SYNOPSIS OF *MATELEA* S.L. (APOCYNACEAE: ASCLEPIADOIDEAE) IN TRINIDAD, TOBAGO, AND THE ABC ISLANDS

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ABSTRACT

The objective of this work is to provide a synopsis of the species of *Matelea* s.l. (Apocynaceae: Asclepiadoideae) from Trinidad, Tobago, and the ABC Islands (Aruba, Bonaire, and Curaçao) to facilitate their recognition and conservation. Six species are recognized from the area. Three of these reach their northernmost limit on the eastern side of the Caribbean in Trinidad and the ABC islands (*M. reflexa*, *M. rubra*, *M. squiresii*). Two species reach the Lesser Antilles (*M. denticulata*, *M. hirsuta*). One is broadly distributed to the Greater Antilles on the east and to Panama on the west (*M. maritima*).

RESUMEN

El objetivo de este trabajo es aportar una sinopsis de las especies de *Matelea* s.l. (Apocynaceae: Asclepiadoideae) de Trinidad, Tobago, y las Islas ABC (Aruba, Bonaire, y Curaçao) para facilitar su reconocimiento y conservación. Se reconocen seis especies en el área. Tres de ellas alcanzan su límite norte en el lado este del Caribe en Trinidad y las islas ABC (*M. reflexa*, *M. rubra*, *M. squiresii*). Dos especies alcanzan las Antillas Menores (*M. denticulata*, *M. hirsuta*). Una está ampliamente distribuida hasta las Antillas Mayores en la costa este y hasta Panamá en el oeste (*M. maritima*).

About fifty species of subtribe Gonolobinae (Apocynaceae: Asclepiadoideae) occur on the islands comprised by the Greater and Lesser Antilles, the Bahamas, Trinidad and Tobago, and Aruba and the Netherland Antilles. Evidence from the chloroplast (Rapini et al. 2003; Liede-Schumann et al. 2005; Rapini et al. 2006; Krings et al. 2008) and nuclear genomes (Krings et al. 2008) supports the monophyly of the subtribe. However, pending resolution of phylogenetic relationships, *Matelea* Aubl. continues to serve as a catch-all for any species not immediately referable to *Fischeria* DC. or *Gonolobus* Michx. (see Krings et al. 2008). The synorganization of androecium and gynoecium appears to have facilitated such a myriad of gynostegial structural variation in this group that it is at times very difficult to discern relationships, much less morphological synapomorphies, in the absence of a resolved phylogeny. Understandably, Woodson's (1941) mass synonymization was born of his frustration with the large variation in corona morphology exhibited by the group. *Matelea* now comprises 230–300 species, of which about half have been described since Woodson (1941), and sixty-six percent of these described in the past three decades. Krings (in press) provided a synopsis of *Matelea* s.l. in the West Indies, including a key to the genera of Gonolobinae in the area. However, Trinidad, Tobago, and the ABC Islands (Aruba, Bonaire, and Curaçao) were excluded from that treatment due their South American affinity. The objective of this work is to provide a synopsis of the species of *Matelea* s.l. from this area to facilitate their recognition and conservation.

RESULTS

Six species of *Matelea* s.l. are recognized from Trinidad, Tobago, and the ABC islands. Of these six, the following three reach their northernmost limit—at least on the eastern and southern side of the Caribbean—in Trinidad or the ABC islands: *M. reflexa* (Hemsl.) Morillo, *M. rubra* (H. Karst.) Spellman & Morillo, and *M. squiresii* (Rusby) Morillo. On the western side of the Caribbean, *M. reflexa* is known from as far north as Nicaragua (although it has apparently not been seen there in the past 150 years sec. Stevens 2001). *Matelea rubra* and *M. squiresii* are northern South American taxa and do not reach Mesoamerica (Krings & Saville 2007; Morillo 2007; Stevens 2009). Of the remaining three species, two reach as far north as the southern

Lesser Antilles (Krings, in press): *M. denticulata* (Vahl) Fontella & E.A. Schwarz (to Grenada) and *M. hirsuta* (Vahl) Woodson (to St. Vincent). Both *M. denticulata* and *M. hirsuta* are also known from Mesoamerica, as far north as Honduras and Nicaragua, respectively (Stevens 2001, 2009). The remaining species, *M. maritima* (Jacq.) Woodson, occurs throughout the West Indies, including the Greater Antilles, and reaches Panama in Mesoamerica (Krings & Saville 2007; Stevens 2009).

Keys and descriptions of the species are provided below. Corona morphological terminology follows Liede and Kunze (1993) and Kunze (1995), although it is recognized that additional work may be needed to clarify issues of family-wide homology (see Endress and Bruyns 2000; Livshultz 2003). Shorthand abbreviations for corona morphology following Liede and Kunze (1993) and Kunze (1995) are as follows: Ca = annular corona of corolline derivation (faucal annulus); Cd = dorsal anther appendage; Ci = interstaminal corona; C(is) = fused interstaminal and staminal corona; Cs = staminal corona.

Species are arranged alphabetically. Herbarium abbreviations follow Index Herbariorum (Holmgren & Holmgren 1998–present). Book abbreviations follow TL-2 (Stafleu & Cowan 1976–1988) and journal abbreviations B-P-H (Lawrence et al. 1968) and B-P-H/S (Bridson & Smith 1991). Author abbreviations follow Brummitt and Powell (1992).

TAXONOMIC TREATMENT

KEY TO THE SPECIES OF *MATELEA* S.L. IN TRINIDAD, TOBAGO, AND THE ABC ISLANDS

1. Corolla urceolate; inflorescence umbelliform _____ **M. hirsuta**
1. Corolla subcampanulate at base; inflorescence racemiform.
   2. Bases of leaf blades rounded or cuneate.
      3. Stems hirsute, pubescence ubiquitous, trichomes yellow-golden, eglandular trichomes antrorse or spreading, the largest ≥ 1.4 mm long, glandular capitate trichomes absent; corolla lobes 4.0–9.2 mm long, gynostegial corona fused into an obcylindric tube (C(is)) obscuring most of the gynostegium except the style head, tube ≥ 1.4 mm tall _____ **M. reflexa**
      3. Stems short-pubescent, pubescence in two lines, trichomes white, eglandular trichomes retrorse, to 0.3 mm long, glandular capitate trichomes spreading, to 0.08 mm long; corolla lobes 2–3.4 mm long, gynostegial corona not fused into a tube around the gynostegium _____ **M. squiresii**
   2. Bases of essentially all leaf blades deeply cordate.
      4. Gynostegial corona pubescent; terminal style-head appendage 0.9–1.6 mm tall, apically capitate _____ **M. maritima**
      4. Gynostegial corona glabrous; terminal style-head appendage absent or reduced to ca. 0.1 mm.
         5. Faucal annulus (corolline corona or Ca) reduced to a distinctly raised protuberance opposite each corolla lobe sinus, short-hispid; gynostegial corona not fused into a tube (C(is)) surrounding the gynostegium, Cs lobes not free; follicle winged, not tuberculate _____ **M. denticulata** s.l.
         5. Faucal annulus absent; gynostegial corona basally fused into a tube surrounding the gynostegium, Cs lobes apically free; follicle tuberculate, not winged _____ **M. rubra**

1. Matelea denticulata (Vahl) Fontella & E.A. Schwarz, Bol. Mus. Bot. Munic. 46:4. 1981. (**Fig. 1A**). *Cynanchum denticulatum* Vahl, Eclog. Amer. 2:23. 1798. TYPE: GUIANA [SURINAM]: *von Rohr120* (HOLOTYPE: C [IDC microfiche photo: Vahl herbarium nr. 17: III, 1!]).

Cynanchum viridiflorum G. Mey., Prim. Fl. Esseq. 141. 1818, nom illegit., non Sims, 1817. *Matelea viridiflora* (G. Mey.) Woodson, Ann. Missouri Bot. Gard. 28:325. 1941. TYPE: GUYANA: *Rodschied 154* (HOLOTYPE: GOET!)

Gonolobus grenadensis Schltr. in Urb., Symb. Antill. 7(3):339. 1912. TYPE: GRENADA: St. Mark Parish, Wooded hillsides near Victoria, elev. 100–300 ft, 24 Nov 1957, *Proctor 17225* (NEOTYPE, designated by Krings 2008: IJ!).

Slender, woody vine. Stems pubescent, pubescence ubiquitous or in two lines, eglandular trichomes retrorse-appressed, glandular capitate trichomes spreading. Leaf blades ovate to elliptic, 5.0–10.0 × 1.6–6.9 cm, adaxial surface glabrous, midvein glabrous or sparsely puberulent basally, eglandular trichomes antrorse, glandular capitate trichomes spreading or absent, abaxial surface glabrous, midvein glabrous or very sparsely pubescent, eglandular trichomes antrorse, glandular capitate trichomes spreading, apex acute to acuminate, base cordate, margins entire, colleters 2–5, lanceoloid; petioles 1.7–4.8 cm long, sparsely to moderately pubescent, pubescence more or less restricted to adaxial groove, eglandular trichomes antrorse, glandular capitate trichomes spreading. Inflorescence racemiform, peduncles 2.6–7.7 mm long, sparsely pubescent, pubescence ubiquitous, eglandular trichomes antrorse, glandular capitate trichomes spreading or absent; pedicels 14.0–20.0 mm long,

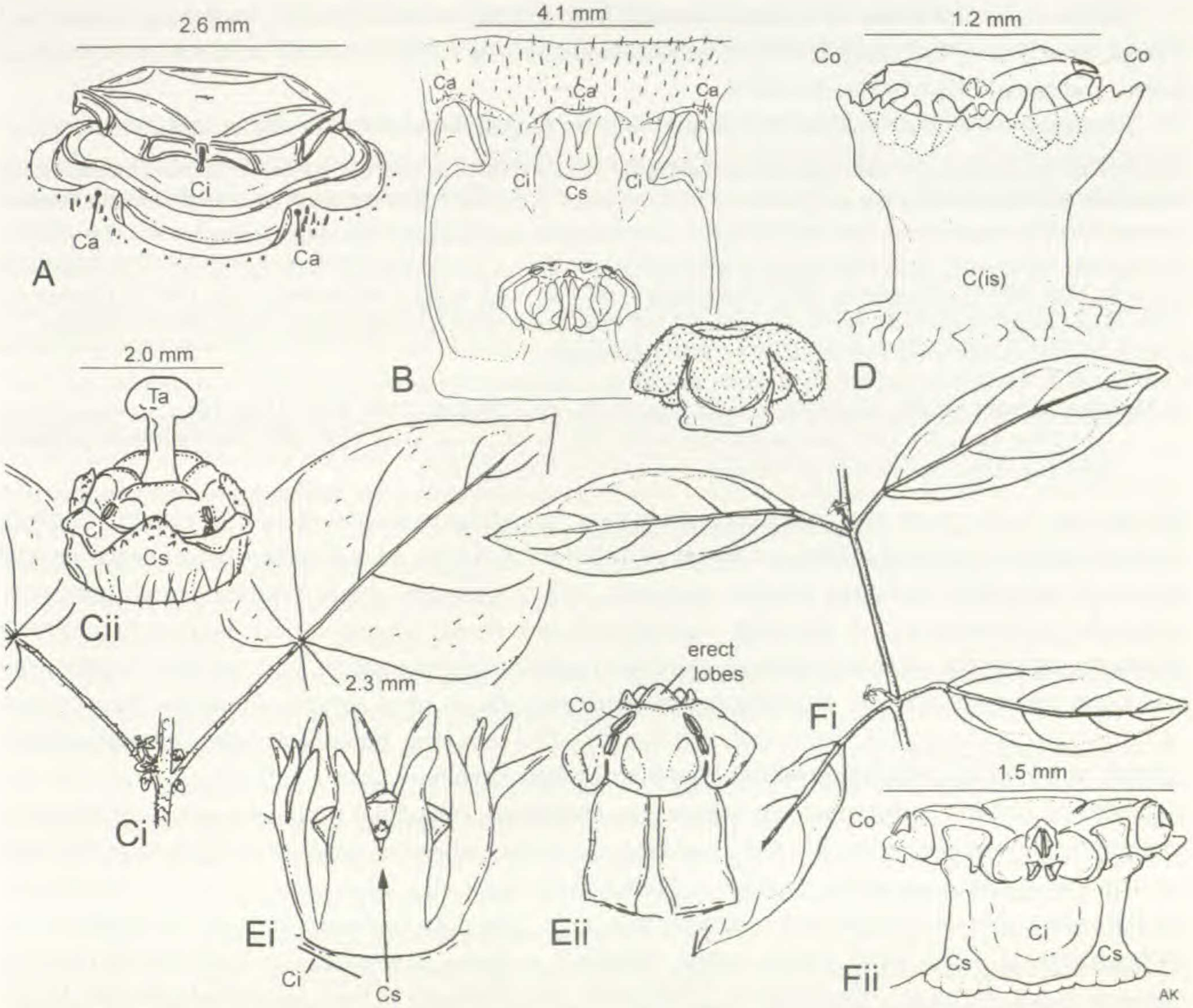

FIG. 1. *Matelea* s.l. in Trinidad, Tobago, and the ABC islands. **A**, *M. denticulata* (gynostegium based on *Dodson & Dodson 15450*, NY). **B**, *M. hirsuta* (corolla and gynostegium based on *Smith & Smith 1862*, NY). **C**, *M. maritima*: i, habit (based on *Ekman H5104*, S); ii, gynostegium (based on *Proctor 41760*, IJ). **D**, *M. reflexa* (gynostegium based on *Clark & Troya 561*, US). **E**, *M. rubra* (based on *Howard 20294*, A, NY): i, gynostegial corona; ii, style-head and subtending stipe. **F**, *M. squiresii* (based on *Fendler 621*, E): i, habit; ii, gynostegium. Ca = annular corona of corolline derivation (faucal annulus); Ci = interstaminal corona; C(is) = fused interstaminal and staminal corona; Co = corpusculum; Cs = staminal corona; Ta = terminal appendage of style-head.

sparsely to moderately pubescent, pubescence ubiquitous or in two lines, eglandular trichomes antrorse, glandular capitate trichomes spreading. Calyx lobes lanceolate, 6.2–7.0 × 1.6–2.3 mm, adaxial surface glabrous, abaxial surface glabrous, apices obtuse to acute, margins entire, colleters 1 per sinus, lanceoloid. Corolla green (fide collectoris), reticulate, subcampanulate at base, tube 0.8–1.0 × 0.8–1.0 mm, lobes imbricate in bud, broadly ovate, 13.0–16.0 × 8.5–9.6 mm, not ocellate, adaxial surface pubescent basally and along right margin, eglandular trichomes spreading, glandular capitate trichomes absent, abaxial surface glabrous, apex obtuse, margins entire. Faucal annulus (corolline corona or Ca) a distinctly raised protuberance opposite each corolla lobe sinus, short-hispid. Gynostegial corona of fused staminal (Cs) and interstaminal parts (Ci), Cs an inverse patelliform depression, not ligulate, Ci an inverse patelliform depression, not ligulate. Style-head 2.5–2.7 mm diam, stipe 0.2–0.5 mm tall, terminal style-head appendage absent. Pollinaria: corpusculum ca. 0.2 mm long, caudicles present, pollinia broadly ovate, 0.6–0.7 × 0.3–0.4 mm. Follicles not seen from the treated area (continental collections exhibit follicles ovoid-fusiform, 8.0–12.0 × 2.7–3.9 cm, glabrous, bases asymmetric, longitudinal wings 5). Seeds not seen from the treated area (continental collections exhibit seeds obovate, 4.8–7.0 × 2.4–3.2 mm, both surfaces reticulate-verrucose, distal margin dentate).

Habitat and Distribution.—Distributed broadly from Central to South America, including Trinidad and Tobago, as well as to the Lesser Antilles (Grenada). Known in the treated area only from roadsides, seasonal forests, and banana fields at low elevations.

Phenology.—Collected in flower in February, March, August, September, November, and December.

Additional specimens examined: **GRENADA. St. George Parish:** Richmond Hill, Aug 1908 (fl), *Bey s.n.* (A). **St. Mark Parish:** wooded hillside near Victoria, 100–300 ft, [31–91 m], 24 Nov 1957 (fl), *Proctor 17225* (A, BM). **TOBAGO.** Moriah, roadside, 27 Feb 1981 (fl), *Adams & Baksh 270* (TRIN); Flagstaff Hill, 13 Jul 1954 (fl), *Baker s.n.* (TRIN [digital image]); Mora Valley, near Rio Claro, low alt., 1 Dec 1957 (fl), *Simmonds s.n.* (TRIN); Little Tobago (Bird of Paradise Island), Ingraham's Walk, 125 m, 15 Aug 1979 (fl), *Webster 24192* (TRIN). **TRINIDAD.** Laventille, 2 Dec 1890 (fl), *Alexander s.n.* (TRIN [digital image]; conf. R.E. Woodson, Jr.); Chatham Beach, 9 Sep 1940 (fl), *Cheesman s.n.* (TRIN [digital image]); Western Rd, near St. Peter's Bay, 17 Mar 1938 (fl), *Cheesman 113* (TRIN [digital image]; conf. R.E. Woodson, Jr.); Diego Martin, River Estate, 16 Sep 1947 (fl), *Dale s.n.* (TRIN [digital image]).

2. Matelea hirsuta (Vahl) Woodson in E.E. Cheesman, Fl. Trinidad 2:170. 1947. (**Fig. 1B**). *Cynanchum hirsutum* Vahl, Eclog. Amer. 2:24. 1798. *Macroscepis hirsuta* (Vahl) Schltr. in Urb., Symb. Antill. 1:265. 1899. TYPE: TRINIDAD: *von Rohr 92* (HOLOTYPE: C [IDC microfiche photo: Vahl herbarium nr. 17: III, 3!; isotype: BM!).

Woody vine. Stems pubescent, pubescence ubiquitous, eglandular trichomes spreading, glandular capitate trichomes absent. Leaf blades elliptic or obovate, 7.3–10.5 × 4.8–6.1 cm, adaxial surface moderately to densely pubescent, eglandular trichomes antrorse, glandular capitate trichomes absent, midvein densely pubescent, eglandular trichomes antrorse, glandular capitate trichomes absent, abaxial surface moderately to densely pubescent, eglandular trichomes antrorse, glandular capitate trichomes absent, midvein densely pubescent, eglandular trichomes antrorse, glandular capitate trichomes absent, apex abruptly acuminate, base cordate, margins entire, colleters 2–5, lanceoloid; petioles 11.0–23.0 mm long, pubescent, pubescence ubiquitous, eglandular trichomes retrorse-spreading, glandular capitate trichomes absent. Inflorescence umbelliform, peduncles to 10.5 mm long, pubescent, pubescence ubiquitous, eglandular trichomes spreading, glandular capitate trichomes absent; pedicels 1.3–4.2 mm long, pubescent, pubescence ubiquitous, eglandular trichomes spreading or antrorse, glandular capitate trichomes spreading. Calyx lobes ovate 9.0–11.5 × 5.8–6.0 mm, adaxial surface glabrous, abaxial surface densely pubescent, eglandular trichomes antrorse, glandular capitate trichomes absent, apices acute, margins entire, colleters 1 per sinus, lanceoloid. Corolla brownish, evidently reticulate or not, urceolate, tube 9.0–10.5 × 7.0–9.0 mm, lobes imbricate in bud, ovate to suborbicular, 4.9–9.7 × 6.1–8.1 mm, not ocellate, adaxial surface moderately to densely pubescent, eglandular trichomes spreading, glandular capitate trichomes absent, abaxial surface moderately to densely pubescent, apex obtuse or rounded, margins entire. Faucal annulus (corolline corona or Ca) present, short hispid. Gynostegial corona of well-developed staminal (Cs) segments, glabrous, adnate to the corolla tube ca. 1.8–2.0 mm above the style-head, ligulate, interstaminal corona (Ci) not well developed, not ligulate. Style-head ca. 3.9–4.1 mm diam, stipe 1.0–1.2 mm tall, terminal style-head appendage absent. Pollinaria: corpuscula ca. 0.4 mm long, caudicles present, pollinia ovate, ca. 0.95 mm × 0.54 mm. Follicles not seen from the treated area (sec. Stevens 2001: follicles asymetrically fusiform, 9–12.5 × 3–4.5 cm, densely pubescent, trichomes glandular, longitudinal wings 5). Seeds not seen from the treated area (sec. Stevens 2001: seeds obovate, 6.5–8.3 × 4.5–5.7 mm, surfaces reticulate-verrucose, distal margin irregularly dentate).

Habitat and Distribution.—Sensu Stevens (2001), this species is broadly distributed from Mesoamerica to South America (including Trinidad) and the Lesser Antilles (St. Vincent).

Phenology.—Collected in flower in March. Collected in fruit in November.

Additional specimens examined: **St. Vincent:** Mar 1890 (fl), *Smith & Smith 1862* (NY). **Trinidad:** Southern Watershed Reserve, Siparia, 8 Sep 1940 (st), *Cheesman & Baker s.n.* (TRIN [digital image]; conf. R.E. Woodson, Jr.); Erin Savanna, 30 Nov 1980 (fr), *Boos & Baksh 67* (TRIN [digital image]); Irois, s.d. (fr), *Broadway 8523* (TRIN [digital image]; conf. R.E. Woodson, Jr.); Quinam Rd, Southern Range, 25 Jun 1929 (st), *Williams s.n.* (TRIN [digital image]; conf. R.E. Woodson, Jr.).

3. Matelea maritima (Jacq.) Woodson, Ann. Missouri Bot. Gard. 28:222. 1941. (**Fig. 1C**). *Asclepias maritima* Jacq., Enum. Syst. Pl. 17. 1760. *Gonolobus maritimus* (Jacq.) R. Br., Mem. Wern. Nat. Hist. Soc. 1:24. 1810. *Ibatia maritima* (Jacq.) Decne. in de Candolle, Prodr. 8:599. 1844. *Lachnostoma maritimum* (Jacq.) G. Nicholson, Ill. Dict. Gard. 2:226. 1884. TYPE: Herbar. Du Jacquin, 2 Insulae Caribaea. *De Ponthieu* (neotype: BM!, lectotype designated by Krings & Saville 2007 corrected here to neotype).

Gonolobus floccosus Bertol., Opusc. Sci. 4:225. 1823. TYPE: GUADELOUPE: *Anonymous s.n.* (HOLOTYPE: BOLO!).

Ibatia muricata Griseb., Fl. Brit. W.I. 421. 1862. TYPE: ANTIGUA: Cedar Hall, 1849, *Wullschlägel* (LECTOTYPE, designated by Krings & Saville 2007: M!).

Slender, woody vine. Stems pubescent, pubescence ubiquitous or in two lines, eglandular trichomes retrorse, glandular capitate trichomes spreading. Leaf blades ovate to oblong-ovate or orbicular, 1.2–10.5 × 0.7–9.8 cm, adaxial surface lightly pubescent, eglandular trichomes antrorse-spreading, glandular capitate trichomes spreading, midvein pubescence denser than that of the surface, eglandular trichomes antrorse, glandular capitate trichomes spreading, abaxial surface tomentose, eglandular trichomes antrorse, glandular capitate trichomes spreading, midvein densely pubescent, eglandular trichomes antrorse, glandular capitate trichomes spreading, apex acute to acuminate, base cordate, margins entire, colleters 3–6, lanceoloid; petioles 8.1–72.3 mm long, pubescence ubiquitous, eglandular antrorse, glandular capitate trichomes spreading. Inflorescence racemiform, peduncles ca. 1.12–1.9 mm long, densely pubescent, pubescence ubiquitous, eglandular trichomes antrorse, glandular capitate trichomes spreading; pedicels 0.6–4.1 mm long, densely pubescent, pubescence ubiquitous, eglandular trichomes antrorse, glandular capitate trichomes spreading. Calyx lobes oblong-ovate to oblong ca. (1.1–)2.1–4.9 × 0.8–1.9 mm, adaxial surface glabrous, abaxial surface pubescent, eglandular trichomes antrorse, glandular capitate trichomes spreading, apices acute, margins entire, colleters 1(–2) per sinus, lanceoloid. Corolla green to yellowish-green (rarely reddish-green) (fide colectoris), not reticulate, subcampanulate at base, tube ca. 0.6–1 × 1.4–1.8 mm, lobes imbricate in bud, lance-oblong 1.6–4.5 × 1.4–3.6 mm, not ocellate, adaxial surface densely pubescent, eglandular trichomes antrorse, gradually reduced in length from corolla lobe base to apex, glandular capitate trichomes absent, abaxial surface densely pubescent, eglandular trichomes antrorse, glandular capitate trichomes very sparse, spreading if present, apex obtuse or acute, margins entire. Faucal annulus (corolline corona or Ca) absent. Gynostegial corona of fused staminal (Cs) and interstaminal (Ci) parts, tube ca. 0.7–0.8 mm tall, papillate-pubescent, Cs apex a triangular lobe, papillate-pubescent up to and including the apex, Ci apically bi- or tri-lobed, lateral margins dissected completely from the Ci apex to the apex of the C(is) tube, medial Ci lobe (if tri-lobed) smaller than the two lateral Ci lobes or of equal dimensions, papillate-pubescent up to, but not including the apex, Ci ligulate basally within, two ridges emanating from the ligule evident to about half way up the C(is) tube. Style-head ca. 1.9–2.2 mm diam, stipe 0.6–0.7 mm tall, terminal style-head appendage 0.9–1.6 mm tall, capitate, not distinctly bi-lobed. Pollinaria: corpuscula ca. 0.2 mm long, caudicles present, pollinia ovate, oblong, or rhombic, ca. 0.6–0.7 mm × 0.28–0.31 mm. Follicles dark green (fide colectoris), narrowly ovoid, 4.1–9.1 × 1.3–5.2 cm, surfaces lanate, eglandular trichomes spreading, glandular capitate trichomes apparently absent, tuberculate, each tubercle ca. 2.8–5.6 mm long, apex broadly capitate or irregularly swollen, ca. 0.7–2.9 mm diam. Seeds obovate, plano-convex, 3.6–6.0 × 1.6–3.4 mm, both surfaces tuberculate, distal margin dentate.

Habitat and distribution.—*Matelea maritima* is known from dry, scrubby coastal thickets from throughout the Greater and Lesser Antilles to northern South America and Panama (Krings & Saville 2007; Stevens 2009).

Phenology.—In its range, *M. maritima* has been collected in flower and fruit year round. In Trinidad, it has been collected in flower in June and from nearby Patos Island in fruit in March (*Britton et al. 529*, GH).

Additional specimens examined: **Trinidad:** roadside, 9 Jun 1929 (fl), *Broadway 7220* (G, K, MO, S, US, Z); field, near landing, 26 Jun 1932 (fl), *Broadway 7220* (A, S). See Krings and Saville (2007) for an extensive list of additional specimens.

4. Matelea reflexa (Hemsl.) Morillo, Ernstia 24:39. 1984. (**Fig. 1D**). *Gonolobus reflexus* Hemsl., Biol. Cent.-Amer., Bot. 2(11): 333. 1882. TYPE: NICARAGUA: Chontales, 1867–1868 (fl), *Tate 241 (410)* (HOLOTYPE: K, n.v.; ISOTYPE: BM [digital image!]).

Fimbristemma brasiliense Schltr., Notizbl. Königl. Bot. Gart. Berlin 6(55):178. 1914. *Matelea brasiliensis* (Schltr.) Spellman, Phytologia 25:438. 1973. TYPE: BRAZIL: Seringal S. Francisco, Alto Rio Acre, Jun 1911 (fl), *Ule 9529* (HOLOTYPE: B, n.v.; ISOTYPE: L [digital image!]).

Slender, woody vine. Stems coarsely pubescent, pubescence ubiquitous, eglandular trichomes antrorse or sometimes spreading, glandular capitate trichomes absent. Leaf blades elliptic, ovate, or oblong, 4.5–8.0 × 1.6–5.8 cm, adaxial surface moderately to densely pubescent, eglandular trichomes antrorse, glandular capitate trichomes absent, midvein densely pubescent, eglandular trichomes antrorse, glandular capitate tri-

chomes absent, abaxial surface moderately to densely pubescent, eglandular trichomes antrorse, glandular capitate trichomes absent, midvein densely pubescent, eglandular trichomes antrorse, glandular capitate trichomes absent, apex obtuse, base rounded, truncate, or subcordate, margins entire, apiculum absent, colleters 2–4, lanceoloid; petioles 5.7–22.3 mm long, pubescence ubiquitous, eglandular trichomes antrorse or spreading, glandular capitate trichomes absent. Inflorescence racemiform, peduncles to 5.0 mm long, densely pubescent, pubescence ubiquitous, eglandular trichomes antrorse, glandular capitate trichomes absent; pedicels 7.5–11.0 mm long, moderately to densely pubescent, pubescence ubiquitous, eglandular trichomes antrorse, glandular capitate trichomes antrorse or spreading, about as long as the eglandular trichomes. Calyx lobes oblong, lanceolate, or elliptic, 1.3–2.0 × 0.6–0.8 mm, adaxial surface glabrous, abaxial surface coarsely pubescent, eglandular trichomes antrorse, glandular capitate trichomes absent, apices obtuse, margins entire, colleters 0–1 per sinus, lanceoloid. Corolla yellow to white-cream (fide collectoris), subcampanulate at base, tube 0.7–0.1.5 × 1.3–1.8 mm, lobes imbricate in bud, ovate or deltate, 4.0–6.2 × 1.7–2.2 mm [considerably lower than Stevens range!], not ocellate, adaxial surface minutely pubescent, eglandular trichomes spreading, glandular capitate trichomes absent, abaxial surface coarsely pubescent, eglandular trichomes mostly spreading, some antrorse, glandular capitate trichomes spreading, about as long as the eglandular trichomes, apex obtuse or rounded, margins entire. Faucal annulus (corolline corona or Ca) absent. Gynostegial corona of fused staminal (Cs) and interstaminal (Ci) parts forming an obcylindric tube with five pockets defined by vertical Cs walls attaching tube to gynostegium, C(is) glabrous on both sides, Cs an elevated ridge, ca. 1.2 mm tall at junction with gynostegium and 1.4 mm tall at its free apex, not ligulate, Ci apex free, base attached to gynostegium, ligulate. Style-head ca. 1.1–1.6 mm diam, stipe 1.2–1.4 mm tall, terminal style-head appendage absent. Pollinaria: corpuscula ca. 0.25 mm long, caudicles present, pollinia narrowly ovoid, ca. 0.5 mm × 0.2 mm. Follicles unknown. Seeds unknown.

Distribution and habitat.—This species is distributed from Nicaragua to Brazil and Peru. It occurs from terra firma to submontane and cloud forests, from 50–1200 m elev.

Phenology.—Collected in flower in January (Trinidad) and December.

Additional specimens examined: **BRAZIL:** between Maloca and Rio Cauaburi, in forest on terra firma, 50–100 m elev., 31 Dec 1965 (fl), *Silva & Brazão 60785* (VEN). **PANAMÁ. Panamá:** between Cerro Jefe and Encida, 2100–2700 ft elev. [640–823 m], 17 Jan 1968 (fl), *Dwyer 8218* (VEN). **TRINIDAD:** Arima-Blanchisseuse Rd., 11th mile, 2000 ft elev. [610 m], roadside, 20 Jan 1952 (fl), *Baker s.n.* (TRIN [digital image]; conf. Sandwith). **VENEZUELA. Sucre:** Cagigal, Peninsula de Paria, trail from El Paujil to summit of the mountain, S-facing slopes, trail leading to El Brasil, beginning of cloud forest, 10°38–39'N, 62°43'W, 700–750 m elev., 20 Feb 1980 (fl), *Steyermark, Liesner, and Carreño Espinosa 121426* (VEN).

Notes.—At a glance, the flowers of *M. reflexa* appear similar to those of members of the *Fimbristemma* Turcz. group of *Gonolobus* because of the conspicuous tube surrounding the gynostegium. However, the tube in *M. reflexa* appears to be gynostegial, not coralline, in origin. It is attached directed to the gynostegial stipe via five Cs rays and completely glabrous. Members of the *Fimbristemma* group in contrast exhibit a gynostegium surrounded by two tubes: the innermost is gynostegial in origin and completely glabrous, whereas the outermost is coralline in origin (thus a modification of the Ca) and typically pubescent, at least along the rim.

5. Matelea rubra (H. Karst.) Spellman & Morillo, Phytologia 34:152. 1976. (**Fig. 1E**). *Omphalophthalma rubra* H. Karst., Fl. Columb. 2:119–120, t. 163. 1866. *Matelea rubra* (H. Karst.) Aa & Stoffers, Proc. Kon. Ned. Akad. Wetensch., C 84(3):309. 1981, nom. illeg. TYPE: COLOMBIA. MAGDALENA: Santa Marta, *Karsten s.n.* (HOLOTYPE: LE, Sennikov, pers. comm., n.v.).

Slender, woody vine. Latex white. Stems pubescent, pubescence ubiquitious or in two lines, eglandular trichomes retrorse, glandular capitate trichomes spreading. Leaf blades ovate to oblong-ovate, 2.1–8 × 1.2–7.3 cm, adaxial surface pubescent, eglandular trichomes generally antrorse, glandular capitate trichomes spreading, midvein more densely pubescent than leaf surface, eglandular trichomes antrorse, glandular capitate trichomes spreading, abaxial surface densely pubescent, eglandular trichomes antrorse, midvein less densely pubescent than surface, eglandular trichomes mostly antrorse or spreading, sometimes retrorse, glandular capitate trichomes spreading, apex acuminate or acute, base cordate, margins entire, colleters 2–5, lanceoloid; petioles 9.9–58.1 mm long, densely pubescent, pubescence ubiquitous, eglandular trichomes antrorse, glandu-

lar capitate trichomes spreading. Inflorescence racemiform, peduncles 1.5–3.1 mm long, densely pubescent, pubescence ubiquitous, eglandular trichomes antrorse-spreading, glandular capitate trichomes absent; pedicels 1.0–4.7 mm long, densely pubescent, pubescence ubiquitous, eglandular trichomes antrorse-spreading, glandular capitate trichomes absent or spreading. Calyx lobes oblong-ovate, ca. 2.6–4.1 × 1.0–1.5 mm, adaxial surface glabrous, abaxial surface sparsely but coarsely pubescent, eglandular trichomes antrorse, glandular capitate trichomes absent, apex acute, margins entire, colleters 1 per sinus, lanceoloid. Corolla maroon, green with brown stripes, greenish-yellow or white (fide collectoris), subcampanulate at base, tube ca. 0.6–1.7 × 0.6–0.7 mm, lobes imbricate in bud, ovate-lanceolate, 5.5–6.5 × 1.7–2.3 mm, adaxial surface glabrous with sparse pubescence at apex, eglandular trichomes spreading, glandular capitate trichomes absent, abaxial surface glabrate or very sparsely pubescent, eglandular trichomes antrorse, glandular capitate trichomes absent, apex obtuse, margins entire. Faucal annulus (Ca) absent. Gynostegial corona of fused staminal (Cs) and interstaminal parts (Ci), tube ca. 1.3–2.4 mm tall, Cs apex a shallow, rounded lobe, ca. 0.2 mm tall, glabrous or papillate-pubescent near the apex, a single ridge leading from the base of the stipe to the base of the Cs within, Ci bi-lobed, lobes extending 2–3.8 mm beyond their medial sinus, glabrous, Ci not ligulate within. Style-head ca. 2.0–2.6 mm diam, stipe 1.28–1.35 mm long, not toothed, terminal style-head appendage absent or reduced to ca. 0.1 mm tall, central rim of style-head exhibiting five erect lobes, each ca. 0.24–0.26 mm tall. Pollinaria: corpuscula ca. 0.3 mm long, caudicles present, pollinia broadly ovate, ca. 0.66 × 0.46 mm. Follicles green and brown (fide collectoris), ovate, 6.3–6.9 × 1.9–3.9 cm, minutely pubescent, tuberculate, tubercles 4.9–8.9 mm long, broadly capitate, apical swelling white, irregular, 2.0–6.6 mm diam., color and pubescence as that of follicle surface. Seeds pyriform, plano-convex (or at least appearing so due to incurved margins), 4.1–4.3 × 2.1–2.5 mm, curved surface with a raised median ridge, both surfaces tuberculate, distal margin dentate.

Distribution and habitat.—*Matelea rubra* is known from subxerophytic associations over limestone from each of the ABC islands, as well as Colombia and Venezuela.

Phenology.—Collected in flower from September through February. Collected in fruit in March and November.

Additional specimens examined: **ARUBA:** Savoneta, Oct 1969 (fl), *Arnoldo-Broeders 3816* (A); sewage treatment plant area, 17–21 Jan 1986 (fl & fr), *Howard 20294* (A, NY); Hooiberg, N-hill, Scree hill, 16 Feb 1999 (fl), *van Proosdij et al. 667* (A, NY). **BONAIRE:** NW of Goto Meer, 6 Nov 1952 (fl), *Stoffers 579* (A). **CURAÇAO:** Christoffelberg, 26 Dec 1952 (fl), *Stoffers 1190* (A); Sint Joris, "Marie Pompoen," 9 Mar 1917 (fr), *Curran & Haman 238* (GH); Hato plain, second limestone plateau near Hato-airport, 9 Feb 1999 (fl), *van Proosdij et al. 597* (A). **VENEZUELA. Falcón:** Cardón, 2 km SE de Punto Fijo, 20 m elev., 27 Nov 1978 (fl & fr), *Flora Falcón (HW, RW, TR) 37* (VEN). Zulia: Bolívar, carretera Maracaibo–Carora, entre km 5–7 al SE de Sabana de la Plata (km 42), 27 Oct 1977 (fl), *Bunting 5770* (VEN); Bolívar, Parque Yaguasa, entre la carretera intercomunal y el Lago de Maracaibo, 0–25 m elev., 24 Sep 1979 (fl), *Bunting & Galué 7930* (VEN).

6. Matelea squiresii (Rusby) Morillo, Ernstia 24:39. 1984. (**Fig. 1F**). *Gonolobus squiresii* Rusby, Descr. S. Amer. Pl. 101. 1920. TYPE: VENEZUELA: Lower Orinoco, 1896 (fl), *Rusby & Squires 294* (HOLOTYPE: NY!)

Matelea mediocris Woodson, Fieldiana, Bot. 28(3):510-511. 1953. TYPE: VENEZUELA: Bolívar, vicinity of Tumeremo, between S of town and airport, 305 m elev., 18 Dec 1944 (fl), *Steyermark 60690* (HOLOTYPE: MO [digital image!]; ISOTYPE: F [digital image!], VEN!)

Slender, woody vine. Stems pubescent to glabrescent, pubescence in two lines, eglandular trichomes retrorse, glandular capitate trichomes spreading. Leaf blades elliptic, slightly oblanceolate, or oblong, 3.5–5.8 × 1.1–2.1 cm, adaxial surface glabrous to very sparsely pubescent, eglandular trichomes antrorse, glandular capitate trichomes absent, midvein glabrous to very sparsely pubescent, eglandular trichomes antrorse, glandular capitate trichomes spreading, abaxial surface glabrous to very sparsely pubescent, eglandular trichomes antrorse, glandular capitate trichomes spreading, midvein glabrous to very sparsely pubescent, eglandular trichomes antrorse, glandular capitate trichomes spreading, apex obtuse, to abruptly short acuminate, base rounded, margins entire, apiculum pubescent on both sides, colleters 2–4, lanceoloid; petioles 5.8–11.7 mm long, pubescence more or less restricted to adaxial ridge, eglandular trichomes antrorse or spreading, glandular capitate trichomes spreading. Inflorescence racemiform, peduncles to 1.8 mm long, glabrous; pedicels 1.9–2.9 mm long, glabrous or sparsely pubescent, pubescence ubiquitous, eglandular trichomes absent, glandular capitate trichomes spreading. Calyx lobes oblong, lanceolate, or elliptic, 1.0–2.0 × 0.6–0.8 mm, adaxial

surface glabrous, abaxial surface coarsely pubescent, eglandular trichomes antrorse, glandular capitate trichomes spreading, apices obtuse, margins entire, colleters 1 per sinus, lanceoloid. Corolla yellow green with green lines (fide collectoris), subcampanulate at base, tube 0.5–0.7 × 0.9–1.2 mm, lobes imbricate in bud, ovate or deltate, 2.0–3.4 × 1.5–2.3 mm, not ocellate, adaxial surface glabrous or pubescent, eglandular trichomes spreading, glandular capitate trichomes absent, abaxial surface coarsely pubescent, eglandular trichomes antrorse, glandular capitate trichomes absent, apex obtuse or rounded, margins entire. Faucal annulus (corolline corona or Ca) absent. Gynostegial corona of fused staminal (Cs) and interstaminal (Ci) parts, Cs an elevated ridge, ca. 0.5 mm tall, ligulate, ligule ca. 0.1 × 0.2 mm, apex truncate, Ci appearing as a sinus between the Cs, not ligulate. Style-head ca. 1.5–1.8 mm diam, stipe 0.5–0.6 mm tall, terminal style-head appendage absent. Pollinaria: corpuscula ca. 0.1 mm long, caudicles present, pollinia narrowly ovoid, ca. 0.3 mm × 0.2 mm. Follicles not seen. Seeds not seen.

Distribution and habitat.—*Matelea squiresii* is known from northern South America (Suriname to Venezuela) to Trinidad. It occurs in a variety of habitats from savannas to mountain forests.

Phenology.—Collected in flower in May, June, and December.

Additional specimens examined: **TRINIDAD:** Maracas-Tucuche, El Tucuche, 16 Jun 1975 (fl), *Raynal s.n.* (TRIN [digital image]; Mt. Tucuche, summit, 5 Jun 1947 (fl), *Baker s.n.* (TRIN [digital image]; conf. R.E. Woodson, Jr.); Tucuche, near summit, 12 May 1949 (fl), *Baker s.n.* (TRIN [digital image]; conf. R.E. Woodson, Jr.). Piarco-Arima, Mausica savannah, 4 Dec 1947 (fl), *Baker s.n.* (TRIN [digital image]; dupl. conf. W.D. Stevens).

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