MICONIA PHRYNOSOMADERMA (MELASTOMATACEAE: MICONIEAE), A NEW SPECIES FROM THE MASSIF DU NORD, HAITI, AND SIXTEEN NEW NAMES AND COMBINATIONS

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ABSTRACT

During revisionary studies of the Greater Antillean *Lima* clade of *Miconia*, we discovered a previously undescribed species, **Miconia phrynosomaderma.** We herein describe this new species, compare it with putative close relatives, and provide an illustration and distribution map. *Miconia phrynosomaderma* is endemic to northern Haiti and known only from the type collection. This species represents yet another new species described from the priceless collections made in the Greater Antilles by the Swedish botanist, Erik L. Ekman. A new section of the genus *Miconia* is described, **Miconia** sect. **Lima,** which is recognized based on a suite of putative morphological synapomorphies. We also make 16 new combinations or new names for members of the *Lima* clade and closely related species that previously were recognized under *Leandra* and/or *Ossaea*.

RESUMEN

Durante estudios taxonómicos del clado *Lima* de *Miconia* de las Antillas Mayores, descubrimos una nueva especie para la ciencia, **Miconia phrynosomaderma.** En este manuscrito describimos esta nueva especie, la comparamos con sus parientes putativos, y aportamos una ilustración y un mapa de distribución. *Miconia phrynosomaderma* es endémica de Haití y conocida solo por la colección tipo. Esta especie representa otra nueva especie más descrita de las colecciones imprescindibles de las Antillas Mayores del botánico sueco, Erik L. Ekman. Se describe una nueva sección de *Miconia*, **Miconia** sect. **Lima,** la cuál se reconoce por caracteres morfológicos. También hacemos 16 nuevas combinaciones o nuevos nombres para miembros del clado *Lima* y parientes, que antes se reconocían bajo los géneros *Leandra* y/u *Ossaea*.

INTRODUCTION

The famous Swedish botanist, Erik L. Ekman, was a voracious collector and incredible taxonomist. He has been described by some as a wild animal in the way he collected plants, as he made easy work of terrain quite difficult for most botanists. He was known for his broad knowledge of the flora of Cuba and Hispaniola, his thoroughness, beautiful collections, and also his indifference to adverse climatic conditions while in the field (Standley 1931; Wolcott 1931). As an avid collector and well-trained botanist, he discovered hundreds of new species in Cuba and Hispaniola, many of which were described either by German botanist, Ignaz Urban, Ekman himself, or Urban and Ekman together (Urban 1923, 1927, 1929, 1931; Standley 1931). However, of the numerous collections made by Ekman, many are still yielding species new to science (e.g., Judd & Beaman 1988; Judd et al. 1988; Judd 1994; Guerrero et al. 2004; Judd & Majure 2013). Likewise, the new species presented in this paper is the result of a collection of a rare *Miconia* Ruiz & Pav. from northern Haiti made by Ekman in 1927.

As currently circumscribed, the genus *Miconia* of tribe Miconieae, is extremely polyphyletic, having numerous other genera, e.g., *Calycogonium* DC., *Clidemia* D. Don, *Conostegia* D. Don, *Leandra* Raddi, *Mecranium* Hook., *Ossaea* DC., *Pachyanthus* A.Rich., *Tetrazygia* Rich., nested within it. However, most of those genera also are non-monophyletic, as several recent molecular phylogenetic analyses (Bécquer et al. 2008; Goldenberg et al. 2008; Michelangeli et al. 2004, 2008) as well as unpublished data (Michelangeli, in prep.) have shown. The problematic generic circumscriptions within Miconieae have been discussed by numerous authors (Cogniaux 1891; Gleason 1932; Macbride 1941; Wurdack 1972; Judd 1986, 1989, 2007; Judd & Skean 1991; Martin et al. 2008; Martin & Michelangeli 2009; Ionta et al. 2012). Cogniaux (1891) even considered the delimitation of

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genera in the group to be arbitrary. It is quite clear that generic circumscription within this group is in need of revision, however, the splitting of *Miconia* would lead to a proliferation of new genera, many of which would be morphologically undiagnosable and of problematic circumscription (see Ionta et al. 2012). In contrast, the Miconieae can be diagnosed by several morphological synapomorphies: partly or entirely inferior ovaries, baccate fruits, stamens without or merely with poorly developed connective appendages, and the absence of megastyloids (Michelangeli et al. 2008). Therefore, it is more useful to recognize a broadly circumscribed *Miconia*, including all those species of Miconieae with berry fruits, while recognizing well-supported, less inclusive clades with clear morphological synapomorphies as subgenera or sections of *Miconia* (Ionta et al. 2012; Ionta & Judd 2012).

The Greater Antillean *Lima* clade within *Miconia* is a good example of the problem of arbitrarily circumscribed traditional genera within Miconieae, as it contains species that have been recognized as *Calycogonium, Clidemia, Leandra, Miconia*, *Ossaea*, *Oxymeris* DC., and *Sagraea* DC., although most species within this monophyletic group are currently recognized within either *Leandra* or *Ossaea* (Alain 1957; Judd & Skean 1991; Liogier 2000; Michelangeli & Bécquer 2012). *Leandra* and *Ossaea* were traditionally recognized based on their acute petal apices, a feature exhibited by most members of the *Lima* clade. *Leandra* is widely polyphyletic, although, *Leandra* s.str. (including the type *L. melastomoides* Raddi; Martin et al. 2008) is a clade quite distantly related to the *Lima* clade. The nomenclatural status of *Ossaea* is problematic, as no type has been designated. However, of the species, which could be used as the type of the genus, none of those are closely related to the *Lima* clade. So even if most of the species of Miconieae were not included in *Miconia* s.l., neither *Leandra* nor *Ossaea* would be the correct genera for members of the *Lima* clade. Thus, we herein describe this clade as a new section within *Miconia,* i.e., *Miconia* sect. *Lima*. For the above stated reasons, we justify the description of the new species within *Miconia s.l.*

Members of *Miconia* sect. *Lima* represent a clade that is restricted to the Greater Antilles and consists of 17 known species, including *Miconia phrynosomaderma,* which is described herein. The monophyly of sect. *Lima* is well supported in molecular phylogenetic analyses (Goldenberg et al. 2008; Martin et al. 2008; Michelangeli et al. 2008; Michelangeli et al., in prep.) and by morphological characters. Putative synapomorphies of this clade are numerous, including the striking and well-developed bulla-based hairs on the adaxial leaf surface (Fig. 1), as well as the ephemeral, long-stemmed, clavate-dendritic hairs on the adaxial leaf surface of developing leaves (which are produced from in between the large bulla-based hairs towards the leaf base along primary, secondary, and occasionally tertiary veins). These clavate-dendritic hairs are also produced at the inflorescence nodes, emerging between the bulla-based hairs. Bulla-based hairs are also produced on other plant parts, e.g., the abaxial leaf surface, stems, inflorescence axes, hypanthia, calyx teeth, and the upper surface of the ovary, although these have narrower bases in most species, as compared to those of the adaxial leaf surface. Sessile glands, another likely apomorphy, are present on the adaxial and abaxial leaf surfaces, hypanthium, and calyx lobes. The flowers produce petals with acute to acuminate apices that bear large bulla-based hairs from the medial portion and/or apex of the petal, and the presence of these distinctive hairs likely is also synapomorphic (Fig. 1). Finally, the anthers generally have a dorso-basal appendage and one dorsally oriented pore, both likely apomorphies.

Inflorescences are terminal and fruits have terete calyx teeth (Fig. 1), and although distinctive, both are likely retained plesiomorphies. The ovaries are typically slightly four- or five-lobed, although this if often obscured by the dense bulla-based hairs.

TAXONOMIC TREATMENT

Miconia sect. **Lima** Majure & Judd, sect. nov. Type: *Miconia lima* (Desr.) M. Gómez, Anales Hist. Nat. 23:69. 1894. Basionym: *Melastoma lima* Desr. in Lam. Encyc. 4:47. 1797. *Clidemia lima* DC., Prodr. [A.P. de Candolle] 3:161. 1828. *Sagraea lima* (Desr.) Naud., Ann. Sci. Nat., Bot. sér. 3, 18:99. 1852. *Calycogonium lima* (Desr.) Griseb., Cat. Pl. Cub. [Grisebach] 95. 1866. *Ossaea lima* (Desr.) Triana, Trans. Linn. Soc. London 28:147. 1871–1872. *Leandra lima* (Desr.) Judd & Skean, Bull. Florida Mus., Biol. Sci. 36:61. 1991.

Ossaea lima (Desr.) Triana var. *grandifolia* Cogn., Monogr. Phan. 7:1061. 1891.

Ossaea lima (Desr.) Triana var. *ovalifolia* Cogn., Symb. Antill. 7:531. 1913.

Trichomata basibus bulliformis per corpus plantae; trichomata longa et clavatidendritica in pagina adaxiali foliorum juvenium; trichomata glandulosa, sessilia a subsessilia, in pagina adaxiali foliorum, inter trichomata bulliformia; trichomata glandulosa, sessilia, in pagina abaxiali foliorum, hypanthio et lobis calycis; petala acuta (vel acuminata) cum trichomatibus basibus bulliformis in pagina abaxiali.

Evergreen shrubs; young **stems** terete, elliptic or slightly rectangular in cross section, lacking longitudinal ridges, the indumentum of dense bulla-based hairs, these long appressed, spreading, or recurved, or short and granulate. **Leaves** opposite, slightly anisophyllous; blade elliptical, ovate, or narrowly ovate, the margin crenulate to dentate, these crenulations/dentations obscured by large bulla-based hairs, which slightly fold over the leaf margin, producing in some cases a moderately revolute margin, the indumentum of adaxial leaf surface typically of broad bulla-based hairs ± filling areoles, although sometimes these hairs relatively narrow and wide-spaced, not filling the areoles, with long-stemmed, clavate-dentritic hairs produced along the primary, secondary and tertiary veins from between the bulla-based hairs, and also sessile to short-stalked glandular hairs present on all parts of the lamina (between bulla-based hairs), the abaxial leaf surface variously covered by narrow bulla-based hairs, these either long and well developed or short and granulate, these appressed, spreading, or erect, the lamina with sparse, sessile glands, the venation acrodromous, with secondary veins arching toward leaf apex, 1 to 3 pairs, basal to suprabasal, tertiary veins percurrent, ± perpendicular to the midvein, sometimes mostly obscured by bulla-based hairs on the adaxial leaf surface, connected by quaternary veins, the primary, secondary, tertiary and quaternary veins mostly impressed on the adaxial surface and raised on the abaxial surface, domatia present or absent, occurring at the junctions of primary, secondary and tertiary veins, forming a pocket-like structure in the axils of the primary and innermost secondary veins or formed from a tuft of hairs in the vein axils. **Inflorescences** terminal, although often surpassed by the rapid growth of axillary shoots, the flowers in 3-flowered dichasia, sessile, subsessile or pedicellate, thus forming open cymes or sessile and nearly headlike clusters. **Flowers** 4–5(6) merous, mostly actinomorphic or nearly so; hypanthium 4–5 lobed, the lobes sometimes obscured by retrorse or antrorse bulla-based hairs, bulla-based hairs long and well developed, or granulate, hypanthium also with sessile glands; calyx lobes triangular, acute to acuminate, often covered by sessile glands throughout the adaxial surface or such glands restricted to the apex of the adaxial surface, abaxial surface covered in bulla-based hairs and ± sessile glands; calyx teeth ± equal or longer than calyx lobes, terete, mostly reflexed in fruit, covered in long and well developed, or granulate bulla-based hairs, sessile glands present or absent; calyx tube often with long stemmed, clavate-dendritic hairs produced from apex along the margin, sessile glands ± present on adaxial surface, abaxial surface covered in bulla-based hairs; petals ovate to obovate or slightly oblong, symmetric or asymmetric, white, red, rose, purple, or white with purple tinge abaxially, apices acute to acuminate, with moderately bulla-based hairs produced from the abaxial surfaces just below the petal apex and occasionally from the medial portion of the petal as well; stamens 8–10(–12), not geniculate, the filaments glabrous, the anthers with or without a small dorso-basal appendage and a single, dorsally inclined pore; style straight to moderately curved, generally expanded in the middle, the stigma punctiform; ovary 2–5 locular, ± inferior, with axile placentation, the placenta intruded into each locule, the ovary apex without a collar but commonly with a crown of multicellular hairs, the upper portion of the ovary pubescent (bulla-based hairs) to mostly glabrous (i.e., with only crown hairs present). **Berries** globose and slightly 4- or 5-lobed, purple-black at maturity. **Seeds** angular, obpyramidal, obovoid to obovoid-falcate, with a linear to oblong, dark colored raphe that extends the length of the seed; testa smooth; appendage absent.

Etymology.—The name *Lima* is derived from the Latin, *lima*, which refers to a file. The bulla-based hairs on the adaxial leaf surface of *Miconia lima* and other members of the clade form a pattern very similar in appearance to that of a file or rasp. Hence, we found it appropriate to use the name *Lima* for this section of *Miconia*.

The following new combinations or new names for species of *Miconia* sect. *Lima* are required. Three other species, *Miconia inaequipetiolata, M. karlkrugii* and *M. krugiana,* also are included. Although they are not part of the *Lima* clade (Michelangeli et al., unpubl. data, Majure et al. in prep.), morphological and phylogenetic data suggest that they are closely related.

Miconia argentimuricata Majure & Judd, nom. nov. *Calycogonium muricatum* Griseb., Cat. Pl. Cub. 95. 1866. *Ossaea muricata* (Griseb.) C. Wright, Anal. Acad. Ci. Habana 5:434. 1868. Type: CUBA: Cuchillos de Baracoa, 14 May 1860–1864, *C. Wright 2485* (lectotype designated by Howard 1984: GOET! online image seen GOET007038!; isolectotypes: GH! MO!). Non *Miconia muricata* (D. Don) Triana, Trans. Linn. Soc. London 28:102. 1871.

The new epithet is meant to call to mind the original epithet and also reflect the silver coloration of the adaxial surface of dried leaves of this species.

Miconia asperifolia (Naudin) Majure & Judd, comb. nov. *Clidemia asperifolia* Naudin, Ann. Sci. Nat., Bot. sér. 3, 17:342. 1852. *Oxymeris asperifolia* (Naudin) Triana, Trans. Linn. Soc. London 28:96. 1871–72. *Ossaea asperifolia* (Naudin) Triana, Trans. Linn. Soc. London 28:147. 1871–72. Type: JAMAICA: In insula Jamaica, loco haud indicato. Planta a celeberrimo Hooker communicate (n.v.).

Note that *Clidemia hirsuta* Macfad., Fl. Jamaica 2:45. 1850., also represents this species, but it is not considered here to be effectively published, and thus is not validly published. The name *Clidemia hirsuta* (Sw.) Griseb. (Fl. Brit. W. I. 248. 1860.) represents a different species.

Miconia cubacinerea Majure & Judd, nom. nov. *Clidemia cinerea* Griseb., Cat. Pl. Cub. 97. 1866. *Oxymeris cinerea* (Griseb.) Triana, Trans. Linn. Soc. London 28:92. 1871. *Leandra cinerea* (Griseb.) Cogn., Fl. Bras. (Martius) 14:71. 1886. *Maieta cinerea* (Griseb.) M. Gómez, Anales Hist. Nat. 23:71. 1894. Non *Miconia cinerea* Cogn., Fl. Bras. (Martius) 14(4):290. 1887. Type: CUBA: Yunque de Baracoa, 11 Jun 1860–1864, *C. Wright 2483* (holotype: GOET! online image seen GOET007034; isotypes: BM! online image seen BM000884493, BR! online image seen BR0000005185191, GH!, K! online image seen K000535607, MO! YU! online image seen YU065014).

The specific epithet, *cubacinerea*, refers to the restricted distribution of this species, which is only known from Cuba.

Miconia cubana (Alain) Majure & Judd, comb. nov. *Ossaea cubana* Alain, Contr. Ocas. Mus. Hist. Nat. Col. "de la Salle" 14:11. 1955. Type: CUBA: Isabel María, 16 Mar 1860–1864, *C. Wright 189* (holotype: NY!; isotypes: GH!, HAC! image seen, HAJB! image seen, S!).

Miconia granulata (Urb.) Majure & Judd, comb. nov. *Ossaea granulata* Urb., Symb. Ant. 9:125. 1923. Type: CUBA. Oriente: Baracoa at Minas de Yberia (pr. Taco Bay) in "charrascales," 7–8 Dec 1914, *E.L. Ekman 3789* (holotype: S!; isotype: NY!).

Miconia hybophylla (Urb.) Majure & Judd, comb. nov. *Ossaea hybophylla* Urb., Ark. Bot. 21A:51. 1927. *Leandra hybophylla* (Urb.) Alain, Sida 18:1026. 1999. Type: HAITI: Massif des Cahos, Petite-Riviére de l'Artibonite, Pérodin, at Ingram, 7 Mar 1925, *E.L. Ekman H3440* (holotype: S!; isotypes: K! online image seen K000535605, NY!, US!).

Miconia inaequipetiolata Majure & Judd, nom. nov. *Ossaea inaequidens* Urb. & Ekm., Ark. Bot. 22A, 17:63. 1929. *Leandra inaequidens* (Urb. & Ekm.) Judd & Skean, Bull. Florida Mus., Biol. Sci. 36:61. 1991. Type: HAITI. Massif de la Selle, Croix-des-Bouquets, Badeau, at Trou-á-l'Sau, 1000m, 15 Mar 1927, *E.L. Ekman H7860* (holotype: S!; isotypes: K! online image seen 000329545, NY!). Non *Miconia inaequidens* (DC.) Naudin, Ann. Sci. Nat., Bot., Ser. 3 16:245. 1850.

Urban and Ekman (1929) referred to the unequal petioles of this species in the protologue, and thus we highlight this characteristic in the new epithet.

Miconia jashaferi Majure & Judd, nom. nov. *Ossaea shaferi* Britton & Wilson, Mem. Torrey Club 16:92. 1920. Type: CUBA. Oriente: Camp La Gloria, S of Sierra Moa, *J.A. Shafer 8152* (holotype: NY!; isotype: A!, CAS!, online image seen CAS0003716). Non *Miconia shaferi* Cogn. in Urb., Symb. Antill. 7:312. 1912.

The new epithet, like the original one, honors John Adolph Shafer (1863–1918).

Miconia karlkrugii Majure & Judd, nom. nov. *Calycogonium krugii* Cogn., Bot. Jahrb. Syst. 4:279. 1886. *Leandra krugii* (Cogn.) Judd & Skean, Bull. Florida State Mus., Biol. Sci. 36:61. 1991. *Ossaea krugii* (Cogn.) F.S. Axelrod, Sida, Bot. Misc 34:214. 2011. Type: PUERTO RICO: Maricao in declivibus montis "Alegrillo," 26 Nov 1884, *P. Sintensis 293* (holotype: BR! online image seen BR0000005193479; isotypes: CORD! online image seen CORD00003589, GH!, GOET! online image seen GOET007892, K! online image seen, MO!, MPU! online image seen MPU013629, NY!, S!, US!). Non *Miconia krugii* Cogn., in A.DC. & C.DC., Monogr. Phan. 7:932. 1891.

The specific epithet *karlkrugii* honors the botanist Karl Wilhelm Leopold Krug (1833–1898) for which the species was first named.

Miconia krugiana (Cogn.) Majure & Judd, comb. nov. *Ossaea krugiana* Cogn., Monog. Phan. 7:1048. 1891. *Leandra krugiana* (Cogn.) Judd & Skean, Bull. Florida State Mus., Biol. Sci. 36:61. 1991. Type: PUERTO RICO: Adjuntas, in sylva juxta flumen ad Junco, 24 Jun 1886, *P. Sintensis 4642* (holotype BR! online image 519349; isotypes: A!, CAS! online image seen CAS0003714, CORD! online image seen CORD00003622, F!, GOET! online image seen GOET008048, GH!, K! online image seen, M! online image seen M0165768, MO!, NY!, US!).

Miconia limoides (Urb.) Majure & Judd, comb. nov. *Ossaea limoides* Urb., Ark. Bot. 21A:50. 1927. *Leandra limoides* (Urb.) Judd & Skean, Bull. Florida State Mus., Biol. Sci. 36:61. 1991. Type: HAITI: Massif de la Selle, Port au Prince, Morne Malanga, ridge of mountain, Laubwald, eruptives, 1300 m, 28 Jan 1926, *E.L. Ekman H5462* (holotype: S!; isotype: K! online image seen K000329547).

Miconia marigotiana (Urb. & Ekm.) Majure & Judd, comb. nov. *Ossaea marigotiana* Urb. & Ekman, Ark. Bot. 22A, 17:65. 1929. *Leandra marigotiana* (Urb. & Ekman) Alain, Sida 18:1026. 1999. Type: HAITI. Sud Est.: Massif de la Selle, Marigot, Sd. Bassin Chotard, 9 June 1928, *E.L. Ekman H10071* (holotype: S!; isotypes: GH! NY! US!).

Miconia norlindii (Urb.) Majure & Judd, comb. nov. *Ossaea norlindii* Urb., Symb. Ant. 9:124. 1923. Type: CUBA. Oriente: Sierra Maestra, La Gran Piedra, supra Daiquiri, 29 Oct 1916, *E.L. Ekman 8136* (lectotype designated here, as Urban (1923) did not select a type from the two specimens given in the protologue, S!; isolectotype: US!).

Ossaea turquinensis Urb., Symb. Ant. 9:122. 1923. Type: CUBA. Oriente: Sierra Maestra, in silva jugo septentr. mont. Pico Turquino, 8 Apr 1915, *E.L. Ekman 5303* (holotype: S!). Non *Miconia turquinensis* Urb. & Ekman, Repert. Spec. Nov. Regni Veg. 22:228. 1926.

Although *M. norlindii* is currently recognized as *O. turquinensis*, the specific epithet *turquinensis* is already occupied in *Miconia* (Judd 2007). Therefore, the synonym *O. norlindii* is transferred to *Miconia*.

Miconia ottoschmidtii (Urb.) Majure & Judd, comb. nov. *Ossaea ottoschmidtii* Urb., Repert. Spec. Nov. Regni Veg. 24:6. 1927. Type: CUBA. Guantánamo. La Prenda, Apr 1889, *H.F.A. von Eggers 5332* (holotype: M! online image # 0165772).

Miconia pedunculata Majure & Judd, nom. nov. *Ossaea polychaeta* Urb. & Ekman, Ark. Bot. 23A:27. 1931. *Ossaea urbaniana* Alain, Brittonia 20:158. 1968. *Leandra polychaeta* (Urb. & Ekm.) Alain, Sida 18:1026. 1999. Type: DOMINCAN REPUBLIC: Cordillera Central, Domingo, Loma la Campana, 2 Nov 1929, *E.L. Ekman H11522* (holotype: S!; isotypes: K! online image seen K000535603, NY!).

The name *Ossaea urbaniana* was proposed to differentiate *Ossaea polychaeta* from *O. polychaete* Urb. & Ekman, Ark. Bot. 22A:60. 1929. *Leandra urbaniana* (Alain) Alain, Sida 20:1645. 2003, nom. illeg., is a later homonym of *L. urbaniana* Cogn., in Mart., Fl. Bras. 14:148. 1886. A new name is needed for *O. polychaeta,* as both *Miconia urbaniana* Cogn. (Bot. Jahrb. Syst. 42:139. 1908) and *M. polychaeta* Wurdack (Phytologia 23:493. 1972) already exist in this genus. The new epithet refers to the condensed and distinctly pedunculate inflorescence of this species.

Miconia tentaculicapitata Majure & Judd, nom. nov. *Ossaea capitata* Urb., Rep. Nov. Sp. Fedde 22:237. 1926. Type: CUBA: Arroyo del Cristo (tributary of Yara), Sierra Maestra, S of Nagua, 7 Aug 1922, *E.L. Ekman 14748* (holotype: S!; isotypes: NY!). Non *Miconia capitata* Ule Notizbl. Königl. Bot. Gart. Berlin 6:360. 1915.

The long calyx teeth of this species resemble tentacles, and this resemblance is reflected in the new epithet, which also serves to mnemonically link the new epithet to the original.

Miconia phrynosomaderma Majure & Judd, sp. nov. (**Fig. 1**). Type: HAITI. Dept. du Nord: Massif du Nord, Marmelade, Morne Belle-Terre, 1050m, fl, fr, 22 May 1927, *E.L. Ekman H8204* (holotype: S!; isotypes: GH! US!).

Species haec ab *Miconia limoides* differt indumento caulium apresso-retrorso (non effuse-retrorso); foliis juvenibus purpureo-violaceis (non viridibus); indumento foliorum sparso in paginis adaxiali et abaxiali (non indumento foliorum denso); inflorescentia aperta, floribus pedicillatis (non floribus ± sessilibus); hypanthio sine trichomatibus ad apicem (non trichomatibus annuliformibus ad apicem); dentibus calyce 2.2–3.3 mm longis (non 1.5–2.1 mm longis); petalis albis in pagina adaxiali et purpureis in pagina abaxiali (non roseis, roseolis, vel omnino albis); staminibus dorso-basaliter prolongatis.

Evergreen shrub (height unknown); **stems** round in cross section, not ridged, the internodes 1–3.2 cm long; stem indumentum of bulla-based hairs 0.4–1.2 mm long, these mixed with some hairs having strongly dilated bases and others only narrowly dilated at the base, the hairs apressed-retrorse along stem or slightly spreading with apices recurved; nodal line present, made up of triangular, bulla-based hairs to 2 mm long. **Leaves** broadly elliptic, 2.4–4.3 × 2–3 cm, often slightly anisophyllous, purplish when young; base rounded to acute; apex broadly acute; venation acrodromous, 5-veined, i.e., with midvein and 2 pairs of arching secondary veins, the innermost pair of secondary veins, mostly symmetrical to subsymmetrical at union with midvein 1.5–5

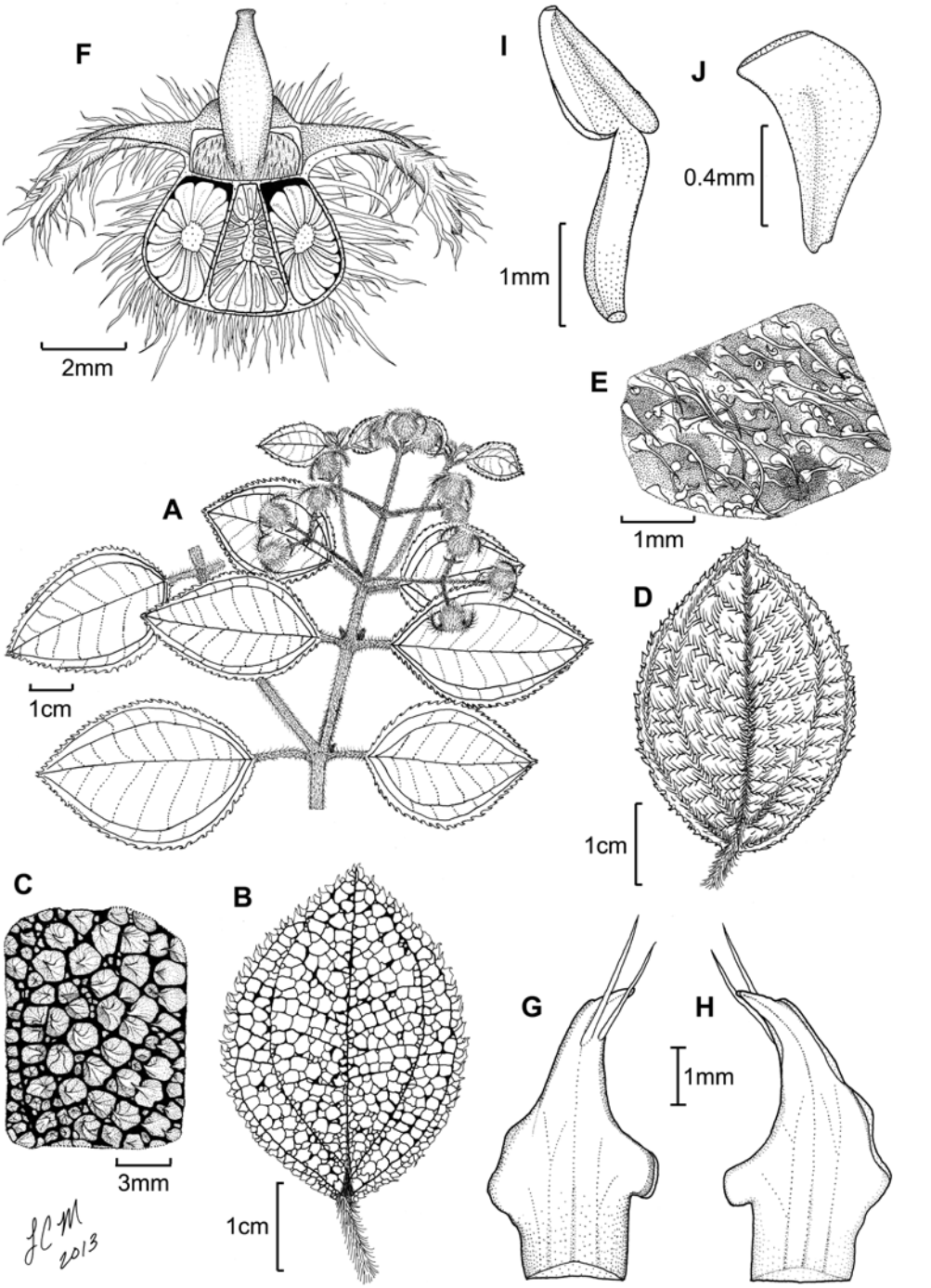

Fig. 1. Illustration of *Miconia phrynosomaderma*. **A)** habit of *M. phrynosomaderma* with the bulla-based hairs removed from the adaxial leaf surface to show venation, **B)** leaf adaxial surface, **C)** close-up of adaxial leaf surface showing expanded bulla-based hairs not fully covering the entire lamina, **D)** leaf abaxial surface, **E)** close-up of abaxial leaf surface showing sparse bulla-based hairs and clearly visible lamina, **F)** longitudinal section (slightly oblique) of young fruit, **G)** petal abaxial surface, **H)** petal adaxial surface, **I)** stamen showing anther with short dorso-basal appendage, **J)** immature seed (all drawn from *Ekman H8204*).

mm above the leaf base, positioned 2.5–5.5 mm in from margin at widest point of blade, the tertiary veins ± perpendicular to midvein, 2.4–3.5 mm apart at mid-leaf; adaxial surface covered in bulla-based hairs, these not meeting at the base, thus the lamina visible between the hairs, i.e., lamina areoles are not completely filled, widest hair bases to 1.8 mm wide, apices of bulla-based hairs mostly erect to slightly spreading, the young leaf adaxial surface with ephemeral, long-stemmed, clavate-dentritic hairs, these sometimes flattened at the apex, arising from between the bases of bulla-based hairs along the primary and secondary veins toward the base of the leaf, and with subsessile to short stalked glandular hairs along the lamina between bulla-based hairs; abaxial leaf surface covered with bulla-based hairs, although the lamina clearly visible, also with bulla-based hairs covering the primary, secondary, tertiary, and quaternary veins, the lamina covered in sessile glands, also with depressions formed from the bulla-based hairs on the adaxial leaf surface; petiole 0.4–1.2 cm long, covered in bulla-based hairs, these spreading to retrorse and recurved on adaxial surface and mostly appressed-retrorse on abaxial surface. **Inflorescences** terminal, well-developed to reduced cymes of 3–15 flowers, 1.7–3.9 cm long, 2.2–5.1 cm across, the peduncle 0.1–0.7 cm long, the proximal branches 0.7–1.7 cm long, the pseudopedicels 1.5–3.5 mm long, and pedicels 0.6–1 cm long; bracts narrowly ovate, 2–3 mm long; bracteoles narrowly ovate, persistent, 2–2.2 mm long, ca. 0.2 mm wide; nodes of inflorescence with mixed bulla-based hairs and long-stemmed, dentritic-clavate hairs, similar to those found at the base of young leaves. **Flowers** 4-merous; hypanthium 3.1–4 mm long, 5–5.2 mm wide, ± spherical, slightly 4-lobed, although lobing mostly obscured by bulla-based hairs 0.9–2.5 mm long, the free portion of hypanthium 0.3 mm long, slightly constricted below the torus, both hypanthium abaxial surface and base of bulla-based hairs with dark, sessile glands; calyx teeth (3.5–4.4 × 0.4–0.7 mm, linear and terete, recurved upon maturation, covered in long, bulla-based hairs; calyx lobes adaxially dark colored (purple?), 1.3 × 1.6 mm, with sessile glands near the apex adaxially and bulla-based hairs abaxially; calyx tube 0.4 mm long; petals white, but purplish on the abaxial surface, ovate, 5.1–5.2 × ca. 3 mm, the apex acuminate, the margin membranous and entire, clawed at base, with two, slightly bulla-based hairs just below the apex on the abaxial surface, these 2–3 mm long; stamens twice the number of petals, the filaments 1.7–1.9 mm long, the anthers 1.4–1.5 mm long, with dorso-basal appendage and a single, dorsally inclined pore, the thecae 1.1 mm long. Style ca. 4.3 mm long, dilated at the center, with punctate stigma, subtended by a crown of long, multicelular hairs, these slightly longer than the surrounding bulla-based hairs on the apex of the ovary; ovary ca. 3.2 mm long, ca. 4.8 mm wide, fully inferior, 4-locular, placentation axile, placenta greatly intruded into the locules. **Berries** globose, ca. 5 mm long, ca. 6.5 mm wide, blue-black at maturity. **Seeds** (immature) ca. 0.9 mm long, sickle-shaped.

Distribution and habitat.—*Miconia phrynosomaderma* is only known from one gathering made in the Massif du Nord, at Morne Belle Terre, Artibonite Province, Haiti (Fig. 2). It was collected at 1050 m in elevation (*Ekman H8204*). Ekman in his field notes mentioned that Morne Belle Terre was built up of metamorphic rock, but no information regarding plant community at the elevation where *M. phrynosomaderma* was collected is known.

Phenology.—*Miconia phrynosomaderma* was in flower and mature fruit at the time of collection (May 22nd), so it is likely that the species begins flowering earlier in the year, but the flowering period is essentially unknown.

Etymology.—*Miconia phrynosomaderma* is named for the lizard genus *Phrynosoma* (Phrynosomatidae). The epidermis of *Phrynosoma* is covered in scales, which develop into horn-like projections, and thus members of the genus are commonly referred to as horned lizards. Bony outgrowths from the cranium also produce these horn-like structures (Fig. 3). The bulla-based hairs on the adaxial leaf surface of *M. phrynosomaderma* bear a striking similarity to the horned epidermis and bony crania of members of *Phrynosoma* (Presch 1969).

Based on morphological characters, *Miconia phrynosomaderma* appears to be most closely related to *M. limoides* and *M. lima*. *Miconia phrynosomaderma* differs from *M. limoides* by its sparse indumentum on the abaxial leaf surface and thus clearly visible abaxial epidermis, i.e., it is not completely covered by the indumentum (Fig. 1D–E), and by the spacing of the adaxial bulla-based hairs, i.e., they do not completely cover the leaf areoles (Fig. 1B–C). In *M. limoides* the bulla-based hairs completely obscure the abaxial lamina and completely

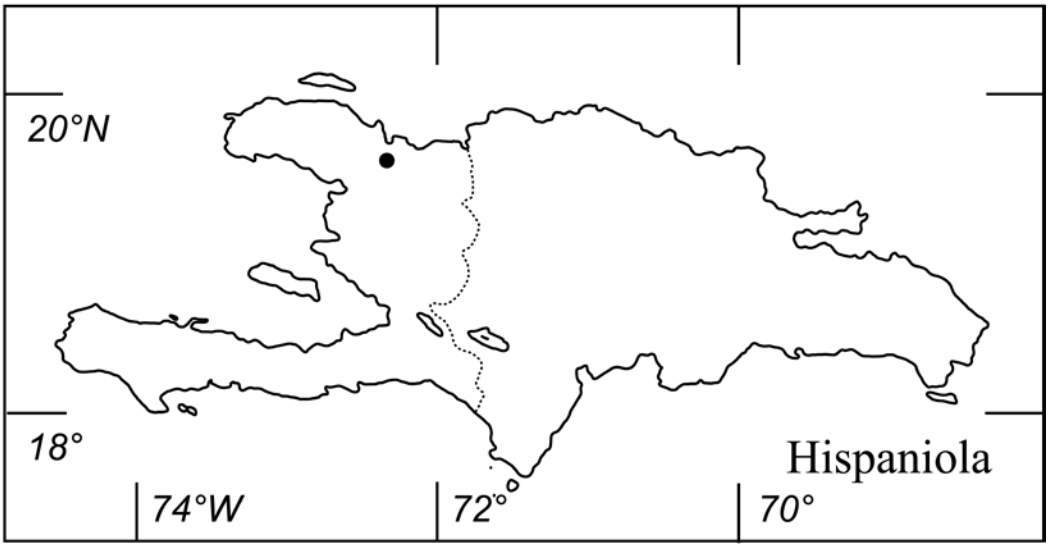

Fig. 2. Distribution of *Miconia phrynosomaderma* in northern Haiti.

Fig. 3. *Phrynosoma taurus* Dugés hanging on to *Tecoma stans* (L.) Juss. ex Kunth in Chilpancingo, Mexico (photo by L.C. Majure).

fill the areoles. Stem hairs of *M. limoides* are mostly spreading to retrorse but not markedly appressed, while in *M. phrynosomaderma* they are mostly appressed-retrorse to slightly recurved at the tips. The ultimate dichasia of the inflorescences of *M. limoides* tend to be more condensed, i.e., flowers are mostly sessile to subsessile, than those of *M. phrynosomaderma*, which are more or less open with pedicellate flowers (Fig. 1A); however, this needs to be investigated further (with more collections of the latter). Also, the calyx teeth of *M. phrynosomaderma* are longer (i.e., 3.5–4.4 mm) than those of *M. limoides* (i.e., 2.1–3.3 mm). Finally, *M. phrynosomaderma* exhibits clawed petals and a dorso-basal appendage on the anther (Fig. 1G–I) to 0.3 mm long. *Miconia limoides* lacks clawed petals and has a reduced dorso-basal anther appendage to 0.1 mm long or it is entirely absent.

Miconia phrynosomaderma differs from *M. lima* by having stems with appressed-retrorse to recurved hairs vs. appressed-antrorse hairs (in *M. lima*), hypanthia 3.1–4 × 5 mm vs. 1.9–3 × 2.3–3.5 mm, and widely elliptical (length to width quotient 0.92–1.95) vs. narrowly elliptical (length to width quotient 1.56–2.05) leaves. *Miconia phrynosomaderma* differs from both *M. lima* and *M. limoides* by the purplish color of young leaves vs. the lime-green color in *M. lima* and *M. limoides*, as well as the color of the petals, that is, white with purple abaxial surfaces in *M. phrynosomaderma* vs. usually rose to red in *M. lima* and *M. limoides*. *Miconia limoides* may sometimes have white petals, but these are not purple abaxially. Also, both *M. limoides* and *M. lima* usually have an androecial fringe on the apex of the free portion of the hypanthium, which is a continuation of the hairs produced on the free portion of the hypanthium, but this structure is absent in *M. prhynosomaderma*.

Miconia phrynosomaderma satisfies the morphological-phenetic (Judd 2007) and diagnostic species concepts (Wheeler & Platnick 2000), as it is easily distinguished, morphologically, from its putative closest relatives, *M. limoides* and *M. lima*. *Miconia phrynosomaderma* also is allopatric from other members of the *Lima* clade, and so is most likely reproductively isolated from other species, thus satisfying the biological species concept (Mayr 1970, 2000). Finally, the clawed petals are likely autapomorphic, and thus *M. phyrnosomaderma* is most probably a cladospecies (Donoghue 1985; Mishler 1985).

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