porto Rico & Virg. Isls.* 5: 225. 1924: Yun. in *Rev. Soc. Cub. Bot.* 6: 77. f. 44. 1949: Yun. in *Ann. Mo. Bot. Gard.* 37: 108. 1950: Trel. & Yun. *Pip. Northern S. Amer.* 678. f. 594. 1950.

Piper obtusifolium L. *Sp. Pl.* 1: 30. 1753.

A fleshy, stoloniferous-assurgent herb, glabrous except the peduncle which is mostly minutely hirtellous as sometimes is also the lower leaf surface; leaves alternate, elliptic-obovate, commonly about 4-6 cm. wide \times 8-12 cm. long, occasionally smaller, apex rounded, obtuse, sometimes slightly emarginate, base cuneate, 7-11-plinerved from below the middle, the midrib branched upward, drying more or less coriaceous; petiole mostly 1.5-4 cm. long, somewhat winged by the decurrent blade; spikes up to 15 cm. long, solitary or paired on a 1-bracted, terminal, leaf-opposed, or occasionally axillary stalk 3-5 cm. long; fruit ellipsoidal, rostrate, the beak slender and usually abruptly hooked at the end; stigma anterior at the base of the beak.

Trinidad: without locality, W. E. Broadway in 1908 (NY); Hort. Trin., Herb. Trin. 2609 (Trin.); Saut d'Eau, Herb. Trin. 6704 (Trin.); Tabaquite, W. E. Broadway in 1918 (NY); Aripo Road, near 4 mile post W. E. Broadway 6269 (Kew); Cascade, hb. O. Kuntze 817 (NY).

Throughout the West Indies and on the mainland from Mexico through Central America and northern South America.

This species closely resembles *P. magnoliaefolia* from which it differs, however, because of its hirtellous peduncles, and slender, abruptly hooked beaks of the fruits.

12. *P. magnoliaefolia* (Jacq.) A. Dietr. *Sp. Pl.* 1: 153. 1831: Dahlst. *Stud.* 58. 1900: Britt. & Wils. *Sci. Surv. Porto Rico & Virg. Isls.* 5: 226. 1924: Yun. in *Rev. Soc. Cub. Bot.* 6: 82. f. 46. 1949: Yun. in *Ann. Mo. Bot. Gard.* 37: 110. 1950: Trel. & Yun. *Pip. Northern S. Amer.* 681. f. 597. 1950.

Piper magnoliaefolium Jacq. *Collect.* 3: 210. 1789.

Peperomia amplexicaulis (Sw.) A. Dietr. var. *magnoliaefolia* Griseb. *Fl. B. W. I.* 167. 1864.

Peperomia talinifolia Griseb. *Fl. B. W. I.* 167, 1864, not H. B. K.

A moderately large, assurgent, glabrous, succulent herb; leaves alternate, round, obovate-elliptic, or subspatulate, 3-8 cm. wide \times 6-15 cm. long, apex rounded, often emarginate, base cuneate or sometimes rather abruptly contracted, drying coriaceous, 7-9-plinerved from near the base, the rather prominent midrib pinnately branched upward; petioles 1-3 cm. long, somewhat winged by the decurrent blade; spikes up to 18 cm. long, 1, 2, or sometimes 3 on a terminal or leaf-opposed, bracted stalk up to 10 cm. long; peduncle 1.5-3 cm. long; fruit ellipsoidal, rostrate, the beak gradually narrowed from a broad base, sharp and curved but usually not abruptly hooked at the apex; stigma at the base of the beak.

Trinidad: without location, A. Fendler 658 (Kew); Herb. Trin. 6689 (Trin.); Mayaro, W. E. Broadway 5749 (NY; Trin.); Maracas Falls, N. W. Simmonds 54 (Trin.); N. L. Britton, T. E. Hazen & W. Mendelson 1637 (NY; US); H. Crueger in 1845 (Kew); headwaters of river above Maracas, N. W. Simmonds 141 (Trin.); road to Maracas Bay, Herb. Trin. 2611 (Trin.); Mt. Tamana, Herb. Trin. 1344 (Trin.); Beausejour Road to Blue Basin, P. McLean 7742 (Trin.); on rocks near the sea, Stauble's to Tetron Bay, R. O. Williams, Herb. Trin. 11664 (Trin.); Tetron Bay, N. L. Britton 486 (NY; US); W. E. Broadway 6928 (Kew; US); Scotland Bay, N. L. Britton & T. E. Hazen 1707 (NY; US); Little Gasparee, N. L. Britton 2787 (NY); Manzanilla, N. L. Britton & E. G. Britton 2190 (NY); North Post to Maqueripe, N. L. Britton, T. E. Hazen & W. Mendelson 895 (NY); Erin, W. E. Broadway 6936 (Kew).

West Indies, Panama, and northern South America.

13. *P. pernambucensis* Miq. in *Hook. Lond. Journ. Bot.* 4: 420. 1845. Griseb. *Fl. B. W. I.* 167. 1864: C. DC. in DC. *Prodr.* 16¹: 405.

1869: C.DC. in Urb. *Symb. Ant.* 3: 245. 1902: Trel. & Yun. *Pip. Northern S. Amer.* 743. f. 667. 1950.

Peperomia paniculata Regel in *Bull. Soc. Nat. Moscou* 31: 542. pl. 3. 1858.
Peperomia longifolia C.DC. in DC. *Prodr.* 16: 405. 1869.

A moderately large, simple, short-stemmed, succulent, terrestrial or epiphytic herb, glabrous except for the densely velvety-puberulent stalks of the inflorescence; stem 3-5 mm. or more thick when dry, ascending from a briefly decumbent, rooting base to 5-10 cm., internodes very short; leaves alternate, elliptic, elliptic-oblong, or lanceolate, 5-12 cm. wide \times 15-30 cm. long, apex rather abruptly sharp-acuminate or occasionally obtuse, base cuneate, decurrent on the petiole, pinnately nerved with 5-8 branches on each side of the prominent midrib; petiole 3-5 cm. long; spikes about 1 cm. long, verticillately arranged in a loose, terminal or axillary, racemose-paniculate inflorescence up to 8 cm. long on a common stalk 4-8 cm. long, stalk densely velvety-puberulent; peduncles about 3 mm. long; bracts round-peltate; fruit about 1 mm long, cylindrical, slightly obliquely truncate at the apex; stigma central.

Trinidad: Irois, H. Crueger s. n. (Kew).

Trinidad, Central America, and northern South America. Apparently rare in Trinidad.

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