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THE LOGANIACEAE OF AFRICA XII A REVISION OF MITREOLA L.

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INTRODUCTION

The present publication is a revision of all species of *Mitreola* based on the material available in many European, one African, and some American herbaria, among which all type specimens. As the delimitation of the species could be well fixed on the basis of this material alone no specimens were requested on loan from other herbaria. Almost all specimens examined are cited. The present author supposes that studies of the entire material may yield more information on distribution but very probably not on the delimitation of the species.

HISTORY OF THE GENUS

LINNAEUS described *Mitreola* accurately in his *Hortus Cliffortianus* (1737), based on a specimen preserved in the Gronovius herbarium, which he cited. This is still well preserved in the British Museum and agrees completely with the description according to the present author. In his *Species Plantarum* (1753), however, LINNAEUS reduced *Mitreola* to a synonym of *Ophiorrhiza*, citing his first publication with *O. mitreola*. Afterwards he mentioned *Mitreola* again in his not well known *Opera Varia* (1758).

In his later publications (1759, 1762, 1764, 1767, 1774), however, he maintained the opinion published in his far better known *Species Plantarum*. The existence of LINNAEUS's two different opinions concerning this taxon resulted in the nomenclatural history described below.

Not aware of LINNAEUS's publications, WALTER (1788) described two species, without placing them in a genus, as *Anonymos petiolata* and *A. sessilifolia*. These GMELIN (1791) shortly afterwards transferred to the genus *Cynoctonum* newly proposed by him.

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Falling back on the earliest generic name G. DON (1838) made the combination *Mitreola sessilifolia*, incorrectly placing *Ophiorrhiza mitreola* L. and *Cynoctonum petiolatum* J. F. GMEL. in its synonymy. Without being aware of DON's book TORREY and GRAY (1841) repeated this transfer, making the combination *Mitreola petiolata* as well. They realised themselves that both *Ophiorrhiza mitreola* and *Cynoctonum petiolatum* are names for one and the same species.

BENTHAM (1856) followed TORREY and GRAY in the nomenclature and described a third species, *M. pedicellata*.

Presently, when LINNAEUS's *Species Plantarum* (1753) internationally had been accepted as the starting point of botanical nomenclature, BRITTON (1894) rejected *Mitreola* as genus name but used the earliest epithet for the first species known, resulting in the new combination *Cynoctonum mitreola*. In accordance with him B. L. ROBINSON (1910) transferred *M. pedicellata* to *Cynoctonum* and LEENHOUTS (1962) described the new species *C. sphaerocarpum*.

This state of affairs should be considered in connection with the fact that many authors did not know LINNAEUS's *Opera Varia* (1758) and that others regarded them as a neglectable uncritical publication of no weight in which ideas were upheld that LINNAEUS had rejected five years before. In fact, it was a reprint of his *Syst. Nat.* ed. 4. 1744. This rejection was, moreover, confirmed in many of his later publications some of which had been consulted.

Recently DANDY (1967) considered the *Opera Varia* of interest and saw to them that they received international recognition. This resulted in the reinstatement of *Mitreola* as a genus and consequently to the combination *M. sphaerocarpa* (Leenh.) Leenh. (1972).

Meanwhile JOVET (1934) described two new species from Madagascar in *Mitreola* one of which is maintained in the present revision.

The last species discovered is *M. reticulata* Tirel (1969).

The genus was placed by G. DON (1838) in the *Spigeliaceae*, a family which soon afterwards was reduced to a tribe of the *Loganiaceae* by DE CANDOLLE (1845). In this the latter author was followed by most authors. The only ones following G. DON are HUTCHINSON (1959) and DANDY (1967). Beside the latter opinions, the only worth noting here is SPANOGHE'S (1841), who described *Mitreola petiolata* as *Selenocera secundiflora* in the tribe *Hedyotideae* of the *Rubiaceae*. BENTHAM and HOOKER f. cited him, apparently without seeing the specimen or they would certainly have recognized the true identity of the plant.

RELATIONSHIP TO OTHER GENERA

The genus *Mitreola* belongs to the tribe *Spigeliaceae* of the *Loganiaceae*, showing the greatest resemblance to *Mitrasacme* in the shape of the fruit. The latter genus, however, has a 4- instead of a 5-merous flower and an induplicate-valvate instead of an imbricate aestivation. Besides, the two genera show other conspicuous differences, unfortunately difficult to define, in habit, in the inflorescence, and in the shape of the corolla.

Mitreola can be distinguished from the other genera of the *Spigeliaceae* as follows:

1. Capsule 2-horned; ovary often halfinferior; style cleft from the base at anthesis or shortly after 2
 Capsule bilobed with rounded lobes or ellipsoid; ovary superior; style not cleft 3
2. Flowers 4-merous; internodes of inflorescence much longer than the flowers or inflorescence one-flowered; leaves often rosulate. Asia, Australia **Mitrasacme**
 Flowers 5-merous; internodes of inflorescence shorter than the flowers, sometimes elongate after anthesis and then slightly longer than the fruits; leaves not rosulate **Mitreola**
3. Capsule bilobed, leaving a basal cupula after shedding of valves; inflorescence usually cincinnous; aestivation valvate. America (only *S. anthemelia* L. naturalized in Africa and Asia) **Spigelia**
 Capsule ellipsoid; valves not shedding; flowers solitary; aestivation imbricate; repeatedly dichasially branched procumbent herb with linear leaves. America **Polypremum**

GEOGRAPHICAL DISTRIBUTION

The small genus *Mitreola*, in which 6 species are maintained here, is widely distributed, but the distribution of the individual species is very different and raises many questions about its possible origin. Three species are local endemics: *M. reticulata* is only known from North Vietnam, *M. sphaerocarpa* only from Mt. Kinabalu in Sabah, and *M. turgida* from a small area around Majunga in northern Madagascar. Two species have a wider distribution: *M. pedicellata* is known from Nepal, northern India, Bhutan, and China, whereas *M. sessilifolia* occurs in the southern United States. The sixth and last species, *M. petiolata* is very widely distributed. Its area is much larger than that of all other species together. It occurs in moist open places which may dry up in the dry seasons between the vegetation periods of this annual herb. *M. petiolata* is common in America from the south-eastern and southern United States to Rio de Janeiro, Brazil, in tropical Asia, Nepal, and northern Australia, but is rare in West Africa. In none of the countries where it occurs it can be definitely said to be introduced. It is possible, however, that it had the opportunity to enlarge its area as a weed in rice fields especially in tropical Asia, but the records from Africa give the impression of being due to natural occurrence. They are all quite far from the coast.

Mitreola L., Op. Var. 214. 1758 (Hort. Cliff. 492. 1737); R. Brown, Prod. 450. 1810; G. Don, Gen. Syst. 4: 171. 1838; De Candolle, Prod. 9: 8. 1845; Bentham, Journ. Linn. Soc. 1: 62. 1856; Fl. Austr. 4: 349. 1869; Grisebach, Fl. Br. W.I. Isl. 331. 1861; Progel in Martius, Fl. Bras. 6 (1): 265. 1868; Bentham & Hooker

f., Gen. Pl. 2: 790. 1876; Solereder in Engler & Prantl, Nat. Pflanzenf. 4 (2): 34. 1892; Dandy, Index Gen. Names, Regnum Veg. 51: 65. 1967; Leeuwenberg, Fl. Cameroun 12 (= Fl. Gabon 19): 23. 1972; Leenhouts in Fl. Males. 1. 6: 959. 1972; Tirel in Fl. Cambodge, Laos, Vietnam 13: 72. 1972.

Type species: *Ophiorrhiza mitreola* L. (= *M. petiolata* (J. F. Gmel.) Torr. et Gray).

Heterotypic synonyms: *Cynoctonum* J. F. Gmel., Syst. 2: 443. 1791, not E. Mey.; Britton, Mem. Torr. Bot. Cl. 5: 258. 1894; B. L. Robinson, Proc. Amer. Acad. Arts Sci. 45: 396. 1910; Britton & Brown, Ill. Fl. N.E. U.S. & Canada 2: 730. 1913; Britton & Milspaugh, Bahama Fl. 329. 1920; Gleason, New Britton & Brown, Ill. Fl. N.E. U.S. & adj. Canada 3: 54. 1952; Leenhouts in Fl. Males. 1. 6: 375. 1962; Gleason & Cronquist, Man. Vasc. Pl. N.E. U.S. & adj. Canada 547. 1963. Type species: *Cynoctonum sessilifolium* J. F. Gmel. (= *M. sessilifolia* (J. F. Gmel.) G. Don).

Selenocera Zipp. ex Span., Linnaea 15: 316. 1841. Type species: *S. secundiflora* Zipp. ex Span. (= *M. petiolata* (J. F. Gmel.) Torr. et Gray).

Parophiorrhiza C. B. Clarke in Hooker f., Fl. Br. Ind. 3: 85. 1880. Type species: *P. khasiana* C. B. Clarke (= *M. pedicellata* Benth.).

Herb, annual and erect or perennial and creeping at the base. *Leaves* opposite, petiolate or sessile, those of a pair equal or subequal (*M. pedicellata*); stipules well developed or reduced to a transverse ridge. *Inflorescence* terminal and/or axillary, usually long-pedunculate, dichasial with long cincinnate branches. *Flowers* shortly pedicellate to sessile, 5-merous. *Calyx* mostly almost parted to the base, glabrous or minutely papillose outside, glabrous inside; lobes ovate to oblong or triangular, green in the central part, diaphanous whitish at the edges, acute or less often obtuse, entire, erect, persistent under the fruit, without colleters. *Corolla* urceolate, longer than the calyx, outside and inside on the lobes papillose, in the throat with hairs in a penicillate or pilose ring; tube mostly contracted at the mouth, mostly slightly longer than the lobes; lobes oblong or triangular, acute or less often obtuse, entire, erect, imbricate in bud. *Stamens* included, inserted just above the corolla base; filaments glabrous, about as long as the anthers or less; anthers suborbicular, ovate or elliptic, 0.2–0.4 mm long, glabrous, introrse, apiculate to retuse at the apex, mostly deeply cordate at the base; cells parallel, discrete, dehiscent throughout by a longitudinal slit. *Pistil* glabrous; ovary halfinferior, globose or nearly so, with an indented line turning deeper at anthesis, 2-celled; style short or very short, longitudinally cleft at anthesis by the enrolling carpels; stigma subcapitate or bilobed, wider than the style, mostly torn when the corolla is shed. In each cell one orbicular peltate placenta with about 30 ovules outside. *Fruit* capsular, 2-horned or bilobed; both carpels dehiscent along the ventral suture; horns or lobes erect, divergent, or curved inwards, very variable in length even in a single species. *Seed* verrucose, reticulate, or smooth, about subglobose or ellipsoid, with fleshy endosperm.

KEY TO THE SPECIES

1. Annual herbs; stems erect; fruit wall mostly not bumpy; seeds mostly smooth 2
- Perennial herbs; stems often creeping and rooting at the base; fruit wall bumpy by the seeds; seeds verrucose or reticulate 4
2. Capsules 5–6 mm long, glabrous, longitudinally veined. Madagascar. 6. *M. turgida*
- Capsules 2–3.5 (–5) mm long, pubescent, papillose, or glabrous, not or sometimes obscurely veined 3
3. Leaves sessile, 6–27 mm long, mostly suborbicular or ovate; last branchings of inflorescence congested; flowers and fruits longer than the internodes in between. SE. United States 4. *M. sessilifolia*
- Leaves petiolate, often larger; inflorescence lax or rather so; flowers and fruits mostly shorter than the internodes 2. *M. petiolata*
4. Leaf-bearing portion of plant several times dichasially branched; inflorescence congested; seeds reticulate; fruit 2-lobed. N. Vietnam 3. *M. reticulata*
- Leaf-bearing portion of plant unbranched or irregularly branched mostly at the base; inflorescence lax; seeds verrucose; fruit 2-lobed or not 5
5. Fruit subglobose; both portions apiculate. Borneo 5. *M. sphaerocarpa*
- Fruit mitre-shaped; both portions acuminate. Nepal, India, China 1. *M. pedicellata*

1. *Mitreola pedicellata* Benth., Journ. Linn. Soc. 1: 91. 1856; C. B. Clarke in Hooker f., Fl. Br. Ind. 4: 79. 1883; Hemsley, Journ. Linn. Soc. 26: 117. 1889; Solereder in Engler & Prantl, Nat. Pflanzenf. 4 (2): 35. 1892. **Fig. 1, p. 6**

Type: India: Sikkim, Tista R., near Tumlong, Hooker 11 May 1849 (K, holotype).

Homotypic synonym: *Cynoctonum pedicellatum* (Benth.) B. L. Robinson, Proc. Amer. Acad. Arts Sci. 45: 396. 1910; Leenhouts in Fl. Males. 1.6: 377. 1962 and 960. 1972.

Parophiorrhiza khasiana C. B. Clarke in Hooker f., Fl. Br. Ind. 3: 85. 1880. Type: India: Sikkim, Khasi-Jaintia Hills, C. B. Clarke 15181 (K, holotype).

Mitreola darrisii Léveillé, Fl. Kouy-Tchéou 1: 262. 1914. Type: China: Kweichow, Tong Tcheok, Esquirol 3263 (E, holotype).

Perennial herb 5–35 cm high. Stem often creeping at the base and there often with adventitious roots, nearly terete to faintly quadrangular, glabrous. *Leaves* opposite, those of a pair equal or subequal, petiolate; petiole 3–25 mm long, glabrous or sometimes with a few hairs; blade membranaceous when dry, very variable in shape and size, ovate to narrowly elliptic, 1.2–5 × as long as wide, 1.4–17 × 1.2–4.5 cm, rounded to long-acuminate at the apex, cordate to cuneate at the base or even decurrent into the petiole, entire, glabrous on both sides or



FIG. 1. *Mitreola pedicellata* Benth.: 1-4. habit, $\frac{1}{2} \times$; 5. flower, $18 \times$; 6. fruit, $18 \times$; 7. seed, $36 \times$ (1. Tsiang 5011; 2. Stainton a.o. 273; 3. Ten 72; 4-7. Cavalrie & Fortunat 2016).

sparsely pubescent or pilose above and more or less sparsely pilose beneath. *Inflorescence* terminal and axillary, lax, long-pedunculate, 3–13 × 1–9 cm, glabrous. Peduncle 1–3 × as long as the remaining portion of the inflorescence. Bracts small, narrowly triangular to almost linear, about as long as the sepals. *Flowers* 2–3.1 mm long. *Calyx* 1.2–1.7 mm long, papillose to almost glabrous on both sides; lobes triangular, 1–1.7 × as long as wide, acute or less often obtuse. *Corolla* white, 1.7–2.8 mm long, inside sometimes also pilose in the tube; tube 0.7–1.3 × 1.5–1.7 mm; lobes triangular, 0.8–1.5 × 0.6–1.3 mm. *Stamens* inserted at 0.2–0.8 mm above the corolla base; filaments 0.5–0.8 × as long as the anthers; anthers orbicular or nearly so, mostly deeply cordate at the base. *Ovary* subglobose, 0.8–1.2 × 1–1.2 mm; style 0.3–1 mm long. *Capsule* 2-lobed or mitre-shaped, laterally compressed, 2–3 × 2–3 × 1–1.5 mm; lobes or horns erect or divergent and 0.1–0.5 × as long as the fruit; wall bumpy by the seeds. *Seed* obliquely ellipsoid, obliquely tetrahedral, or obliquely hemispherical, verrucose, 0.4 × 0.3–0.4 × 0.3 mm.

Distribution: Nepal, northern India, Bhutan, southern China.

Ecology: Moist places in mountains.

Nepal: Boubkare, near Kali R. (fl. Apr.) Dobremez 13 (BM); near Pokhara (fl., imm. fr. Apr.) Stainton a.o. 2443 (BM, E, UPS); Bhim Khola, E. of Kutharpekot (fl., fr. Apr.) Stainton a.o. 273 (BM, UPS).

India: Assam: Khasi-Jaintia Hills, Griffith 2877 (K); *ibid.*, J. D. Hooker & T. Thomson s.n. (BM, CGE, GH, GOET, L, M, P, W); *ibid.*, Cherrapunji (fr. Nov.) Clarke 15181 (K, type of *Parophiorrhiza khasiana*), (fr. May) 43870 (BM); *ibid.* (fl., fr. June) W. J. Hooker 973 (K); *ibid.* (fl., fr. May) Koelz 29690 (L).

Sikkim: Tista R., near Tumlong (fl., fr.) W. J. Hooker 11 May 1849 (K, type).

Bhutan: Chungkar (fl., fr. Feb.) Ludlow & Sherriff 1138 (BM).

China: Szechwan: Mt. Omei Shan (fl. June) Wilson 5090 (K, P); Chungking, Yangtze Kiang, Faber 634 (A, K, NY, W); Chunghsien, Faber s.n. (K). Hupeh: sin. loc., Henry 3340 (BM); (fl. July) Wilson 1490 (K, W); Nanto (fl., imm. fr. May) Wilson 849 (K, W); Ichang, Henry 1346 (BM, K, P), 4201 (GH, K). Yunnan: Hoa-a-pin Rocks (fl. Apr.) Maire s.n. (P); Beyendjing, near Tienpatou (fl. March) Ten 72 (C, W); Yunnan-Sen District, Cavalrie 1791 (E, K), 8161 (K). Kweichow: Mou-jou-se (fl., fr. May) Cavalrie & Fortunat 2016 (P); sin. loc., Cavalrie s.n. (P); Tien-chu-tze, Tung-tze (fl. May) Tsiang 5011 (W); Hoang-tsao-pa (fl. June) Esquirol 1547 (E); Tong Tcheok (fr. June) Esquirol 3263 (E, type of *Ophiorrhiza darristii*). Kiangsi: Nam Tanguen (fl., imm. fr. June) C. Wang 40924 (A).

2. *Mitreola petiolata* (J. F. Gmel.) Torr. et Gray, Fl. N. Amer. 2: 45. 1841; De Candolle, Prod. 9: 8. 1845; Gray, Manual Bot. 2nd ed. 174. 1856; Bentham, Journ. Linn. Soc. 1: 91. 1856; Grisebach, Fl. Br. W. I. Isl. 331. 1861; Progel in Martius, Fl. Bras. 6 (1): 266, t. 82. 1. 1868; Solereder in Engler & Prantl, Nat. Pflanzenf. 4 (2): 35, f. 18. G–H. 1892; Urban, Symb. Ant. 4: 489. 1910; Merrill, Philip. Journ. Scie. 11: Bot. 307. 1917; Enum. Philipp. Pl. 3: 311. 1923; Specht, Rec. Am.–Austr. Exped. Arnhem Land 3: 468. 1958; Heine, Kew Bull. 23: 251. 1969; Leeuwenberg, Fl. Cameroun 12 (= Fl. Gabon 19): 24, pl. 8. 1972; Leenhouts in Fl. Males. 1. 6: 959. 1972. **Fig. 2, p. 8, 3: f-h, p. 11; Map 1, p. 12**

Basionym: *Cynoctonum petiolatum* J. F. Gmel., Syst. Nat. 2: 443. 1791

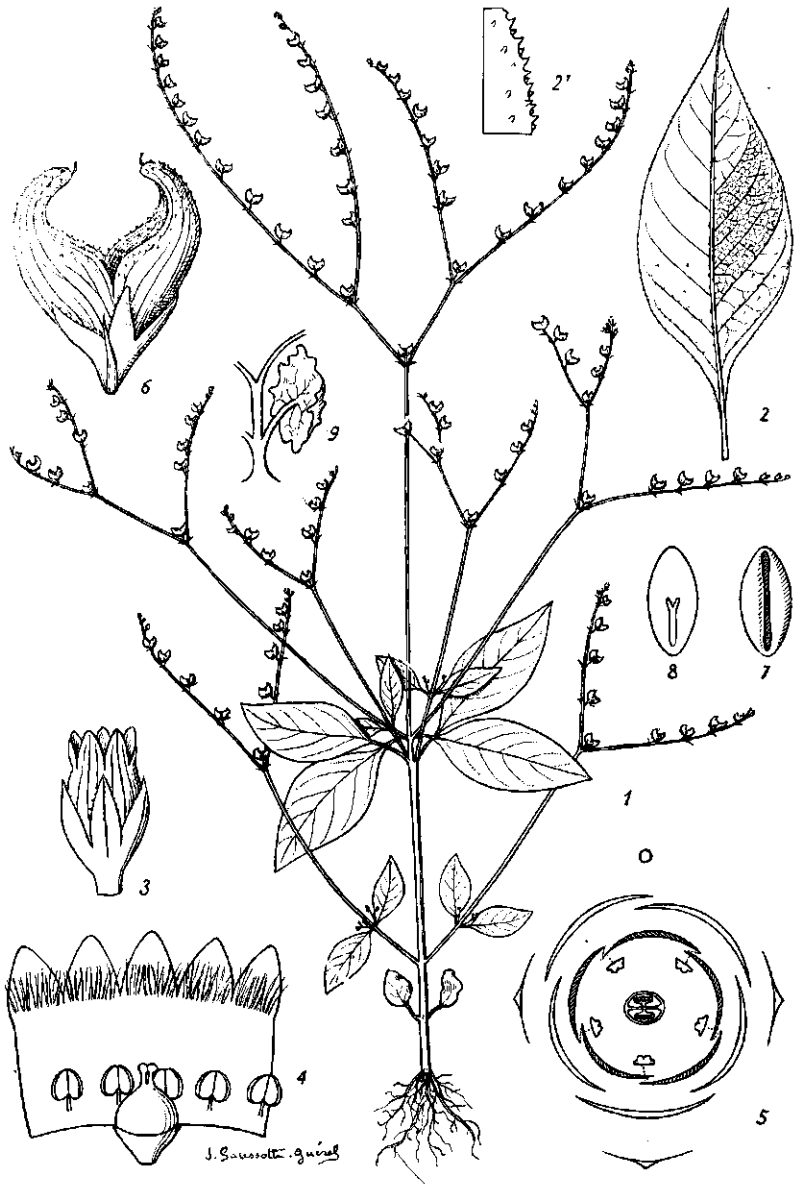


FIG. 2. *Mitreola petiolata* (J. F. Gmel.) Torr. et Gray: 1. habit, $\frac{2}{3} \times$; 2. leaf, $1 \times$; 3. flower, $12 \times$; 4. opened corolla with pistil, $17 \times$; 5. diagram; 6. fruit, $8 \times$; 7. seed, $36 \times$; 8. longitudinal section of seed with embryo, $36 \times$; 9. placenta, $14 \times$ (1. Bon 4943; 2-9. Thorel 1452) (from Fl. Camb., Laos & Vietnam 13. 1972).

(based on the *Anonymos petiolata* Walt., Fl. Carol. 108. 1788). Type apparently not preserved, not in the Walter herbarium in BM.

Homotypic synonym: *Cynoctonum mitreola* var. *campylocarpa* Hochr., Bull. N.Y. Bot. Gard. 6: 284. 1910.

Heterotypic synonyms: *Ophiorrhiza mitreola* L., Sp. Pl. 150. 1753; Syst. Nat. 10th ed. 920. 1759; 12th ed. 2: 153. 1767; Sp. Pl. 2nd ed. 213. 1762; 3rd ed. 213. 1764; Syst. Veg. 13th ed. 166. 1774; Swartz, Obs. 59, t. 3. f. 2. 1791; Lamarck, Illustr. 1: 475, t. 107. 1793. Type: U.S.A.: Virginia: sin. loc., D. Clayton 578 in herb. Gronovius (BM, holotype). Homotypic synonyms: *Mitreola ophiorrhizoides* Rich., Mém. Soc. Hist. Nat. Paris 1: 63, t. 3. 1823. *Cynoctonum mitreola* (L.) Britton, Mem. Torr. Bot. Cl. 5: 258. 1894; Hochreutiner, Bull. N.Y. Bot. Gard. 6: 282. 1910; Britton & Brown, Fl. N.E. U.S. & Canada 2: 731, with fig. 1913; Britton & Millspaugh, Bahama Fl. 329. 1920; Urban, Symb. Ant. 8: 535. 1921; Barker & Dardeau, Fl. Haïti 290. 1930; Small, Manual S.E. Fl. New York 1046. 1933; Moscoso, Cat. Fl. Domingensis 1: 489. 1943; Merrill & Perry, Journ. Arn. Arb. 29: 163. 1948; Bakhuizen van den Brink f., in Backer, Bkn. Fl. Java (em. ed.) 7. fam. 170: 4. 1948; Fernald in Gray's Manual Bot. 8th ed. 1152. 1950; Gleason, New Britton & Brown, Ill. Fl. N.E. U.S. & adj. Canada 3: 54, fig. on p. 55. 1952; Sauget & Liogier in Fl. Cuba 4: 155. 1957; Leenhouts in Fl. Males. 1. 6: 375, f. 37. f-h. 1962; Heine, Kew Bull. 17: 172. 1963; in Fl. W. Trop. Afr. 2nd ed. 2: 34. 1963; Gleason & Cronquist, Man. Vasc. Pl. 547. 1963; Bakhuizen van den Brink f., Fl. Java 2: 204. 1965; J. P. Lebrun & G. Fotius, Bull. Soc. Bot. France 114: 214. 1968; R. W. Long & O. Lakela, Fl. Trop. Florida 691. 1971. *Cynoctonum mitreola* var. *intermedia* Hochr., Bull. N.Y. Bot. Gard. 6: 284. 1910.

Ophiorrhiza lanceolata Elliott, Sketch Bot. S. Carol. and Georgia 1: 238. 1821; Curtis, Pl. Wilmington, N. C., Boston Journ. Nat. Hist. 1: 105. 1835. Type: U.S.A.: ?S. Carolina, Chaplinn Fregi, Stephen Elliott s.n. (CHARL, holotype, not seen; photo seen: NY; isotypes seen: K, NY). Homotypic synonym: *Mitreola lanceolata* (Elliott) Torr. ex Croom, Cat. Pl. New Bern 45. 1837.

Mitreola swartzii G. Don, Gen. Syst. 4: 171. 1838. Type: Jamaica: sin. loc., Swartz s.n. (BM, holotype; isotype: S).

M. paniculata Wall. ex G. Don, l.c.; De Candolle, Prod. 9: 9. 1845; Wight, Icon. 4 (4): 14, t. 1600. 1850 (under plate err. as *Mitriola*); Illustr. 2: t. 156b. f. 1. 15-21. 1850; Hooker, Icon. 9: t. 828. 1852; Bentham, Journ. Linn. Soc. 1: 63. 1856; Miquel, Fl. Ind. Bat. 2: 361. 1857; Grisebach, Fl. Br. W. I. Isl. 331. 1861; Progel in Martius, Fl. Bras. 6 (1): 266, t. 71. 1868; Solereder, l.c. p. 35, f. 18. J; Koorders, Exk. Fl. Java 3: 57. 1912; Cammerloher, Bull. Jard. Bot. Buitenzorg 3. 5: 298. 1923; Backer, Onkr. Suiker 485. 1931. Type: Burma: Prome, Mt. Taong Dong, Wallich 4349 p.p. (K-WALL, holotype; isotypes: BM, M, OXF, P). Homotypic synonym: *Cynoctonum paniculatum* (Wall. ex G. Don) B. L. Robinson, Proc. Amer. Acad. Arts Sci. 45: 396. 1910; Merrill, Pap. Mich. Acad. Sci. 23: 188. 1938.

Selenocera secundiflora Zipp. ex Span., Linnæa 15: 316. 1841; Bentham &

Hooker f., Gen. Pl. 2: 29. 1876 (as *Solenocera*); K. Schumann in Engler & Prantl, Nat. Pflanzenf. 4 (4): 155. 1891. Type: Buton Island, near S. Celebes, Zippelius s.n. (L 908. 127–1116, holotype; isotype: U).

Mitreola oldenlandioides Wall. ex D.C., Prod. 9: 9. 1845 (ex G. Don, Gen. Syst. 4: 172. 1838, in syn.); Wight, Icon. 4 (4): 14. 1850; Hooker, Icon. 9: t. 827. 1852; Bentham, Journ. Linn. Soc. 1: 91. 1856; Miquel, Fl. Ind. Bat. 2: 360. 1857; Dalzell & Gibson, Bombay Fl. 155. 1861; Bentham, Fl. Austr. 4: 349. 1869; C. B. Clarke in Hooker f., Fl. Br. Ind. 4: 79. 1883; Boerlage, Handl. 2: 449, 458. 1899; King, Journ. As. Soc. Beng. 74 (2): 598. 1908; Dop in Fl. Gén. Indo-Chine 4: 155, f. 20. 1–2. 1912; Gilg & Benedict in Engler, Bot. Jahrb. 54: 163. 1916; in op. cit. 56: 547. 1921; Ridley, Fl. Mal. Pen. 2: 413. 1923; Gamble, Fl. Madras 5: 863. 1923; Kanjilal & Das, Fl. Assam 3: 310. 1939; Henderson, Mal. Nat. Journ. 6: 303, f. 287. 1950; Kerr in Craib, Fl. Siam. En. 3: 52. 1951. Type: India: Sukanoghur, Wallich 4350 p.p. (K-WALL, holotype; isotypes: BM, K). Homotypic synonyms: *Cynoctonum oldenlandioides* (Wall. ex D.C.) B. L. Robinson, Proc. Amer. Acad. Arts Sci. 45: 396. 1910. *Cynoctonum mitreola* var. *orthocarpa* Hochr., Bull. N.Y. Bot. Gard. 6: 284. 1910.

Mitreola inconspicua Zoll. et Mor. in Moritzi, Syst. Verz. 55. 1846. Type: Madura: Zollinger III 376 (W, holotype; isotypes: A, BM, L, P, S, W).

M. paniculata var. *lilacina* Backer ex Cammerl., Bull. Jard. Bot. Buitenzorg 3. 5: 299. 1923; Bakhuisen van den Brink f., Fl. Java 2: 208. 1965. Type: Java: between Tegalombo and Slahung, Backer 3400 (L, lectotype). Homotypic synonym: *Cynoctonum mitreola* var. *lilacina* (Backer ex Cammerl.) Bakh. f. in Backer, Bekn. Fl. Java (em. ed.) 7. fam. 170: 4. 1948.

M. tracyi Gandoger, Bull. Soc. Bot. France 70: 921. 1923. Type: U.S.A.: New Orleans, Louisiana, Tracy 7535 (LY, lectotype; isotypes: BM, GH, NY, S, W).

Cynoctonum succulentum R. W. Long, Rhodora 72: 29. 1970; R. W. Long & O. Lakela, Fl. Trop. Florida 691. 1971, syn. nov. Type: Florida: near Manatee, J. H. Simpson 11 June 1890 (GH, holotype).

Erect annual herb 5–80 (–100) cm high, simple or branched from the base. Stem quadrangular to narrowly 4-winged, glabrous; stipules broadly triangular, 1–1.5 mm long. Leaves petiolate; petiole (0.2–) 0.5–3 cm long, glabrous or nearly so; blade membranaceous when dry, ovate, narrowly ovate, or elliptic, 1.2–3 × as long as wide, 1.2–10.5 × 0.5–4.5 cm, acute or obtuse at the apex, cuneate or rounded at the base or decurrent into the petiole, very sparsely appressed-pubescent to glabrous on both sides, ciliate at the entire margin. Inflorescence partly terminating the stem and the few-leaved branches, partly in the highest leaf-axils, widely branched; the ultimate branches 2–15 cm long, slender, glabrous or shortly ciliate under the nodes. Distance between two flowers or two fruits mostly longer than the flowers and fruits themselves. Bracts narrowly triangular or narrowly elliptic, 1.5–3 mm long. Flowers shortly pedicellate to subsessile. Calyx obconical, 1.2–2 mm long, glabrous; lobes ovate or triangular, 0.8–1.5 × 0.5–1.2 mm. Corolla white or less often mauve, 1.5–2.5 mm long; tube 1–1.3 × 1–1.3 mm, glabrous inside; lobes 1–1.2 × 0.4–0.5 mm.

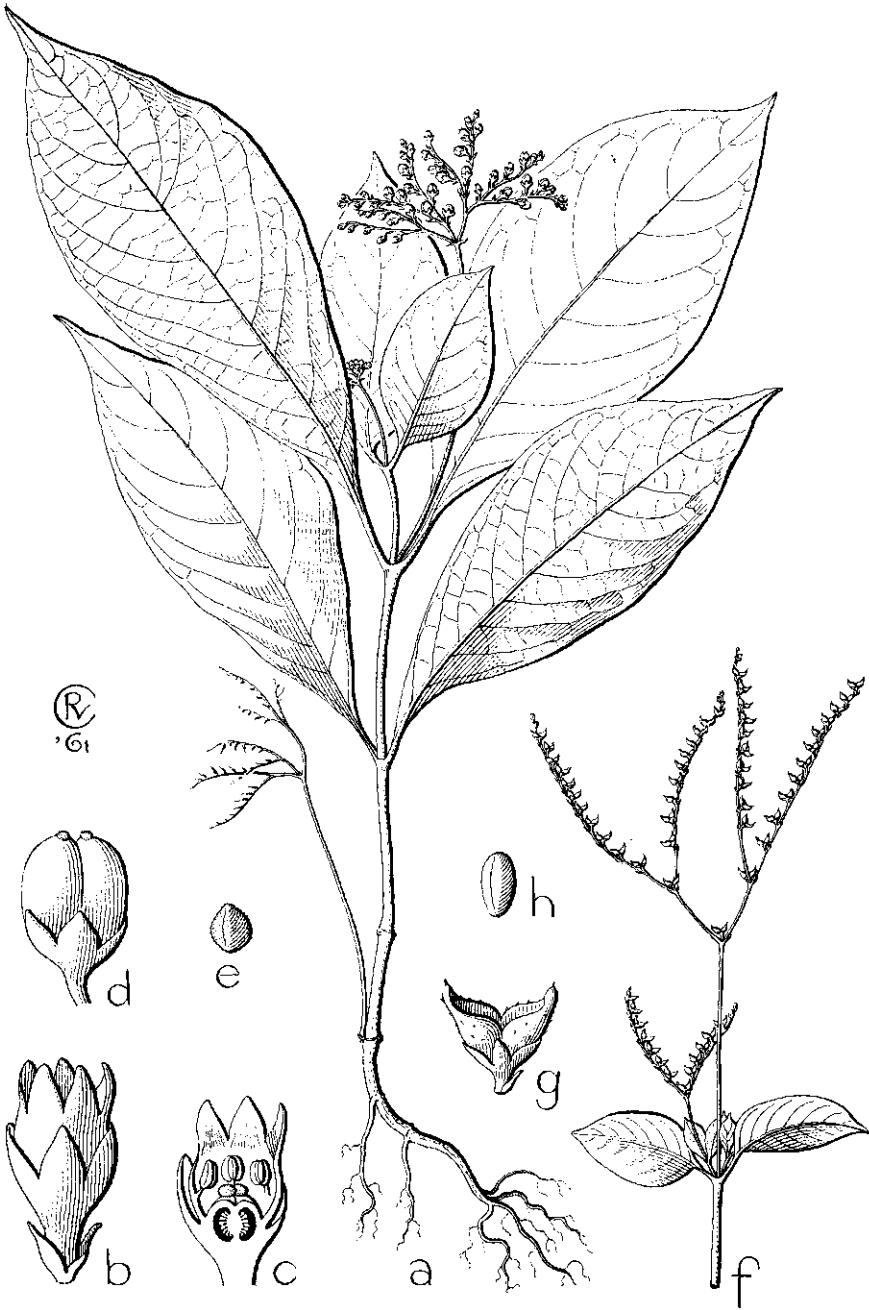
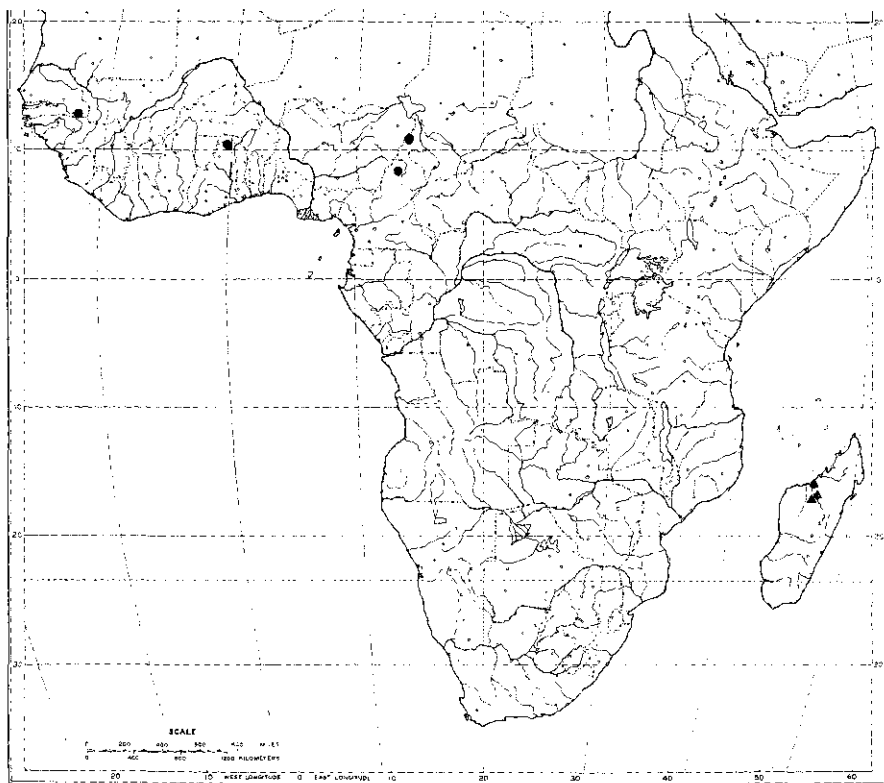


FIG. 3. a-e. *Mitreola sphaerocarpa* (Leenh.) Leenh.: a. habit, $\frac{2}{3}\times$; b. flower, $8\times$; c. longitudinal section of flower, $8\times$; d. fruit, $4\times$; e. seed, $20\times$ (a. combined from Clemens 29469 and Jaheri 286; b-e. Clemens 29469). f-h. *Mitreola petiolata* (J. F. Gmel.) Torr. et Gray: f. habit, $\frac{2}{3}\times$; g. fruit, $4\times$; h. seed, $20\times$ (f-h. Hoogland 4365) (from Flora Malesiana 1. 6. 1962).

Stamens inserted at 0.1–0.5 mm from the corolla base; anthers 0.3–0.4 × 0.2–0.4 mm. *Pistil* 1–1.4 mm long; ovary subglobose, 0.7–0.8 mm in diameter, slightly laterally compressed. *Capsule* 2-horned, 2–3.5 (–5) mm long, ciliate on midrib and along the margins or entirely appressed-pubescent to papillose, not or sometimes obscurely veined, usually not bumpy; the horns shorter to longer than the remaining portion of the fruit, divergent, erect, or curved inwards. *Seed* 0.5–0.7 mm long, mostly shining, dark brown (when mature); either ellipsoid, smooth, and with a longitudinal indented line; or depressed-subglobose, reticulate, with a flat or concave side, and with a rather large hilum; or with an intermediate shape, obscurely verrucose, and with a short indented line.

Distribution: SE. United States, tropical America, West tropical Africa, Nepal, tropical Asia, N. Australia.

Ecology: Forest edges, along roads, on grassy plains, sometimes as a weed on fields; often moist sandy or rocky places, light shade; alt. up to 1000 m; obviously bound to areas subject to a dry season. Flowering at the end of the rainy season.



MAP. 1. ● *Mitreola petiolata* (J. F. Gmel.) Torr. et Gray; ▲ *Mitreola turgida* P. Jovet.

U.S.A.: Virginia: D. Clayton 578 in herb. Gronovius (BM, type of *Ophiorrhiza mitreola*); SE. of Ivor (fl., fr. Sept.) Fernald & Bayard Long 13727 (BM, GH, NY, S, 1); Prince George County, SE of New Bohemia (fl. July) Fernald & Bayard Long 6339 (GH, NY). N. Carolina: M. A. Curtiss s.n. (K); Dolittle anno 1808 (P-JU 7010); Columbus County, near Hallsbara (?) (fl., fr. Aug.) Godfrey 6275 (GH, 1); E. of Combs Fork, Jones County (fl., imm. fr.) Radford 40061 (U); Smithville, Princeton herb. (NY); near Beaufort, I. F. Lewis 217 (NY, 1); Wilmington (fl., imm. fr.) C. S. Williamson 3 Aug. 1910 (NY); Cartaret County (fl., fr. Sept.) Godfrey 6417 (GH, 1); Dare County (fl.) Brace 12 July 1941 (NY). S. Carolina: Hunt 17220 (U); 15 km SW. of Barton, Allendale County (fl., fr. Sept.) Ritchie Bell 5157 (K); Sumter County (fl., fr. Aug.) Harper 470 (BM, GH, K, NY, P, W); *ibid.*, 6 km W. of Shiloh (fl. July) Radford 27443 (GH); NE. of Moncks Corner (fl., fr. July) Godfrey & Tryon 590 (GH, NY, 1); S. of Kingstree (fl. July) Wiegand & Manning 2520 (GH); 6 km NE. of Andrews (fl., fr. Oct.) Radford 31246 (C, 1); McClellanville (fl., fr.) Schallert 2 Sept. 1940 (GH, 1); 5 km N. of Awendaw (fr. Oct.) Leonard & Radford 2166 (NY, 1); Georgetown (fl., fr.) Rhoades 10 Aug. 1935, p.p. (S, 1); Hampton County (fl., fr. Sept.) Radford a.o. 11509 (P, S, 1); NW. of Tillman (fl., fr. Sept.) Ahles & Bell 18200 (NY, 1); Bluffton (fl., fr.) Mellichamp anno 1878 (NY, 1), anno 1884 (P). S. Carolina (?): Chaplinn Fregi (?) (fl., fr. Aug.-Sept.) Stephen Elliott s.n. (CHARL, holotype of *Ophiorrhiza lanceolata*, not seen; photo. seen: NY; isotypes seen: K, NY). Tennessee: 10 km S. of Lebanon (fl. Aug.) Ken E. Rogers 44296 (NY); SE. of Manchester (fl., fr. Aug.) Norris & Sharp 16266 (GH, NY, 1); *ibid.* (fr.) Shanks 15 Sept. 1955 (GH, 1); Sequatchie R. (fl. Aug.) Ken E. Rogers 44175 (NY). Missouri: Butler County (fl., fr. Oct.) Bush 3765 (CGE). Oklahoma: W. of Willis (fl., fr. July) Goodman 5954 (GH, 1). Arkansas: Hot Springs (fl.) Letterman 5 Aug. 1879 (NY); Little Rock (fl., fr.) Hase 5 Oct. 1886 (NY, 1); Lake City (fl., fr. July) Demaree 7035 (NY, 1). Texas: J. Drummond s.n. (UPS, 1); Torrey & Gray s.n. (UPS); near Texarkana (fl. Aug.) Heller 4090 (NY); Lake Worth (fl., fr. Sept.) Ruth 998 (NY, 1); Dallas (fl. Aug.) Reverchon 2096 (S), anno 1873 (GH), (fl.) June 1876 (P), (fl., fr.) Sept. 1877 (NY, 1), (fl., fr.) July 1879 (UPS, 1), (fl., fr.) Aug. 1879 (P); Bachmans Dam, Dallas County (fl. Sept.) Lundell 11714 (GH, NY); 19 km S. Uvalde, Zavalla County (fr. Oct.) Cory 11933 (GH, 1); Pulliam, Zavalla County (fl., fr. June) Palmer 12306 (BM, GH, NY, 1); San Augustine (fr. Sept.) Palmer 10616 (S, 1); Rock Springs (fl.) Fisher 19 July 1936 (UPS); Montell Creek, Uvalde County (fl. Sept.) Cory 9895 (GH); Junction (fr. Oct.) Palmer 10947 (S, 1); Comfort (fl., fr. Aug.) Palmer 1031 (GH, K, NY, 1); Barton Springs Creek, Travis County (fl. July) Barkley 13363 (NY); New Braunfels (fr. Nov.) Trécul 1322 (P, WAG, 1); *ibid.*, Lindheimer 1000 (BM, BR, C, GH, K, M, NY, P, W, 1); Seguin (fl., fr. Aug.) Groth 251 (GH, 1); Austin (fr.) Tharp 15 Oct. 1929 (NY, 1), Onion Creek, Austin (fl., fr.) Tharp 8 July 1920 (W, 1); Bee Creek, Austin (fl., fr.) Tharp 2 Aug. 1920 (W, 1); Cibolo, Lindheimer 150 (GH, K, 1); San Marcos, Stanfield anno 1897 (NY, 1), anno 1898 (NY, 1); 34 km SE. of Cleveland (fl., fr. July) Webster & Wilbur 3177 (GH, NY, 1); Liberty (fl., fr. Sept.) Palmer 8556 (K); near Trinity R., Madison County (fl., fr. July) Dixon 426 (GH, NY, W, 1); Gonzales County (fl. Aug.) Tharp 118 (GH); Houston (fl., fr. Oct.) Bush 240 (GH, K, 1); *ibid.* (fl., fr.) Fisher 9 Sept. 1916 (BM, S, 1); W. of Houston, Lindheimer 67 (BM, CGE, K, OXF, P, W, 1); 3 km S. of Grapeland, Houston County (fl. Oct.) Cory 26114 (GH); Saratoga (fl., fr.) Fisher 30 Aug. 1933 (GB, GH, S, 1); 3 km N. of Gist, Hardin County (fr. Nov.) Cory 50915 (NY, 1); Columbia (fl., fr. Nov.) Bush 337 (GH, K, NY, 1); Nome (fl., fr. Aug.) Fisher 38079 (GB, S, 1); Beaumont (fl., fr. Sept.) Palmer 12725 (BM, GH, NY, 1); *ibid.* (fl.) Kolthoff 17 May 1927 (S); Comal County, Matthews 571 (W, 1); Harrisburg (fl., fr.) Joor 7 Sept. 1875 (NY, 1). Louisiana: herb. Haileybury (OXF); near Lake Charles (fl., fr. Sept.) Mackenzie 423 (NY, 1); Mer Rouge (fl., fr. Aug.) Bush 63 (CGE, NY); Red River, Elliott s.n. (BM, GH, K, 1); *ibid.*, James s.n. (NY, 1); Alexandria, Hale s.n. (K); Natchitoches (fl., fr. Sept.) Palmer 8708 (K); Greenbrier, Lafayette (fl., fr. Oct.) Reese 5696 (GH, 1); Denham Springs, Livingston Parish (fl., imm. fr. June) Correll 9159 (GH); Covington (June-Aug.) Drummond anno 1832 (BM, K); New Orleans (fl., fr. Aug.) Tracy 7535 (BM, GH, LY, NY, S, W, lectotype of *M. tracyi*); Feliciana (?), Carpenter s.n. (GH, 1); near Mississippi R. (fl., imm. fr. Sept.) Trécul 839 (P, WAG); Lower Louisiana, Barbe anno 1839 (P). Mississippi: Spillman s.n. (GH, 1); Marion County, 21 km S. of Columbia (fl., fr. Aug.) Ray 5372 (GH, NY, 1); Newton

County, 3 km S. of Conehatta (fl. July) Ray 7258 (GH); 19 km SW. of Quitman (fl. July) Ray 6962 (GH); S. of Kiln (fl. May) Jones 12675 (NY); Waynesboro (fl., imm. fr. Aug.) Pollard 1229 (GH, NY); Ocean Springs (fl. Sept.) Tracy & Lloyd 590 (BM, LY, W, paratype of *M. tracyi*); St. Catharina's Creek, Adams County (fl., fr.) J. D. Smith 11 Sept. 1885 (GH, 1). Alabama: Bigelow s.n. (K); Buckley s.n. (BM, OXF); Drummond anno 1832 (CGE, K); herb. Endlicher s.n. (W, 1); herb. Torrey s.n. (GH); Mobile herb. Mohr s.n. (GH, 1); Birmingham (fl., fr.) McCarthy July 1888 (NY, 1); near Greenville (fl., imm. fr. Aug.) Biltmore Herb. 4224a (BM, GOET); Asheville, Vasey anno 1878 (NY, 1); Jacksonville (fl., fr. June) Biltmore Herb. 4224f (L); Spring Hill (fl. Aug.) Bush 37 (CGE, NY). Georgia: Bartram anno 1765 (BM); Beyrich anno 1841 (GOET, K, L); Saurman anno 1867 (NY, 1); near Albany (fl. Aug.) Pollard & Maxon 528 (NY); *ibid.* (fl.) J. K. Small 9-12 July 1895 (NY); Monticello-Jackson (?), T. C. Porter anno 1846 (GH, 1); between Statesboro and Oliver (fl. Aug.) Boole 1185 (GH); Murray County (fl., fr.) Buckley Aug. 1840 (GH, 1). Florida: Alden s.n. (CGE); Buckley s.n. (C, 1); Chapman 345 (NY), s.n. (BM, GH, GOET, K, NY, OXF, 1); Torrey s.n. (K, S); Alapattah (fl. May) Eaton 900 (GH); E. of Westville, Holmes County (fl., fr. July) Kral & Redfearn 2837 (GH, 1); 29 km NW. of Lynn Haven (fl. June) Beckner 1486 (NY); Apalachicola R., near Mount Vernon (fl., fr. Aug.) Rugel 674 (BM, HAL, NY, OXF, W, 1); 16 km N. of Marianna (fl., imm. fr.) Wiegand & Manning 2523 (GH); Chipola R., 6 km below Marianna (fl., imm. fr. Sept.) Godfrey 57726 (GH, 1); Chattahoochee (fl., imm. fr.) Tracy 5038 (GH, NY); Aucilla R., at Nuttal's Rise, Taylor County (fl., imm. fr. July) Godfrey 55776 (GH, 1); Wakulla R., at Upper Bridge (fl., fr. June) Godfrey 53531 (NY, 1); River Junction, Gadsden County (fl., fr. Aug.) Wiegand & Manning 2522 (GH, 1); edge of Lake Talquin, Leon County (fl. July) Redfearn 2606 (GH, NY); near St. Marks (fl. Aug.) Rugel 644 (BM, NY); Haman, near St. Marks R. (fr.) Rugel Oct. 1845 (BM); 1,5 km S. of Itchetuknee Springs, Suwanee County (fr. Oct.) D'Arcy 969 (C, 1); near Jacksonville (fl., fr. Sept.) A. H. Curtiss 5140 (NY, 1), (fl., fr. Aug.) 5751 (GH, K, NY, P, WAG, WU, 1); 5 km SE. of Hines, Dixie County (fl. Aug.) Kral & Redfearn 3050 (GH); 25 km NW. of Cross City, Dixie County (fl., fr. June) Kral 2672 (GH, 1); 9 km N. of Cross City (fl. June) Redfearn 2515 (GH, NY); Orange Glade (fl., fr. May) Eaton 857 (K); Orange Creek, near Sulphur Springs (fl., fr. July) Rugel 328 (BM, K, P); W. of Starke (fl., imm. fr. Aug.) R. R. Smith a.o. 492 (BM, GH); 9 km S. of Homosassa (fl., fr. Aug.) Kral 7763 (GH, 1); 11 km E. of Brooksville (fl., fr. Aug.) Kral 7904 (GH, 1); near Weeki Wachee Springs, Hernando County (fl., fr. June) Kral 6778 (GH, NY), 7033 (GH, NY, 1); 3 km NNE. of Aripeka, Hernando County (fl., imm. fr.) Kral 7310 (GH); near Eustis (fl. Aug.) Nash 1716 (NY), 1181 p.p. (NY); Orange County (fl., fr. July) Fredholm 5362 (GH, 1); Palm Springs, Orange County (fl., fr.) Lewton 9 Aug. 1894 (NY, 1); Indian R. (fl., fr. Aug.) A. H. Curtiss 2261 (BM, GH, K, M, NY, P, WU, 1); Bevrard County (fl., fr. July) Fredholm 5884 (GH, 1); near Melbourne (fl., fr. Dec.) Moldenke 5397 p.p. (NY, W, 1); Tampa (fl., imm. fr.) Churchill 5 Apr. 1923 (GH); near Maximo Point, St. Petersburg (fl., fr. Sept.) Thorne 15407 (GH, 1); near Manatee (fl., imm. fr.) Simpson June 1890 (GH, type of *Cynoctonum succulentum*); *ibid.* (fl., fr.) Tracy 12 Nov. 1901 (NY, 1); near Manatee R., Rugel anno 1845 (BM); Hillsborough County (fl., imm. fr. June) Lakela 26058 (GH, 1); 9 km W. of Myakka R., Sarasota County (fl. Aug.) R. R. Smith & Myint 604 (GH); about 40 km E. of Punta Gorda (fl. Apr.) D. B. Ward B-52 (GH); Fort Meyers (July-Aug.) Hitchcock 212 (GH, NY, 1); *ibid.* (fl., imm. fr. May) J. P. Standley 200 (BM, GH, NY), (fl. May-June) 483 (GH); near Ft. Shackelford, Lee County (fl., fr. May) J. K. Small 8330 (NY, 1); Collier County (fl. June) Lakela & Almeda 29964 (NY); Naples (fl., fr. June) Meebold 26923 (M), 27815 (M); 13 km E. of Naples (fl., fr. Oct.) Cooley a.o. 9038 (BM); Royal Palm Hammock (fl., fr. Mar.) van Heerd 47 (U, 1); S. of Monroe Station, Collier County (fl., imm. fr. May) Cooley a.o. 6169 (GH, NY); East Henson Marsh, Collier County (fl., fr. Feb.) Brass 15972 (GH); Kreamer Island, Lake Okeechobee (fl., fr. Nov.) J. K. & G. K. Small 4187 (NY, 1); Monroe County (fl., fr. Jan.) Moldenke 349 (GB, K, NY, S, 1); about New River Sound, below Ft. Lauderdale (fl., fr. Nov.) J. K. Small & Carter 1181 (NY, 1); W. of Miami (fl., fr. Nov.-Dec.) J. K. Small 4021 (NY, S, 1); Miami (fl., fr.) Garber July 1877 (GH, NY, P); *ibid.* (fl., fr. Sept.) Ostenfeld 181 (C, 1); between Coconut Grove and Cutler (fl., fr. Nov.) J. K. Small & Carter 761 (K, NY, 1); between Cutler and Longview (fr.

Nov.) J. K. Small & Carter 1451 (NY, 1); near Camp Longview (fl., fr. May) J. K. Small & Wilson 1597 (NY, 1); Biscayne Bay, Palmer 335 (GH, 1); 16 km NW. of Hialeah, Dade County (fr. Aug.) Webster 4237 (NY, 1); Everglade Keys (fl., fr. Feb.) J. K. Small & E. W. Small 5424 (NY, 1); *ibid.*, Royal Palm Hammock, Dade County (fl. June) J. K. Small a.o. 6684 (GH, NY, S); about Nixon-Lewis Hammock, Dade County (fr. July) J. K. Small a.o. 6860 (NY, S, 1); S. of Long Pine Key, Dade County (fl. Apr.) Robertson 211 (GH); Cross Key (fl., fr. Nov.) J. K. Small & Carter 2646 (NY, 1); Large Island, E. of Naranja (fl., fr. Jan.) J. K. Small & Carter 3160 (NY, 1); Key Largo (fl., fr. June) Meebold 27981 (M, 1). California: Santa Rosa Mts. (fl.) Bigelow 1 Jan. 1853 (NY); San Felipe R. banks (fl., fr.) Bigelow Sept. (NY, 1).

Bahamas: Brace 130 (K); Fresh Creek Settlement (fl., imm. fr. Apr.) A. E. Wight 259 (GH); West road (fl., fr. June) Coker 175 (NY, 1). Great Bahama: West End (fl., fr. Apr.–May) Brace 3552 (NY, 1), 3647 (NY, 1); Dead Man's Reef (fl., fr. Dec.) W. H. Lewis 7115 (NY, 1); Lavuett's Point (fr. Feb.) Britton & Milspaugh 2625 (NY, 1). Andros: Mastic Point (fl., fr. Mar.) Brace 7023 (NY), 7115 (NY, 3); Deep Creek (fl. Aug.–Sept.) Brace 5162 (NY); Red Bays (fl., fr. Apr.–May) Northrop 492 (GH, K, NY, 1), 573 (GH, K, NY). New Providence: Nassau (fr.) A. H. Curtiss Mar.–May 1903 (NY, 1); *ibid.* (fr. Apr.) Burch 4207 (NY, 1); Adelaide (fl., fr. Sept.) Britton & Brace 447 (GH, K, NY); Clifton (fl., fr. Sept.) Britton & Brace 749 (NY, 1); S. side beach (fl., fr. Aug.) Britton & Brace 399 (NY, 1). Hog Island: (fl., fr. May) Wilson 8284 (NY, 1). Cat Island: 3 km E. of McQueens (fl. July) Byrne 528 (A).

Cuba: (fl., fr. May) Linden 1731 (BM, BR, K, W); C. Wright 389 (BM, BREM, GH, GOET, NY, S, W); near Lemonar (fl., fr. Aug.) Rugel 830 (BM, L, NY); Gavilan, near Soledad (fl., fr. Aug.) Howard 6350 (GH, NY); Mina Carlota, SE of Cumanayagua (fl., fr. July) Howard 5719 (GH, NY, 1). Pinar del Rio: Pinar del Rio (fl., fr. Apr.) Shafer 526 (NY, 1); *ibid.* (fl., fr. Mar.) Britton 10040 (NY, 1); Herradura (fl., fr.) Jasima 26 Aug. 1905 (P); near Coloma (fl., fr. Sept.) Britton a.o. 7033 (NY, 1); between El Gato and Bolandrau (fl., fr. Apr.) Roig 3216 (NY, 1); Remates (fr. June) Ekman 11175 (NY, S, 1). Habana: Batabano (fl., fr. Apr.) Britton a.o. 13350 (NY, 1); El Cajío (fl., fr. May) Bro. León a.o. 22324 (GH, 1); Laguna Ariguanabo (fl. Apr.) Ekman 13721 (S); Finca Europa, Guaminar (fl., fr. June) Bro. León 5060 (NY, 1). Las Villas: El Corte, Santo Tomas, Peninsula de Zapata (fl., fr. July) Roig & Crematan 2239 (NY, 1); Cienfuegos District (fl. Aug.) Combs 496 (GH, K, P); Santa Clara (fl., fr. Mar.) Luna 498 (NY, 1); near Sancti Spiritus (fr. Aug.) Bro. Alain (H. Liogier) 1525 (NY); banks of Caracusey, Sancti Spiritus Mts. (fl., fr. Aug.) F. León & F. Clément 6751 (NY, 1); near Manacas (fr. Dec.) Bro. Leon & Cazanias 5883 (NY, 1); La Magdalena-Cayamas (fl., fr. Feb.) Baker 4639 (NY, 1); Sabana de San Marcos (fr. July) Bro. Leon 9191 (NY, 1); near Banao (fl., fr. Aug.) Bro. Leon 4003 (NY, 1); Pitajones, Ly R. (fl., imm. fr. Mar.) Shafer 12296 (NY). Oriente: Bayate, Rio Jagua bank (fl., fr. Aug.) Ekman 2461 (K, NY, S, 1); Bayamita, near Sevilla (fl., fr. July) Ekman 9322 (S, 1); Nagua, Rio Yara bank (fl., imm. fr. Apr.) Ekman 5360 (S). Isla de Pinos: Caleta Cocodrilos (fl., fr. Mar.) Britton a.o. 15254 (NY, 1); Cayo del Res (fl., fr. Dec.) Ekman 12441 (S, 1); near SE. corner of Cerro Daguilla (fl., fr. Apr.) Killip 43960 (GH, S, 1); Cayo Mono (fr. May) Cremata 36 (NY, 1).

Jamaica: Hooker anno 1843 (CGE P, U, 1); Purdie s.n. (K); Swartz s.n. (BM, S, type of *M. swartzii*); Negril (fl., fr. Dec.) Adams 8559 (BM, M, 1); *ibid.* (fl., imm. fr.) Britton & Hollick 2113 (NY); Lucea (fl., fr.) Hitchcock 11 Jan. 1891 (WU); near Black R. (fl., fr. Sept.) Britton 1351 (NY, 1); *ibid.* (fl., fr. Sept.) Harris 9759 (BM, K, NY, P, 1); Luna District, 4 km N. of Black R. (fl., fr. July) Howard & Proctor 14548 (BM); 2 km N. of Mountainside, E. margin of Black R. Morass (fl., fr. Aug.) Webster & Proctor 5339 (A, 1); Maggoty Falls (fl., imm. fr. Feb.) Proctor 7649 (A); St. Ann's Bay (fl., fr. Mar.) Harris 10354 (BM, C, K, NY, P, 1); Ocho Rios (fl., fr. Feb.) Hunnewell 18833 (GH, 1); Moneague (fr.) R. C. Alexander 20 March 1850 (GOET, K), April 1850 (K); Hope Bay (fr. Mar.) A. E. Wight 171 (NY); near Port Antonio (fl., fr. Sept.) Britton 876 (NY, 1); *ibid.* (fr. Mar.) A. E. Wight 155 (NY, 1); St. Thomas (fl., fr. Jan.) Adams 10429 (BM).

Haiti: Bayeux, near Port Margot (fl., fr. Aug.) Nash 327 (NY, 1); *ibid.* (fl., imm. fr. Nov.) Ekman H 2685 (S); near Port à Piment (fl., fr. Aug.) Ekman H 709 (NY, S, 1); near Port au

Prince (fl., fr.) herb. J. Hennecart 15 May 1827 (P); near Aux Cayes (fl., fr. June) Ekman H 280 (K, S, 1); near Fond Parisien, Etang Saumatre (fl., fr. May) Leonard 4194 (GH, NY, 1).

Dominican Republic: Amvorown anno 1803 (BM); Schomburg 120 (K, P); El Choco, W. of Cabarete (fl., fr. Oct.) Bro. Alain H. Liogier 16518 (NY, 1); Duvergé (fl., fr. Jan.) Bro. Alain H. Liogier 18317 (NY, 1); Barahona (fl., fr. Oct.) Pater Fuertas 565 (GH, 1); near Maniel de Oca (fl., fr. Oct.) von Türkheim 3638 (BM, BR, C, GH, K, L, M, NY, P, S, U, W, WU, 1); Nizao R. (fl., fr. Nov.) Lavastre 2339 (NY, 1); San Cristóbal (fl., fr. Jan.) Ekman H 11362 (K, NY, S, 1); near Ciudad Trujillo (fl., fr. Oct.) Allard 15779 (S).

Puerto Rico: Ledru 162 (P, P-JU 7010+A); Mercier anno 1830 (P); Plée 774 (P); Riédlé 254 (K, P); Schwanecke 3567 (GOET, W); herb. Vahl s.n. (C); Wydler 408 (L, 1); Lares to San Sebastian (fl., fr. Apr.) Britton & Hess 2781 (NY, 1); *ibid.* (June-July) Underwood & Griggs 93 (NY, 1); Arecibo (fl., fr. July) Stimson 3716 (GH, 1); Laguna Tortuguero (fl., fr. Feb.) Britton 8738 (NY, 1); *ibid.* (fl., fr. Aug.) Liogier 10147 (NY), 10155 (NY, 1); *ibid.* (fl., fr.) R. J. Wagner 385 (U, 1); *ibid.* (fl., fr. Jan.) Howard & Nevlings 16977 (A, 1); near Dorado (fl., fr. Mar.) Britton a.o. 6669 (NY, 1); Bayamón (fl., fr. Mar.) Sintenis 960 (BM, BREM, GH, GOET, K, L, M, NY, P, S, WU, 1); Catano (fl., fr. Feb.) Britton & Cowel 1549 (NY, 1); near Luquillo (fl. Apr.) Britton a.o. 7035 (NY); Playa de Humacao (fl. June) Eggers 619 (K); Martin Piena (?) (fr. Nov.) Johnston 1081 (NY, 1); El Monerio (fr. Mar.) Britton a.o. 6513 (NY, 1).

St. Thomas: Riédlé s.n. (P).

Guadeloupe: Bertero s.n. (BREM, M, 1); Forsström s.n. (S); road from Pointe à Pitre to Gosier (fl., fr. Apr.) Duss 3644 (GH, NY, 1), 2nd NY sheet collected on Petit-Canal; Gosier (fl., fr. Dec.) Stehlé 1629 (NY, 1); *ibid.* (fl., fr. Apr.) Questel 2456 (P).

Mexico: herb. de Jussieu 7010 (P-JU); chiefly in the Valley of the Rio Grande below Donana, Melina Creek, Bigelow (C. C. Parry) 439 (K, NY, P, 1); Canizita (fl., fr.) Gregg 28 May 1847 (GH); Monterey, San Juan (fl., fr.) Eaton & Edwards 87 (K, NY, 1). San Luis Potosi: San Dieguito (fl., fr. June) Palmer 619 (GH, NY, 1); Aguacatal (?) (fl., fr.) Oersted Nov. 1846 (C, 2). Jalisco: S. of Puerto Vallarta (fl., fr. Nov.) Mexia 1143 (BM, NY, 2). Michoacán and Guerrero: El Ocote (fl., fr. Oct.) Langlassé 524 (GH, K, P, 2). Guerrero: Coyuca District (fl., fr. Aug.) Hinton 6949 (GH, K, 2); Vallecitos, Montes de Oca District (fr. Nov.) Hinton 11572 (BM, GH, K, NY, S, 2); Calera (fl., fr. Oct.) Hinton 5005 (BM, K); Chorrera (fl., fr. Nov.) Hinton 2629 (BM, K). Vera Cruz: (fl., fr.) Couin 29 July 1865 (P), 26 March 1866 (P); near Tantoyuca, Ervendberg anno 1858 (GH, 1); Aconica (fl., fr. Oct.) Purpus 8920 (GH, NY, 2). Oaxaca: Chiltepec (fl., fr. Dec.) Martínez-Calderón 363 (GH, 2). Chiapas: E. end of Lake Tepancuapan (fl., fr. May) E. J. Alexander 1423 (NY, 1); Sierra de Ionala (fl., fr. Sept.) Purpus 6991 (BM, GH, NY, 2).

Belize (= British Honduras): Forest Home (fl., fr. Dec.) Schipp 1066 (BM, GH, K, NY, S, 2).

Guatemala: Santa Elena (fl., fr. Oct.) Ortiz 1981 (NY, 1); Lacandon, Petén (fl., fr. Jan.) Contreras 3266 (GH, S, 2); Nictun, Petén (fl., fr. May) Lundell 3146 (S, 1); region of Platanares, Santa Rosa Department (fr. Dec.) P. C. Standley 79123 (NY, 2); between Mazatenango and Coyotenango (fl., fr. Nov.) Bernoulli & Cario 1800 (GOET, 2).

Honduras: Matorrales, Department Sta. Barbara (fl., fr. Dec.) Molina 3753 (GH, 2); Santa Clara Creek, Río Yeguaré Valley, Department Morazán (fr. Dec.) L. O. Williams & Molina (GH, 2).

Costa Rica: Hacienda Valle Brimont, Prov. Guanacaste (fl., fr.) Brenes 16 Feb. 1909 (NY, 2); escarpment above Bahía de Salinas, 5 km S. of La Cruz (fr. Jan.) L. O. Williams a.o. 26470 (NY, 2); Nicoya (fl., fr. Jan.) Tonduz 13781 (BR, GH, K, P, W, WAG, 2); Cabo Blanco Nat. Res., S. tip of Nicoya Peninsula (fl., fr. Dec.) Burger & Liesner 6520 (BM, NY, 2); near El General, Prov. San José (fr. Jan.) Skutch 3835 (GH, K, NY, S, 2); Boruca (fl., fr. Nov.) Tonduz 4431 (BM, BR, GH, P, 2).

Panama: Duchassaing anno 1851 (P); Hooker anno 1857 (P); near Santiago (fl., fr. Nov.) Seemann 193 (BM, K); Matías Hernández (fl., fr. Dec.) Pittier 6881 (GH, 2). Canal Zone: Cocoli Road (fl., fr. Dec.) Burch a.o. 1401 (GH, K, NY, 2); Madden Road For. Res. (fl., imm. fr. Dec.) Dressler 3209 (A); Empire Sta. (fl., fr. Dec.) Hayes 434 (BM, K), 556 (K);

Paraiso (fl., imm. fr. Dec.) M. Wagner Dec. 1857 (M, herb. 453); near Miraflores Lake (fl., imm. fr. Dec.) P. White 273 (GH). Near Panama City (fl., fr.) Debeaux 14 Jan. 1897 (P); Corozal Road, near Panamá (fl., fr. Dec.) P. C. Standley 26825 (C, 2).

Colombia: Isla Crava, Magdalena (fl., fr. Dec.) André 331 (K, NY, 2); Santa Marta, Masinga Vieja (fl., fr. Nov.) H. H. Smith 313 (GH, K, NY, P, S, U, 2); Santa Marta, Hagea R., v. Rohr s.n. (P); Tigre Grande (fl., fr. Sept.) André 4205 (K, 2); Poponte (fl., fr. Dec.) Allen 852 (K, 2); Intendencia del Meta, Rio Guejar (fl., fr. Nov.) Philipson a.o. 1374 (BM, S, 3).

Ecuador: Daule R., near Guayaquil, Spruce 6282 (BM, CGE, K, OXF, P, W, 3); Milagro, Prov. Guayas (fr. July) Hitchcock 20276 (GH, NY, 2); El Recreo (fl., fr. Aug.) Eggers 15014 (BM, C, GH, K, L, M, NY, P, S, 3).

Peru: Río Marañón, Prov. Bagua, Amazonas (fl., fr. Sept.) Wurdack 1946 (NY, 3), 1947 (GH, NY, S, 3); Bosque Nacional de Iparia, Prov. Pachitea, Huánuco (fr. Apr.) Schunke 1845 (K, NY, 3, but tending to 2); Puerto Yessup, Junín (fl., fr. July) Killip & A. C. Smith 26348 (NY, 3).

Venezuela: near Tovar, Merida (fl., fr. Nov.) Fendler 1882 (GH, GOET, K, 2); between San Juan de Los Morros and Parapara, Guarico (fl., fr. Jan.) Alston 6001 (BM).

Trinidad: Fendler 367 (K), 416 (BM, K); St. Anns R. Valley (fr. Jan.) Purdie 60 (K); St. Anns R. Cascade (fr. Dec.) Broadway 5172 (S, 2); Chancellor Road, St. Anns R. (fl., fr.) Broadway 18 sept. 1929 (BM); St. Clara (fl., fr.) Crueger 26 Sept. 1847 (GOET, 2); Woodbrook (fl., fr. Nov.) Broadway 6328 (K).

Tobago: Dam road to Gastara (fl., fr. Feb.) Hunnewell 20105 (GH, 2).

Suriname: Wilhelmina Gebergte, lower slopes of Juliana Top (fl., fr. Aug.) Irwin a.o. 54832 (K, M, NY, W, 3); Palaima R. bank, tributary Sipaliwini R. (fl., imm. fr. Mar.) Wessels Boer 862 (U, 3).

Brazil: Martius s.n. (M, herb. 148); Pohl s.n. (M, 2); Itaipú (fl. Jan.) herb. Schwacke 7106 (P). Para: Monte Alegre, Barata (fl., imm. fr. May) Lima 53-1533 (K); between Porto Real and Funil, near Tocantins R. (fl., fr. May) Burchell 8840 (BR, GH, K, L, P, 2). Piauí: Martius anno 1819 (BR), herb. 150 (M, 2). Matto Grosso: Cuiabá (fl., fr. Apr.-May) Malme 1532 (S, UPS, 2), 3231 (S, UPS, 2). Goiás: near Villa Arraias (fl., fr. Mar.) Gardner 3897 (BM, CGE, K, NY, OXF, P, W, WAG, 2); near Goiás, Burchell 6862 (BR, GH, P), 6972-2 (BR, K, P). Minas Gerais: Corinto (fl., fr. Apr.) Mexia 5693 (BM, GH, K, NY, P, S, 2). Rio de Janeiro: Mato Abril, Glaziou 13963 (C, K, P, 2).

Senegal: Kanéméré (fl. Sept.) Fotius 561 (ALF, WAG), (fl., fr. Oct.) 561 bis (ALF, P, WAG, 2).

Ghana: Gambaga (fr. Nov.) Morton A 2728 (K); Nakpanduri (fl., fr.) Hall & Enti GC 35708 (K).

Cameroun: Koza, about 20 km NE. of Mokolo-Mora Road (fl., fr. Sept.) Bounougou 143 (K, P, WAG, 2); Poli, south slopes of Hosséré Godé (fl., fr. Sept.) Jacques-Félix 8405 (P, WAG, 2).

Nepal: Kuepani, near Jajarkot (fl., fr. Oct.) Polunin a.o. 5768 (BM); Andhi Khola (fl., fr. Oct.) Stainton a.o. 8723 (A, BM, UPS, 2); Baglung, Kali Gandaki (fl., imm. fr. Sept.) Stainton 7001 (BM, UPS); Mayangdi Khola (fl., imm. fr. Sept.) Stainton a.o. 4136 (A, BM, UPS).

India: Uttur Pradesh: Lackiwola, Dehra Dun (fl. Sept.) Gamble 24651 (K); Kamaun, Kali Valley (fl., fr. Sept.) Duthie 3152 (BM, K). Bihar: Hazaribagh (fr. Nov.) Clarke 24996 (K); Ranchi (fl., fr. Oct.) Clarke 20324 (BM); Manbhum, Chota Nagpur (fl., fr. Dec.) Clarke 25219 (K). Orissa: Barapahar Hills (fl., imm. fr. Sept.) Mooney 3619 (A, K, NY); Dhani Forest, Ranpur State (fl., fr. Oct.) Mooney 2087 (K); near Khandbandh, Dhenkanal (fl. Sept.) Mooney 2071 (K); Marainpur, Jashpur State (fr. Oct.) Mooney 1959 (K); Kulada Mts., Ganjam District (fl., fr. Dec.) Gamble 21576 (K), 21727 (K). West Bengal: Sukna, Darjeeling (fl., fr. Oct.) Gamble 3252A (K), 3252B (K). Assam: Singbhum, West Duars (fl., fr. Oct.) Haines 233 (K); Nungpo, Khasi-Jaintia Hills (fl., fr. Oct.) Clarke 40694 (BM); Naga Hills (fl., fr. Oct.) Clarke 40898 (K). Manipur: Koropom (fr. Nov.) Meebold 6317 (K). Maharashtra: Bombay, Dabyell s.n. (K); *ibid.*, Law in coll. Hooker anno 1857 (CGE, K); Bombay Presidency (fl., fr.) A. P. Young Oct. 1882 (BM). Kerala: Concan, Stocks, Law & c. in herb.

Hooker f. & Thomson s.n. (BM, C, CGE, GH, GOET, L, M, NY, OXF, P, S, U, W, 2); Ellirecir (?) (fr.) L. Pierre Dec. 1877 (P). Kala Naddi (fr. Dec.) Ritchie 1869 (K); Nkauara (fl., fr. Oct.) Sedgwick 6578 (K); Sukanoghur (fl., fr. Oct.) Wallich 4350 p.p. (BM, K, K-WALL, type of *M. oldenlandioides*); Hill opposite Bungalo (fl., fr. Sept.) Wallich 4350 p.p. (K-WALL).

Burma: Camp Landis area, Myitkyina region (fl., fr. Oct.) Belcher 686 (K); Prome, Anderson anno 1868 (K); *ibid.*, Mt. Taong Dong (fl., fr. Nov.) Wallich 4349 p.p. (BM, K-WALL, M, OXF, P, type of *M. paniculata*); Prome Hills (fl., fr. Sept.-Oct.) Wallich 4349 p.p. (K-WALL); Gokteik (fl., fr. Oct.) Lace 5449 (K).

Thailand: M. C. Bradley 135 (GH, 2); Doi Sutep (fl. Oct.) Kerr 1462 (BM, C, K, L, P); Muang Ha, near Doi Sutep (fl., fr. Oct.) Kerr 6386 (BM, K); Me Ban, Prov. Phrae (fl.) C. W. Frank Sept. 1929 (C); Keng Chum, Mi Pinj Rapids (fr. Nov.) Kerr 4621 (BM, K, P); Khawnkaen, Chumphae (fr. Nov.) Smitinand 4921 (L, 2); Dong Lan For., near Chumphae (fr. Nov.) Sørensen a.o. 6117 (L, 2); Muang Petchabun (fr. Nov.) Kerr 11082 (BM, K); Khwae Noi R. Basin, Brankasi (fl., fr. July) Kostermans 1056 A (A); Kanchanaburi District (fl., fr. Nov.) van Beusekom a.o. 3854 (K, L, 2); Pu Prom, near Kanchanaburi (fr. Nov.) Burkill 1270 (A, K, 2); near Ben Si Racha (fr. Nov.) Collins 1692 (K); *ibid.* (fl., fr. Nov.) Put 479 (K); Aranya Prathet (fl., imm. fr. Oct.) Kerr 1993 (BM); Ban Kao (fl., fr. Nov.) Larsen 8093 (A, C, 2), 8279 (C); Muak Lek, Saraburi (fl., imm. fr. Oct.) Smitinand & Sleumer 1320 (L); Chanburi, Pong Namrawn (fl. Oct.) Smitinand 3565 (L); Klawng Son, Kaw Chang (fl., fr. Oct.) Kerr 9280 (BM); Kuan Po, Satul (fr. Dec.) Kerr 13803 (BM, K).

Laos: Counillon s.n. (P); Massie s.n. (K, L, P, 2); Louang Prabang (fr. Feb.) Vidal 4263 (P); region of Se Done R., Prov. Se Done, Thorel 2425 (P).

Cambodia: Anlong Veng, Prov. Siem Reap (fr. Nov.) Poilane 14035 (P).

N. Vietnam: Hanoi (fl., fr. Oct.) Balansa 3116 (K, P); Ro Nha (fr. Nov.) Bon 4943 (K, L, P, 2).

S. Vietnam: Dinh Mts., Prov. Phuoc Tuy (Baria) (fr.) Pierre Dec. 1866 (L, P, 2); Giao Thanh, Prov. Kiên Hoa, Thorel 1452 (L, P, 2).

Malay Peninsula: Langkawi: E. of Kuah (fl., fr. Nov.) C. Curtiss 3685 (K); Batu Ayam, Selat Panchor (fl., fr. Nov.) Henderson S. F. 28932 (K); near Sanatorium (fl., fr. Nov.) Nauen S. F. 37954 (BM, K, L, 2).

Philippines: Luzon: Santiago (fr. Mar.) Clemens 18161 (C, 2); Prov. Rizal (fl., imm. fr. Dec.) Reillo 19272 (BM, K, L, NY, P); *ibid.*, Mt. Irig (fl., fr. Feb.) Ramos 41975 (BM, GH, K, L, W, 2); Sibul Springs, Bulacao Prov. (fr. Dec.) Clemens 17684 (C, S, W, 2); Santa Maria, Ilocos Sur Prov. (fr. Jan.) Clemens 17917 (C, W, 2). Mindoro: Bo. Manual, Mansalay (fr. Dec.) Sulit 4859 (L, 2). Bohol Island: (fl., fr. Aug.-Oct.) Ramos 42730 (BM, W, 2).

Caroline Islands: Yap Island, Volkens 410 (BM, P).

Indonesia: Sumatra: Medan (fr. Feb.) Lörzing 16688 (L, 2); Upper Deli, Central Petani Valley (fr. Jan.) Lörzing 14992 (L, 2); Langga Pajung, Kota Pinang District (fl., fr. Mar.) Toroes 3658 (L, NY, 2). Java: Commerson s.n. (P-JU 7010+A); herb. Horsfield s.n. (CGE); herb. Wanman s.n. (S); Bantam, Ujungkulon, Tjikarang (fl., fr. May) Hoogerwerf 48 (L, 2); Tandjung (?), Horsfield 555 (K); Preanger (fl., fr. May) Backer 13485 (L, 2); Tjiribon (fl., fr. Mar.) van Steenis 6645 (A, L, 2); Munung (fl. May) Coert 484 (L); Nanas, Res. Rembang (fr. June) Beumée 858 (L, 2); Res. Madiun, between Tegalombo and Slahung (fl.) Backer 3400 (L. lectotype of *M. paniculata* var. *lilacina*); Res. Kediri, N. slope of Mt. Willis (fl., fr. Mar.) Wind 2565 a (L, 2); Surabaya (fl., fr. May) Dorgelo 359 (L, 2); *ibid.* (fr. May) Backer 37669 (L, 2); Pasuruan, Bangil (fl., fr. May) Backer 7567 (L, 2); SE. of Pasuruan, Kepuh (fl., fr. March) Backer 36764 (L, 2); Blambangan, Horsfield s.n. (BM, K). Kangean: Ardjasa, Backer 26882 (L); between Tambayangan and Batuputih (fl., fr. Mar.) Backer 27614 (K, L, U, 2); Saubi, Backer 28295 (L, 2); Sepapan, Backer 28461 (L, 2); Sepandjang, Backer 28797 (L, 2). Madura: Zollinger III 376 (A, BM, L, P, S, W, 2, type of *M. inconspicua*); Petjaidan, herb. Bogor anno 1817 (L, 2). Bawéan: (fl., fr. May) Karta 165 (L, 2). Celebes: Enrekang (fl., fr. May) Kjellberg 3954 (S, 2); Sangona (fl., fr. Mar.) Kjellberg 937 (S); Sukon (fl. Sept.) Kaudern 377 (L, 2). Butung Island, S. of SE. Celebes: Zippelius s.n. (L, U, 2, type of *Selenocera secundiflora*). Bali: Prapatagung (fl. Apr.) van Steenis 7631 (GH, K, NY).

Lomben: (fl., fr. Apr.) Loeters 1691 (L, 2). Timor: Bauer 52 (W, 2); Riedel s.n. (K); Kupang (fl., fr.) R. Brown 1-7 April 1803 (BM, W, 2); Kp. Obé Naik (fl. Mar.) Bloembergen 3319 (L). Kai Islands: near Elat (fl., fr. Apr.) Jensen 168 (C, 2). W. New Guinea: Tanimbar Island (fl., fr. Mar.) Pleyte 117 (L, 2); Pioniersbivak (fl. July) Lam 508 (K); Mamberamo R. (fl., fr. Oct.) Feuilletau de Bruyn 170 (L, 2); *ibid.*, near Marine Falls (fl., fr. Dec.) Lam 2097 (L, 2); Merauke, Koch 341 (L, 2), 570 (L); E. of Merauke (fl., fr. Aug.) van Royen 4566 (L, 2).

E. New Guinea: Maprik District, Ulupa (fr.) Stopp 24 April 1961 (M); Stephansort, near Bogadjim (fl., fr. Aug.) Lewardowsky 47 (L, S, 2); *ibid.* (fr. Jan.) Nyman 181 (UPS, 2); near Bulu (fr. Apr.) Schlechter 16060 (NY, 2); near Seit (?), Finisterre Mts. (fl., fr. Jan.) Schlechter 19219 (GH, K, L, NY, S, 2); Markham R. Mouth, Weinland 209 (L, M, 2); Finschhafen (fl., fr. Oct.) Clemens 4269 bis (A, 2); near Kajabit Mission, Morobe District, Clemens 40766 (A); Baroka, Nakeo District (fl., fr. Apr.) Brass 3737 (A, K, L, 2); SE. side of Little Mt. Lawes, about 26 km N. of Port Moresby (fl., fr. Apr.) Pullen 6815 (A, L, 2); about halfway between Tapio and Mukawa, Milne Bay District (fl., fr. July) Hoogland 4365 (L, 2); Papua, *sin. loc.* (fl., fr. Apr.) Crutwell 10 (K).

Solomon Islands: NW. Guadacanal, Rove Creek, Honiara (fl., fr. May) Ramo BSIP 7890 (L, 2); *ibid.* (fl. Aug.) Dennis BSIP 8039 (L).

Australia: Arnhem Land (fr.) F. Mueller 29 July 1856 (GH, K, 2); *sin. loc.*, herb. Torrey s.n. (NY, 2).

Remarks. Some vigorous young specimens of *M. petiolata* collected in Florida have led to the establishment of *Cynoctonum succulentum* as a distinct species. They have still incompletely developed inflorescences and their basal leaves are still present. Other samples of similar specimens are Proctor 7649 from Jamaica and Sintenis 960 from Puerto Rico.

The seeds of *M. petiolata* show three different forms, the third of which may be considered as intermediate between the others:

1. Subglobose, reticulate, with a flat or concave side and a rather large hilum.
2. Ellipsoid, smooth, with a longitudinal indented line.
3. Intermediate in shape, obscurely verrucose, with a short indented line; resembling those of *M. sessilifolia*.

Shape 1 is found in all extra-American, most South American, all Trinidad, and many Central American specimens.

Shape 2 is found in all North American, Antillean (except Trinidad), and some Central American specimens.

Shape 3 is found in material from northern South and Central America.

The shape of the seeds does not show any correlation with characters of other parts of the plants. Therefore it is here regarded as being without taxonomic significance. It may be supposed that the species originated somewhere in tropical America and was spread to other regions by human activities. The weedy character of the plants collected in Asia may support this supposition. It is striking that the seeds of the extra-American collections are always smooth.

The category of the shape of the seeds is indicated here with the citation of herbarium specimens, where observed. This may permit later authors to go into the matter more deeply.



FIG. 4. *Mitreola reticulata* Tirel: 1. branch, $\frac{2}{3} \times$; 2. base of stem and roots, $\frac{2}{3} \times$; 3. stipule, $6 \times$; 4. hairs of stipule, $50 \times$; 5. flower, $6 \times$; 6. opened corolla with pistil, $6 \times$; 7. fruit, $6 \times$; 8. opened fruit with placenta, $6 \times$; 9. seed, $40 \times$ (1, 3-6. Pételot 6698; 2, 7-9. Bon 2417) (from Fl. Camb., Laos & Vietnam 13. 1972).

3. *Mitreola reticulata* Tirel, Adansonia ser. 2. 9: 119, pl. 1. 1969; in Flore du Cambodge, du Laos et du Vietnam 13: 77, pl. 13. 1972; Leenhouts in Fl. Males. 1. 6 (6): 960. 1972. **Fig. 4, p. 20**

Type: North Vietnam: Hoa Binh Prov., Muong Thon, Pételot 6698 (P, holotype; isotypes: GH, K, L).

Perennial herb 50 cm high. Stem creeping and rooting at the base, several times dichasially branched. *Leaves*: petiole glabrous, 3–12 mm long; blade membranaceous when dry, narrowly ovate or elliptic, about 3 × as long as wide, 4–9 × 1.5–3 cm, long-acuminate at the apex, decurrent into the petiole, glabrous on both sides. *Inflorescence* terminal, congested; peduncle 1–2.5 cm long. *Calyx* 1.5 mm long. *Corolla* white (?), 2.6 mm long, penicillate in the throat; tube 1.6 mm long; lobes 1 × 0.8 mm. *Stamens* inserted at 0.8 mm from the corolla base; filaments 0.5 × as long as the anthers; anthers 0.4 mm in diameter. *Ovary* subglobose; stigma sessile, bilobed. *Capsule* 2-lobed, 2 × 2 × 1 mm, bumpy by the seeds; lobes apiculate. *Seed* obliquely hemispherical or obliquely tetrahedral, 0.4–0.5 × 0.4–0.5 × 0.3–0.4 mm, reticulate, with a large hilum.

Distribution: Only known from two collections of North Vietnam.

Ecology: Moist places on limestone.

North Vietnam: type (see above); Ha Dong Prov., Ban Phet Mts., Bon 2417 (P, paratype).

4. *Mitreola sessilifolia* (J. F. Gmel.) G. Don, Gen. Syst. 4: 171. 1838 (p.p., excl. syns. *Ophiorrhiza mitreola* and *Cynoctonum petiolatum*); Torrey & Gray, Fl. N. Amer. 2: 45. 1841 (unnecessary new combination); De Candolle, Prod. 9: 9. 1845; Bentham, Journ. Linn. Soc. 1: 91. 1856; Solereder in Engler & Prantl, Nat. Pflanzenf. 4 (2): 35. 1892. **Fig. 5, p. 22**

Basionym: *Cynoctonum sessilifolium* J. F. Gmel., Syst. 2: 443. 1791 (*Anonymos sessilifolia* Walt., Fl. Carol. 108. 1788); Britton & Milspaugh, Bahama Fl. 329. 1920 (in obs.); Small, Manual S.E. Fl. New York 1046. 1933; Fernald in Gray's, Manual Bot. 8th ed. 1153. 1950.

Type: U.S.A.: Carolina: sin. loc., Th. Walter 685 (BM-WALT, on p. 117 of his book-shaped herbarium).

Misapplied name: *Ophiorrhiza mitreola* Elliott, Sketch Bot. S. Carol. and Georgia 1: 237. 1821, not L. Homotypic synonym: *Ophiorrhiza croonii* Curtis, Plants around Wilmington, N. C., Boston Journ. Nat. Hist. 1: 105, 128. 1835.

Heterotypic synonyms: *Mitreola sessilifolia* var. *angustifolia* Torr. et Gray, Fl. N. Amer. 2: 45. 1841; De Candolle, Prod. 9: 9. 1845; R. W. Long & O. Lakela, Fl. Trop. Florida 691. 1971. Type: U.S.A.: Florida: sin. loc., herb. Chapman s.n. (GH, holotype; isotypes: K, OXF, P). Homotypic synonym: *Cynoctonum angustifolium* (Torr. et Gray) Small, Bull. Torr. Bot. Cl. 23: 129. 1896; Manual S. E. Fl. New York 1046. 1933.

Cynoctonum sessilifolium var. *microphyllum* R. W. Long, Rhodora 72: 27.

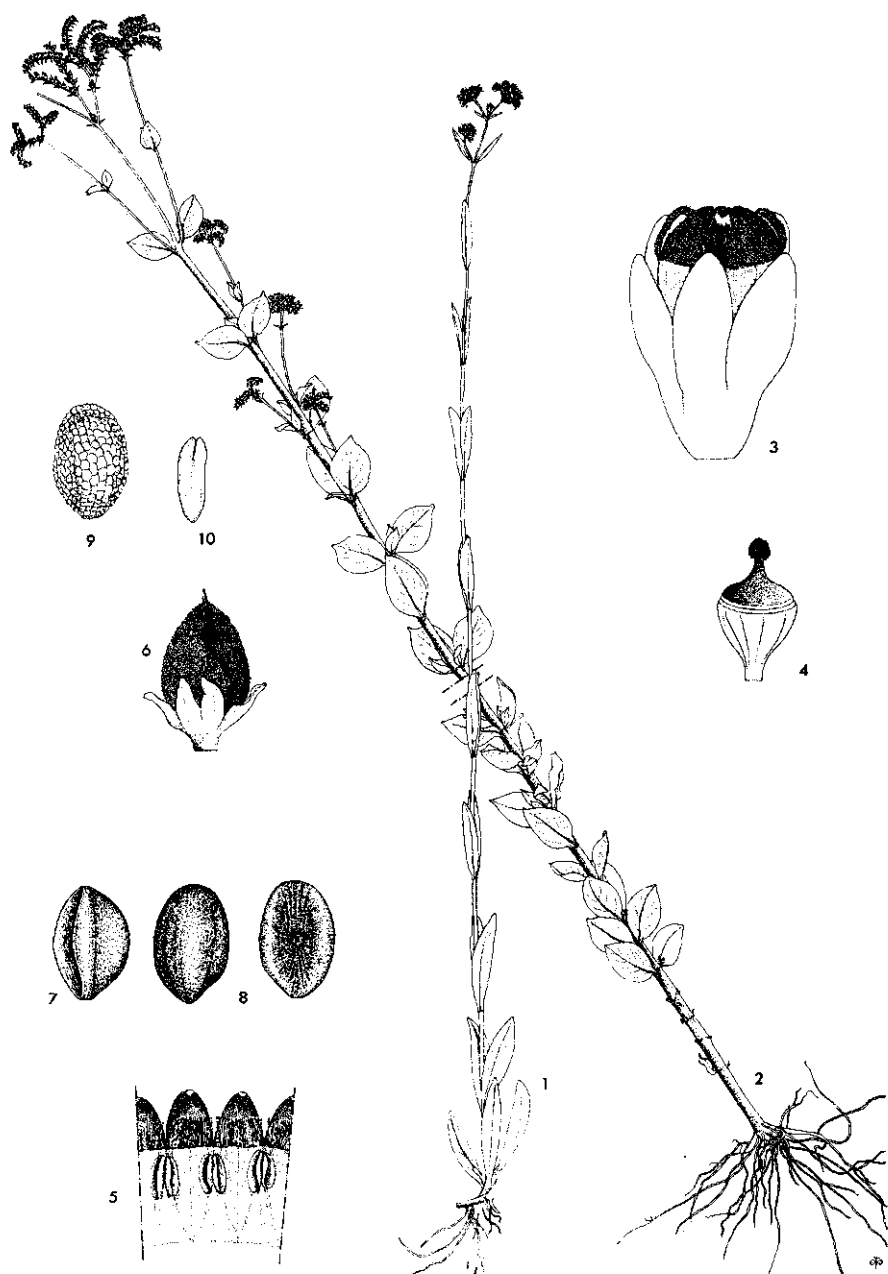


FIG. 5. *Mitreola sessilifolia* (J. F. Gmel.) G. Don: 1-2. habit, $\frac{1}{2} \times$; 3. flower, $15 \times$; 4. pistil, $12 \times$; 5. opened corolla with stamens, $12 \times$; 6. fruit, $6 \times$; 7-8. seeds, $45 \times$; 9. endosperm, $45 \times$; 10. embryo, $45 \times$ (1. A. H. Curtiss 5752; 2-5. Perdue 1732; 6. Vinzent 112; 7-10. Hitchcock 214).

1970; R. W. Long & O. Lakela, Fl. Trop. Florida 691. 1971, syn. nov. Type: U.S.A.: Florida: Bevrard County, 6 km W. of Melbourne, R. Kral 7961 (GH, holotype; isotype: NY).

Slender erect annual herb 10–50 cm high. Stem quadrangular, glabrous, mostly unbranched. *Leaves* sessile, suborbicular, ovate, or elliptic, 1.3–2 (–4) × as long as wide 0.6–2.7 (–3.7) × 0.4–2.1 cm, acute or less often obtuse or apiculate at the apex, rounded or cuneate at the base, glabrous, minutely ciliate. *Inflorescence* terminal and often also axillary, especially in the last branchings congested, 1–4 × 1.5–3 cm. Distance between two flowers or fruits shorter than the flowers and fruits themselves. Bracts somewhat shorter and narrower than the sepals. *Flowers* sessile. *Calyx* 1.8–2.2 mm long, papillose outside, glabrous inside; lobes triangular to oblong, 2–3 × as long as wide, 1.2–1.6 × 0.5–0.8 mm, acute. *Corolla* white, 2–3 mm long, inside penicillate in the throat; tube 1–1.6 × 1–1.4 mm, glabrous inside; lobes triangular to oblong, 0.8–1.4 × 0.5–0.6 mm, acute. *Stamens* inserted at 0.5 mm from the corolla base; filaments as long as the anthers; anthers elliptic, 0.3 × 0.15–0.2 mm, deeply cordate at the base. *Ovary* subglobose, laterally compressed, 0.6–1 × 0.7–1 × 0.4–0.5 mm; style about 0.5 mm long. *Capsule* 2-horned, laterally compressed or not, 2–3 × 2–2.5 × 1.5–2 mm, papillose, not veined; horns erect, divergent, or curved inwards; wall smooth. *Seed* dark brown, shining, obliquely ellipsoid, about 0.4 × 0.3 × 0.2 mm, smooth, obscurely verrucose, or sometimes reticulate, indented at one side.

Distribution: SE. United States.

Ecology: Grassy open moist places, on sand or peat. Alt. 0–250 m.

United States: Virginia: 2 km SE. of Triplett (fl.) J. B. Lewis 24 Aug. 1942 (GH). N. or S. Carolina: Thomas Walter 685 on page 117 of his herb. (BM-WALT, type). N. Carolina: Dolittle anno 1808 (P-JU 7010+B); Newport (fl. Aug.) Godfrey 5786 (GH); *ibid.* (fl. Aug.) Godfrey & Blomquist 49853 (GH); Wallace (fl. Aug.) Ahles & Leisner 33109 (U); Wilmington (fl., fr.) C. S. Williamson Aug. 1895 (LY); *ibid.* (fr.) Canby Oct. 1867 (NY); 16 km NE. of Wilmington (fl.) E. J. Alexander 30 June 1939 (NY); 3 km W. of Montrose, Hoke County (fl., fr.) Ahles & Leisner 33775 (C); 8 km SSE. of Hoffman (fl., fr. Nov.) McNealy 904 (BM). S. Carolina (?): Elliott s.n. (K, NY). S. Carolina: Bartram s.n. (BM); Herbe-mont s.n. (P); Torrey s.n. (S); N. of Luray, Hampton County (fl. June) Ahles & Bell 15780 (NY); 8 km S. of Columbia (fl. Aug.) Godfrey & Tryon 1255 (GH, NY); 5 km SW. of Manning (fl. July) Godfrey & Tryon 929 (GH, NY); Georgetown (fl., fr.) Rhoades 10 Aug. 1935 (S); 9 km S. of Georgetown (fl. Aug.) Bozeman & Logue 11350 (P, S); 19 km NW. of Georgetown (fl. July) Godfrey & Tryon 739 (GH, NY); Conway (fl., fr.) Schallert 1 Sept. 1940 (GH); *ibid.* (fl., fr. Aug.) ten Houten & Schoenmakers 1045 (U); Santee Canal, Ravenel s.n. (GH, S); McGirts Creek, Lee County (fl. July) Radford 27262 (GH); W. of Chicora, Berkeley County (fl. July) Godfrey & Tryon 838 (GH, NY). New Mexico: Fairview (fl. June) Bro. Arsène 12205 (P). Texas: Drummond s.n. (UPS); Robertson County (fl. Aug.) Barkley 13593 (GH); Grapeland, Houston County (fr. Sept.) Palmer 12849 (BM, GH, NY); Rusk County (July–Aug.) Vinzent 112 (BM, BREM); Orange (fl.) Letterman 11 Aug. 1880 (NY); Fannett (fr. Aug.) Tharp 2417 (GH). Arkansas: near Texarkana (fl.) Heller 8 Sept. 1898 (NY). Louisiana: 16 km S. of De Ridder (fl., fr. July) Correll 9673 (GH); near Lake Charles (fl. Aug.–Sept.) Mackenzie 422 (NY); Alexandria, Hale s.n. (K); Covington (fl., fr. Oct.) Bro. Arsène 11306 (P), (fl. July) 11475 (P); *ibid.* (fl., fr.) Drummond June–Aug. 1832 (BM, GH, K); 3 km W. of Leander, Vernon Parish (fl., imm. fr.) Webster & Wilbur 3235 (GH, NY);

Abita Springs (fl. Aug.) Pennell 4128 (NY), Mississippi; 5 km N. of Purvis (fl. July) Ray 7213 (GH); 21 km NW. of Hattiesburg (fl., fr. July) Webster & Wilbur 3372 (GH); 35 km S. of Hattiesburg (fl. Aug.) McDaniel 3300 (NY); Bay St. Louis (fl., fr. Sept.) Langlois 46 (NY); near Pass Christian (fl.) Langlois July 1880 (NY); Biloxi (fl., fr. Sept.) Lloyd & Tracy 120 (NY), 355 (NY); *ibid.* (fl., fr. Aug.) Tracy 7005 (BM, GH, NY, W); *ibid.* (fl. Aug.) Pennell 4373 (NY); Ocean Springs (fl. Aug.) Demaree 28216 (NY); *ibid.* (fl.) Earle 20 Aug. 1889 (NY); *ibid.* (fl. July) Pollard 1070 (GH, NY); *ibid.* (fl. Aug.) Seymour & Earle S 148 (GH, S); Nicholson (fr.) Kearney 11 Oct. 1896 (NY); near Moss Point (fl., imm. fr. July) Webster & Wilbur 3467 (GH, NY); *ibid.* (fl. Aug.) Degener 4975 (NY). Alabama: Buckley s.n. (BM, OXF); Drummond anno 1832 (K, W); Gates s.n. (NY); herb. Nuttall s.n. (BM); Torrey anno 1835 (P); Mobile, Eaton 21 (GH); *ibid.*, Jewett 103 (GOET, P); Chapel Hill (fl. July) Bridges 10969 (GH); Spring Hill (fl. Aug.) Bush 372 (CGE, NY). Georgia: Beyrich s.n. (GOET, L); herb. Torrey s.n. (K, NY); 3 km E. of Villa Rica (fl. July) Cronquist 5563 (GH, NY); Americus (fl., fr. Aug.) Harper 511 (BM, K, NY); Thomasville (fl.) A. P. Taylor 25 July 1903 (GH); Waycross (fl., fr. Sept.) Egleston 5102 (NY); near Molena, Pike County (fl., Aug.) Harper 1271 (GH, NY). Florida: herb. Chapman s.n. (BM, GH, K, NY, OXF, P, broad leaves), (GH, K, OXF, P, narrow leaves, type of *M. sessilifolia* var. *angustifolia*); herb. Haileybury s.n. (OXF); Palmer 436 (GH, NY); herb. Torrey & Gray s.n. (BR, HAL, M; L sheet n); 6 km NNW. of Baker, Okaloosa County (fl., fr. July) Kral & Redfearn 2912 (GH); 50 km S. of Hosford, Liberty County (fl., fr. July) Godfrey 55710 (GH, n); 6 km E. of Marianna (fl. Aug.) Wiegand & Manning 2524 (GH); Calhoun County (fl., fr. Sept.) Biltmore herb. 2824a (BM, GH, L, NY, W, WU); near Tallahassee, N. K. Berg s.n. (NY); near St. Marks (fl.) Rugel Aug. 1843 (BM, HAL, NY); Baldwin, Duval County (fl., imm. fr. July) Nash 2248 (GH, K, NY, n), (fl. Aug.) 2320 (GH, K, NY); St. Nicholas, Duval County (fl., fr. Aug.) Lighthipe 596 (NY); near Jacksonville (fl., fr. July–Sept.) A. H. Curtiss 2262 (BM, GH, K, P, broad, i & n); 5171 (GH, K, NY, P, W, WAG), 5172 (K, NY, n), 5752 (GH, NY, P, WAG, WU, n); *ibid.* (fl., fr. Sept.) Lighthipe 9682 (CGE); 5 km S.W. of Otter Creek, Levy County (fl., imm. fr. Sept.) Perdue 1732 (C); N. of Gainesville (fl. Aug.) Dress & Moran 2552 (BM); Hernando County (fl. Sept.) Codley a.o. 7087 (GH); 8 km S. of Homosassa (fl. Aug.) Kral 7764 (GH); Jessamine, Pasco County (fr. Nov.) Barnhart 2884 (NY); Cedar Hammock, Sumpter County (fl.) Lewton 3 Aug. 1894 (NY); near Eustis (fl. July) Nash 1181 p.p. (GH, K, NY, WU); Sanford, Orange County (fl., fr.) Vesterlund Sept. 1889 (S, UPS); near Melbourne (fl. Dec.) Moldenke 5397 p.p. (NY); 6 km W. of Melbourne (fl., fr. Aug.) Kral 7961 (GH, NY, type of *Cynoctonum sessilifolium* var. *microphyllum*); Tampa (fl. Aug.) Britton & Wilson 42 (NY); near Manatee R., Rugel anno 1845 (BM); Sarasota (fl. June) Meebold 27789 (M); Osceola County (fl., imm. fr. Aug.) Fredholm 5947 (GH, i); 11 km W. of Vero Beach (fl. Aug.) Kral 5587 (GH); Fort Meyers (fl., fr. July–Aug.) Hitchcock 213 (GH, LY, NY), 214 (GH, NY); *ibid.* (fl. June) J. P. Standley 221 (GH, NY, broad & i); Miami (fl., fr.) Garber July 1877 (GH, NY, P, i); between Cutler and Longview (fr. Nov.) J. K. Small & Carter 847 (NY, i), 1082 (NY, i); between Homestead and Camp Jackson (fr. Nov.) J. K. Small & Carter 2645 (NY, i); between Peter's Prairie and Homestead (fl., fr. Nov.) J. K. Small & Carter 2647 (NY); Big Pine Key (fr. Dec.) Killip 43384 (GH); *ibid.* (fr. Nov.) J. K. Small 3797 (NY, i); Boca Chica Key (fr. Nov.) J. K. Small 3917 (NY, i).

Remarks: G. DON published the combination *Mitreola sessilifolia* three years before TORREY & GRAY, correctly citing the basionym *Cynoctonum sessilifolium*.

The leaves of *M. sessilifolia* are usually up to twice as long as wide, but in some specimens they are up to 5 times as long as wide. A specimen with narrow leaves (4–5 × as long as wide) has been described as *M. sessilifolia* var. *angustifolia*. Several specimens, however, have leaves about 3 × as long as wide or vary between 2–3 × or 3–4 × and therefore this variety seems untenable. The

same seems to hold for var. *microphylla* (*Cynoctonum sessilifolium* var. *microphyllum*) as there is a continuous range of variation in leaf size. Moreover, the size of the leaves in the type of *M. sessilifolia* varies within the range "reserved" for the latter variety (mostly 1–1.5 cm long).

The letter "i" is added after the symbols of the herbaria cited for specimens with intermediate and an "n" for those with narrow leaves.

The seeds are usually smooth or obscurely verrucose. Reticulate seeds had been observed only in three specimens with narrow leaves (Curtiss 5172, 5752, and Godfrey 55710). The latter fact may indicate that there is introgression with *M. petiolata*. The verrucose seeds of the small specimen, Brace 7115 of *M. petiolata* from the Bahamas which resemble *M. sessilifolia* very much also points to this possibility.

5. *Mitreola sphaerocarpa* (Leenh.) Leenh. in Fl. Males. 1. 6: 960. 1972.

Fig. 3, p. 11

Basionym: *Cynoctonum sphaerocarpum* Leenh., Bull. Jard. Bot. Brux. 32: 417. 1962 and in Fl. Males. 1. 6: 377, f. 37. a–e. 1962.

Type: Sabah: Mt. Kinabalu, Tenompok, in Minitindok Gorge, J. & M. S. Clemens 29649 (L, holotype; isotypes: A, BM, K).

Perennial herb about 20–30 cm high. *Leaves*: petiole 1–1.5 cm long; blade elliptic, 6–14 × 3–6 cm, acute to acuminate at the apex, cuneate at the base or decurrent into the petiole. *Calyx* 1–1.3 mm long. *Corolla* white, 2 mm long. Stigma subsessile, very soon cleft after fecundation. *Fruit* broadly ovoid, bilobed, not or slightly split at the apex, about 3 mm in diameter. Other characters as in *M. pedicellata*.

Distribution: Only known from two collections from Sabah (one seen) and one from Sarawak.

Ecology: Mountains. Alt. about 100–1500 m.

Sabah: type (see above); Sarawak: G. Api, ulu Melinau (fl., fr. Sept.) P. Chai S 30397 (L).

Remarks: *M. pedicellata* and *M. sphaerocarpa* are very closely allied. They differ exclusively in the shape of the fruit, as stated under heading 5 of the key. Moreover, as they are geographically well separated, *M. sphaerocarpa* is maintained here as a distinct species. More collections should be made for additional evidence.

6. *Mitreola turgida* P. Jovet, Bull. Mus. Hist. Nat. Paris ser. 2. 6: 296, pl. 2. 1934.

Fig. 6, p. 26; Map 1, p. 12

Type: Madagascar: Mahvarem, near Majunga, Perrier de la Bâthie 9057 (P, lectotype; isotypes: BM, L).

Heterotypic synonym: *M. perrieri* P. Jovet, l.c. p. 292, pl. 1. Type: Madagascar: Ouest Moratraitra, right bank Betsiboka R., near Maevatanana, Perrier de la Bâthie 847 (P, holotype).

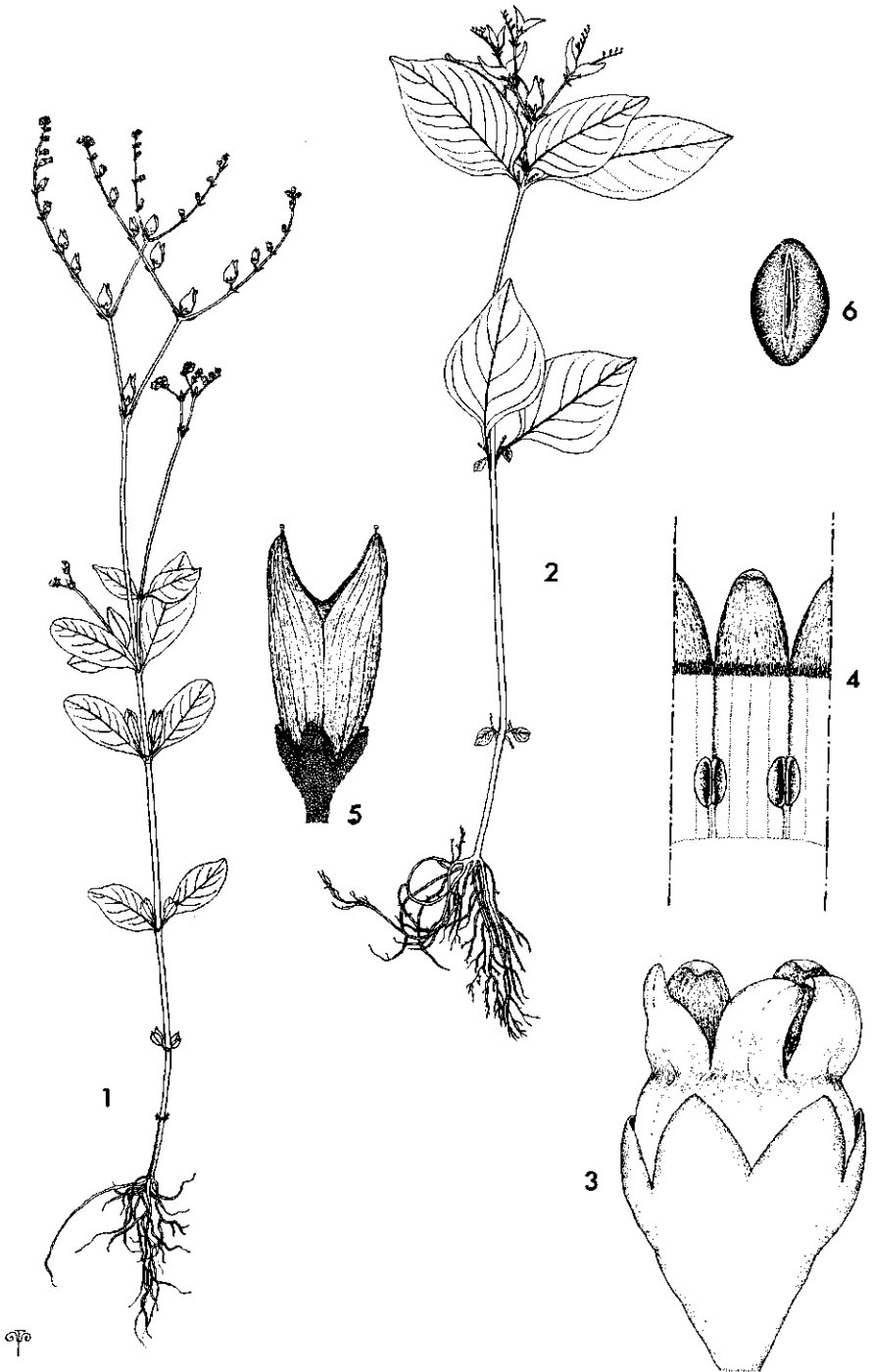


FIG. 6. *Mitreola turgida* P. Jovet: 1-2. habit, $\frac{2}{3} \times$; 3. flower, $24 \times$; 4. portion of opened corolla, $24 \times$; 5. fruit, $24 \times$; 6. seed, $20 \times$ (1, 3-4. Perrier 17268; 2. Perrier 847; 5-6. Perrier 9079).

Annual erect herb 5–25 cm high. Stems quadrangular, with 4 narrow wings, glabrous. *Leaves* shortly petiolate; petiole 1–7 mm long, glabrous; blade membranaceous when dry, ovate or elliptic, 1.3–2 × as long as wide, 6–46 × 4–23 mm, acute or obtuse at the apex, more or less abruptly narrowed into the petiole, glabrous on both sides, minutely ciliate. *Inflorescence* very variable in size, terminal and often also axillary, rather lax. Peduncle and branches slender, glabrous. *Calyx* 1 mm long; lobes 0.5 × 0.4 mm, acute. *Corolla* white 1.5–2.2 mm long; in throat penicillate ring; tube inside glabrous, 0.8–1.3 × 1–1.2 mm; lobes oblong, 0.7–1 × 0.4–0.6 mm, acute. *Filaments* inserted 0.1 mm above the corolla base, 0.2 mm long; anthers 0.2 mm in diameter. *Ovary* 0.5–0.6 mm in diameter; style with stigma 0.2 mm long. *Capsule* 5–6 × 2–5 × 1.5 mm, glabrous (minutely pilose when immature), with longitudinal veins; horns shorter or longer than the remaining portion, erect or divergent; seed dark brown, shining, ellipsoid, 0.5–0.6 × 0.2–0.3 × 0.15–0.2 mm, smooth, with an indented line at one side.

Distribution: Only known from Majunga and south to Maevatanana and the Ankara Plateau, Madagascar.

Ecology: On limestone, creek banks.

Madagascar: Ouest: Majunga (fl. Apr., fr. Aug.) Perrier de la Bâthie 17268 (P, paratype), 17268 bis (K, P, paratype); Mahvaram, near Majunga (fl., fr. Apr.) Perrier de la Bâthie 9057 (P, holotype; isotypes: BM, L); Katsepe, Majunga Province (fl., fr. July) Waterlot 163 (P); Ambaladiky (fl., fr. June) Bossier 6977 (P); Moratraitra, right bank Betsiboka R., near Maevatanana (fl., fr. Mar.) Perrier de la Bâthie 847 (P, type of *M. perrieri*); Ankara Plateau (fr. May) Perrier de la Bâthie 9079 (P).

After comparing the types of *Mitreola turgida* and *M. perrieri* and the other specimens cited the present author concluded that they all belong to a single species. The leaves of the type of *M. perrieri* are ovate or elliptic and acute or obtuse at the apex, like those of the type and the paratypes of *M. turgida*. The blades which have been strongly pressed are smoother than when slightly pressed. The type of *M. perrieri* has one mature fruit, as it is a sample from a population of young plants from a rather shady place. That of *M. turgida* is a sample from a population of fruiting full-grown plants from an open place. Therefore the latter has more numerous fruiting pedicels 1–4 mm long. The flower of the type of *M. perrieri* is not 0.75 but 1.5 mm long, that of herb. Perrier 17268 2.2 mm, and that of Waterlot 163 2 mm long. The corolla is always penicillate in the throat. The horns of the capsule are erect or divergent, as in *M. petiolata*.

NOMEN NUDUM

Ophiorrhiza ovatifolia Muehlenberg, Cat. 20. 1813. = *M. sessilifolia* (J. F. Gmel.) G. Don. Specimen with this name: Gates s.n. (NY).

EXCLUDED SPECIES

Mitreola bodinieri Léveillé, Fl. Kouy-Tchéou 1: 262. 1914. = *Omphalodes bodinieri* Léveillé, Boraginaceae.

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REGISTER

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