

THE PIPERACEAE OF PANAMA

BY WILLIAM TRELEASE

INTRODUCTION

No botanist who visits Central America can fail to take an interest in the great number of species of *Piper* and *Peperomia* which he finds everywhere in this region. The family is most abundantly developed in the wet forests of the Atlantic watershed, but many species of *Piper* and some *Peperomias* are common in the drier forests of the Pacific slope. It is Costa Rica, doubtless, which of Central American countries possesses the richest representation of the Pepper family, chiefly in the wet forests at middle and upper elevations, but in Panama also the family is well represented, as may be seen by the 138 species here listed.

There is no doubt that the real number of species existing in Panama is much greater, since no part of Panama except the region of the Canal Zone has been well explored botanically. The species of *Pothomorphe* are common and widely distributed plants, and this is true also of a few species of *Piper* and *Peperomia*. Most of the species of the latter genera, however, seem to be very limited in their distribution, and not until every secluded valley of Panama has been explored will it be possible to make a complete census of the Piperaceae of the country.

The species of *Piper* are mostly low shrubs, and it is easy to collect and preserve specimens of them. Most of the *Peperomias* are fleshy herbaceous epiphytes. It is difficult to collect them, and even harder to dry specimens, since there is no other group of Central American plants which dry so slowly in the press. For this reason the species of *Peperomia* are neglected by most collectors and inadequately represented in herbaria.

This paper is based largely upon the collections existing in the U. S. National Herbarium. These consist chiefly of material collected by Mr. H. Pittier and Dr. William R. Maxon in 1911 and 1912, in the course of the Smithsonian Biological Survey of the Canal Zone; by Mr. Ellsworth P. Killip in 1918 and 1922; by Dr. Maxon in 1923; by Dr. C. V. Piper in 1923; and by the present writer in 1923-24.

The collections of 1911-12 were identified by Casimir de Candolle, who based numerous new species upon them. The recent collections, as well as the earlier ones, were submitted to Doctor Trelease, who has kindly prepared the report here presented, which lists all the Piperaceae now known from Panama.—PAUL C. STANDLEY.

SYSTEMATIC TREATMENT

KEY TO GENERA

Stigmas 2 to 5 (mostly 3 or 4).

Spikes axillary.

Spikes several on a common peduncle. Plants suffruticose.

1. POTHOMORPHE.

Spikes solitary in the leaf axil. Plants suffruticose. 2. SARCORHACHIS.

Spikes opposite the leaves, solitary. Plants woody. 3. PIPER.

Stigma 1, often penicillate. Plants herbaceous. 4. PEPEROMIA.

1. POTHOMORPHE Miquel

Leave distinctly peltate. 1. *P. peltata*.

Leaves cordate, not peltate. 2. *P. umbellata*.

1. *Pothomorphe peltata* (L.) Miquel, *Comm. Phyt.* 37. 1840.

Piper peltatum ("pelatum") L. *Sp. Pl.* 30. 1753.

Peperomia peltata Dietr. *Syn. Pl.* 1: 142. 1831.

Lepianthes peltatum Raf. *Sylv. Tellur.* 85. 1838.

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

TYPE LOCALITY: "America calidiore."

RANGE: Cuba, through the West Indies (the prototype figured by Plumier) and northern South America to Mexico on the mainland.

CHIRIQUÍ: Cerro de la Plata, San Félix, *Pittier* 5160. CANAL ZONE: Without locality, *Eppelsheimer*. Balboa, *Killip* 3064; *Standley* 25602. Fort Lorenzo, *Piper* 5929. Fort Sherman, *Standley* 30969. Frijoles, *Standley* 27619. Frijoles to Monte Lirio, *Killip* 12117. Gamboa, *Standley* 28525. Gamboa to Cruces, *Pittier* 3782. Gatún, *Standley* 27257. Juan Mina, *Piper* 5689. Las Cascadas Plantation, *Standley* 25797. Monte Lirio, *Maxon* 6858. Summit, *Stevens* 314, 315. Río Sirri, *Pittier* 4016. PANAMA: Río Tapia, *Standley* 28062. Río Tecumen, *Standley* 26735. DARIÉN: Boca de Cupe, *Williams* 697.

2. *Pothomorphe umbellata* (L.) Miquel, *Comm. Phyt.* 36. 1840.

Piper umbellatum L. *Sp. Pl.* 30. 1753.

Peperomia umbellata Kunth, *Syn. Pl. Aequin.* 1: 124. 1822.

Lepianthes umbellatum Raf. *Sylv. Tellur.* 85. 1838.

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

TYPE LOCALITY: Santo Domingo, Hispaniola.

RANGE: Through the West Indies; on the continent reaching Brazil and Peru to the south and Mexico to the north, in a number of often segregated forms, also (? naturalized) in tropical Asia and Africa.

CHIRIQUÍ: El Boquete, *Pittier* 3133.

2. SARCORHACHIS Trel., gen. nov.

Trailing or climbing, rather succulent, glabrous shrubs. Leaves alternate. Spikes solitary in the axils. Flowers spicate, perfect, naked, sessile, subtended by minute concave bracts. Stamens usually 4, distinct, essentially

hypogynous, short, with rounded anthers. Pistil 1, 1-celled, with a single erect ovule; stigmas mostly 4, sessile. Fruit a small 1-seeded drupe, partly immersed in and coalescent with the somewhat fleshy rachis at maturity.

Type species, *S. incurva* Trel. (*Piper incurvum* Sieber).

1. *Sarcorrhachis naranjoana* (C. DC.) Trel.

Piper naranjoanum C. DC. *Linnaea* 37: 363. 1872.

TYPE LOCALITY: Naranjo, Costa Rica.

RANGE: Costa Rica and Panama.

DABIÉN: Sambú River, *Pittier* 5562.

3. PIPER L.

KEY TO SPECIES

- | | |
|---|-------------------------------|
| 1. Leaves palmately nerved..... | 2. |
| Leaves pinnately nerved..... | 4. |
| 2. Inner nerves confluent below..... | 3. <i>P. pinoganense</i> . |
| Nerves separate to the base..... | 3. |
| 3. Petiole short, wingless; leaves green..... | 1. <i>P. smilacifolium</i> . |
| Petiole elongate, winged; leaves brown when dry..... | 2. <i>P. san-joseanum</i> . |
| 4. Midrib subequally branched throughout..... | 5. |
| Midrib without strong ascending branches upwards..... | 23. |
| 5. Leaf base appreciably acute..... | 6. |
| Leaf base appreciably obtuse, at least on one side..... | 16. |
| 6. Leaves glabrous above..... | 7. |
| Leaves pubescent above, large..... | 24. <i>P. gatunense</i> . |
| 7. Leaves glabrous beneath..... | 8. |
| Nerves (at least) pubescent beneath..... | 14. |
| 8. Leaves about half as broad as long..... | 9. |
| Leaves more elongate..... | 10. |
| 9. Leaves 10 to 14 by 20 to 30 cm..... | 22. <i>P. calocoma</i> . |
| Leaves scarcely half as large..... | 14. <i>P. darlense</i> . |
| 10. Leaf base nearly equilateral..... | 11. |
| Leaves distinctly oblique..... | 18. <i>P. falcifolium</i> . |
| 11. Spikes scarcely 2 cm. long..... | 35. <i>P. amphoricarpum</i> . |
| Spikes more elongate..... | 12. |
| 12. Leaves drying green..... | 13. |
| Leaves pale or bronzed beneath..... | 17. <i>P. cordulatum</i> . |
| 13. Berries depressed-globose..... | 16. <i>P. acutissimum</i> . |
| Berries ellipsoid-mucronate..... | 13. <i>P. laxispicum</i> . |
| 14. Spikes scarcely 3 cm. long; leaves large..... | 27. <i>P. latibracteum</i> . |
| Spikes more elongate..... | 15. |
| 15. Leaves scarcely 4 by 14 cm..... | 15. <i>P. trichopus</i> . |
| Leaves much larger..... | 23. <i>P. polyneurum</i> . |
| 16. Leaves glabrous above..... | 17. |
| Leaves somewhat villous on both faces..... | 24. <i>P. gatunense</i> . |
| 17. Leaves large, granular or pitted..... | 18. |
| Leaves scarcely 6 by 15 cm..... | 20. |
| 18. Leaves firm and rugose..... | 27. <i>P. latibracteum</i> . |
| Leaves thin and not rugose..... | 19. |
| 19. Leaves coarsely glandular-granular..... | 23. <i>P. polyneurum</i> . |
| Leaves finely glandular; pubescence white..... | 25. <i>P. ladrillense</i> . |
| 20. Leaf base nearly equilateral..... | 12. |
| Leaves distinctly oblique or shorter on one side..... | 21. |

21. Leaves about half as broad as long.....	22.
Leaves more elongate.....	19. <i>P. laevibracteum</i> .
22. Leaves acuminate, 6 by 15 cm.....	20. <i>P. subnudispicum</i> .
Leaves rather blunt and smaller.....	21. <i>P. tuberculatum</i> .
23. Leaf base appreciably acute.....	24.
Leaf base appreciably obtuse, at least on one side.....	47.
24. Mature leaves glabrous above between the nerves.....	25.
Leaves scabrous or pubescent on both sides.....	76.
25. Leaves quite glabrous beneath.....	26.
Nerves, at least, puberulent or pubescent beneath.....	41.
26. Leaves about half as broad as long.....	27.
Leaves more elongate.....	31.
27. Spikes scarcely 1 cm. long.....	28.
Spikes more elongate.....	29.
28. Petiole winged; flowers perfect.....	34. <i>P. wagneri</i> .
Petiole wingless; dioecious.....	34a. <i>P. wagneri minutispicum</i> .
29. Leaves drying green, 5 by 11 cm.....	36. <i>P. tenuimucronatum</i> .
Leaves drying papery, rather large.....	30.
30. Stigmas sessile; berry subglobose.....	44. <i>P. callibracteum</i> .
Stigmas borne on a short style.....	47. <i>P. papyraceum</i> .
31. Spikes 2 cm. long; leaves dark-granular.....	33. <i>P. magnantherum</i> .
Spikes more elongate.....	32.
32. Petiole glabrous.....	33.
Petiole sparsely hirtellous or villous.....	40. <i>P. hirtellipetiolum</i> .
33. Leaves scarcely 5 by 14 cm.....	34.
Leaves appreciably larger.....	39.
34. Some petioles winged or some leaves subcordate.....	10. <i>P. chiriquinum</i> .
Petiole not winged above the base.....	35.
35. Leaves green.....	36.
Leaves drying yellow beneath.....	38.
36. Leaves 3 or 5-nerved near the base.....	37.
Leaves not triple-nerved.....	12.
37. Midrib without ascending branches upward.....	38. <i>P. san-lorenzanum</i> .
Midrib with a few such branches.....	39. <i>P. subtrinerve</i> .
38. Leaves lance-oblong; plant glabrous.....	63. <i>P. infraluteum</i> .
39. Petiole 5 mm. long; spikes filiform.....	51. <i>P. sambuanum</i> .
Petiole 20 mm. long; spikes stouter.....	45. <i>P. nitidifolium</i> .
40. Nerves glabrescent beneath.....	37. <i>P. tecumense</i> .
Nerves persistently puberulent or pubescent beneath.....	41.
41. Leaves about half as broad as long.....	48. <i>P. amphioxys</i> .
Leaves more elongate.....	42.
42. Twigs glabrous, pale-granular.....	43.
Twigs at least locally or transiently pubescent.....	45.
43. Leaves granular-punctulate beneath.....	44.
Leaves not dark-punctulate; petiole short.....	52. <i>P. storkii</i> .
44. Petiole scarcely 10 mm. long.....	50. <i>P. subnudibracteum</i> .
Petiole 15 to 30 mm. long.....	45. <i>P. nitidifolium</i> .
45. Leaves glossy, equilateral at base.....	41. <i>P. tapianum</i> .
Leaves dull, oblique.....	46.
46. Leaves lanceolate.....	61. <i>P. killipi</i> .
Leaves lance-elliptic.....	55. <i>P. lucigaudens</i> .
Leaves lance-oblong.....	42. <i>P. turbense</i> .
47. Mature leaves glabrous above between the nerves.....	48.
Leaves rough or pubescent on both sides.....	76.

48. Leaves glabrous beneath.....	49.
Nerves, at least, puberulent or pubescent beneath.....	61.
49. Leaves about half as broad as long.....	50.
Leaves more elongate.....	57.
50. Leaves peltate.....	51.
Leaves not peltate.....	52.
51. Leaves oblong-ovate.....	89. <i>P. veraguense</i> .
Leaves broadly ovate.....	90. <i>P. maxonii</i> .
52. Spikes scarcely 1 cm. long.....	28.
Spikes more elongate.....	53.
53. Twigs glabrous.....	54.
Twigs tomentulose.....	4. <i>P. pervenosum</i> .
54. Twigs pale-granular.....	55.
Twigs scarcely pale-granular.....	56.
55. Leaf base suboblique.....	43. <i>P. davidianum</i> .
Leaf base subequilateral.....	10. <i>P. chiriquinum</i> .
56. Leaves about 6 by 12 cm.....	12. <i>P. crassispicatum</i> .
Leaves distinctly larger.....	11. <i>P. pseudo-variabile</i> .
57. Plants creeping or climbing.....	84. <i>P. reptabundum</i> .
Plants not creeping.....	58.
58. Twigs somewhat dark-granular.....	59.
Twigs green-granular.....	43. <i>P. davidianum</i> .
Twigs scarcely granular.....	60.
59. Petioles not winged.....	51. <i>P. sambuanum</i> .
Lower petioles winged.....	9. <i>P. dunlapi</i> .
60. Leaves scarcely 12 cm. long.....	60. <i>P. septuplinervium</i> .
Leaves much larger.....	11. <i>P. pseudo-variabile</i> .
61. Older leaves rather deeply cordate or auricled, or peltate.....	62.
Leaves at most cordulate or shallowly subcordate.....	67.
62. Leaf base equilateral; petiole not winged.....	7. <i>P. paulownifolium</i> .
Leaf base inequilateral.....	63.
63. Petiole fleshy-warty.....	92. <i>P. imperiale</i> .
Petiole not warty.....	64.
64. Leaves subacute.....	65.
Leaves long-acuminate.....	66.
65. Leaves neither rugose nor peltate.....	91. <i>P. auritum</i> .
Leaves rugose and peltate.....	88. <i>P. hayesii</i> .
66. Leaves auricled on one side.....	67. <i>P. sperdinum</i> .
Leaves inequilaterally subcordate.....	71. <i>P. peracuminatum</i> .
67. Petiole glabrous.....	68.
Petiole subpuberulent.....	58. <i>P. colonense</i> .
Petiole more or less hairy.....	69.
68. Leaves acute on one side at base.....	50. <i>P. subnudibracteum</i> .
Leaves rounded at base.....	37. <i>P. tecumense</i> .
69. Twigs sparsely subvelvety; leaves oblanceolate.....	69. <i>P. subdilatum</i> .
Twigs transiently appressed-hairy.....	68. <i>P. diazanum</i> .
Twigs crisp-tomentulose.....	54. <i>P. williamsii</i> .
Twigs crisp-hairy or hirsute.....	70.
Twigs villous.....	29. <i>P. culebratum</i> .
70. Twigs glabrescent, green.....	71.
Pubescence persistent.....	73.
71. Lower petioles winged.....	8. <i>P. palmasanum</i> .
Petioles not winged.....	72.

72. Leaves 8 cm. wide, not caudate.....	46. <i>P. erectamentum</i> .
Leaves 7 cm. wide, caudate.....	49. <i>P. subcaudatum</i> .
Leaves 5 to 6 cm. wide.....	42. <i>P. turbense</i> .
Leaves 4 cm. wide.....	82. <i>P. taboganum</i> .
73. Leaves cordulate, rather glossy.....	74.
Leaves not cordulate, firm, dull.....	75.
74. Leaves glabrescent between the nerves.....	23. <i>P. gonocarpum</i> .
Leaves loosely hairy beneath; spikes very short.....	30. <i>P. pubistipulum</i> .
75. Leaves smooth.....	59. <i>P. panamense</i> .
Leaves lepidote-roughened; nerves impressed.....	61. <i>P. killipi</i> .
76. Leaves about half as broad as long.....	77.
Leaves more elongate.....	87.
77. Leaves glandular-granular above.....	71. <i>P. peracuminatum</i> .
Leaves scabrous above.....	78.
Leaves scarcely scabrous.....	83.
78. Twigs crisp-pubescent.....	79.
Twigs scabrid-hispid or hirsute.....	80.
Twigs villous.....	76. <i>P. villiramulum</i> .
79. Leaves scarcely 6 by 12 cm.....	66. <i>P. pseudo-cativalense</i> .
Leaves becoming 8 by 16 cm.....	73. <i>P. barbinerve</i> .
80. Pubescence short-scabrid.....	81.
Pubescence more upcurved and hirsute.....	82.
81. Leaves scarcely 6 by 12 cm.....	66. <i>P. pseudo-cativalense</i> .
Leaves becoming 9 by 15 cm.....	64. <i>P. trachydermum</i> .
82. Leaves pale-granular beneath.....	74. <i>P. non-retrosum</i> .
Leaves not markedly pale-granular beneath.....	72. <i>P. sancti-felicis</i> .
83. Plants climbing; leaves very lepidote.....	83. <i>P. vitabundum</i> .
Plants not climbing.....	84.
84. Leaves 10 by 20 cm.....	85.
Leaves distinctly smaller.....	86.
85. Leaves not cordulate.....	26. <i>P. stvensi</i> .
Leaves unequally cordulate.....	71. <i>P. peracuminatum</i> .
86. Pubescence velvety-tomentulose.....	6. <i>P. bigelovii</i> .
Pubescence soft, crisp-appressed.....	70. <i>P. obaldianum</i> .
Pubescence sparsely villous.....	65. <i>P. cativalense</i> .
87. Leaves scabrous above.....	88.
Leaves scarcely scabrous.....	96.
88. Spikes hooked.....	77. <i>P. elongatum</i> .
Spikes nearly or quite straight.....	89.
89. Twigs densely red-velvety.....	86. <i>P. pervelutinum</i> .
Twigs crisp-pubescent or appressed-pubescent.....	91.
Twigs hispid-hirsute.....	61. <i>P. killipi</i> .
Twigs tomentose or scabrous-hispid.....	90.
Twigs villous.....	94.
90. Leaves oblong, 4 by 16 cm.....	79. <i>P. changuinolanum</i> .
Leaves obliquely elliptic-ovate, 8 by 18 cm.....	75. <i>P. scabrilibum</i> .
91. Twigs densely canescent upwards.....	85. <i>P. breve</i> .
Pubescence more sparse.....	92.
92. Leaves rough, oblong.....	85. <i>P. breve</i> .
Leaves smoother.....	93.
93. Leaves broadly lance-elliptic.....	78. <i>P. chagresianum</i> .
Leaves broadly oblanceolate.....	69. <i>P. subdilatatum</i> .
94. Leaves subequilateral, elliptic-oblong.....	95.
Leaves obliquely ovate-elliptic.....	76. <i>P. villiramulum</i> .

95. Leaves scarcely 4 by 12 cm.....56. *P. viridicaule*.
 Leaves twice as long, granular.....57. *P. persubulatum*.
 96. Leaves scarcely 2 by 10 cm.....81. *P. linearifolium*.
 Leaves distinctly larger.....97.
 97. Twigs glabrous, granular.....52. *P. storkii*.
 Twigs appressed-hispid; plants climbing.....83. *P. vitabundum*.
 Twigs sparingly crisp-pubescent or appressed-pubescent or hirsute.....98.
 Twigs almost canescent above.....85. *P. breve*.
 Twigs villous.....100.
 98. Leaves scarcely 5 by 15 cm., the base obtuse.....99.
 Leaves 8 by 20 cm., the base subacute.....53. *P. pallidibracteum*.
 99. Leaves lanceolate.....80. *P. fatoanum*.
 Leaves oblanceolate.....69. *P. subdilatum*.
 100. Spikes short.....101.
 Spikes slender and elongate.....87. *P. pilosiusculum*.
 101. Leaves granular beneath.....32. *P. garagaranum*.
 Leaves not granular.....31. *P. pseudo-garagaranum*.

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

TYPE LOCALITY: Caripe, Venezuela.

RANGE: Venezuela to Panama and Guatemala.

CANAL ZONE: Barro Colorado Island, *Standley* 31267. Caño Quebrado, *Pittier* 6986. Cerro Gordo, Culebra, *Standley* 26008. Fort Sherman, *Standley* 30959; *Stevens* 1066. France Field to Catival, *Standley* 30338. Gamboa to Cruces, *Pittier* 3778. Gatún, *Standley* 27201. Gatuncillo, *Piper* 5603, 5620. Gorgona to Gatún, *Pittier* 2279. Las Cascadas Plantation, *Standley* 25728. Mamel Hill, *Pittier* 3811. Matachín, *Kuntze* 1918. Obispo, *Standley* 31726. Río Agua Salud, Frijoles, *Piper* 5859, 5860. Río Pedro Miguel, East Paraíso, *Standley* 29969. COLÓN: Chagres Mouth, *Stevens* 278. Fató, *Pittier* 3842. Río Fató, *Pittier* 3872, 3882. PANAMA: Río Tecumen, *Standley* 29363. Río Tapla, *Mason & Harvey* 6650, 6708; *Standley* 26160, 28035, 28241. Juan Díaz, *Standley* 30548. DARIÉN: Sambú River, *Pittier* 5570. BOCAS DEL TORO: Lower Changuinola River, *Stork* 50.

2. *Piper san-joseanum* C. DC. *Linnaea* 37: 351. 1872.

Piper marginatum Auct. as to Panama.

TYPE LOCALITY: Mount Aguacate, Costa Rica.

RANGE: Costa Rica and Panama.—One of the continental equivalents of *P. marginatum* of the Antilles, which is quite lacking from the Caribbees.

PROVINCE (?): Santa Rita Trail, *Cowell* 122. VERAGUAS: Isla de Uva, *Pittier* 5112. CANAL ZONE: Agua Clara, *Stevens* 546. Ancón Hill, *Killip* 3041, 12087; *Standley* 26326. Balboa, *Standley* 25600. Cerro Gordo, Culebra, *Pittier* 3737; *Standley* 25964. Culebra, *Pittier* 2146; *Stevens* 927. Darién Station, *Standley* 31557. Fort Clayton to Corozal, *Standley* 29214. Fort Randolph, *Standley* 28655. Las Cruces Trail, *Standley* 29214. Fort Sherman, *Standley* 30942; *Stevens* 267. Frijoles, *Standley* 27627. Frijoles to Monte Lirio, *Killip* 12116. Gamboa, *Standley* 28334, 28536. Gatún, *Standley* 27247, 27288. Corozal, *Stevens* 63, 118. Monkey Hill above Colón, *Lehmann* 768. Juan Mina, *Piper* 5696, 5698. Las Cascadas Plantation, *Standley* 25751. Summit, *Standley* 26938. New Limón, *Stevens* 1015. COLÓN: Fató to Playa de Damas, *Pittier* 3934. Río Chagres, *Piper* 5898, 5917, 5962. Santa Isabel, *Pittier* 4176. PANAMA: Bella Vista, *Killip* 12012; *Standley* 25332. Chepo, *Pittier* 4708. Corozal Road, *Standley* 26834. Camino de la Granja, *Bro. Heriberto* 166. Juan Díaz, *Standley* 30521. Las Sabanas to Matías Hernández, *Standley* 31835. Punta Paitilla, *Standley* 26274. Río Tapla, *Standley* 28207.

Río Tecumen, *Standley* 26599, 29482. Taboga Island, *Killip* 3165, 3195; *Pittier* 3553: *Standley* 27044, 27057, 27847. DARIÉN: Garachiné, *Pittier* 5512.

2a. *Piper san-joseanum aristolochiaefolium* Trel., var. nov.

A form with more narrowly ovate, dull dark green, bullate leaves 8 to 8.5 by 15 cm., deeply cordate, with parallel margins to the sinus.

Type in the U. S. National Herbarium, no. 1,217,625, collected on hills north of Frijoles, Canal Zone, Panama, by Paul C. Standley (no. 27524).

3. *Piper pinoganense* Trel., sp. nov.

A shrub; flowering internodes green, much fluted, minutely and very transiently puberulent; leaves elliptic, caudate, rounded at base but sulcately narrowed to the petiole, moderate (4.5–5.5×9–12 cm.), 5-nerved, the nerves salient on both sides, glabrous, very thick and firm, drying green; petiole very short (scarcely 5 mm.), puberulent, winged and deeply channeled; spikes opposite the young leaves, filiform, 4 cm. long, loosely flowered; peduncle scarcely 1 cm. long, slender; bracts minute, concave; flowers sessile, perfect; stigmas 3, minute.

Type in the Delessert Herbarium, Geneva (duplicate in the U. S. National Herbarium), collected at Pinogana, southern Darién, Panama, by H. Pittier (no. 6556).

RANGE: Southeastern Panama.

4. *Piper pervenosum* C. DC. (*Candollea* 1: 268, name only. 1923) Schroeder, *Candollea* 3: 137. 1926.

A shrub; flowering internodes moderately slender but short, gray-tomentulose; leaves broadly ovate, subacute, equally rounded or slightly cordulate at base, rather large (8×14–11×18 cm.), pinnately nerved from below the upper third, the main nerves¹ 3 or 4×2 but with intermediates and spaced shorter veins nearly to the end, glabrous, gray-green, paler beneath; petiole very short (5 mm.), tomentulose-puberulent, winged to the end; spikes terminal or opposite the leaves, small (4×25 mm.); peduncle short (scarcely 10 mm.), gray-tomentulose; bracts lunulate; flowers sessile, perfect; ovary round, with a very short style.

TYPE LOCALITY: Puerto Obaldía, San Blas Coast, Province of Colón (*Pittier* 4302, the type).

RANGE: Northeastern Panama.

5. *Piper oblitum* Trel., sp. nov.

A small scandent (?) shrub; flowering internodes slender and short, from slightly velvety quickly glabrescent; leaves broadly ovate, very bluntly acuminate, subequally rounded at base, moderately large (6–8×10–13 cm.), submultiple-nerved from the lower fourth, the nerves 4×2, the lower congested, the nerves above sparsely hairy, rusty-tomentulose beneath; petiole rather short (13+2 or 3 mm.) fleecy, winged at base; spikes opposite the leaves, moderate (3×30–40 mm.); peduncle short (5–7 mm.), sparingly hairy; bracts lunulately subpeltate, velvety; flowers sessile, perfect.

Type in the herbarium of the New York Botanical Garden, collected in "Panama" by Sutton Hayes (no. 803).

RANGE: Northeastern (?) Panama.

¹Two forms of expression used in this paper in the description of leaves perhaps require explanation. The phrase "main nerves 3 or 4×2" indicates that there are 3 or 4 chief lateral nerves on each side of the costa. The phrase "petiole rather short (13+2 mm.)" indicates that in a leaf with unequal base the blade extends on one side 2 mm. below the apex of the petiole.

6. *Piper bigelovii* Trel., sp. nov.

A shrub, nodose, rusty-tomentulose or velvety throughout; flowering internodes rather slender and short; leaves elliptic to ovate, subacuminate, rounded or cordulate at base with one side commonly shorter, moderately large (5-7×12-13 cm.), pinnately nerved from below the middle, the nerves 5 or 6×2; petiole rather short (10-10+4 mm.), winged at base; spikes opposite the leaves, moderately elongate (3×60-65 mm.); peduncle short (5-10 mm.); bracts triangular-subpeltate, ciliate; flowers sessile, perfect; berries minute, obpyramidal, 3-sided; stigmas 3, minute, linear, sessile.

Type in the Torrey Herbarium, New York Botanical Garden, collected on the "Isthmus of Panama" by J. N. Bigelow.

RANGE: Panama.

7. *Piper paulownifolium* C. DC. Anal. Inst. Fís. Geogr. Costa Rica 9: 173. 1898.

Piper castmirianum Auct. as to Panama.

TYPE LOCALITY: La Palma, Costa Rica.

RANGE: Costa Rica and Panama.

CHIRIQUÍ: Hato de Jobo, San Felix, *Pittier* 5427. Cerro de la Plata, San Felix, *Pittier* 5158. CANAL ZONE: Barro Colorado Island, *Mason, Harvey & Valentine* 6809; *Standley* 31282, 31893; *Stevens* 645. Caño Quebrado, *Pittier* 6866. Frijoles, *Standley* 27612. Gatún, *Standley* 27226. Gorgona to Gatún, *Pittier* 2261. Mamei Hill, *Pittier* 3812. COLÓN: Fató, *Pittier* 3844, 3862. DARIÉN: Boca de Pauarandó, Sambú River, *Pittier* 5687.

8. *Piper palmasanum* C. DC. Smiths. Misc. Coll. 71^o: 3. 1920.

TYPE LOCALITY: Cuesta de las Palmas, Cerro de la Horqueta, Chiriquí (*Pittier* 3225, the type).

RANGE: Southwestern Panama.

9. *Piper dunlapi* Trel., sp. nov.

A shrub, glabrous, nodose; flowering internodes rather slender and short, granular, dark in drying; leaves ovate or lance-ovate, more or less sharply acuminate, rather unequally acute to equilaterally rounded at base, moderately small (5-5.5×13 cm.), submultiple-nerved, the midrib on each side with about 5 branches from below the middle or upper third, the lowermost basal, somewhat glandular-granular; petiole short (10-15 mm.), winged at base only or on the larger leaves throughout; spikes opposite the leaves, rather small (3×23 mm.) before flowering, mucronate; peduncle slender and short (scarcely 10 mm.); bracts roundish-subpeltate, brown-umbonate, with broad yellow ciliate margin; flowers sessile.

Type in the U. S. National Herbarium, no. 1,205,151, collected in Changuinola Valley, Bocas del Toro, Panama, by V. C. Dunlap (no. 231).

RANGE: Northwestern Panama.

10. *Piper chiriquinum* C. DC. Smiths. Misc. Coll. 71^o: 2. 1920.

TYPE LOCALITY: El Boquete, Chiriquí (*Pittier* 2930, the type).

RANGE: Southwestern Panama.

11. *Piper pseudo-variabile* Trel., sp. nov.

Piper grandifolium Auct. as to Panama.

Piper variabile Auct. as to Panama.

A shrub, glabrous; flowering internodes rather long and slender; leaves elliptic to broadly ovate, acuminate, equilaterally rounded or the larger subtruncate at base, large (7-8×17-13×20 cm.), pinnately to submultiple-nerved from below the upper fourth, the nerves 5 to 7×2 with the lower congested toward the base; petiole relatively short (10-15 mm.), winged toward the base;

spikes opposite the leaves, rather slender and long (3×50-90 mm.); peduncle rather slender and short (18 mm.); bracts inconspicuous, concave; flowers sessile, perfect; berries minute, obpyramidal, 3-sided, glabrous; stigmas 3, minute, sessile.

Type in the U. S. National Herbarium, no. 678920, collected on Loma de la Gloria, near Fató, Province of Colón, Panama, by H. Pittier (no. 3845).

RANGE: Panama.

CHIRIQUÍ: San Felix, *Pittier* 5189, 5262. COCLÉ: Ola, *Pittier* 5075. CANAL ZONE: Ancón Hill, *Standley* 25179; *Williams* 19. Barro Colorado Island, *Standley* 31308. Fort Sherman, *Standley* 31022. PANAMA: Juan Díaz, *Standley* 30610.

11a. *Piper pseudo-variabile pachypus* Trel., var. nov.

Nodose; leaves broadly elliptic, 10.5×20 cm.; spikes 100 mm. long; peduncle stout.

Type in the U. S. National Herbarium, no. 1,167,279, collected between Frijoles and Monte Lirio, Canal Zone, Panama, by E. P. Killip (no. 12145).

RANGE: Central Panama.

11b. *Piper pseudo-variabile collium* Trel., var. nov.

Leaves becoming elongate, 7 to 8 by 20 to 25 cm.; passing into the type.

Type in the U. S. National Herbarium, no. 1,153,478, collected along the Río Tapla, Province of Panama, Panama, by Paul C. Standley (no. 26130).

RANGE: Central Panama.

CANAL ZONE: Caño Quebrado, *Pittier* 6662. Frijoles, *Standley* 27555. Gatún, *Standley* 27191. Las Cascadas Plantation, *Standley* 25700, 25733, 29518, 29658. Obispo, *Standley* 31702. Río Paraíso, *Standley* 29892. PANAMA: Juan Díaz, *Standley* 30577.

12. *Piper crassispicatum* Opiz in Presl, Rel. Haenk. 1: 152. 1830.

Artanthe crassispicata Miquel, Syst. Piper. 521. 1844.

TYPE LOCALITY: "Panama."

RANGE: Panama.

13. *Piper laxispicum* Trel., sp. nov.

A small glabrous soft-wooded shrub scarcely 50 cm. tall; stems slender, green; leaves lanceolate or lance-oblong, subacuminate, equilaterally acute at base, moderately small (4-5×12-16 cm.), pinnately nerved throughout, the nerves about 8×2 with some shorter intermediates, drying green and papery; petiole rather short (10 mm.), not winged; spikes opposite the leaves, in fruit rather thick and short (7×50 mm.); peduncle slender, scarcely 10 mm. long; bracts concave; flowers sessile, perfect; berries not crowded, ellipsoid, mucronate, drying angular; stigmas 3, from the mucro.

Type in the U. S. National Herbarium, no. 1,215,963, collected on Barro Colorado Island, Gatún Lake, Canal Zone, Panama, by Paul C. Standley (no. 31375).

RANGE: East-central Panama.

13a. *Piper laxispicum latifolium* (C. DC.) Trel.

Piper acuminatissimum latifolium C. DC. in herb.

Leaves broader (6-8×15-17 cm.) and more heavily nerved.

Type in U. S. National Herbarium, no. 679401, collected at Puerto Obaldía, San Blas Coast, Province of Colón, Panama, by H. Pittier (no. 4288).

RANGE: Northeastern Panama.

14. *Piper darienense* C. DC. in DC. Prodr. 16¹: 374. 1869.

Piper lanceolatum Auct. as to Panama.

TYPE LOCALITY: "Veraguas" (*Seemann*).

RANGE: South-central Panama.

14a. *Piper darienense tricuspe* (Miquel) Trel.

Artanthe tricuspis Miquel; Seem. Bot. Voy. Herald 200. pl. 42. 1856.

Piper tricuspe C. DC. in DC. Prodr. 16¹: 263. 1869.

Piper lanceolatum tricuspe C. DC. Candollea 1: 255. 1923. Name only, in index.

TYPE LOCALITY: "Panama" (Seemann).

RANGE: Panama to Ecuador.

15. *Piper trichopus* Trel., sp. nov.

A shrub; flowering internodes slender, rather short (2-3 cm.), sparsely pubescent; leaves lanceolate, almost equally acute at both ends or one side subobtuse at base, moderately small (3-3.5×12-13 cm.), pinnately nerved nearly throughout, the looping nerves about 8×2, appressed-pubescent on the nerves beneath and somewhat granular; petiole rather short (5-10 mm.), very slender, not winged, pubescent; spikes opposite the leaves (2×50 mm.); peduncle extremely slender, 10 to 15 mm. long, short-hairy; bracts inconspicuous, concave, ciliate; flowers perfect, sessile; stigmas 3, minute, sessile; berries subcubical, glabrous.

Type in the Herbarium of Columbia University, New York Botanical Garden, collected in "Panama" by Sutton Hayes (no. 797).

RANGE: Central (?) Panama.

16. *Piper acutissimum* Trel., sp. nov.

Piper lucaeanum Auct. as to Panama.

A shrub, glabrous, nodose; flowering internodes short (2 cm.) and slender; leaves narrowly lanceolate or lance-oblong, acute at both ends or subacuminate, rather small (2.5-3×10-14 cm.), pinnately nerved nearly throughout, the larger nerves about 6×2, but with ascending nervules upward; petiole rather short (10 mm.), not winged; spikes opposite the leaves, rather small (3×50 mm.), submucronate; peduncle slender and short (scarcely 10 mm.); bracts concavely truncate, ciliate; flowers sessile, perfect; berries depressed-globose, more or less angular from pressure, velvety; stigmas 3, sessile.

Type in the U. S. National Herbarium, no. 38081, collected at Chagres, Province of Colón, Panama, by A. Fendler (no. 266).

RANGE: Eastern central Panama.

CANAL ZONE: Barro Colorado Island, Stevens 7. Frijoles, Standley 27504, 27599.

17. *Piper cordulatum* C. DC. Journ. Bot. Brit. & For. 4: 217. 1866.

TYPE LOCALITY: Chagres, Province of Colón (Fendler 267, the type).

RANGE: Eastern central Panama.

CANAL ZONE: Agua Clara, Stevens 580. Barro Colorado Island, Standley 31355. Frijoles, Standley 27450, 27578. Gatón, Hayes "739?". Gorgona to Gatón, Pittier 2267. Las Cruces, Pittier 26241. Río Paraíso, Standley 29905.

17a. *Piper cordulatum granulatum* Trel., var. nov.

Differs from the type in its very acute-based, granular-roughened leaves.

Type in the U. S. National Herbarium, no. 1,153,882, collected near Frijoles, Canal Zone, Panama, by Paul C. Standley (no. 27587).

RANGE: East-central Panama.

18. *Piper falcifolium* Trel., sp. nov.

Piper geniculatum Auct. as to Panama.

A shrub, glabrous, nodose; flowering internodes slender and short (2-3 cm.), becoming coarsely warty; leaves falcately lanceolate, acuminate, unequally acute at base with one side appreciably longer and decurrent, moderately small (3-3.5×11-14 cm.), pinnately nerved throughout, the nerves about 10×2 with

short intermediates; petiole rather long (10+5 or even 25 mm.), winged throughout; spikes moderate (3×60 mm.); peduncle filiform, rather short (10 mm.); bracts truncately sublunate, rusty-ciliate; flowers sessile, perfect.

Type in the U. S. National Herbarium, no. 715322, collected at San Felix, Chiriquí, Panama, by H. Pittier (no. 5137).

RANGE: Southwestern Panama.

19. *Piper laevibracteum* Trel., sp. nov.

A shrub, glabrous, nodose; flowering internodes slender and moderately short (2.5–4 cm.), at length warty; leaves lance- or elliptic-oblong, subacuminate, very unequal at base with the longer side acute except on the largest, moderately large (4.5–7×15–22 cm.), pinnately nerved throughout, the nerves about 12×2; petiole short (5+10 mm.), winged throughout; spikes opposite the leaves, moderate (2×60 mm.); peduncle slender and short (10 mm.); bracts truncate-lunulate, microscopically ciliolate; flowers sessile, perfect; stigmas 2 to 4, sessile.

Type in the U. S. National Herbarium, no. 715545, collected on Cerro Vaca, Chiriquí, Panama, by H. Pittier (no. 5324).

RANGE: Southwestern Panama.

CHIRIQUÍ: San Felix, *Pittier* 5131. El Boquete, *Mason* 5381. El Boquete to Caldera, *Pittier* 3327.

20. *Piper subnudispicum* Trel., sp. nov.

An essentially glabrous shrub, resembling the preceding; leaves elliptic-oblong, acuminate, unequally obtuse at base, rather large (6–7×16 cm.), drying membranaceous; spikes filiform, 2×80 mm.; peduncle short (5 mm.); bracts very inconspicuous.

Type in the U. S. National Herbarium, no. 679342, collected on Loma de la Gloria, Fató, Province of Colón, Panama, by H. Pittier (no. 4241).

RANGE: East-central Panama.

CANAL ZONE: Barro Colorado Island, *Mason, Harvey & Valentine* 6813. Fort Sherman, *Standley* 31115. Frijoles, *Killip* 3420; *Standley* 27519.

21. *Piper tuberculatum* Jacq. Coll. Bot. 5: 7. 1786.

TYPE LOCALITY: "Tropical America" (Venezuela?).

RANGE: Northern South America to Central America.

CANAL ZONE: Balboa, *Standley* 25409, 32117. Empire, *Stevens* 1143. PANAMA: Corozal Road, *Standley* 26781. Juan Díaz, *Standley* 30470. Juan Franco Race Track, Panama, *Standley* 27676. Río Tapla, *Standley* 28280. Tumba Muerta Road, *Standley* 29712. Taboga Island, *Pittier* 3550; *Standley* 27093.

22. *Piper calocoma* (Miquel) C. DC. in DC. Prodr. 16¹: 264. 1869.

Artanthe calocoma Miquel in Seem. Bot. Voy. Herald 199. 1856.

TYPE LOCALITY: Darién (*Seemann* 1067, the type).

RANGE: Colombia to south-central Panama.

COCLÉ: Bismarck, above Penonomé, *Williams* 332. DARIÉN: *Seemann* 1067.

23. *Piper polyneurum* C. DC. (*Candollea* 1: 270. 1923, name only, in index); *Schroeder, Candollea* 3: 138. 1926.

A small tree 2 to 4 meters tall, coarsely glandular-granular throughout; flowering internodes moderately stout and long, sparingly tomentulose or glabrate; leaves elliptic-ovate, short-acuminate, subequally cordulate or rounded or exceptionally acute at base, large (9–11×20–23 cm.), pinnately nerved nearly throughout, the nerves about 12×2, appressed-pubescent on the nerves beneath; petiole short (5 mm.) and not winged or on the round-based leaves elongate (20–40 mm.) and winged to the end, glabrate; spikes opposite

the leaves, arched, rather large (5×100 mm.); peduncle thick and short (scarcely 10 mm.), glabrate; bracts large, deltoid-peltate, brown-tomentulose; flowers sessile, perfect; stigmas 3, large, slightly stalked.

TYPE LOCALITY: Cerro de Garagará, Sambú Basin, Darién (*Pittier* 5677, the type).

RANGE: Panama.

CANAL ZONE: Frijoles, *Standley* 27495. Río Indio de Gatún, *Pittier* 2790, 2791.

24. *Piper gatunense* Trel., sp. nov.

A shrub, 2 to 3 meters tall; flowering internodes finally stout and long, green, from villous glabrescent and glandular-granular; leaves lance-elliptic, short-acuminate and slightly inequilaterally acute at base, or ovate-oblong and equilaterally subtruncate at base, pinnately nerved nearly throughout, the nerves 12 to 15×2, sparsely villous on both sides; petiole short (5–10 mm.) and not winged, or on the broader leaves 3 cm. long, villous; spikes opposite the leaves, arched, large (8×100 mm.); peduncle stout and moderately elongate (20 mm.), from villous glabrescent; bracts triangular-subpeltate, the yellow margin ciliate; flowers sessile, perfect; stigmas 3, sessile; berries oblong.

Type in the Torrey Herbarium, New York Botanical Garden, collected at Gatún, Canal Zone, Panama, by Sutton Hayes (no. 502).

RANGE: East-central Panama.

CANAL ZONE: Frijoles, *Standley* 27465, 27491.

25. *Piper ladrillense* Trel., sp. nov.

A moderate-sized shrub; flowering internodes rather slender and elongate, not granular, transiently crisp-puberulent; leaves broadly ovate, shortly sub-acuminate, somewhat inequilaterally rounded at base or the shorter side sub-acute, large (11×20–22 cm.), pinnately nerved nearly throughout, the nerves 12 to 15×2, sparsely white-crisp-hairy on the nerves beneath and obscurely and finely glandular-granular; petiole moderately short (10+2–15+5 mm.), winged, very sparsely white-hairy or glabrate; spikes opposite the leaves, rather large (before flowering 4×55 mm.); peduncle short (10 mm.), glabrate; bracts round or lunate-subpeltate, the narrow pale margin ciliolate; flowers sessile, perfect.

Type in the U. S. National Herbarium, no. 677563, collected along the Río Ladrillo, Chiriquí, Panama, by H. Pittier (no. 3164). The collection has been referred to the glabrous peltate-leaved *P. mazonii*.

RANGE: Southwestern Panama.

26. *Piper stevensi* Trel., sp. nov.

A shrub; flowering internodes rather stout and long, green, densely crisp-hairy; leaves elliptic, short-acuminate, rounded at base on one side with the other shorter and acute, large (10–11×21–23 cm.), pinnately nerved from below the upper fourth, the nerves about 7×2, rather loosely crisp-pubescent on both faces with the nerves pale-hirsute beneath, scarcely granular; petiole moderately long (20+10 mm.), winged below the middle, crisp-hairy; spikes opposite the leaves, rather large (5×80 mm.); peduncle 2 cm. long, moderately slender, subretroscely crisp-pubescent; bracts elliptical-subpeltate, pale-margined and ciliate; flowers sessile, perfect; stigmas 3, sessile; berries subglobose-oblong.

Type in the herbarium of the University of Illinois, collected at Frijoles, Canal Zone, Panama, by F. L. Stevens (no. 1247).

RANGE: East-central Panama.

27. *Piper latibracteum* C. DC. *Smiths. Misc. Coll.* 71^o: 5. 1920.

TYPE LOCALITY: Boca de Pauarandó, Sambú River, Darién (*Pittier* 5588).

RANGE: Southeastern Panama.

28. *Piper gonocarpum* Trel., sp. nov.

A shrub, 2 meters tall; flowering internodes moderately slender and elongate, dingy-tomentulose; leaves lance-elliptic or oblong, somewhat acuminate, rounded at base or subcordulate, with one side slightly shorter, moderate (6.5×17 cm.), pinnately nerved from below the middle, the nerves 5 or 6×2, dull green, glabrous and slightly cellular-pitted above, hirsute on the nerves and paler beneath; petiole rather short (10+2 mm.), deeply concave, winged, tomentulose; spikes opposite the leaves, thick and rather short (8×45 mm.), caudate and sterile at tip; peduncle short (10 mm.), sparsely hairy; bracts broad, concave; flowers sessile, perfect; berries depressed-quadrangular, 2 to 3 mm. in diameter, 4-ridged, obscurely puberulent; stigmas 3, broad, sessile.

Type in the U. S. National Herbarium, no. 1,153,832, collected near Frijoles Canal Zone, Panama, by Paul C. Standley (no. 27437).

RANGE: East-central Panama.

29. *Piper culebranum* C. DC. *Candollea* 1: 121, 243. 1923.

TYPE LOCALITY: Río Culebra, Colón (*Pittier* 4154, the type).

RANGE: East-central Panama.

CANAL ZONE: Fort Randolph, *Standley* 28622, 28667. France Field to Catival, *Standley* 30375. PANAMA: Juan Díaz, *Standley* 30611.

30. *Piper pubistipulum* C. DC. *Smiths. Misc. Coll.* 71^o: 5. 1920.

TYPE LOCALITY: Agua Clara, Gatún, Canal Zone (*Pittier* 2661, the type).

RANGE: East-central Panama.

30a. *Piper pubistipulum estylosum* Trel., var. nov.

Differing in its sessile stigmas.

Type in the U. S. National Herbarium, no. 1,215,959, collected on Barro Colorado Island, Canal Zone, Panama, by Paul C. Standley (no. 31364).

RANGE: With the type.

31. *Piper pseudo-garagaranum* Trel., sp. nov.

A shrub, scarcely 2 meters tall; flowering internodes zigzag, rather slender and short, evanescently villous; leaves elliptic-lanceolate, acuminate, inequilaterally rounded at base, moderately large (5.5–7×14–16 cm.), pinnately nerved from below about the middle, the alternate nerves about 4×2, with a few soft appressed long hairs on the dark green upper surface, the nerves villous beneath; petiole short (3+3 mm.), scarcely winged, villous; spikes opposite the leaves, as yet young and small (1×20 mm.), with short (5 mm.), sparsely pubescent peduncle; bracts rounded-subpeltate, the narrow pale margin ciliate; flowers sessile.

Type in the U. S. National Herbarium, no. 1,215,804, collected on Barro Colorado Island, Canal Zone, Panama, by Paul C. Standley (no. 31409).

RANGE: East-central Panama.

32. *Piper garagaranum* C. DC. *Smiths. Misc. Coll.* 71^o: 15. 1920.

TYPE LOCALITY: Garagará, Sambú Basin, Darién (*Pittier* 5618, the type).

RANGE: Southeastern Panama.

33. *Piper magnantherum* C. DC. *Smiths. Misc. Coll.* 71^o: 16. 1920.

TYPE LOCALITY: Cerro de Garagará, Darién (*Pittier* 5666, the type).

RANGE: Southeastern Panama.

34. *Piper wagneri* C. DC. in DC. *Prodr.* 16¹: 302. 1869.

TYPE LOCALITY: "Chiriquí" (*Wagner*).

RANGE: Southwestern Panama.

34a. *Piper wagneri* var. *minutispicum* (C. DC.) Trel.

Piper minutispicum C. DC. Smiths. Misc. Coll. 71^o: 1. 1920.

TYPE LOCALITY: Sabana Grande, El Salto, above El Boquete, Chiriquí (*Pittier* 3116, the type).

RANGE: Southwestern Panama.

35. *Piper amphoricarpum* Trel., sp. nov.

A shrub, glabrous; flowering internodes rather slender and short (2–3 cm.); leaves lanceolate, subacuminate, equilaterally long-acute at base, moderately small (3–4×12–14 cm.), pinnately nerved nearly to the end, the nerves about 8×2; petiole short (5 mm.), winged at base; spikes opposite the leaves, small (3–5×12–15 mm.), very blunt; peduncle filiform, short (scarcely 10 mm.); bracts lunulate-subpeltate, golden-ciliate; flowers sessile, perfect; ovary glabrous, granular, flask-shaped, in fruit attenuate into a slender style bearing the 3 stigmas.

Type in the U. S. National Herbarium, no. 1,010,185, collected near El Boquete, Chiriquí, Panama, by E. P. Killip (no. 3611).

RANGE: Southwestern Panama.

36. *Piper tenuimucronatum* C. DC. Smiths. Misc. Coll. 71^o: 12. 1920.

TYPE LOCALITY: Los Sigüas Camp, Cerro de la Horqueta, Chiriquí (*Mason* 5421, the type).

RANGE: Southwestern Panama.

37. *Piper tecumense* Trel., sp. nov.

A shrub, scarcely 2 meters tall, essentially glabrous; internodes slender and elongate, evanescently velvety at the nodes; leaves lance-ovate to elliptic-ovate, sharply but gradually long-acuminate, rounded at base with one side slightly longer, moderately small (4×11–6×14 cm.), pinnately nerved from below the middle, the nerves about 4×2, looping, very obscurely appressed-pubescent on the nerves beneath or quite glabrescent; petiole very short (scarcely 5+2 mm.), winged at base; stipules and stipular line somewhat pubescent; spikes opposite the leaves, when young rather small (1.5×35 mm.); peduncle filiform, 1 cm. long; bracts rounded-subpeltate, with pale ciliate margin; flowers sessile, perfect.

Type in the U. S. National Herbarium, no. 1,154,367, collected along the Río Tecumen, Province of Panama, Panama, by Paul C. Standley (no. 29358).

RANGE: Eastern Panama.

38. *Piper san-lorenzanum* Trel., nom. nov.

Artanthe trinervia Miquel; Seem. Bot. Voy. Herald 200. pl. 41. 1856.

Piper trinerve C. DC. in DC. Prodr. 16^t: 292. 1869. Not *P. trinerve* Vahl, 1804.

TYPE LOCALITY: San Lorenzo, Veraguas (*Seemann* 1217, the type).

RANGE: South-central Panama.

39. *Piper subtrinerve* Trel., sp. nov.

A shrub, 2 to 3 meters tall, essentially glabrous; flowering internodes very slender, moderately short, finely white-dotted; leaves lanceolate, very gradually attenuate or acuminate, characteristically somewhat unequally acute at base, moderately small (3–4×9–14 cm.), pinnately nerved from below the middle, the nerves about 4×2 with the second pair greatly prolonged, glossy green, obscurely granular beneath; petiole very short (2 mm.), not winged; spikes opposite the leaves, moderate (4×55 mm.); peduncle short (10 mm.), glabrous or sparsely pilose upward; bracts conspicuous, triangular-subpeltate, ciliate; flowers sessile, perfect; berries subprismatic, glabrous; stigmas 3, sessile.

Type in the U. S. National Herbarium, no. 678676, collected on Taboga Island, Panama, by H. Pittier (no. 3618).

RANGE: East-central Panama.

PANAMA: Corozal Road, *Standley* 26854. Juan Díaz, *Standley* 30600. Las Sabanas, *Bro. Celestine* 110. Las Sabanas to Matías Hernández, *Standley* 31836. Punta Paitilla, *Piper* 5410. Río Tecumen, *Standley* 26563. Tumba Muerta Road, *Standley* 29710. Taboga Island, *Standley* 27869.

39a. *Piper subtrinerve harveyanum* Trel., var. nov.

Differs chiefly in having the spikes more distinctly annulate, with the large triangular pale bracts alternating with the dark ovaries.

Type in the U. S. National Herbarium, no. 1,180,427, collected along the Tapia River, Province of Panama, Panama, by W. R. Maxon and A. D. Harvey (no. 6684).

RANGE: East-central Panama.

PANAMA: Tapia River, *Maxon & Harvey* 6734.

40. *Piper hirtellipetiolum* C. DC. *Smiths. Misc. Coll.* 71^o: 3. 1920.

TYPE LOCALITY: David, Chiriquí (*Pittier* 2832 [not 2932], the type).

RANGE: Southwestern Panama.

41. *Piper tapianum* Trel., sp. nov.

A shrub, 3 meters tall, nodose; flowering internodes slender, moderately short, at first sparingly villous; leaves lanceolate or lance-elliptic, caudate, slightly inequilaterally acute at base, moderate (5-6.5×15-16 cm.), pinnately nerved from below about the middle, the nerves about 4×2, glossy dark green and glabrous above, paler and with the nerves somewhat upcurved-pubescent beneath; petiole short (about 5 mm.), winged below, hirsute; spikes opposite the leaves, rather slender and short (10 mm.), sparsely hirsute; bracts conspicuous, roundish-subpeltate, very gray-ciliate; flowers sessile, perfect; ovary depressed, glabrous; stigmas 3, filiform, sessile.

Type in the U. S. National Herbarium, no. 1,180,449, collected along the Tapia River, Province of Panama, by W. R. Maxon and A. D. Harvey (no. 6709).

RANGE: East-central Panama.

PANAMA: Río Tapia, *Standley* 26122.

42. *Piper turbense* Trel., sp. nov.

A shrub; flowering internodes slender and rather short, loosely hairy or glabrate; leaves undulately lance-oblong, acuminate, obliquely rounded at base or with one side shorter and subacute, moderately large (5-5.5×16-20 cm.), pinnately nerved from below the middle, the nerves 4 or 5×2, sparsely villous on the nerves beneath; petiole very short (5, or 4+4 mm.), not winged, somewhat hairy; spikes opposite the leaves, small (3×20 mm.), mucronate; peduncle slender, short (5 mm.), loosely pubescent; bracts inconspicuous, sublunate, cillolate; flowers sessile, perfect; ovary flask-shaped, attenuate into a style; stigmas 3, large.

Type in the Torrey Herbarium, New York Botanical Garden, collected at Turbo, Colombia, by Schott (no. 3).

RANGE: Western Colombia; and adjacent Colón, Panama (?)

43. *Piper davidianum* C. DC. *Smiths. Misc. Coll.* 71^o: 9. 1920.

TYPE LOCALITY: David, Chiriquí (*Pittier* 2837, the type).

RANGE: Southwestern Panama.

44. *Piper callibracteum* C. DC. *Smiths. Misc. Coll.* 71^o: 13. 1920.

Piper chamissonis rubellibracteum C. DC. *Smiths. Misc. Coll.* 71^o: 13. 1920.

?*Piper aequale* Auct. as to Panama.

TYPE LOCALITY: El Boquete, Chiriquí (*Pittier* 2940, the type).

CHIRIQUÍ: El Boquete, *Pittier* 2899, type of *P. chamissonis rubellibracteum*; *Killip* 3549, in part.

RANGE: Southwestern Panama.

45. *Piper nitidifolium* C. DC. Smiths. Misc. Coll. 71⁶: 14. 1920.

TYPE LOCALITY: El Boquete, Chiriquí (*Maxon* 4943, the type).

RANGE: Southwestern Panama.

46. *Piper erectamentum* C. DC. Smiths. Misc. Coll. 71⁶: 10. 1920.

TYPE LOCALITY: Cerro de la Horqueta, Chiriquí (*Pittier* 3191, the type).

RANGE: Southwestern Panama.

47. *Piper papyraceum* Trel., sp. nov.

Piper pseudo-propinquum Auct. as to Panama.

A small, essentially glabrous tree; flowering internodes moderately slender and short, drying green, green-granular; leaves ovate-elliptic, acuminate, subequilaterally acute at base, moderately large (6×14–9×20 cm.), pinnately nerved from below the middle, the nerves 5×2, drying green and papery; petiole rather long (2–3 cm.), winged to above the middle; spikes opposite the leaves, moderate (5×60–80 mm.); peduncle short and thick, more or less velvety; bracts triangular-subpeltate, pale, ciliolate; flowers sessile, perfect; berries ovoid, with a short stout style; stigmas 3, large.

Type in the U. S. National Herbarium, no. 677410, collected at El Boquete, Chiriquí, Panama, by H. Pittier (no. 3023).

RANGE: Southwestern Panama.

48. *Piper amphioxys* Trel., sp. nov.

A shrub; flowering internodes slender and short, at most very obscurely and transiently puberulent, scarcely granular; leaves elliptic, bluntly acuminate, equilaterally acute at base, rather small (4×10–7.5×15 cm.), submultiple-nerved from below the upper third, the nerves 3 or 4×2 with the lowest pair essentially basal, slightly puberulent on the nerves beneath; petiole very short (5 mm.), channeled, not winged, glabrous; spikes opposite the leaves, slender and moderately elongate (2×50 mm.); peduncle slender, short (5 mm.), glabrous; bracts inconspicuous, round-peltate, cillolate; flowers sessile, perfect; berries minute, somewhat triquetrously obpyramidal, glabrous; stigmas 3, minute, sessile.

Type in the U. S. National Herbarium, no. 679340, collected between Loma de la Gloria and Fató, Province of Colón, Panama, by H. Pittier (no. 4239).

RANGE: East-central Panama.

48a. *Piper amphioxys laurifolium* Trel., var. nov.

Differs in its narrow leaves (4×9–5×13 cm.), with the second pair of midrib branches opposite and about 1 cm. from the base.

Type in the U. S. National Herbarium, no. 715872, collected at Garagará, Sambú Basin, Darién, Panama, by H. Pittier (no. 5598).

RANGE: Southeastern Panama.

49. *Piper subcaudatum* Trel., sp. nov.

A shrub, nodose; flowering internodes rather slender and short (2–3 cm.), transiently crisp-hairy below the petioles; leaves obliquely elliptic or elliptic-obovate, subcaudately long-acuminate, subobtuse at the narrowed base, rather large (6–7.5×14–16 cm.), pinnately nerved from below the middle, the nerves 5 or 6×2, more or less appressed-hairy on the nerves beneath; petiole very short (5+3 mm.), somewhat crisp-hairy on the back, not winged; spikes opposite the leaves, as yet very young and small (1×10 mm.); peduncle sparsely velvety; bracts rounded-subpeltate, ciliolate; flowers sessile.

Type in the U. S. National Herbarium, no. 715886, collected at Garagará, Sambú Basin, Darién, Panama, by H. Pittier (no. 5612).

RANGE: Southeastern Panama.

50. *Piper subnudibracteum* C. DC. Smiths. Misc. Coll. 71^o: 14. 1920.

TYPE LOCALITY: Cerro Vaca to Hato del Loro, Chiriquí (*Pittier* 5390, the type).

RANGE: Southwestern Panama.

51. *Piper sambuanum* C. DC. Smiths. Misc. Coll. 71^o: 13. 1920.

TYPE LOCALITY: Garagará, Sambú Basin, Darién (*Pittier* 5663, the type).

RANGE: Southeastern Panama.

DARIÉN: Garagará, *Pittier* 5726.

52. *Piper storkii* Trel., sp. nov.

A shrub, essentially glabrous; flowering internodes slender and short, green, granular; leaves lance-elliptic, acuminate, very inequilateral, acute at base or the longer side somewhat rounded, moderate (4×10–6×15 cm.), pinnately nerved from below about the middle, the nerves 4 or 5×2, drying green, rarely with a soft hair above and the nerves very obscurely appressed-pubescent beneath; petiole very short (scarcely 5 mm.), granular, not winged above the base; spikes opposite the leaves, dull red, 2×60 mm.; peduncle very short (5 mm.) and relatively thick; bracts roundish-subpeltate, glabrous; flowers sessile, perfect.

Type in the U. S. National Herbarium, no. 1,166,892, collected at Rubber Tree Station, Bocas del Toro, Panama, by H. E. Stork (no. 124).

RANGE: Northwestern Panama.

53. *Piper pallidibracteum* C. DC. Smiths. Misc. Coll. 71^o: 8. 1920.

TYPE LOCALITY: Puerto Obaldía, San Blas Coast, Province of Colón (*Pittier* 4396, the type).

RANGE: Northeastern Panama.

54. *Piper williamsii* Trel., sp. nov.

A shrub, 2 to 3 meters tall, nodose; flowering internodes slender and short (2–3 cm.), grayish-tomentulose; leaves inequilaterally lanceolate or lance-elliptic, acuminate, obliquely rounded at base with one side slightly shorter and more acute, moderately large (5–7×13–17 cm.), pinnately nerved from below the middle or upper third, the nerves 5 or 6×2, cancellate-veiny, lepidote but essentially glabrous above, appressed-tomentulose on the nerves beneath; petiole rather short (10+3 mm.), tomentulose, not winged; spikes opposite the leaves, slender, 2×90 mm., refracted-mucronate; peduncle slender and short (10 mm.), appressed-pubescent or tomentulose; bracts lunately subpeltate, ciliolate; flowers sessile, perfect.

Type in the U. S. National Herbarium, no. 678344, collected at Marragantí, Panama, by R. S. Williams (no. 986).

55. *Piper lucigaudens* C. DC. Smiths. Misc. Coll. 71^o: 10. 1920.

TYPE LOCALITY: Río Indio de Gatún, Canal Zone (*Pittier* 2791, the type).

RANGE: East-central Panama.

56. *Piper viridicaule* Trel., sp. nov.

A shrub, 2 meters tall; flowering internodes green, slender and rather elongate, villous; leaves lanceolate, gradually sharp-acuminate, inequilaterally cordulate with the longer side covering the petiole, moderately small (3.5–4×10–12 cm.), pinnately nerved from below about the middle, the nerves about 5×2, green, dull, sparsely villous and very white-scabrous above, paler and appressed-white-hirsute beneath especially on the nerves; petiole moderately short (8+2–20+2 mm.), white-villous, winged below; inflorescence unknown.

Type in the U. S. National Herbarium, no. 1,215,801, collected on Barro Colorado Island, Gatún Lake, Canal Zone, Panama, by Paul C. Standley (no. 31402).

RANGE: East-central Panama.

57. *Piper persubulatum* C. DC. *Smiths. Misc. Coll.* 71^a: 4. 1920.

TYPE LOCALITY: Loma de la Gloria, Fató, Colón (*Pittier* 4240, the type).

RANGE: East-central Panama.

58. *Piper colonense* C. DC. *Smiths. Misc. Coll.* 71^a: 11. 1920.

TYPE LOCALITY: Dos Bocas, Río Fató, Colón (*Pittier* 4221, the type).

RANGE: East-central Panama.

59. *Piper panamense* C. DC. *Journ. Bot. Brit. & For.* 4: 216. 1866.

Piper citrifolium panamense C. DC. *Candollea* 1: 114. 1923.

TYPE LOCALITY: Chagres, Province of Colón (*Fendler* 270, the type).

RANGE: Northern Panama.

BOCAS DEL TORO: Laguna de Chiriquí, *Hart* 124

60. *Piper septuplinervium* (Miquel) C. DC. in DC. *Prodr.* 16¹: 313. 1869.

Artanthe septuplinervia Miquel in *Seem. Bot. Voy. Herald* 199. pl. 40. 1856.

TYPE LOCALITY: "Panama" (*Seemann* 1066, the type).

RANGE: Northern (?) Panama.

COLÓN: Porto Bello, *Pittier* 2477.

61. *Piper killipi* Trel., sp. nov.

A shrub; flowering internodes moderately slender and short, dingy-subtomentose; leaves lanceolate, gradually acuminate, obliquely subacute at base, moderately small (4-5×11-15 cm.), pinnately nerved from below the middle, the impressed nerves 5 or 6×2, dull, glabrous and scarcely scabrous above, appressed-hairy on the nerves beneath; petiole very short (5 mm.), crisp-hairy; spikes opposite the leaves, elongate (3×100 mm.), hooked-mucronate; peduncle short (5-10 mm.), glabrate; bracts triangular-subpeltate, ciliate; flowers sessile, perfect; stigmas 3, minute, sessile.

Type in the U. S. National Herbarium, no. 1,012,175, collected near El Boquete, Chiriquí, Panama, by E. P. Killip (no. 3549).

62. *Piper killipi calderanum* Trel., var. nov.

Differs in somewhat larger (5×15 cm.) and rugose, cordulate leaves, and straight-mucronate spikes.

Type in the U. S. National Herbarium, no. 1,266,034, collected along Río Caldera, above El Boquete, Chiriquí, Panama, by E. P. Killip (no. 3544).

RANGE: Southwestern Panama.

63. *Piper infraluteum* Trel., sp. nov.

A shrub, glabrous; flowering internodes slender and short; leaves lance-oblong or ovate-oblong, acuminate, subequally acute at base, small (3-4×10 cm.), pinnately nerved from below the middle, the nerves about 4×2, drying yellow beneath; petiole short (7+2 mm.), not winged; spikes opposite the leaves, slender, 2×50 mm. before flowering; peduncle slender, short (scant 10 mm.); bracts large, round- or triangular-subpeltate, ciliate; flowers sessile, perfect.

Type in the herbarium of the New York Botanical Garden, collected in "Panama" by Sutton Hayes (no. 793).

RANGE: Central (?) Panama.

64. *Piper trachydermum* Trel., sp. nov.

A shrub; flowering internodes slender and rather elongate, scabrid; leaves elliptic-subovate or subobovate, sharp-acuminate, inequilaterally obtuse at base, moderately large (7-8×16 cm.), pinnately nerved from below the upper third,

the nerves about 5×2 , microscopically white-scabrous, dingy appressed-pubescent on the nerves beneath; petiole short (7+3 mm.) not winged, hispid; spikes opposite the leaves, slender, $2 \times 50-80$ mm. before flowering; peduncle short (5 mm.), scabrid; bracts rounded-subpeltate, rusty-ciliolate; flowers sessile.

Type in the herbarium of the New York Botanical Garden, collected in "Panama" by Sutton Hayes (no. 791).

RANGE: East-central Panama.

PANAMA: Río Tapia, *Standley* 28208. COCLÉ: Bismarck, *Williams* 343.

65. *Piper cativalense* Trel., sp. nov.

A shrub, 2 to 3 meters tall; flowering internodes slender and elongate, villous; leaves elliptic-ovate or subovate, rather abruptly acuminate, inequilaterally cordulate, moderate ($6.5 \times 12-14$ cm.), pinnately nerved from below the middle or upper third, the nerves about 5×2 , green, rather glossy and sparsely long-hairy above, more villous beneath, especially on the nerves; petiole rather short (scarcely 10+2 mm.), loosely villous, winged below; inflorescence unknown.

Type in the U. S. National Herbarium, no. 1,154,579, collected between France Field, Canal Zone and Catival, Province of Colón, Panama, by Paul C. Standley (no. 30206).

RANGE: East-central Panama.

66. *Piper pseudo-cativalense* Trel., sp. nov.

A shrub, 2 meters tall; flowering internodes slender and elongate, green, sparingly crisp-pubescent; leaves elliptic-ovate to oblong, rather bluntly sub-acuminate, inequilaterally rounded at base or the broader deeply cordulate, moderate ($5-6 \times 12-13$ cm.), pinnately nerved from below the middle, the nerves 4 or 5×2 , dull, crisp-hairy, and very scabrous above, grayer and obscurely granular beneath with the nerves upcurved-pubescent; petiole short (scarcely 10+2 mm.), hispid or matted-hairy, winged below; spikes opposite the leaves, as yet minute and dingy-canescenscent.

Type in the U. S. National Herbarium, no. 1,215,573, collected between France Field, Canal Zone, and Catival, Province of Colón, Panama, by Paul C. Standley (no. 30399).

RANGE: East-central Panama.

CANAL ZONE: Barro Colorado Island, *Standley* 31288, 31387. Mount Hope Cemetery, *Standley*, 28776.

67. *Piper sperdinum* C. DC. *Smiths. Misc. Coll.* 71⁶: 1. 1920.

TYPE LOCALITY: Puerto Obaldía, San Blas Coast, Colón (*Pittier* 4348, the type).

RANGE: Northeastern Panama.

COLÓN: Puerto Obaldía, *Pittier* 4301.

68. *Piper diazanum* Trel., sp. nov.

A shrub, scarcely 2 meters tall; flowering internodes slender, moderately short, green, sparingly appressed-pubescent; leaves lanceolate to subovate or subobovate, gradually acuminate, rounded or subtruncate at base or shallowly subcordate, with one side sometimes shorter, moderately large ($3.5-5$ or $7 \times 13-16$ cm.), pinnately nerved from below the middle, the nerves about 5×2 , slightly pubescent on the nerves, yellowish green, the paler lower surface granular-punctate; petiole short (5 or 5+2-10 mm.), loosely crisp-hirsute or subvillous, winged only at base; spikes opposite the leaves, moderate ($3 \times 60-90$ mm.); peduncle short (5 mm.), with short appressed white hairs or glabrate; bracts rounded-subpeltate, ciliate; flowers sessile, perfect; berries triquetrously oblong; stigmas 3, minute, sessile.

Type in the U. S. National Herbarium, no. 863136, collected east of Juan Díaz, Province of Panama, Panama, by E. P. Killip (no. 3114).

RANGE: East-central Panama.

COLÓN: Porto Bello, *Pittier* 2428. CANAL ZONE: Cerro Gordo, Culebra, *Standley* 26006. Fort Sherman, *Standley* 30953, 30974, 30996. Fort San Lorenzo, *Maxon & Valentine* 7012. Las Cascadas Plantation, *Standley* 25798, 29625. Matachín to Las Cascadas, *Cowell* 338. Monte Lirio, *Maxon* 6843. Mount Hope Cemetery, *Standley* 28802. Obispo, *Standley* 31671. Tabernilla, *Pittier* 3828.

69. *Piper subdilatum* Trel., sp. nov.

A shrub, scarcely 2 meters tall; flowering internodes rather slender and short, drying dark, at first loosely velvety or crisp-pubescent; leaves oblanceolate-oblong, acuminate, unequally truncate or rounded below or abruptly subacute at the very base, moderately large (8×18–22 cm.), pinnately nerved from below the middle, the nerves 5 or 6×2, scabrid and transiently or obscurely appressed-pubescent above and velvety on the nerves, and somewhat appressed-hairy or loosely velvety beneath; spikes opposite the leaves, as yet young and scarcely 1×10 mm., canescent; flowers sessile.

Type in the U. S. National Herbarium, no. 863177, collected on Taboga Island, Gulf of Panama, Panama, by E. P. Killip (no. 3194).

RANGE: South-central Panama.

PANAMA: Taboga Island, *Standley* 27019, 27920.

70. *Piper obaldianum* C. DC. *Smiths. Misc. Coll.* 71^o: 7. 1920.

TYPE LOCALITY: Puerto Obaldía, San Blas Coast, Colón (*Pittier* 4366, the type).

RANGE: Northeastern Panama.

71. *Piper peracuminatum* C. DC. *Smiths. Misc. Coll.* 71^o: 9. 1920.

TYPE LOCALITY: Dos Bocas, Río Fató, Colón (*Pittier* 4210, the type).

RANGE: East-central Panama.

COLÓN: Chagres, *Fendler* 269. Río Indio de Fató, *Pittier* 4254. "Panama," *Hayes* 771.

72. *Piper sancti-felicis* Trel., sp. nov.

A shrub; flowering internodes rather slender, elongate, nodose, retrorsely and somewhat hamately gray-hispid; leaves elliptic-oblanceolate or subobovate, gradually acuminate, inequilaterally rounded at base, rather large (8–10×15–20 cm.), pinnately nerved from below the middle, the nerves 6 or 7×2, minutely scabrous on both faces and the nerves hirsute beneath; petiole short (5+4 mm.), not winged, subretrorsely hispid; spikes opposite the leaves, elongate (3×120 mm.); peduncle short (5 mm.), hispid; bracts transversely subpeltate, ciliate; flowers sessile, perfect; stigmas 3, minute, sessile; berries small, oblong.

Type in the U. S. National Herbarium, no. 715306, collected at San Felix, Chiriquí, Panama, by H. Pittier (no. 5124).

RANGE: Southwestern Panama.

73. *Piper barbinerve* Trel., sp. nov.

A shrub; flowering internodes moderately slender and elongate, for a time dingy crisp-pubescent; leaves elliptic-lanceolate or oblanceolate, bluntly acuminate, unequally cordulate with the longer side covering the petiole, moderately large (6–7.5×14–16 cm.), pinnately nerved from below the middle, the nerves at first hairy; petiole short (scarcely over 5+5 mm.), winged to the middle, hairy; spikes opposite the leaves, moderate (2×60 mm. before flowering); peduncle slender, short (10 mm.), sparsely velvety; bracts triangular-subpeltate, pale-ciliate; flowers sessile, perfect.

Type in the U. S. National Herbarium, no. 679247, collected above Santa Isabel, Culebra River, Province of Colón, Panama, by H. Pittier (no. 4148).

RANGE: Northeastern Panama.

74. *Piper non-retrorsum* Trel., sp. nov.

A shrub, nodose; flowering internodes rather slender and short, hirsute with upcurved hairs; leaves inequilaterally elliptic-oblongate, sharply acuminate, the narrowed base obtuse or with the shorter side acute, moderately large (8-9×18-20 cm.), pinnately nerved from below the upper third, the nerves 6 or 7×2, white-scabrous above, somewhat hairy beneath on the nerves; petiole moderate (10+7 mm.), hairy, not winged; spikes opposite the leaves, elongate (3×135 mm.), mucronate; peduncle short (scarcely 10 mm.), rough with upcurved pubescence; bracts round- or lunulate-subpeltate, pale-ciliate; flowers sessile, perfect.

Type in the U. S. National Herbarium, no. 677170, collected near Porto Bello, Province of Colón, Panama, by H. Pittier (no. 2429).

RANGE: Northeastern Panama.

CANAL ZONE: Fort Sherman, *Standley* 31121.

75. *Piper scabrilimum* C. DC. *Candollea* 1: 121, 276. 1923.

TYPE LOCALITY: Boca de Pauarandó, Sambú River, Darién (*Pittier* 5584, the type).

RANGE: Southeastern Panama.

76. *Piper villiramulum* C. DC. *Smiths. Misc. Coll.* 71^o: 11. 1920.

TYPE LOCALITY: Loma de la Gloria, Fató, Colón (*Pittier* 4083, the type).

RANGE: East-central Panama.

CANAL ZONE: Ancón, *Bro. Celestine* 32; *Piper* 6028. Balboa, *Standley* 26073, 29267. Bella Vista, *Macbride* 2732. Cerro Gordo, Culebra, *Standley* 26012. El Paraíso, *Pittier* 2534. Empire to Mandinga, *Piper* 5514. Frijoles, *Piper* 5867. Gamboa, *Standley* 28522. Las Cascadas Plantation, *Standley* 25692, 25701. Miraflores to Corozal, *Pittier* 2193. Río Pedro Miguel, East Paraíso, *Standley* 29966. Summit, *Standley* 26937. COLÓN: Fort Lorenzo, Río Chagres, *Piper* 5971. PANAMA: Pacora River, *Killip* 3123. Corozal Road, Panama, *Standley* 26843. Sabana de Juan Corso, Chepo, *Pittier* 4537.

76a. *Piper villiramulum gamboanum* (C. DC.) Trel.

Piper hispidum gamboanum C. DC. *Smiths. Misc. Coll.* 71^o: 12. 1920.

TYPE LOCALITY: Gamboa, Canal Zone (*Pittier* 3410, the type).

RANGE: North- and east-central Panama.

BOCAS DEL TORO: Changuinola Valley, *Dunlap* 234. CANAL ZONE: Corozal, *Stevens* 116, 117, 124. Cerro Gordo, Culebra, *Standley* 25998. Las Cascadas Plantation, *Standley* 29639. Las Cruces Trail, *Standley* 29048, 29199. Obispo, *Standley* 31794. PANAMA: Juan Díaz, *Standley* 30623. Las Sabanas to Matías Hernández, *Standley* 31818. Río Tapia, *Standley* 28134. Río Tecumen, *Standley* 26598. Camino de la Granja, *Bro. Heriberto* 165.

77. *Piper elongatum* Vahl, *Enum. Pl.* 1: 312. 1804.

TYPE LOCALITY: Brazil (?).

RANGE: Around the northeastern part of South America and, in similar if separable forms, through Central America into Mexico.

CANAL ZONE: Gatún, *Standley* 27256. Fort Sherman, *Mason & Valentine* 6992; *Standley* 30941. COLÓN: Fató to Playa de Damas, *Pittier* 3930. Fort Lorenzo, *Piper* 5985. PANAMA: Tapia River, *Mason & Harvey* 6671. Tumba Muerta Road, *Standley* 29803.

77a. *Piper elongatum laevifolium* (C. DC.) Trel.*Piper aduncum laevifolium* C. DC. Smiths. Misc. Coll. 71^o: 8. 1920.TYPE LOCALITY: Porto Bello, Colón (*Pittier* 2438, the type).

RANGE: North-central Panama.

77b. *Piper elongatum brachyarthrum* Trel., var. nov.

Differs from the type with sparsely soft-pubescent stem in having the latter very hirsute-villous.

Type in the U. S. National Herbarium, no. 675501, collected near El Boquete, Chiriquí, Panama, by William R. Maxon (no. 5139).

RANGE: Panama.

CANAL ZONE: Chiva-Chiva Trail, *Piper* 5749.78. *Piper chagresianum* Trel., sp. nov.*Piper aduncum* Auct. as to Panama.

A shrub; flowering internodes moderately slender and rather short, sparsely tawny crisp- or velvety-pubescent; leaves lance-oblong or elliptic-oblong, bluntly subacuminate, rounded or subtruncate at base with one side sometimes a little shorter, rather large (5.5–6.5×15–19 cm.), pinnately nerved from below the middle, the nerves 6 or 7×2, somewhat scabrous and hairy on the nerves above, rather sparingly appressed-pubescent beneath; petiole moderately elongate (10–15+5 mm.), winged below the middle, dingy velvety-hirsute; spikes opposite the leaves, straight, moderate (3–4×65–80 mm.); peduncle short (10 mm.), loosely velvety; bracts inconspicuous, lunulate-truncate, ciliate; flowers sessile, perfect, stigmas 2 or 3, linear, sessile; berries minute, trigonously obpyramidal, glabrous.

Type in the U. S. National Herbarium, no. 42617, collected at Chagres, Province of Colón, Panama, by A. Fendler (no. 268).

RANGE: East-central Panama.

COLÓN: Río Indio de Fató, *Pittier* 4271.79. *Piper changuinolanum* Trel., sp. nov.

A shrub, scabrous throughout, nodose; internodes short and rather slender, drying sulcate, densely but finely gray-hispid; leaves inequilaterally or sub-falcately oblong, acuminate, rounded at base and shorter on one side, rather small (4×15 cm.), pinnately nerved from below about the middle, the nerves about 5×2, the lowest somewhat approximate, slightly rugose, dull, paler and granular-punctulate beneath and appressed-pubescent on the nerves; petiole short (scarcely 5+5 mm.), winged at base, at first appressed-hairy; spikes opposite the leaves, 2 becoming 3×80–100 mm.; peduncle rather short (10 mm.), appressed-hispid; bracts small, round-subpeltate, ciliate; flowers sessile, perfect; berries short-oblong, mostly elongate with the rachis, glabrous; stigmas 3, minute, sessile.

Type in the U. S. National Herbarium, no. 1,205,153, collected in the Changuinola Valley, Bocas del Toro, Panama, by V. C. Dunlap (no. 233).

RANGE: Northwestern Panama.

80. *Piper fatoanum* C. DC. Smiths. Misc. Coll. 71^o: 7. 1920.TYPE LOCALITY: Fató to Playa de Damas, Colón (*Pittier* 3925, the type).

RANGE: East-central Panama.

81. *Piper linearifolium* C. DC. *Linnaea* 37: 355. 1872.

TYPE LOCALITY: Hacienda Santa Rosa, Costa Rica.

RANGE: Costa Rica to central Panama.

CHIRIQUÍ: El Boquete, *Maxon* 5140. COLÓN: Río Fató, *Pittier* 3881.

82. *Piper taboganum* C. DC. Smiths. Misc. Coll. 71^o: 4. 1920.

TYPE LOCALITY: Taboga Island, Gulf of Panama (*Pittier* 3529, the type).

RANGE: South-central Panama.

83. *Piper vitabundum* Trel., sp. nov.

Climbing; flowering internodes rather slender and long, sparingly and transiently appressed-hairy; leaves subelliptic, subacute at both ends or the base rather rounded, moderate (4.5×10–12 cm.), pinnately nerved from below the middle, the nerves about 4×2, closely lepidote on both faces, the nerves appressed-pubescent beneath; petiole short (5+3 mm.), sparsely hairy, scarcely winged; spikes opposite the leaves, normally (?) arched, 3×80 mm.; peduncle short (scarcely 10 mm.), glabrate; bracts roundish-subpeltate, the very narrow pale margin ciliolate; flowers perfect, sessile; berries subcubical; stigmas 3, minute, sessile.

Type in the U. S. National Herbarium, no. 1,205,222, collected in the Changuinola Valley, Bocas del Toro, Panama, by V. C. Dunlap (no. 338).

84. *Piper reptabundum* C. DC. Bot. Gaz. 70: 169. 1920.

TYPE LOCALITY: Shirores, Talamanca, Costa Rica.

RANGE: Costa Rica and adjacent Panama.

BOCAS DEL TORO: Sibubi Falls, *Rowlee* 372.

85. *Piper breve* C. DC., sp. nov.

A low shrub; flowering internodes slender and short, canescently subappressed-hairy when young; leaves lanceolate or lance-oblong, gradually pointed, rounded at base with one side shorter, moderately small (3–4.5×9–13 cm.), pinnately nerved from below the middle, the nerves about 5×2, softly appressed-pubescent on both faces or becoming slightly scabrid, not rugose; petiole short (3+3 mm.), hairy, winged to the middle, spikes opposite the leaves, relatively rather thick and short (4×45–60 mm.); peduncle rather short (10 mm.), loosely pubescent, bracts lunate- or triangular-subpeltate, ciliate; flowers sessile, perfect; stigmas 3, sessile; berries subglobose, glabrous.

Type in the U. S. National Herbarium, no. 678858, collected between Gamboa and Cruces, Canal Zone, Panama, by H. Pittier (no. 3787).

RANGE: East-central Panama.

CANAL ZONE: Cerro Gordo, Culebra, *Standley* 25975, 26018. Empire to Mandinga, *Piper* 5523. France Field to Catival, Colón, *Stevens* 981. COLÓN: Fató to Playa de Damas, *Pittier* 3923. Fort Lorenzo, *Piper* 5944.

85a. *Piper breve pallidineurum* Trel., var. nov.

A rather larger, more scabridulous-leaved form, with the prominent nerves paler beneath, the spikes scarcely longer than in the type.

Type in the U. S. National Herbarium, no. 1,154,564, collected between France Field, Canal Zone, and Catival, Colón, Panama, by Paul C. Standley (no. 30164).

RANGE: East-central Panama.

CANAL ZONE: Ancón Hill, *Killip* 12078; *Standley* 25203, 26382. Brazos Brook, *Stevens* 752. Chiva-Chiva Trail, *Maxon & Harvey* 659. Culebra, *Pittier* 3445; *Stevens* 993. Gamboa, *Standley* 28374, 28481. Juan Mina, *Piper* 5692. Obispo, *Standley* 31764. PANAMA: Chepo, *Pittier* 4539. Juan Franco Race Track, Panama, *Standley* 27713, 27734, 27777. Tumba Muerta Road, Panama, *Standley* 29724. Matías Hernández, *Standley* 28957. Las Sabanas to Matías Hernández, *Standley* 31832. Las Sabanas, *Bro. Celestine* 110. Punta Paitilla, *Standley* 26303; *Stevens* 349.

85b. *Piper breve pseudo-dumeticola* Trel., nom. nov.

Piper dumeticola panamense C. DC. Smiths, Misc. Coll. 71^o: 7. 1920.

A form with lance-oblong, rugose, and scabrid leaves, the spikes scarcely 40 mm. long.

TYPE LOCALITY: Olá, Coclé (*Pittier* 5034, the type).

RANGE: East-central Panama.

85c. *Piper breve bellae-vistae* Trel., var. nov.

A form with lanceolate-oblong leaves 7×16 cm.

Type in the U. S. National Herbarium, no. 1,167,181, collected at Bella Vista, Panama, by E. P. Killip (no. 12045).

RANGE: East-central Panama.

PANAMA: Bella Vista, *Killip* 12004; *Piper* 5331.

85d. *Piper breve divaricatum* Trel., var. nov.

A spreading form with lance-elliptic or subovate leaves, and spikes becoming 90 cm. long.

Type in the U. S. National Herbarium, no. 1,180,701, collected at Fort Sherman, Canal Zone, Panama, by William R. Maxon and A. T. Valentine (no. 6986).

RANGE: East-central Panama.

CANAL ZONE: Fort Sherman, *Standley* 30918, 30982, 31149.

85e. *Piper breve pseudo-fatoanum* Trel., var. nov.

A distinct form with narrow leaves 4×15 cm., and elongate spikes 3 to 4 by 90 mm.

Type in the U. S. National Herbarium, no. 678777, collected at Gamboa, Canal Zone, Panama, by H. Pittier (no. 3709).

RANGE: East-central Panama.

CANAL ZONE: Balboa, *Standley* 25420, 25565, 25603. Corozal, *Standley* 27341. Fort Randolph, *Maxon & Harvey* 6504, 6543; *Standley* 28659. Margarita Swamp, *Maxon & Harvey* 7055. PANAMA: Juan Díaz, *Standley* 30637. Río Tecumen, *Standley* 26551, 29451. Tapia River, *Maxon & Harvey* 6620, 6626; *Standley* 28103; *Stevens* 1033.

86. *Piper pervelutinum* Trel., sp. nov.

A shrub, nodose; flowering internodes short, densely red-velvety; leaves oblong, subacuminate, rounded at base with one side shorter, rather small (5×12–15 cm.), pinnately nerved from above the middle, the nerves 6×2, gradually approximate downward, rugose, glossy and very scabrous above, dull and red-hairy beneath; petiole short (8+2 mm.), not winged, red-hairy; spikes opposite the leaves, while very young 2×15 mm.; peduncle short, velvety; bracts round-subpeltate, ciliate; flowers sessile.

Type in the herbarium of the New York Botanical Garden, collected in "Panama" by Sutton Hayes (no. 796).

RANGE: Panama.

87. *Piper pilosiusculum* Opiz in Presl, Rel. Haenk. 154. pl. 29. 1830.

TYPE LOCALITY: "Panama" (*Haenke*, the type).

RANGE: Panama.

88. *Piper hayesii* Trel., sp. nov.

A shrub (?), at first densely rusty-tomentose; leaves obliquely ovate, subacuminate, subcordate, peltate, fully 20 by 30 cm., submultiple-nerved from below the middle, the nerves 6 to 8×2, glabrate between the velvety nerves above, velvety between the hairy nerves beneath, very bullately rugose; petiole elongate (fully 7 cm.), rusty-tomentose, winged; spikes large (4×200 mm.);

peduncle moderate (3.5 cm.), puberulent and somewhat rusty-hairy; bracts triangular-subpeltate, hairy; flowers sessile, perfect; ovary round-ovoid; stigmas 3, sessile.

Type in the Torrey Herbarium of the New York Botanical Garden, collected in "Panama" by Sutton Hayes (no. 765).

RANGE: Panama.

89. *Piper veraguense* C. DC. in DC. Prodr. 16¹: 294. 1869.

TYPE LOCALITY: "Costa Rica and Veragua" (*Warscewicz*, the type in the Bolssier Herbarium).

RANGE: Northwestern (?) Panama.

90. *Piper maxonii* C. DC. Smiths. Misc. Coll. 71⁶: 16. 1920.

TYPE LOCALITY: El Boquete, Chiriquí (*Maxon* 5050, the type).

RANGE: Southwestern Panama.

CHIRIQUÍ: Río Ladrillo, above El Boquete, *Maxon* 3163, 3164.

91. *Piper auritum* H. B. K. Nov. Gen. & Sp. 1: 54. 1816.

TYPE LOCALITY: About Jalapa, Veracruz, Mexico.

RANGE: Through Central America to Colombia in a number of scarcely separable forms, the southernmost chiefly of the large-leaved variety *seemannianum* (Miquel) Trel. (*Artanthe seemanniana* Miquel).

PROVINCE (?): *Seemann* 37, 1069. BOCAS DEL TOBO: Changuinola Valley, *Dunlap* 403. Laguna de Chiriquí, *Hart* 125, 126. CHIRIQUÍ: San Félix, *Pittier* 5159. CANAL ZONE: Fort Sherman, *Maxon & Valentine* 6983; *Standley* 3093; *Stevens* 263. Gatún, *Standley* 27244; *Stevens* 832. Gorgona to Gatún, *Pittier* 2263. Monkey Hill, *Cowell* 22. Nuevo Limón, *Maxon* 6898. COLÓN: Fató to Playa de Damas, *Pittier* 3933. Porto Bello, *Pittier* 2441. Puerto Obaldía, *Pittier* 4380. Río Fató, *Pittier* 3909. Santa Isabel, *Pittier* 4177. PANAMA: Chepo, *Pittier* 4709. DARIÉN: Boca de Cupe, *Williams* 785.

92. *Piper imperiale* (Miquel) C. DC. in DC. Prodr. 16¹: 339. 1869.

Artanthe imperialis Miquel in Seem. Bot. Voy. Herald 198. 1856.

Piper portobellense C. DC. Smiths. Misc. Coll. 71⁶: 6. 1920.

TYPE LOCALITY: Cacagual Island, Darién (*Seemann* 1068, the type).

RANGE: East-central Panama.

CANAL ZONE: Barro Colorado Island, *Standley*, 31273. Frijoles, *Standley* 27441. Frijoles to Monte Lirio, *Killip* 12155. COLÓN: Porto Bello, *Maxon* 5795.

Piper salicinum Opiz (in Presl, Rel. Haenk. 150. 1830), ascribed when published to Mexico and Panama, is clearly labeled at Prague as from the Marianne Islands, and so is to be dismissed definitely from all consideration of the American flora.

4. PEPEROMIA Ruiz & Pav.

KEY TO SPECIES

1. Leaves alternate (the uppermost sometimes subopposite because of shortened internodes) 2.
- Leaves opposite or whorled 41.
2. Leaves, or some of them, obviously peltate; spikes never paniculate 3.
- Leaves not peltate (the margin exceptionally barely crossing the petiole) 7.
3. Stem short and few-leaved 4.
- Stem elongate and leafy 6.

- | | |
|---|----------------------------------|
| 4. Leaves over 10 cm. long | 39. <i>P. variegata</i> . |
| Leaves 4 to 6 cm. long | 5. |
| 5. Leaves round-ovate | 3. <i>P. killipi</i> . |
| Leaves elliptic-ovate | 4. <i>P. hymenodes</i> . |
| 6. Stem stout; spikes large | 31. <i>P. cordulata</i> . |
| Stem slender; spikes small | 30. <i>P. cordulatiformis</i> . |
| 7. Spikes paniced on a scape; leaves large | 8. |
| Spikes subpaniced on the leafy stem | 38. <i>P. oblongibacca</i> . |
| Spikes solitary or paired | 9. |
| 8. Leaves lanceolate, acute | 44. <i>P. mameiana</i> . |
| Leaves subobovate, acute | 37. <i>P. williamsii</i> . |
| 9. Leaves palmately nerved (the inner nerves exceptionally confluent toward the base) | 10. |
| Leaves pinnately nerved | 30. |
| 10. Leaves appreciably obtuse at base or cordate | 11. |
| Leaves appreciably acute at base | 21. |
| 11. Leaves at most ciliate or obscurely puberulent | 12. |
| Leaves evidently pubescent; creeping; leaves small | 20. |
| 12. Stem short or stout | 13. |
| Stem elongate and rather slender | 16. |
| 13. Leaves few, at end of the stem | 14. |
| Leaves distributed along the stem | 15. |
| 14. Leaves round-ovate | 3. <i>P. killipi</i> . |
| Leaves elliptic-ovate | 4. <i>P. hymenodes</i> . |
| 15. Petiole thick and short | 31. <i>P. cordulata</i> . |
| Petiole slender and elongate | 2. <i>P. brevipeduncula</i> . |
| 16. Leaves 4 to 6 cm. long; plant prostrate or pendent | 17. |
| Leaves scarcely half as long | 19. |
| 17. Leaves round, cordate | 30. <i>P. cordulatiformis</i> . |
| Leaves oblong, not cordate | 18. |
| 18. Spikes opposite the leaves | 25. <i>P. portobellensis</i> . |
| Spikes axillary | 26. <i>P. elata</i> . |
| 19. Plant creeping; leaves obovate | 15. <i>P. panamensis</i> . |
| Plant erect; leaves round-ovate | 1. <i>P. pellucida</i> . |
| 20. Leaves ovate | 29. <i>P. urocarpoides</i> . |
| Leaves round-subcordate | 28. <i>P. scandens</i> . |
| Leaves round-subobovate | 13. <i>P. rotundifolia</i> . |
| 21. Leaves at most ciliate or obscurely puberulent | 22. |
| Leaves evidently pubescent | 24. <i>P. obscurifolia</i> . |
| 22. Leaves granular-punctulate | 23. |
| Leaves not granular | 28. |
| 23. Leaves 4 to 6 cm. long | 24. |
| Leaves 2.5 to 4 cm. long | 27. |
| Leaves scarcely 2 cm. long, black-granular | 21. <i>P. fusco-ciliata</i> . |
| 24. Leaves lanceolate | 25. |
| Leaves lance-elliptic | 26. |
| 25. Leaves merely acute at base | 17. <i>P. parietariaefolia</i> . |
| Leaves long-cuneate | 22. <i>P. percuneata</i> . |
| 26. Stem slender | 18. <i>P. conjungens</i> . |
| Stem rather stout | 27. <i>P. pascuicola</i> . |
| 27. Leaves pale-granular | 19. <i>P. leucosticta</i> . |
| Leaves black-granular | 20. <i>P. leucandra</i> . |

28. Leaves 4 to 6 cm. long-----29.
 Leaves 1 to 4 cm. long-----14. *P. hygrophiloides*.
 29. Spikes opposite the leaves-----25. *P. portobellensis*.
 Spikes axillary-----26. *P. elata*.
 30. Leaves appreciably obtuse at base or cordate-----31.
 Leaves appreciably acute at base-----36.
 31. Plants glabrous; leaves round-ovate-----1. *P. pellucida*.
 Plants locally pubescent, usually; leaves elongate-----32.
 32. Leaves 8 to 14 cm. long, velvety-----40. *P. ciliolibractea*.
 Leaves 3 to 7 cm. long-----33.
 33. Plants densely velvety-----16. *P. stevensi*.
 Plants distinctly silky-pubescent-----24. *P. obscurifolia*.
 Pubescence transient-----34.
 34. Leaves drying thick; peduncle elongate-----39. *P. piperorum*.
 Leaves drying thin-----35.
 35. Peduncle elongate-----41. *P. caudulilimba*.
 Peduncle very short-----43. *P. gatunensis*.
 36. Leaves at most ciliate or obscurely puberulent-----37.
 Leaves evidently pubescent-----40.
 37. Leaves 12 to 20 cm. long or more-----35. *P. flavispica*.
 Leaves 6 to 10 or 12 cm. long-----38.
 Leaves 4 to 6 cm. long-----39.
 Leaves scarcely 4 by 4 cm-----33. *P. machaerodonta*.
 38. Leaves sharply acuminate-----36. *P. acuminatifolia*.
 Leaves blunt-----34. *P. dodecatheontophylla*.
 39. Leaves drying thick, subsessile-----39. *P. piperorum*.
 Leaves drying thin, slender-petioled-----41. *P. caudulilimba*.
 40. Petiole elongate-----41. *P. caudulilimba*.
 Petiole very short-----42. *P. cylindribacca*.
 41. Leaves lanceolate or lance-elliptic-----42.
 Leaves round-obovate, whorled, small-----45.
 Leaves round, opposite, small-----5. *P. cyclophylla*.
 Leaves oblong, whorled, minute-----12. *P. apoda*.
 42. Leaves 6 to 10 cm. long-----10. *P. seemanniana*.
 Leaves 4 to 6 cm. long-----9. *P. viridispica*.
 Leaves scarcely 4 cm. long-----43.
 43. Stem stout-----8. *P. sarcocarpa*.
 Stem slender-----44.
 44. Leaves all opposite-----11. *P. glabrior*.
 Leaves alternate on stem-----23. *P. allagotacta*.
 45. Plant glabrous-----6. *P. subquadrifolia*.
 Plant pubescent-----7. *P. quaternata*.

1. *Peperomia pellucida* (L.) H. B. K. Nov. Gen. & Sp. 1: 64. 1815.

Piper pellucidum L. Sp. Pl. 30. 1753.

PANAMA: Without locality, *Seemann* 113; *Hayes* 195. Las Sabanas. *Standley* 25950. Taboga Island, *Standley* 27063, 27881. Chepo, *Pittier* 4450. COLÓN: Chagres, *Fendler* 302. Porto Bello, *Pittier* 2469. Puerto Obaldía, *Pittier* 4370. BOCAS DEL TOBO: Changuinola River, *Stork* 1. CANAL ZONE: Summit, *Standley* 26905; *Stevens* 325. Balboa, *Standley* 25827, 27159; *Mrs. Foster* in 1924. Ancón Hill, *Pittier* 3962; *Stevens* 794.

A common weed through the West Indies (the type apparently from Martinique), Mexico, Central America, and northern South America, and introduced into tropical Africa. The continental plant usually has the leaves whitened

beneath and often smaller, var. *pygmaea* Kunth (Syn. Pl. Aequin. 1: 117. 1822, the type from Loxa) and its f. *minor* Van Heurck & Muell. (Obs. Bot. 115. 1870, the type from Panama).

2. *Peperomia brevipeduncula* (C. DC.) Trel.

Peperomia heydei γ *brevipeduncula* C. DC. Ann. Cons. Jard. Bot. Genève 21: 274. 1920.

A rather small, simple, erect, glabrous herb, perennial from a rhizome; stem scarcely 10 cm. high, with short internodes; leaves few (scarcely 10), alternate, round or round-ovate or elliptic-ovate, rounded or barely subacute at apex, cordulate, moderate (4 to 7 cm. long and wide), drying dark green, dull and thin, 5 or 7 nerved; petiole 2 to 5 cm. long; spikes several, clustered at the end, comparatively stout and short (scarcely 2-3×80-150 mm.), rather closely flowered above; peduncle almost suppressed; bracts round-peltate; berries blackening, globose; stigma apical, sessile.

TYPE LOCALITY: Santa Marta, Colombia.

DARIÉN: Boca de Pauarandó, Sambú River, *Pittier* 5590.

RANGE: Eastern Panama and adjacent Colombia.

3. *Peperomia killipi* Trel. Bot. Gaz. 73: 143. 1922.

COLÓN: Alhajuela, *Killip* 3218. Alhajuela to El Vigía, *Pittier* 4712. CANAL ZONE: Río Paraíso, East Paraíso, *Standley* 29890.

4. *Peperomia hymenodes* Trel., sp. nov.

A small, nearly glabrous herb; stem short and subrhizomatous, with very short internodes; leaves alternate, almost radical, elliptic-ovate, somewhat acute, cordulate to subacute at base, moderate or rather small (2×4-5 or 3.5×6 cm.), ciliate and more or less minutely pubescent near the base, drying very thin and membranaceous, 7-nerved; petiole very slender, 2 to 5 cm. long; spikes scapose, slender and elongate (1×80 mm.), rather closely flowered, the flowers separated by anastomosing papillate ridges; peduncle 3 to 5 cm. long; bracts round-peltate; berries globose; stigma subapical.

Type in the U. S. National Herbarium, no. 715477, collected near San Felix, Chiriquí, Panama, by H. Pittier (no. 5266).

RANGE: Southwestern Panama.

5. *Peperomia cyclophylla* Miquel in Mart. Fl. Bras. 4¹: 219. 1852.

CANAL ZONE: Gorgona, *Seemann* 607, the type; *Wagner*. Gatuncillo, *Piper* 5652. East Paraíso, *Standley* 29987. CHIRIQUÍ: Puerto Remedios, *Pittier* 3381. Chorrera, *Killip* 3408. PANAMA: Río Tecumen, *Standley* 26542. Matías Hernández to Juan Díaz, *Standley* 31938. Río Tapia, *Standley* 26195, 30670.

6. *Peperomia subquadrifolia* Trel., sp. nov.

Peperomia quadrifolia Auct. as to Panama.

A small, essentially glabrous, arboricolous mountain herb; stem slender, rooting from many nodes, repeatedly forking; leaves 3 to 7, commonly 4, at a node, obovate or oblong-obovate, revolutely emarginate and slightly hairy in the notch, subacute at base, minute or small (5×8-7×14 mm.), drying opaque and often pale, scarcely nerved; petiole very short (1-2 mm.); spikes terminal, small (25 mm. long), rather closely flowered; peduncle slender, 10 to 15 mm. long; bracts round-peltate, slender, 10 to 15 mm. long; berries ovoid, with slender abrupt style and viscid pseudocupule; stigma apical.

Type in the U. S. National Herbarium, no. 677591, collected at Los Sigüas Camp, Cerro de la Horqueta, Chiriquí, Panama, by H. Pittier (no. 3197).

CHIRIQUÍ: Without locality, *Wagner*. Cerro de la Horqueta, *Mason* 5298, 5539. El Boquete, *Killip* 3534; *Mason* 5013.

7. *Peperomia quaternata* Miquel in Seem. Bot. Voy. Herald 197. 1854.

CHIRIQUÍ: *Wagner* 302, in part. Volcano of Chiriquí, *Seemann* 895.

RANGE: Panama and adjacent South America.

8. *Peperomia sarcocarpa* Trel., sp. nov.

A moderately large, glabrous, assurgent herb, drying greenish, on rocks; stem moderately stout (3 to 6 or 8 mm.), rooting from the lower or even the upper nodes; leaves opposite, rhombic-obovate or rhombic-oblongate, conspicuously blunt-acuminate, subcuneate, moderately small (1.5×2.5-2×3-4 or 5 cm.), drying coriaceous, indistinctly 3 or 5-nerved; petiole scarcely over 2 mm. or on the lower leaves 10 to 20 mm. long; spikes terminal, slender and moderately elongate (2×70 mm.), rather loosely flowered; peduncle as thick as the rachis, 2 cm. long; bracts elliptic-peltate; berries globose, red, and succulent; stigma apical.

Type in the herbarium of the New York Botanical Garden, collected near Penonomé, Province of Coelá, Panama, by R. S. Williams (no. 382).

RANGE: South-central Panama.

9. *Peperomia viridispica* Trel., sp. nov.

A rather large, glabrous, pendent, succulent, epiphytic herb; stem rather thick (3-5 mm.); leaves opposite or exceptionally 3 at a node, subrhombically lanceolate or oblongate, blunt-acuminate, subcuneate, rather large (1.5×3.5, 2×4.5-3×6.5 cm.), drying rather thick and opaque, indistinctly about 5-nerved; petiole 5 to 10 mm. long, winged; spikes terminal and occasionally axillary, filiform (scarcely 2×70-100 mm.), loosely flowered, green; peduncle 1 to 2.5 cm. long; bracts subelliptic-peltate; ovary ovoid, attenuate upward; stigma apical.

Type in the U. S. National Herbarium, no. 1,154,147, collected at Balboa Canal Zone, Panama, by Paul C. Standley (no. 28550).

CANAL ZONE: Balboa, *Standley* 27117, 28568. PANAMA: Tumba Muerta, *Standley* 29827. Las Sabanas to Matías Hernández, *Standley* 31893.

RANGE: Central Panama.

9a. *Peperomia viridispica* perejil Trel., var. nov.

Erect, 60 cm. tall; leaves more commonly 3, exceptionally 4, at a node, blunter-pointed.

Type in the U. S. National Herbarium, no. 1,153,969, collected on Taboga Island, Panama, by Paul C. Standley (no. 27893).

PANAMA: Taboga Island, *Macbride* 2808.

RANGE: Southern Panama.

10. *Peperomia seemanniana* Miquel in Seem. Bot. Voy. Herald 198. pl. 37. 1854.

CHIRIQUÍ: Volcano of Chiriquí, *Seemann* 896. Cerro de la Horqueta, *Pittier* 3269. El Boquete, *Pittier* 2921; *Maxon* 5037; *Killip* 3542.

11. *Peperomia glabrior* (C. DC.) Trel., sp. nov.

Peperomia palmana glabrior C. DC. *Candollea* 1: 304. 1923.

An erect herb of the aspect of *P. palmana*; leaves somewhat larger (1.5-2×3-5 cm.), glabrous; spikes larger (2×40 mm.).

Type in the U. S. National Herbarium, no. 675770, collected on Cerro de la Horqueta, Chiriquí, Panama, by William R. Maxon (no. 5401).

CHIRIQUÍ: Cerro de la Horqueta, *Maxon* 5541, 5553; *Pittier* 3217. El Boquete, *Killip* 3519.

RANGE: Southwestern Panama.

12. *Peperomia apoda* Trel., sp. nov.

A small stoloniferous mountain herb; stem slender (1-2 mm.), rooting from the lower nodes, minutely but densely puberulous; leaves 2 to 4 at a node,

oblong, rounded at both ends, sometimes emarginulate, minute (2×10 mm.), somewhat pale-granular beneath, glabrous, 1-nerved; petiole almost suppressed; spikes terminal and from the upper axils, filiform ($1 \times 20-35$ mm.), rather loosely flowered; peduncle nearly suppressed (1-2 mm.); bracts round-peltate; ovary ovoid; stigma subapical.

Type in the U. S. National Herbarium, no. 1,266,031, collected in valley of Río Caldera, Chiriquí, Panama, by E. P. Killip (no. 3514).

RANGE: Southwestern Panama.

13. *Peperomia rotundifolia* (L.) H. B. K. Nov. Gen. & Sp. 1: 65. 1816.

Piper rotundifolium L. Sp. Pl. 30. 1753.

COLÓN: Río Fató, *Pittier* 3888. CANAL ZONE: Frijoles, *Pittier* 3759.

A wide-spread species, the prototype from Martinique, ranging from the Antilles to and well into South America in puzzling forms with leaves either orbicular or obovate.

14. *Peperomia hygrophiloides* C. DC. Candollea 1: 329, 392. 1923.

CHIRIQUÍ: Cerro de la Horqueta, *Pittier* 3205, "3203." Río Caldera, *Killip* 3564.

15. *Peperomia panamensis* C. DC. Candollea 1: 329, 401. 1923.

CANAL ZONE: Río Indio de Gatún, *Pittier* 2789.

16. *Peperomia stevensi* Trel., sp. nov.

A small, densely velvety, assurgent herb in tree tops; stem short, with short internodes; leaves alternate, clustered at end of the stem, elliptic or elliptic-ovate, subacute to acuminate, cordulate, rather small ($2.5-3 \times 4-6$ cm.), paler beneath, drying green, submultiple-nerved from below the upper third, the branches of the midrib about 5×2 ; petiole 1.5 to 3 cm. long; spikes terminal, moderately large ($2 \times 60-70$ mm.), closely flowered; peduncle 10 to 15 mm. long; bracts round-peltate, drying thin and light yellow; berries globose, obliquely subtruncate; stigma anterior.

Type in the herbarium of the University of Illinois, collected at Frijoles, Canal Zone, Panama, by F. L. Stevens (no. 1247).

RANGE: Central Panama.

17. *Peperomia parietariaefolia* Trel., sp. nov.

A rather large, forking, glabrous herb; stem slender (1 mm.), or stout (5 mm.) below; leaves alternate, lanceolate, acuminate, typically acute at base, moderate ($1.5-2.5 \times 4-6$ cm.), conspicuously 5-nerved, brown-granular beneath; petiole about 5 mm. long; spikes axillary, as yet immature and very small, with short peduncle; bracts round-peltate.

Type in the U. S. National Herbarium, no. 1,266,032, collected in valley of the Río Caldera, between El Boquete and the cordillera, Chiriquí, Panama, by E. P. Killip (no. 3520).

RANGE: Southwestern Panama.

18. *Peperomia conjungens* Trel., sp. nov.

A moderate-sized, repent-assurgent, merely ciliate, black or brown-punctulate herb; stem slender (1-2 mm.), ciliate-lined below the petiole margins, rooting from the nodes; leaves alternate, lanceolate to subrhombic-elliptic, acute or somewhat blunt-acuminate, rather acute at base, moderate (1.5×3 , $2 \times 4-6$, or 2.5×6 cm.), 5 or 7-nerved, rather firm; petiole 5 to 10 or 15 mm. long, coarsely ciliate; spikes terminal or also from the uppermost axil, rather small (as yet scarcely 2×50 mm.), becoming loosely flowered; peduncle 5 mm. long; bracts round-peltate; ovary ovoid; stigma oblique.

Type in the U. S. National Herbarium, no. 1,215,950, collected on Barro Colorado Island in Gatón Lake, Canal Zone, Panama, by Paul C. Standley (no. 31342).

CANAL ZONE: Las Cascadas Plantation, *Standley* 25730, 29652. Frijoles, *Standley* 27411, in part.

RANGE: Central Panama.

19. *Peperomia leucosticta* Trel., sp. nov.

A rather small, assurgent, glabrous herb; stem slender (2 mm.), rooting from the lower nodes; leaves alternate, broadly rhombic, rhombic-lanceolate or oblanceolate, or obovate, blunt-acuminate, acute-based, rather small (1.5-2×2.5-3.5 cm.), somewhat paler-granular beneath, 5-nerved; petiole 10 mm. long, decurrent; spikes terminal and axillary, rather slender and elongate (scarcely 2×60 mm.), remotely flowered, the flowers in fusiform pits separated by broad flat anastomosing ridges; peduncle filiform, 10 to 15 mm. long; bracts small, round-peltate; ovary ovoid-pointed; stigma anterior.

Type in the herbarium of the New York Botanical Garden, collected in Panama by Sutton Hayes (no. 811).

20. *Peperomia leucandra* Trel., sp. nov.

Peperomia glabella Auct. in part as to Panama.

A rather small, repent or assurgent, black-punctulate herb; stem slender (about 1 mm.), occasionally slightly ciliate below the petiole margins, rooting from the nodes; leaves alternate, elliptic or lance-elliptic, more or less acuminate, acute-based, rather small (1.5-2×2.5-4.5 cm.), somewhat ciliate above, 5-nerved; petiole filiform, 5 mm. long, sometimes ciliate; spikes terminal and axillary, rather slender and elongate (1.5×50 mm.), moderately closely flowered; peduncle 5 mm. long; bracts roundish-peltate; anthers often drying white (as in some other species) in contrast with the dark bracts; ovary ovoid, acuminate; stigma oblique.

Type in the U. S. National Herbarium, no. 715329, collected at San Felix, Chiriquí, Panama, by H. Pittier (no. 5143).

RANGE: Southwestern Panama.

21. *Peperomia fusco-ciliata* Trel., sp. nov.

A delicate black-punctulate repent herb; stem slender (1-2 mm.), rusty-ciliate below the petiole margins, rooting from the nodes; leaves alternate, ovate, acute, rounded or subacute at base, minute as represented (scarcely 7×11 mm.), 3-nerved, ciliate upward; petiole 5 mm. long, rusty-ciliate; spikes terminal and axillary, loosely flowered, small (when partly in flower 1×7 mm.); peduncle scarcely 5 mm. long; bracts round-peltate, black; ovaries ovoid, sunken in the rachis; stigma anterior.

Type in the herbarium of the New York Botanical Garden, collected in Panama, 1859-60, by Sutton Hayes (no. 519).

RANGE: Panama.

22. *Peperomia percuneata* Trel., sp. nov.

A rather small, prostrate or stoloniferous, black-punctulate herb; stem slender (1-2 mm.), sometimes slightly ciliate below the petiole margins, rooting from the nodes; leaves alternate, rhombic-lanceolate or oblanceolate, acute or somewhat blunt-acuminate, cuneate, moderate or rather small (1×3-1.5×5 cm.), 3 or 5-nerved; petiole filiform, about 5 mm. long, occasionally ciliate; spikes terminal, filiform (1×90 mm.), at length rather loosely flowered; peduncle 5 mm. long; bracts round-peltate; ovary ovoid; stigma oblique.

Type in the U. S. National Herbarium, no. 715426, collected along the Río Dupí, Chiriquí, Panama, by H. Pittier (no. 5224).

RANGE: Southwestern Panama.

23. *Peperomia allagetacta* C. DC. *Candollea* 1: 317, 378. 1923.
 CHIRIQUÍ: El Potrero, Chiriquí Volcano, *Pittier* 3108. Cerro de la Horqueta, *Killip* 3531.
24. *Peperomia obscurifolia* C. DC. *Candollea* 1: 357, 400. 1923.
 CANAL ZONE: Agua Clara, Trinidad River, *Pittier* 3982. Barro Colorado Island, *Standley* 31333. Las Cascadas Plantation, *Standley* 25726.
 RANGE: Panama.
- 24a. *Peperomia obscurifolia fatoana* (C. DC.) Trel.
Peperomia fatoana C. DC. *Candollea* 1: 357, 387. 1923.
 A small, softly white-hairy, epiphytic herb; stem rather slender (2 mm.), rooting from the nodes; leaves alternate, but the uppermost congested, lance-elliptic, acute at both ends, rather small (1×3 to scarcely 1.5×3.5 cm.), 5-nerved with the inner laterals from above the base, ciliolate upward, yellowing and sparsely hairy on the nerves beneath; petiole very short (3 mm.); spikes axillary and terminal, filiform and elongate (1×100 mm.); peduncle filiform, elongate (2-3 cm.), hairy; bracts round-obovate, peltate; berries globose, obliquely mucronulate; stigma subapical.
 COLÓN: Río Fató, *Pittier* 3902. CANAL ZONE: Agua Clara, *Pittier* 3983.
 RANGE: Central Panama.
- 24b. *Peperomia obscurifolia minor* Trel., var. nov.
 A reduced form of the Canal Zone.
 Type in the herbarium of the New York Botanical Garden, collected between Matachín and Las Cascadas, Canal Zone, Panama, by J. F. Cowell (no. 336).
 CANAL ZONE: Trinidad River, *Pittier* 3983.
25. *Peperomia portobellensis* Beurl. *Svensk. Vet. Akad. Handl.* 1854: 147. 1856.
 COLÓN: Porto Bello, *Billberg*.
26. *Peperomia elata* C. DC. *Candollea* 1: 355, 386. 1923.
 CHIRIQUÍ: El Boquete, *Maxon* 5582.
27. *Peperomia pasculicola* C. DC. *Candollea* 1: 352, 402. 1923.
 CHIRIQUÍ: El Boquete, *Pittier* 2915a; *Killip* 3547.
28. *Peperomia scandens* Ruiz & Pavón, *Fl. Peruv.* 1: 32. pl. 51, b. 1798.
 CANAL ZONE: Río Indio de Gatún, *Maxon* 4857.
 Wide-spread from Peru, the type locality, to Nicaragua on the continent, and through the West Indies. A probably divisible species, of many synonyms.
29. *Peperomia urocarpoides* C. DC. *Candollea* 1: 362, 414. 1923.
 DARIÉN: Cerro de Garagará, Sambú Basin, *Pittier* 5670.
30. *Peperomia cordulatiformis* Trel. *Bot. Gaz.* 78: 143. f. 19. 1922.
 CANAL ZONE: Mamel Hill, *Pittier* 3806, 3467.
31. *Peperomia cordulata* C. DC. *Journ. Bot. Brit. & For.* 4: 137. 1866.
 COLÓN: Chagres, *Fendler* 265.
32. *Peperomia variegata* Ruiz & Pavón, *Fl. Peruv.* 1: 33. pl. 52, f. a. 1798.
 CHIRIQUÍ: El Boquete, *Pittier* 2984.
 A Peruvian species; rarely found in Central America.
33. *Peperomia machaerodonta* Trel., sp. nov.
 A rather small, suberect, arboricolous, glabrate herb; stem moderate (3 mm.); leaves alternate, round-elliptic, obtuse or abruptly short-acuminate, rounded or acute at base, rather small (2.5×3.5-3×4 cm.), drying coriaceous but greenish, multiple-nerved, the basal nerves and branches of the midrib 2×2 each, appressed-puberulent beneath, especially on the nerves; petiole

about 5 mm. long, winged; spikes terminal, rather thick and elongate (2×70 mm.); peduncle 2.5 cm. long; bracts round-peltate, about 9 in a whorl; berries ellipsoid, with an equilateral, slightly curved, strong beak, at first in ellipsoid pits separated by narrow anastomosing ridges; stigma anterior, at base of the beak.

Type in the U. S. National Herbarium, no. 1,266,033, collected in the valley of Río Piarnasta, east of El Boquete, Chiriquí, Panama by E. P. Killip (no. 3528).

RANGE: Southwestern Panama.

34. *Peperomia dodecatheontophylla* Trel., sp. nov.

A rather small, glabrous, epiphytic herb; stem moderate (3 mm.), rooting from the lower nodes; leaves alternate, elliptic-subobovate, subacute, acute at base, rather large (3.5×7.5 to usually 5.5–6×11–12 cm.), fleshy, drying dull, chartaceous, and wrinkled beneath, obscurely pinnately veined to the middle, the branches of the midrib about 4×2; petiole 2.4 to 3.5 cm. long, winged above the middle; spikes axillary or terminal, 1 or 2 on a rather persistently 1 or 2 bracted stalk, rather slender and elongate (2–3×70–100 mm.); peduncle rather long (4–5 cm.); bracts round-peltate; berries oblong-fusiform, the conical beak filiform-attenuate.

Type in the U. S. National Herbarium, no. 677275, collected along Río Indio de Gatún, Canal Zone, Panama, by H. Pittier (no. 2800).

COLÓN: Río Indio de Fató, *Pittier* 4263.

RANGE: East-central Panama.

35. *Peperomia flavispica* Trel., sp. nov.

A rather large, glabrous, arboricolous herb; stem stout (5–10 mm.), rooting from the nodes, with very short, erect, leafy branches; leaves alternate, elliptic-subobovate, subacute, acuminate at base, large (6×12–10×20 cm. or more), fleshy, drying rather glossy, coriaceous, and wrinkled beneath, obscurely pinnate-veined to beyond the middle, the delicate branches of the midrib about 6×2; petiole 5 to 12 cm. long, winged upward; spikes axillary (?) or terminal, slender and long (scarcely 3×100 mm. or more), yellow; peduncle rather short (2–3 cm.), red; bracts round-peltate, small, about a dozen to the pseudo-whorl; ovary oblong, slender-beaked; stigma anterior at base of the beak.

Type in the U. S. National Herbarium no. 1,153,501, collected along the Río Tapia, Province of Panama, Panama, by Paul C. Standley (no. 26196).

CANAL ZONE: Las Cascadas Plantation, *Standley* 25729.

RANGE: Central Panama.

36. *Peperomia acuminatifolia* Trel., sp. nov.

An assurgent (?), essentially glabrous herb; stem succulent, rather stout (3–4 mm.); leaves alternate, oblanceolate-obovate, sharply acuminate, subcuneate from about the middle, rather large (about 4×9 cm.), drying rather coriaceous, very indistinctly pinnate-veined below about the middle, the delicate branches of the midrib about 5×2, sparingly ciliolate; petiole 1 to 2 cm. long, winged; spikes terminal, moderately thick and elongate (3×75 mm.), subacute; peduncle 2 cm. long; bracts round-peltate.

Type in the herbarium of Columbia College, New York Botanical Garden, collected in Panama by Sutton Hayes (no. 817).

RANGE: Panama.

37. *Peperomia williamsii* Trel., sp. nov.

A glabrous, subsimple, rather large, succulent herb growing on trees; stems stout (nearly 1 cm.); leaves alternate, obovate-elliptic, rounded or slightly

emarginate at apex, somewhat abruptly contracted to the broadly winged petiole, large (10–11×15 cm. or more), impressed-punctulate, very obscurely pinnate-veined, slightly revolute; petiole long (8–12 cm.); spikes mostly paired at the upper nodes of a stout zigzag 1-leaved prolongation of the stem, moderately thick and long (2–3×100 mm.), obtuse; peduncle long (3–4.5 cm.); bracts round-peltate; berries honey-colored, conic-ovoid, tapering into a nearly equilateral, stout, conic beak, the stigma anterior on the lower part of the beak.

Type in the herbarium of the New York Botanical Garden, collected at Bismarck, Province of Coclé, Panama, by R. S. Williams (no. 433).

RANGE: Southern Panama.

38. *Peperomia oblongibacca* C. DC. *Candollea* 1: 288, 400. 1923.

COLÓN: Río Fató, *Pittier* 3891.

39. *Peperomia piperorum* Trel., sp. nov.

A moderately large, succulent, glabrous, pendent, arboricolous herb; stem moderate (3 mm.), more or less scurfy-exfoliating; leaves alternate, subsessile, lanceolate, sharply long-acuminate, subacute at base, moderate (1.5×4 cm.) or becoming rather large (fully 2×6 cm.), drying opaque and thick and somewhat yellowish and granular beneath, pinnately veined, the branches of the midrib about 3×2; petiole thick, scarcely 2 mm. long; spikes terminal on the short narrow-bracted apex, moderately slender and short (2×40–60 mm.), closely flowered; peduncle slender, 1 cm. long; bracts large, round-peltate; berry reddish, oblong, short and thick, acuminate-obliquely truncate; stigma central on the scutulum.

Type in the U. S. National Herbarium, no. 1,166,334, collected along Río Agua Salud, near Frijoles, Canal Zone, Panama, by C. V. Piper (no. 6035).

RANGE: Central Panama.

40. *Peperomia ciliolibractea* C. DC. *Candollea* 1: 360, 383. 1923.

PANAMA: Charara River near Chepo, *Pittier* 4712. CANAL ZONE: Las Cascadas Plantation, *Standley* 25731.

41. *Peperomia caudulilimba* C. DC. *Ann. Cons. Jard. Bot. Genève* 21: 269. 1920.

CANAL ZONE: Río Indio de Gatún, *Pittier* 2788.

41a. *Peperomia caudulilimba marragantina* C. DC. *Ann. Cons. Jard. Bot. Genève* 21: 269. 1920.

PANAMA: Marragantí, *Williams* 694.

41b. *Peperomia caudulilimba cryptopoda* Trel., var. nov.

Peperomia glabriramea Auct. as to Panama.

A moderate-sized repent herb, rooting from the nodes; stem moderate (3–4 mm.), glabrous, or pubescent below the petiole margins; leaves alternate, lanceolate, gradually acuminate, somewhat rounded at base, rather large (2.5–4.5×8–11 cm.), pinnately veined from below about the middle, the delicate branches of the midrib 3 or 4×2, glabrous; petiole very short (scarcely 5 mm.), sometimes ciliate; spikes solitary or paired on sparsely hairy, bracted stalks less than 5 mm. long, filiform and elongate (1×110 mm.); peduncle very short (5 mm.); bracts round-peltate; berries obconical-oblong, truncately scutulate with short horizontal beak; stigma anterior.

Type in the U. S. National Herbarium, no. 715837, collected at Boca de Pauarandó, Sambú River, Darién, Panama, by H. Pittier (no. 5571).

CANAL ZONE: Río Indio de Gatún, *Maxon* 4864.

RANGE: Panama.

41c. *Peperomia caudulilimba longependula* C. DC. Ann. Cons. Jard. Bot. Genève 21: 269. 1920.

CANAL ZONE: Fort Sherman, *Standley* 31118. Barro Colorado Island, *Standley* 31321.

42. *Peperomia cylindribacca* C. DC. Candollea 1: 370, 385. 1923.

CHIRIQUI: San Felix, *Pittier* 5273.

43. *Peperomia gatunensis* C. DC. Candollea 1: 363, 389. 1923.

PANAMA: *Seemann* 608. CANAL ZONE: Gorgona to Gatún, *Pittier* 2280. Río Indio de Gatún, *Mason* 4818. Barro Colorado Island, *Standley* 31356. COCLÉ: Penonomé, *Williams* 866.

44. *Peperomia mameiana* C. DC. Candollea 1: 290, 396. 1923.

CANAL ZONE: Mamei Hill, *Pittier* 3805.