MICONIA VINCENTIANA (MELASTOMATACEAE: MICONIEAE), A CURIOUS ENDEMIC TO ST. VINCENT, LESSER ANTILLES

Walter S. Judd

Department of Biology &
Florida Museum of Natural History
University of Florida
Gainesville, Florida 32611, U.S.A.
lyonia@ufl.edu

Gretchen M. Ionta

Department of Biological &
Environmental Sciences
Georgia College & State University
Milledgeville, Georgia 31061, U.S.A.
gretchen.ionta@gcsu.edu

ABSTRACT

The new combination **Miconia vincentiana** and a detailed description are provided for the species previously known as *Clidemia vincentiana*, a member of *Miconia* sect. *Sagraea* endemic to the island of St. Vincent in the Lesser Antilles. In addition, the curious supernumerary leaflets often borne on the distal portion of the petiole are described. Such structures have not been recorded from any other species of Miconieae.

Key Words: *Miconia vincentiana*, Miconieae, Melastomataceae, St. Vincent, supernumerary leaflets

RESUMEN

Se aportan la nueva combinación **Miconia vincentiana** y una descripción detallada para la especie conocida previamente como *Clidemia vincentiana*, un miembro de *Miconia* sect. *Sagraea* endémico de la isla de St. Vincent en las Antillas Menores. Además, se describen los curiosos foliolos supernumerarios que nacen a menudo en la porción distal del peciolo. Tales estructures no se habían citado en ninguna otra especie de Miconieae.

In the course of work on the systematics and phylogeny of Miconieae, we have become aware of a number of taxonomic problems, especially in the species of the Greater Antilles. Recent phylogenetic analyses (Bécquer et al. 2008; Goldenberg et al. 2008; Martin et al. 2008; Majure et al. 2014, 2015; Michelangeli et al. 2008, submitted) have shown nearly all of the genera of Miconieae to be highly polyphyletic, a result that is in keeping with the problematic generic delimitations within the tribe (Cogniaux 1891; Wurdack 1972, 1980; Judd 1986, 1989; Judd & Skean 1991; Judd et al. 2014a, b; Ionta et al. 2012). As a result, major changes in generic circumscriptions are required. The most workable solution to this classificatory problem (as clearly evident in Figs. 1–3 of Goldenberg et al. 2008) is to place all species of Miconieae within a greatly expanded *Miconia* Ruiz. & Pav., comprising the DNA-supported clade within Miconieae that can be diagnosed by the synapomorphy of berry fruits (Gamba & Almeda 2014; Goldenberg et al. 2013; Ionta et al. 2012; Judd et al. 2014a, b, 2015; Majure et al. 2014; Michelangeli et al. 2016).

Within *Miconia* sensu lato we recognize major clades at the subgeneric and sectional levels when such groups are supported by ongoing phylogenetic investigations; e.g. *Miconia* sect. *Sagraea* (Ionta et al. 2012), comprising those species of *Miconia* with axillary inflorescences, 4-merous flowers with well-developed calyx teeth, and minute, short-stalked, furrowed, gland-headed hairs. The monophyly of sect. *Sagraea* is supported by DNA sequence data (see Goldenberg et al. 2008; Michelangeli et al. 2008, submitted; and Ionta, unpublished data). These plants traditionally have been treated as species of *Clidemia* D. Don or *Ossaea* DC., depending upon the form of the petal apex (see Cogniaux 1891; Alain 1957; Moscoso 1943; Proctor 1972; Michelangeli & Bécquer 2012), however, as is typical for "genera" of Miconieae, both *Clidemia* and *Ossaea* have been shown to be extremely non-monophyletic, as well as morphologically undiagnosable. The suite of morphological features characterizing sect. *Sagraea* has previously been noted, resulting in occasional recognition at the generic level—as *Sagraea* DC. (Judd 1989; Liogier 2000). The distinctive short-stalked, glandular hairs of this clade, i.e , *Sagraea*-type hairs (see Ionta et al. 2012, fig. 1A; Wurdack 1986, figs. 52, 54–56), are likely synapomorphic (but not unique to sect. *Sagraea*; see Wurdack 1986, figs. 49–51, 53), as are the axillary inflorescences, 4-merous flowers, and prominent calyx teeth (Majure et al., unpublished data). Two major clades of sect. *Sagraea*

have radiated in the Greater Antilles, the first, a group of ca. 29 species, including species such as *M. capillaris* (Sw.) M. Gomez, *M. portoricensis* (Alain) Ionta, Judd & Skean, *M. navifolia* Ionta, Judd & Skean, *M. scabrosa* (L.) Ionta, Judd & Skean, *M. scalpta* (Vent.) Ionta, Judd & Skean, and *M. woodsii* (Judd & Skean) Ionta, Judd & Skean, is under revision by G. Ionta (see Ionta et al. 2012), while the second clade includes seven species of Cuba, Hispaniola, and Puerto Rico, i.e., the *Clidemia domingensis* Cogn. complex (Judd, Bécquer, Majure & Ionta, in prep.). Several other Antillean species of the *Sagraea* clade likely represent independent dispersal events and have their closest relatives in South America—one of these, *Clidemia vincentiana* Urb., an endemic to the Lesser Antillean island of St. Vincent (Howard 1989), is the subject of this investigation.

This species is here updated nomenclaturally, provided a detailed description, and compared with its putative closest relatives. Finally, the species is morphologically unusual, as the distal portion of its petioles often bears supernumerary leaflets. The description follows the format of Judd (2007) and the guidelines for contributors to the on-line monograph of Miconieae (Michelangeli et al. 2009 onward).

TAXONOMIC TREATMENT

Miconia vincentiana (Urb.) Judd & Ionta, comb. nov. *Clidemia vincentiana* Urb., Repert. Spec. Nov. Regni Veg. 14:339. 1916. TYPE: ST. VINCENT: ad Petit Bordel River, 1800 ft, 9 Jan 1890, *Eggers 6870* (LECTOTYPE, here designated, US [US-01361458]!, as holotype at B destroyed; ISOLECTOTYPES: A [A-00072076]!, S [S-10-22596]!).

Shrub or small tree to 6.5 m. Indumentum of minute, multicellular, short-stalked, gland-headed hairs that have furrows between the cells of the head (i.e., *Sagraea*-type hairs), and multicellular, short to elongate, simple, eglandular or occasionally gland-headed hairs, these smooth or with ± bulging cells. Young stems slightly quadrangular to terete, with moderate to dense, spreading, short to elongate, multicellular, eglandular to occasionally gland-headed hairs, these smooth or with ± bulging cells, to 1 mm long, mixed with sparse to moderate, *Sagraea*-type hairs, both persistent, and hairs of the nodes similar to those of the internodes; internodes 4–11 cm long, the nodes not swollen, with faint nodal line. Leaves slightly anisophyllous; petiole 1–15 cm long, terete with a dorsal groove, the indumentum similar to that of the stems, and apical portion of petiole often bearing 1–4 supernumerary, minute leaflets, these to 1 cm long; blade 10–27 cm long, 6.5–17.6 cm wide, ovate to nearly elliptic, flat, membranaceous to chartaceous, the apex acuminate, the base rounded to truncate or slightly cordate, the margin plane, obscurely to irregularly dentate, the largest teeth 0.2–0.7 mm, and with elongate, multicellular, eglandular hairs on the teeth and margin, to 1 mm long; venation acrodromous, with prominent midvein and 3 (or 4) secondary vein pairs, basal, the outermost 1 (or 2) pair(s) intramarginal and inconspicuous, positioned 0.5–2.7 mm from margin (and if 2 inconspicuous pairs, then the outermost ending below the widest point of the blade), the inner 2 pairs conspicuous, positioned 3.5–14 mm and 15–44 mm from margin, respectively, the tertiary veins numerous, percurrent, oriented subperpendicular to midvein and 1.5–10 mm apart, jointed by numerous percurrent quaternary veins, and the higher order veins orthogonal-reticulate; adaxial surface green, dull, the midvein and prominent secondary veins with dense, elongate, multicellular, eglandular hairs, these smooth to or with bulging cells, the other veins usually with only *Sagraea*-type hairs, and lamina with scattered *Sagraea*-type hairs, these ± deciduous, along with numerous elongate, smooth, multicellular, eglandular hairs, these 0.2–1.1 mm long, persistent, the midvein and major secondary veins slightly impressed, other veins ± flat, abaxial surface pale green, with midvein and major secondary veins with moderate to dense, elongate, multicellular, smooth to roughened (i.e , their cells ± bulging), eglandular hairs, and scattered *Sagraea*-type hairs, the tertiary to fifth-order veins with moderate to sparse elongate, smooth, eglandular hairs and *Sagraea*-type hairs, the higher order veins with only *Sagraea*-type hairs, the midvein and major secondary veins moderately to strongly raised, the tertiary, quaternary, and minor secondary veins very slightly raised, and fifth-order (and higher) veins ± flat; domatia present, a series of pouches at junction of midvein and major secondary veins. Inflorescences axillary, ca. 11 to 30-flowered, open, panicle-like cymes, with 1–4 major branch-pairs, with a single inflorescence per leaf axil, 3.2–18 cm long, 1.5–11.5 cm in diameter, proximal segment of lowermost inflorescence branches 5–37 mm long, the ultimate axes (pseudopedicels) 0.5–10.5 mm long, and flowers ± well-spaced, the inflorescence branches with indumentum of short

to elongate, smooth to roughened, multicellular, eglandular or occasionally gland-headed hairs and *Sagraea*-type hairs; peduncle 0.6–5.5 cm long, with indumentum similar to the inflorescence branches; bracts 1–2.5 × 0.6–0.8 mm, ovate to obovate, with obtuse to acute or acuminate apex, ± persistent, with short to elongate, smooth to roughened, multicellular, eglandular hairs and *Sagraea*-type hairs; bracteoles 0.9–2 × 0.5–1 mm, ovate to obovate, with acute to obtuse apex, persistent, with indumentum the same as the bracts. Flowers 4-merous, radial, with pedicel 0.2–1 mm long. Hypanthium 2–2.3 mm long, ± cylindrical, not constricted, the free portion 1–1.3 mm long, 1–1.4 mm wide at the base of the calyx, the outer surface with moderate to dense elongate, smooth, multicellular, eglandular, hairs and *Sagraea*-type hairs, the inner surface smooth, glabrous or with a few globular hairs, but apically with conspicuous, globular to slender and elongated hairs, but *Mecranium*-type androecial fringe absent. Calyx lobes 4, separate in bud, 0.3–0.55 × 1–1.3 mm, ± triangular, the apex rounded to obtuse, the margins entire, abaxially with elongate, smooth, multicellular, eglandular and occasionally also gland-headed hairs, along with *Sagraea*-type hairs and adaxially with inconspicuous globular-hairs; calyx tube 0.25–0.3 mm long, not tearing between lobes, with indumentum similar to the lobes. Calyx teeth present, 4, 0.5–0.8 mm long, borne on the lobes, spreading, with acute apex, and elongate, smooth, multicellular, eglandular hairs and *Sagraea*-type hairs. Petals 4, white, 1.5–2 × 0.9–1.3 mm, ovate or broadly so, spreading to recurved at anthesis, the adaxial surface glabrous, the abaxial surface glabrous, the apex rounded with a slight notch, the base slightly narrowed, the margin entire. Stamens 8, isomorphic, geniculate near apex of filament, ± radially arranged; staminal filament 1.3–1.5 mm long, linear and slightly flattened, glabrous, white (?); anther thecae 1.3–1.5 × 0.3–0.4 mm, narrowly ovoid, yellow, opening by a single, apical pore, the connective slightly thickened, not appendaged. Ovary 4-locular, 1.4–1.7 mm long, 1.2–1.4 mm wide, 2/3- to 3/4-inferior, with a cylindrical apical collar surrounding the style [or not], the collar distinctly lobed, and with a poorly developed crown of short-globular and longer, slender hairs, with axile placentation, the ovules numerous, borne on expanded placenta; style 4–4.5 mm long, straight, terete, glabrous; stigma capitate, 0.3–0.4 mm wide. Berries globose, 3–5 mm long, 3–5 mm in diameter, blue-black, with elongate, multicellular, eglandular hairs and *Sagraea*-type hairs. Seeds 0.3–0.4 mm long, hemispheric-obovoid, with elliptic, flat, hilum, covering nearly full length of seed; testa with cells bulging-papillose; appendage absent. (Fig. 1).

Phenology.—The species has been collected in bloom from January through April.

Distribution and Ecology.—*Miconia vincentiana* is endemic to the island of St. Vincent, where it grows in moist forests from 100–670 m.

Specimens examined: **ST. VINCENT:** Silver Spoon area above Three Rivers, 1–7 Apr 1950, *Howard 11176* (GH); Trail from Golden Grove to Majorca crest to Francis, reaching 2200 ft, 23 Feb 1972, *Howard & Howard 18029* (NY); along Chateaubelair River, 100–400 m, 16–25 Aug 1947, *Morton 5239* (GH, US); St. Andrew Parish, Lowrt district, upper valley of the Buccament River, 800–1300 ft, 7 Mar 1965, *Proctor 26164* (GH, IJ); without definite locality, Sep 1889, *Smith & Smith s.n.* (NY).

Miconia vincentiana clearly belongs within *Miconia* sect. *Sagraea* (Ionta et al. 2012), as evidenced by its axillary inflorescences of 4-merous flowers and *Sagraea*-type hairs (see description); it is unfortunate that it has not been included within any DNA-based phylogenetic analyses. As noted by Wurdack (1973), the species is phenetically similar to *Clidemia grandifolia* Cogn., and was considered within the circumscription of this species by Cogniaux (1891). It differs from *C. grandifolia* Cogn., however, in its longer pseudopedicels, such that its flowers are not clustered within the inflorescences, and its somewhat smaller leaves. Finally, in *Miconia vincentiana* supernumerary leaflets are frequently borne on the distal portion of the petiole (Fig. 2); these curious appendages have not been observed or reported in *M. grandifolia* or any other species of Miconieae. Their structure is similar to the leaf blade but minute, reaching at most 10 mm in length, and with a form and indumentum similar to that of the lamina. They somewhat resemble (in structure and position) the complex petiole (and midvein) outgrowths seen in the Andean *Miconia spennerostachya* Naudin, but the leaflet-like outgrowths of that species are nectar-producing (and perhaps also domatial), while those of *M. vincentiana* are apparently non-nectar producing (as well as non-domatial). Additionally, the petioles of *M. vincentiana* are fairly short when the lamina first expands, later elongating greatly in older leaves (Fig. 1). The shoots, therefore, show an array of leaves that differ markedly in petiole length. Thus, the petioles seemingly express certain stem-like

Fig. 1. ***Miconia vincentiana,*** **branch with axillary cymose inflorescences; note greatly expanded petioles in older leaves (*Morton 5239*).**

characteristics—the production of leaf-like structures, i.e., the supernumerary leaflets and delayed elongation; the developmental processes underlying the formation of these unique petiole structures need investigation.

Miconia vincentiana also is phenetically similar to (and occasionally has been confused with) both *Clidemia domingensis* and *C. umbrosa* (Sw.) Cogn. *Clidemia domingensis* is easily differentiated because its leaves lack mite-domatia and also its stems (and other plant parts) lack elongated hairs with bulging cells, i.e.,

Fig. 2. *Miconia vincentiana,* distal portion of petiole with supernumerary leaflets, the largest 3.5 mm long (*Morton 6205*).

the stiff, elongated hairs in *C. domingensis* are exclusively smooth. *Clidemia umbrosa* differs in its indumentum, in that the elongate, rather strigose hairs of its stems are stouter and 1.5–6 mm long (while those of *C. vincentiana* do not exceed 1 mm in length).

The specimen of *Miconia vincentiana* at US is selected as the lectotype because its label data best matches the information in the protologue, i.e., "in sylvis juxta rivulum Petit Bordel" (Urban 1916). The isotype at Stockholm indicates only that the specimen is from St. Vincent, while the isotype at the Arnold Arboretum states that the plant was collected "ad Chateau Belair" at 2000 ft. The specimen at the Arnold Arboretum was annotated as an isotype by R.A. Howard, but as indicated above, it is necessary to lectotypify the name because the holotype at Berlin was destroyed during World War II.

ACKNOWLEDGMENTS

We thank Renato Goldenberg, Fabian Michelangeli, Lucas C. Majure, and J. Dan Skean, Jr., for their helpful suggestions on the identity of the petiole outgrowths of this species, especially the suggestion to compare it with *Miconia spennerostachya*. We also thank Lucas and Dan for their helpful reviewer comments.

REFERENCES

Alain, Bro. (=A.H. Liogier). 1957. Flora de Cuba. Vol 4. Dicotiledóneas: Melastomataceae a Plantaginaceae. Contr. Ocas. Mus. Hist. Nat. "De La Salle" 10:1–556.

Bécquer, E.R., K. Neubig, W.S. Judd, F.A. Michelangeli, J.R. Abbott, & D.S. Penneys. 2008. Preliminary molecular phylogenetic studies in *Pachyanthus* (Miconieae, Melastomataceae). Bot. Rev. 74:37–52.

Cogniaux, A. 1891. Melastomataceae. In: A. de Candolle & C. de Candolle, eds. Monographiae phanerogamarum. 7. Masson, Paris. Pp. 1–1256.

Gamba, D. & F. Almeda. 2014. Systematics of the Octopleura Clade of *Miconia* (Melastomataceae: Miconieae) in Tropical America. Phytotaxa 179:1–174.

Goldenberg, R., D.S. Penneys, F. Almeda, W.S. Judd, & F.A. Michelangeli. 2008. Phylogeny of *Miconia* (Melastomataceae): Patterns of stamen diversification in a megadiverse Neotropical genus. Int. J. Pl. Sci. 169:963–979.

Goldenberg, R., F. Almeda, M.K. Caddah, A.B. Martius, J. Meirelles, F.A. Michelangeli, & M. Weiss. 2013. Nomenclatur botanicus for the Neotropical genus *Miconia* (Melastomataceae: Miconieae). Phytotaxa 106:1–171.

Howard, R.A. 1989. Flora of the Lesser Antilles: Leeward and Windward Islands. Vol. 5. Dicotyledoneae – Part 2. Arnold Arboretum, Harvard University, Jamaica Plain, Massachusetts, U.S.A.

Ionta, G.M., W.S. Judd, J.D. Skean, & C.K. McMullen. 2012. Two new species of *Miconia* sect. *Sagraea* (Melastomataceae) from the Macaya Biosphere Reserve, Haiti. J. Bot. Res. Inst. Texas 6:37–44.

Judd, W.S. 1986. Taxonomic studies in the Miconieae (Melastomataceae). I. Variation in inflorescence position. Brittonia 38:150–161.

Judd, W.S. 1989. Taxonomic studies in the Miconieae (Melastomataceae). III. Cladistic analysis of axillary-flowered taxa. Ann. Missouri Bot. Gard. 76:476–495.

Judd, W.S. 2007. Revision of *Miconia* sect. *Chaenopleura* (Miconieae, Melastomataceae) in the Greater Antilles. Syst. Bot. Monogr. 81:1–235.

Judd, W.S. & J.D. Skean, Jr. 1991. Taxonomic studies in the Miconieae (Melastomataceae). IV. Generic realignments among terminal-flowered taxa. Bull. Florida Mus. Nat. Hist., Biol. Sci. 36:25–84.

Judd, W.S., E.R. Bécquer, L.C. Majure. 2014a. Taxonomic studies in the Miconieae (Melastomataceae). XI. A revision of *Miconia* sect. *Calycopteris* on Hispaniola. Brittonia 66:216–249.

Judd, W.S., E.R. Bécquer, J.D. Skean, Jr., & L.C. Majure. 2014b. Taxonomic studies in the Miconieae (Melastomataceae). XII. Revision of *Miconia* sect. *Miconiastrum*, with emphasis on the *Miconia bicolor* complex. J. Bot. Res. Inst. Texas 8:457–491.

Judd, W.S., L.C. Majure, J.D. Skean, Jr., & K.M. Neubig. 2015. *Miconia abscondita* (Melastomataceae: Miconieae), a new species from the Massif de la Hotte, Haiti: Rediscovered in herbaria after being hidden for nearly nine decades. Rhodora 117:317–341.

Liogier, A.H. 2000. La flora de la Española. Vol. IX. Melastomataceae. Jardín Botánico Nacional "Dr. Rafael Ma. Moscoso." Instituto Tecnológico de Santo Domingo, Santo Domingo, República Dominicana.

Majure, L.C., W.S. Judd, G.M. Ionta, J.D. Skean, Jr., K.M. Neubig, & E.R. Bécquer. 2014. *Miconia cineana*, a new species from the Massif de la Hotte, Haiti, based on morphological and molecular evidence. Syst. Bot. 39:906–914.

Majure, L.C., K.M. Neubig, J.D. Skean, Jr., E.R. Bécquer, & W.S. Judd. 2015. Evolution of the sandpaper clade (Miconieae, Melastomataceae). Int. J. Pl. Sci. 176:607–626.

Martin, C.V., D.P. Little, R. Goldenberg, & F.A. Michelangeli. 2008. A phylogenetic evaluation of *Leandra* (Miconieae, Melastomataceae) based on ITS data and its implications on inflorescence position. Taxon 53:279–290.

Michelangeli, F.A. & E.R. Bécquer. 2012. Melastomataceae. In: P. Acevedo-Rodríguez & M. T. Strong. Catalogue of seed plants of the West Indies. Smithsonian Contr. Bot. No. 98. Smithsonian Institution Scholarly Press, Washington, D.C. Pp. 531–652.

Michelangeli, F.A., W.S. Judd, D.S. Penneys, J.D. Skean, Jr., E.R. Bécquer, R. Goldenberg, & C.V. Martin. 2008. Multiple events of dispersal and radiation of the tribe Miconieae (Melastomataceae) in the Caribbean. Bot. Rev. 74:53–77.

Michelangeli, F.A., F. Almeda, R. Goldenberg, W.S. Judd, E.R. Bécquer, & M. Tulig. 2009 onward. A complete web-based monograph of the tribe Miconieae (Melastomataceae). (http://sweetgum.nybg.org/melastomataceae). The New York Botanical Garden, Bronx, New York, U.S.A.

Michelangeli, F.A., F. Almeda, M. Alvear, E.R. Bécquer, J. Burke, M.K. Caddah, R. Goldenberg, G.M. Ionta, W.S. Judd, L.C. Majure, J. Meirelles, A.N. Nicolas, G. Ocampo, D.S. Penneys, J.D. Skean, Jr., & C. Ulloa Ulloa. 2016. Proposal to conserve *Miconia* nom. cons. against the additional names *Maieta* and *Tococa* (Melastomataceae: Miconieae). Taxon 65:892–893.

Michelangeli, F.A., A.N. Nicolas, G. Ocampo, R. Goldenberg, F. Almeda, W.S. Judd, E.R. Bécquer, J.D. Skean, Jr., R. Kriebel, K. Sosa, M.K. Caddah, G.M. Ionta, D.S. Penneys, M. Alvear, J.M. Burke, L.C. Majure, & M. Reginato. Submitted. Historical biogeography of the Neotropical tribe Miconieae (Melastomataceae) reveals a pattern of progressive colonization from Amazonia to other Neotropical forests. J. Biog.

Moscoso, R.M. 1943. Catalogus florae domingensis. Parte 1. Spermatophyta. Universidad de Santo Domingo, Santo Domingo, Dominican Republic.

Proctor, G.R. 1972. Melastomataceae. In: C.D. Adams. Flowering plants of Jamaica. University of the West Indies, Mona, Jamaica. Pp. 529–548.

Urban, I. 1916. LVIII. Sertum Antillanum. III. Repert. Spec. Nov. Regni Veg. 14:331–343.

Wurdack, J.J. 1972. Certamen Melastomataceis XVIII. Phytologia 22:399–418.

Wurdack, J.J. 1973. Melastomataceae. In: T. Lasser, ed. Flora of Venezuela, No. 8. Instituto Botánico, Ministerio de Agricultura y Cria.

Wurdack, J.J. 1980. Melastomataceae. In: G.H. Harling & B. Sparre, eds. Flora of Ecuador. Vol. 13. University of Göteborg & Riksmuseum, Stockholm, Sweden. Pp. 1–416.

Wurdack, J.J. 1986. Atlas of hairs for Neotropical Melastomataceae. Smithsonian Contr. Bot. 63:1–80.