TAXONOMIC AND NOMENCLATURAL NOTES ON MICONIA CRENATA AND RELATED SPECIES (MELASTOMATACEAE: MICONIEAE) IN THE GREATER ANTILLES

Walter S. Judd
Department of Biology and Florida Museum of Natural History
University of Florida
Gainesville, Florida 32611-7800, U.S.A.
yonia@ufl.edu

Gretchen M. Ionta
Department of Biological and Environmental Sciences
Georgia College and State University, CBX-081
Milledgeville, Georgia 31061, U.S.A.
gretchen.ionta@gcsu.edu

Lucas C. Majure
Desert Botanical Garden
1201 N Galvin Parkway
Phoenix, Arizona 85008, U.S.A.
lmajure@dbg.org

Fabián A. Michelangeli
Institute of Systematic Botany
The New York Botanical Garden
2900 Southern Blvd.
Bronx, New York 10458, U.S.A.
fabian@nybg.org

ABSTRACT
The nomenclature and phylogenetic placement of five species of Miconieae in the Greater Antilles with conspicuous multicellular, simple, elongate, eglandular or gland-headed hairs, pseudolateral inflorescences, and flowers with elongated calyx teeth, 5–8, white, rounded petals, white, ovate anthers, and purple- or blue-black fruits are considered. These species have traditionally been considered within the polyphyletic genus Clidemia, but are here transferred to Miconia sensu lato. Four new combinations are presented, i.e., Miconia dependens (D. Don) Judd & Majure, M. erythropogon (DC.) Judd & Ionta, M. octona (Bonpl.) Judd & Majure, and M. strigillosa (Sw.) Judd & Ionta. Finally, we note that the widespread and economically important species previously known as Clidemia hirta (L.) DC., when considered within Miconia, bears the name Miconia crenata (Vahl) Michelang.

KEY WORDS: Clidemia, Clidemia hirta, Cuba, Heterotrichum, Hispaniola, Maieta

RESUMEN
Se considera la nomenclatura y ubicación filogenética de cinco especies de Miconieae de las Antillas Mayores. Estas cinco especies muestran pelos conspicuos, multicelulares, sencillos, eglandulares o glandulares, inflorescencias pseudolaterales, flores con los dientes del cáliz elongados, 5–8 pétalos rodenados blancos, anteras aovadas, y frutos morados o negro-azulados. Tradicionalmente estas especies fueron consideradas dentro del género polifiletico Clidemia, pero aquí se transfieren las especies a Miconia sensu lato. Se presentan cuatro combinaciones nuevas, Miconia dependens (D. Don) Judd & Majure, M. erythropogon (DC.) Judd & Ionta, M. octona (Bonpl.) Judd & Majure, y M. strigillosa (Sw.) Judd & Ionta. Finalmente, notamos que la especie ampliamente distribuida y económicamente importante previamente conocida como Clidemia hirta (L.) DC., tiene el nombre de Miconia crenata (Vahl) Michelang., cuando es considerada como parte de Miconia sensu lato.

The genus Clidemia D. Don, like nearly all other genera of Miconieae, has been shown to be highly polyphyletic (Goldenberg et al. 2008; Michelangeli et al. 2008, submitted), a finding in keeping with the history of problematic generic delimitations within the tribe (Cogniaux 1891; Judd 1989; Judd & Skean 1991). 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).

We here consider the Greater Antillean species formerly placed in Clidemia that have conspicuous, multicellular, simple, elongate, eglandular or gland-headed hairs, sympodial growth, pseudolateral inflorescences, flowers with elongate calyx teeth, 5–8 white, rounded petals, white, ovate anthers, and purple- or blue-black fruits. These species, including the widespread and well-known C. hirta (L.) D. Don, C. capitellata (Bonpl.) D. Don, C. strigillosa (Sw.) DC., and C. octona (Bonpl.) L.O. Williams, have in the twentieth century consistently been considered within Clidemia, but are here transferred to Miconia sensu lato.


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been placed in Clidemia (see, for example, Alain 1957; Almeda 2009; Croat 1978; Gleason 1939; Howard 1989; Liogier 1995, 2000; Moscoso 1943; Proctor 1972; Standley & Williams 1961; Urban 1921; Wurdack 1973, 1980). These species were placed by Cogniaux (1891) within Clidemia sect. Staphidium (Naudin) Cogn. (the type species of which is C. octona), and later were placed in Clidemia sect. Clidemia by Wurdack (1973). Clidemia neglecta D. Don (= C. capitellata) was selected as the type of the genus Clidemia by Britton and Wilson (1925); this was the first species listed by David Don in his treatment of the genus (Don 1823), and it may have been selected by Britton and Wilson for that reason (following the New York code). Moreover, it perfectly matches Don's generic diagnosis and well represents the morphology of core-Clidemia. We thus agree with their lectotypification, which was unfortunately automatic and invalid. Below, we formally designate Clidemia neglecta D. Don as the type species of Clidemia. We here briefly consider the phylogenetic placement of these Greater Antillean species and propose names for them within an expanded Miconia.

The first author has long suggested that those species of Clidemia with pseudolateral inflorescences (i.e., determinate shoot development and terminal inflorescences with branch elongation due to sympodial growth, and the inflorescences deflexed to a pseudolateral position as the result of the development of an axillary bud immediately below the inflorescence; see Fig. 1 A, B, E, I, J) were not closely related to those species showing indeterminate shoot growth and truly axillary inflorescences (Judd 1986, 1989; Judd & Skean 1991). This morphology-based hypothesis is now supported, at least in part, by molecular data (Goldenberg et al. 2008; Martin et al. 2008; Michelangeli et al. 2004, 2008, submitted), although the classificatory situation is even more complicated than anticipated given the results of molecular analyses that suggest that pseudolateral inflorescences (and the associated sympodial stem growth) have evolved multiple times in the Miconieae, e.g., in the M. strigillosa group (represented in the Antilles by M. strigillosa (Sw.) Judd & Ionta and M. dependens (Don) Judd & Majure), in the M. octona group (represented in the Antilles by M. octona (Bonpl.) Judd & Majure, M. crenata (Vahl.) Michelang., and M. erythropogon (DC.) Judd & Ionta), and in the Octopleura clade (Gamba & Almeda 2014; represented in the Antilles by M. rubescens (Triana) Gamba & Almeda). These three clades are not each other’s closest relatives, but instead they are positioned across the cladogram (Goldenberg et al. 2008; Michelangeli et al., 2008, submitted), with the species of the M. strigillosa group more closely related to Miconia sect. Sagarea (Ionta et al. 2012) than they are to the members of the M. octona group, and the species of the M. octona group perhaps most closely related to many species of Leandra (Martin et al. 2008). The Octopleura clade is most closely related to Miconia s.s. (Gamba & Almeda 2014; Michelangeli et al. 2008). Additional striking morphological features that apparently have also evolved in parallel among these species of the M. octona and M. strigillosa groups include their conspicuous strigose indumentum and elongate calyx teeth (see Majure et al. 2013; Fig. 1 C, D, F–H, J, K). Thus, despite their phenetic similarity and long tradition of being considered closely related (Cogniaux 1891; Wurdack 1973, 1980), phylogenetic analyses based on DNA-sequences do not support a close relationship between the species of the M. octona clade and the M. strigillosa clade, although this hypothesis is preliminary and increased taxon sampling is needed.

In addition to molecular data (Michelangeli et al., submitted), the monophyly of the Miconia strigillosa clade (= Clidemia sect. Clidemia) is supported by the putative synapomorphies of gland-headed hairs on the abaxial leaf surface (but we note that this character has also evolved within the M. octona clade), stellate hairs on the abaxial leaf surface, pseudolateral inflorescences (Fig. 1 I, J), and shoots producing only a single internode with one pair of leaves before terminating in an inflorescence (Majure et al. 2013). Additionally, the thickened bases of the elongated hairs on the adaxial leaf surface (Fig. 1 I) may be synapomorphic. Many members of this group also bear an ovary crown, and some also have torus hairs. Exclusively continental relatives of M. strigillosa and M. dependens include species such as Clidemia pustulata DC., C. biserrata DC., C. urceolata DC., and C. novemvernia (DC.) Triana (Michelangeli et al., submitted), and perhaps also the phenetically similar C. siapensis Wurdack. [Names in Clidemia are used, here and elsewhere, for continental species lacking combinations in Miconia.] The M. octona clade (= Clidemia sect. Staphidium) is supported by the potential synapomorphies of pseudolateral inflorescences (Fig. 1 A, B, E, F), shoots producing only a single pair of leaves before terminating in an inflorescence (both likely evolved in parallel with the species of the M.
Miconia crenata (n = 17 (Almeda 2013; Solt & Wurdack 1980). These species, however, do show some variation in chromosome numbers within the tribe Miconieae are remarkably uniform and usually represented by n = 17 (Caetano 2014). 

M. crenata of asexual entities (Melo et al. 1999). We note that agamospermy has also been recorded for ability for the tribe may correlate with the occurrence of asexuality in these taxa.

M. crenata is prolonged dorso-basally, forming a gland-edged appendage, and their hypanthia and mature berries are longitudinally ribbed (Gamba & Almeda 2014).

Although it is clear that the species of the Miconia octona and M. strigillosa groups should be included within Miconia s.l., a detailed presentation of their taxonomic placement and infrageneric nomenclature must await an investigation of these Antillean species in the context of their continental relatives. However, their specific distinctions are already clear, they are recognized in many floristic treatments (e.g., Alain 1957; Almeda 2009; Gleason 1939; Liogier 1995, 2000; Michelangeli & Bécquer 2012; Proctor 1972; Wurdack 1973, 1980), and are presented in the following dichotomous key (based upon the study of numerous herbarium specimens from the Greater Antilles). The most useful characters distinguishing these two groups (as evidenced in the key) are the presence of bulla-based hairs on the adaxial leaf surface in species of the M. strigillosa clade, vs. their absence in members of the M. octona clade, along with the presence vs. absence of an ovary crown. Additionally, the leaves of species of the M. strigillosa clade are usually stellate-pubescent beneath, while those of the M. octona group often lack such hairs on the abaxial surface of the lamina. Note that M. octona is an exception, having stellate hairs abaxially (see key).

In the taxonomic section below, we present an updated nomenclature for each of the Antillean species of the Miconia octona and M. strigillosa groups, along with an identification key and brief statements relating to their geographical distributions. Although morphologically variable, these species are phenetically distinct and easily distinguished—and, except for M. dependens, they show no significant internal morphological discontinuities in the Greater Antilles. Miconia dependens is exceptionally variable, such that infraspecific taxa have frequently been recognized within it (and infraspecific taxa have also been recognized within M. crenata and M. octona, relating to variation in continental regions). Perhaps some of these deserve specific recognition, but a detailed consideration of the pattern of variation within this broadly distributed species is beyond the scope of this article, which is focused on the populations of the Greater Antilles. The complex pattern of variation within M. dependens is unsurprising, given that the species is agamospermic and likely comprises a series of asexual entities (Melo et al. 1999). We note that agamospermy has also been recorded for M. crenata (Caetano 2014).

Chromosome numbers within the tribe Miconieae are remarkably uniform and usually represented by n = 17 (Almeda 2013; Solt & Wurdack 1980). These species, however, do show some variation in chromosome number, i.e., Miconia crenata (n = 17), M. dependens (n = 17), M. erythropogon (n = 15), M. octona (n = 17), and M. strigillosa (n = ca. 25–27) (Missouri Botanical Garden 2007; Solt & Wurdack 1980). This unusual level of variability for the tribe may correlate with the occurrence of asexuality in these taxa.

**TAXONOMIC TREATMENT**

**Key to Greater Antillean species of Miconia with conspicuous multicellular, elongate, simple, glandular or gland-headed hairs, pseudolateral inflorescences, and flowers with elongated calyx teeth, 5 to 8, white, rounded petals, white, ovate anthers, and purple- or blue-black fruits.**

1. Hairs of adaxial leaf surface swollen at base, the abaxial surface with associated depressions; ovary collar with a crown (i.e., with conspicuous, elongated hairs).
2. Inflorescences, broad and open, paniculate cymes; inflorescence bracts 0.2–1.4 mm wide; leaves ± cordate, with marginal hairs to 1–2 mm long; calyx teeth 2.5–4.5 mm long

**Miconia strigillosa**

2. Inflorescences, spike-like cymes (or occasionally elongate-paniculate); inflorescence bracts (0.2) 0.7–2.5 mm wide; leaves (acute) obtuse to rounded or slightly cordate, with marginal hairs to 1–4.5 mm long; calyx teeth 1.3–3 mm long

**Miconia dependens**

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Fig. 1. Miconia crenata and close relatives. A. M. crenata showing habit and inflorescence structure (Bath Fountains, Jamaica). B. M. crenata showing sympodial growth, with terminal inflorescences deflexed to seeming axillary position (Judd 3057; and photo previously published in Judd, 1986, fig. 5). C. Fruits of M. crenata (Majure 6044). D. Inflorescence and flowers of M. erythropogon (Wakefield, Jamaica). E–F. Habit and inflorescence structure of M. erythropogon (Judd 5246 and Judd 8299). G. Flower of M. erythropogon (Judd 5246). H. Flower showing typical eight petals of M. octona (Michelangeli 1750). I. Habit and inflorescence structure of M. strigillosa (Judd 8338). J–K. Flowers (Judd 8338) and fruit (Mason River, Jamaica) of M. strigillosa. Photos B, E–G, and I–J taken by W.S. Judd; D and K taken by G.M. Ionta; A taken by J.D. Skean, Jr.; H taken by F.A. Michelangeli; and C taken by L.C. Majure.
Distribution.—Miconia erythropogon is endemic to the Greater Antilles, occurring only in Jamaica, Cuba (in the Sierra Maestra and Sierra de Moa), and Hispaniola (Dominican Republic, at Valle Flores, and Haiti, in the Massif de la Hotte) (Alain 1957; Liogier 2000; Proctor 1972). This species is morphologically similar to its close relative, the widespread M. crenata, but the two species may be consistently distinguished by the characteris-
tics provided in the key. The species has also been recognized by other systematists, e.g., Alain (1957), Proctor (1972), and Michelangeli and Bécquer (2012).


Distribution.—Miconia octona is found only in Cuba and Jamaica within the Greater Antilles (Alain 1957; Proctor 1972), it does not occur in the Lesser Antilles. The species is widespread in the continental Neotropics—growing in North America (Mexico), Central America, and South America as far south as Bolivia.

Species of the Miconia strigillosa group:


Distribution.—Within the Greater Antilles, Miconia strigillosa occurs on Cuba, Hispaniola (Dominican Republic and Haiti), Puerto Rico, and Jamaica (Alain 1957; Axelrod 2011; Liogier 1995, 2000; Proctor 1972). It is absent from the Lesser Antilles. The species is also widespread in continental regions of the Neotropics, growing in Central America and northern South America, extending south to Peru.


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Distribution.—Within the Greater Antilles Miconia dependens grows only in eastern Cuba (Pinar del Rio, Isla de Pinos), and a single specimen, possibly mislabeled, exists from Jamaica (Alain 1957; Proctor 1972); the species is absent from the Lesser Antilles. It is widely distributed in the Neotropics, occurring in North America (southern Mexico), throughout Central America, and in northern South America.

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