



<http://dx.doi.org/10.11646/phytotaxa.177.3.5>

***Miconia indicoviolacea* (Melastomataceae: Miconieae): a new Colombian species from the western flanks of the cordillera Occidental**

DIANA GAMBA¹, FRANK ALMEDA¹ & MARCELA ALVEAR¹

¹ Institute for Biodiversity Science and Sustainability, Department of Botany, California Academy of Sciences, 55 Music Concourse Drive, Golden Gate Park, San Francisco, CA 94118, USA. E-mail: dgamba333@gmail.com; falmeda@calacademy.org; malvear@calacademy.org

Abstract

Miconia indicoviolacea is described from the western slopes of the western cordillera in the Chocó biogeographic region of Colombia, illustrated, and compared with superficially similar species that are also endemic to the country. It is readily recognized by its prevalingly purple to dark blue inflorescence branches, peduncles, and internodes, minute glandular-puberulent vegetative and hypanthial indumentum, caudate foliar apex, dorsally inclined anther pores, glabrous rounded to truncate dorso-basal staminal appendages, and seeds with a conspicuous appendage at the chalazal end and a raphal zone that is approximately double the size of the seed corpus.

Resumen

Miconia indicoviolacea es una especie descrita de la vertiente occidental de la cordillera Occidental en la región del Chocó biogeográfico de Colombia, es ilustrada y comparada con especies superficialmente similares y también endémicas para el país. Se reconoce fácilmente por sus pedúnculos y ramas de la inflorescencia de color morado a azul oscuro, indumento diminutamente glandular-puberulento en órganos vegetativos e hipanto, ápice foliar caudado, poros de las anteras dorsalmente inclinados, apéndices estaminales glabros y redondeados a truncados dorso-basalmente, y semillas con un apéndice conspicuo en el extremo calazal y una zona rafal que es aproximadamente el doble del tamaño del cuerpo de la semilla.

Introduction

Within the neotropics, Colombia stands out as a major center of diversity for the Melastomataceae, with over 985 species in 61 genera (Almeda *et al.* in press, Mendoza-C. & Ramírez 2006). Over half of the species recorded for the country belong to the Miconieae, a diverse group of berry-fruited species that represents the largest monophyletic group in the family (Goldenberg *et al.* 2008).

The new species of *Miconia* Ruiz & Pavón (1794: 60) described here was discovered during recent collecting expeditions to Colombia for the Miconieae Planetary Biodiversity Inventory project (<http://sweetgum.nybg.org/melastomataceae/>). It is superficially similar to rare and little-known Colombian species that were described in the genus *Clidemia* D. Don (1823: 306). Because the latter genus is nested in *Miconia* based on DNA sequence data and difficult to differentiate based on morphological characters, we adopt the expanded *Miconia* approach employed in several recent papers that have addressed this issue (e.g. Gamba & Almeda in press, Ionta *et al.* 2012, Judd & Majure 2013, Majure & Judd 2013, Michelangeli & Meier 2013, Ocampo & Almeda 2014).

Miconia indicoviolacea Gamba, Almeda & Alvear, sp. nov.

Distinguished by the dark blue inflorescence peduncle and branches, aristate-caudate leaf apices, minute glandular-puberulent vegetative and hypanthial indumentum, dorsally appendiculate stamens, and seeds with a conspicuous appendage at the chalazal end and a raphal zone that is approximately the double the size of the seed corpus.

Type:—COLOMBIA. Valle del Cauca: municipio de Dagua, corregimiento El Queremal, Parque Nacional Natural Farallones de Cali, Alto Anchicayá, trail off of (upslope) Quebrada La Riqueza, cordillera Occidental, vertiente occidental, 03°39.998'N, 76°53.609'W, 650–810 m, 6 February 2011, F. Almeda, M. Alvear, D. Penneys, G. Ocampo, D. Alvear, I. Alegría 10277 (holotype: COL!; isotypes: CAS!, CUVC!, HUA!, NY!).

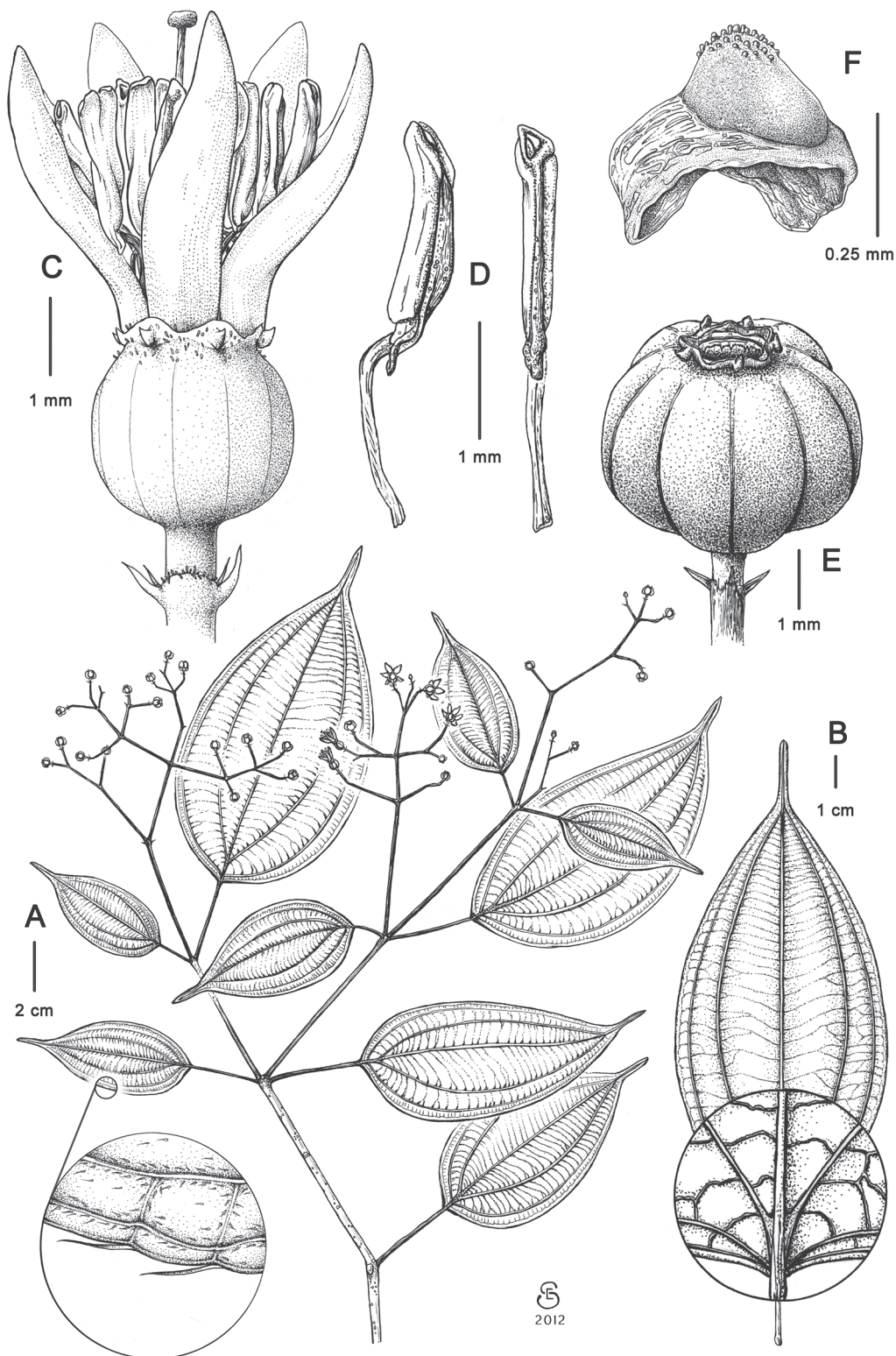


FIGURE 1. *Miconia indicoviolaacea*. **A.** Flowering and fruiting branch. **B.** Leaf (abaxial surface). **C.** Flower. **D.** Stamens, lateral view (left) and dorsal view (right). **E.** Fruiting hypanthium. **F.** Seed. (A–F from *Almeda 10277*, CAS).

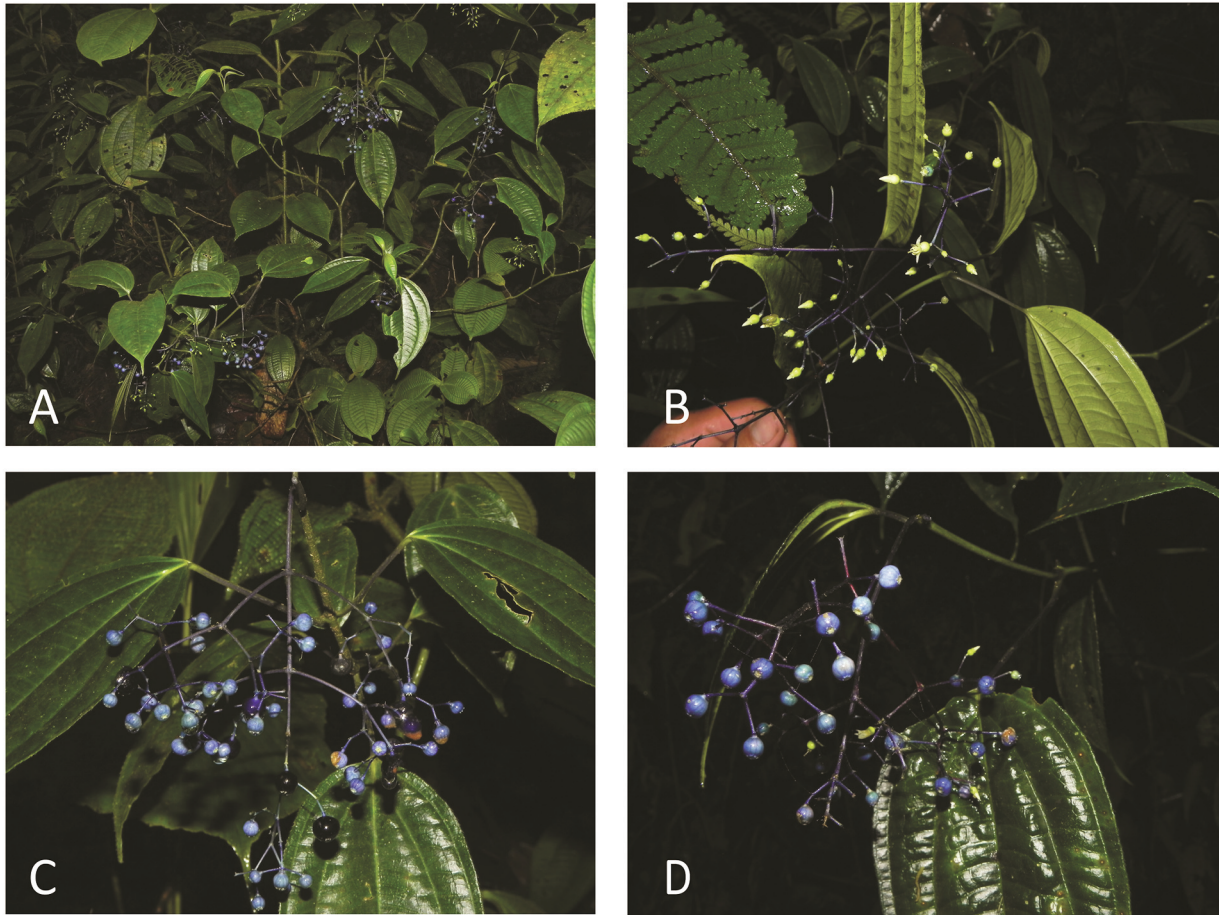


FIGURE 2. *Miconia indicoviolacea*. **A.** Habit. **B.** Inflorescence. **C & D.** Infructescences. (A, C, D from *Alvear 1547*; B from *Alvear 1800*, all by M. Alvear).

Shrub to 1 m tall with open and scraggly branching, bark greenish. *Upper internodes* rounded-quadrate, 5.75–6.3 cm long, bluntly grooved, green, cauline nodes terete, nodal line absent. *Indumentum* on branchlets, petioles, leaf surface, primary, secondary, tertiary and higher order veins adaxially and abaxially, inflorescence axes, bracts, bracteoles, pedicels, hypanthia, calyx lobes abaxially, and exterior calyx teeth sparsely and caducously composed of resinous short stalked glands 0.15–0.25 mm long with thin-walled short to slightly elongate heads, the translucent stalks dark brown, the resinous heads light brown. *Leaves* of each pair somewhat anisophyllous in size; the thin petioles 3.5–4.7 cm long (on larger leaves) or 0.8–2.3 cm long (on smaller leaves), canaliculate adaxially, bluntly grooved and fluted abaxially, green to dark blue; larger blades 10–15.3 × 4–7 cm, smaller blades 6.6–9.2 × 2.85–4.2 cm, ovate to elliptic-ovate, the base broadly obtuse to rounded, the margin entire and obscurely ciliolate, the apex aristate-caudate, membranaceous; mature leaves adaxially with resinous glands on surface mostly 0.25 mm long; abaxial surface soon glabrescent; 5–(7)-plinerved, including the tenuous marginals, innermost pair of secondary veins diverging somewhat asymmetrically from the primary vein 0.3–0.5 cm above the base and producing a membrane-like structure at the point where the primary and secondary veins diverge from one another (acarodomatia?), areolae 0.5–1 mm, adaxially the primary, secondary, tertiary and higher order veins slightly impressed, abaxially the primary vein elevated and terete, the secondary, tertiary and higher order veins slightly raised and terete. *Inflorescence* a pendant pseudolateral thyrse 6.7–7.4 to 10 cm long in fruit (including the peduncle 1.7–2.7 cm long), blue to dark violet, divaricately branched, inflorescence nodes somewhat thickened; bracts 0.6–1.9 × 0.25–0.45 mm (the lowermost longer than the uppermost), oblong-linear to ovate-oblong, sometimes tapering to a translucent tooth-like apex, glabrous, persistent in fruit; bracteoles 0.4–2 × 0.2–0.6 mm, ovate-oblong, sometimes tapering to a translucent tooth-like apex, somewhat thickened dorso-ventrally, glabrescent, persistent in fruit. *Flowers* 5-merous on pedicels 0.6–1.2 mm long. *Hypanthium* at anthesis 2.1–2.3 × 1–2.2 mm (free portion of hypanthium 0.8 mm long), globose to urceolate, bluntly 10-ribbed, green to bluish, sparsely covered with clavate glands to 0.2 mm long, the ridged inner surface densely covered with

white-translucent sessile glands, the torus adaxially beset with caducous brown-translucent glands less than 0.2 mm long. *Calyx* open in bud and persistent in fruit, white to dark blue; tube 0.3 mm long with the same vestiture as the torus adaxially and as the hypanthium abaxially; lobes 0.25–0.4 × 0.8 mm, broadly triangular to semicircular, the margin vaguely undulate, the apex blunt; exterior teeth 0.3–0.4 mm long, narrowly tuberculiform, inserted at the base of the calyx tube, not exceeding the calyx lobes. *Petals* 3.7–4.5 × 0.7–1.3 mm, oblong, the margin entire to vaguely undulate, the apex bluntly acute, white, glabrous on both surfaces, erect at anthesis. *Stamens* 10; filaments 1.7 × 0.25 mm, white, glabrous; anther thecae 1.5–1.7 × 0.5–0.6 mm, oblong, truncate to slightly emarginate at the apex, opening by one dorsally inclined pore 0.1–0.15 mm in diameter, white; connective somewhat darker than the thecae, its prolongation and appendage 0.6–0.7 mm long, the appendage oblong, rounded to truncate at the apex, minutely and sparsely beset with sessile white-translucent glands present also throughout the connective. *Ovary* 5-locular, 3/4 inferior, 1.8–1.9 mm long at anthesis, the apical collar absent, the apex forming a shallow bowl-like depression 0.4 mm in diameter, glandular-puberulent; style 3.5–3.8 mm long, white, glabrous; stigma expanded-truncate. *Berries* 3–3.5 × 3.5–4 mm when dry, globose-oblate, green becoming bluish when ripe, the hypanthial indumentum persistent at maturity. Seeds 0.26–0.35 × 0.19–0.2 mm, ovoid, somewhat angled, brownish; lateral and antiraphal symmetrical planes ovoid, the highest point toward the chalazal side or near the central part of the seed. Raphal zone suboblong, ca. twice as long as the seed corpus, ventrally and laterally expanded, dark-brown. Appendage present at the chalazal end, ca. 0.26–0.27 mm long, translucent-white. Individual cells elongated and isodiametric, the latter only located at the highest part of the seed, anticlinal boundaries inconspicuous; periclinal walls par-convex, high-domed, microrelief absent.

Additional specimens examined (paratypes):—COLOMBIA. Nariño: municipio de Barbacoas, corregimiento de Junín, Reserva Natural de las Aves El Pangán, Sendero El Pangán, 1°21.539' N, 78°5.097' W, 719 m, 8 February 2013, *Alvear M. et al. 1800* (CAS!, COL!, CUVC!, NY!, PSO!); Valle del Cauca: municipio de Dagua, corregimiento El Queremal, Parque Nacional Natural Farallones de Cali, sector Alto Anchicayá, Sendero de la quebrada La Riqueza, 3° 36.072' N, 76° 53.627' W, 796 m, 10 January 2013, *Alvear M. et al. 1547* (CAS!, COL!, CUVC!, NY!).

Habitat, distribution and ecology:—A local species known only from cloud forests on the western slope of the Western Cordillera of the Andes in the departments of Valle del Cauca and Nariño in Colombia, at 650–810 m.

Phenology:—Collected in flower and fruit in January and February.

Etymology:—The specific epithet refers to the vivid blue and violet coloring of the petioles, inflorescence rachis and other floral parts as seen in living material.

Conservation status:—This species is known only from two localities on the western flank of the cordillera Occidental. One of them is situated within the Farallones de Cali National Park which has an area of 2067.7 km² and an elevational gradient from 200 m up to 4100 m (Parques Nacionales Naturales de Colombia 2013). In that region this species is only known to grow between 700–800 m. The other location is within the Reserva Natural de las Aves El Pangán which has an area of 603 km² and an elevational gradient between 500–1900 m (Fundación Proaves 2010). At that locality this species is only known to grow around 700 m.

Based on georeferenced data from the known collections, GeoCAT (Bachman *et al.* 2011) was used to calculate extent of occurrence (EOO) and area of occupancy (AOO) based on a user defined cell of 2 km. The extent of occurrence for *Miconia indicovioacea* is 478.570 km² and the area of occupancy is 12.000 km². Using IUCN guidelines and criteria (IUCN 2014), we assign this species a conservation status of Endangered EN B1ab(iii).

Discussion

Miconia indicoviolacea is characterized by its purple to dark blue inflorescence branches, minute glandular-puberulent vegetative and hypanthial vestiture, aristate-caudate foliar apex, dorsally inclined anther pores and glabrous rounded to truncate dorso-basal staminal appendages. The seeds are especially distinctive. They are sparingly verruculose on the angles at the highest point on the antiraphal side and have a conspicuous prolonged appendage at the chalazal end and a raphal zone that is approximately double the size of the seed corpus.

Among described species, *Miconia indicoviolacea* is morphologically similar to species that have been described as *Clidemia aquaclarensis* Wurdack (1962: 172–173) and *Clidemia diguensis* Wurdack (1962: 173–174), two species that are also endemic to the same general region in Colombia and known from few collections. The former grows at lower elevations (150–500 m) and the latter at higher elevations (1540–1650 m). These two species are similar in having leaves that are somewhat anisophyllous in size in each pair and have similar general inflorescence architecture, but differ greatly in overall indumentum details, leaf shape and floral and seed morphology.

Clidemia aguacclarensis has an overall stellulate-furfuraceous indumentum, petioles with one side (adaxially) that is densely setose with barbellate trichomes 0.4–1 mm long, leaves with a cordate base and gradually blunt-acute apex, smaller oblong petals (1.7–1.8 × 1.1–1.3 mm), smaller and inconspicuous dorso-basal anther appendages that are alternately slightly unequal in size, a setulose torus, and a 3-locular ovary. The seeds of *C. aguacclarensis* are similar in size to those of *M. indicoviolacea* but differ notably in being ovate to galeiform, unappendaged, essentially smooth on the antiraphal side and with a raphal zone that pretty much extends the length of the seed.

Clidemia diguensis has an overall dense indumentum of spreading smooth trichomes (0.5–1 mm long) on cauline internodes, petioles, primary and higher order veins, inflorescence and hypanthia, intermixed with some stellulate caducous trichomes, conspicuously bullate leaves with a cordate base and bluntly-acute apex, smaller and obovate to rounded petals, unappendaged anther connective, and 3-locular ovary.

Miconia indicoviolacea is also superficially similar to *M. neomicrantha* Judd & Skee (1991: 62) in leaf shape (ovate to elliptic-ovate) and flower morphology (with oblong-lanceolate petals, and oblong thecae). The latter lacks the bright blue-purple coloration of the inflorescence peduncle and branches, and has a different indumentum consisting of hyaline or brownish stellate-lepidote trichomes. The hypanthia of *M. neomicrantha* are bluntly 8-ribbed, the stamens have deflexed dorso-basal appendages that are copiously gland-edged, the seeds lack appendages, and the ovary is 4-locular.

Based on indumentum details and seed morphology, the systematic position of this new species within the Miconieae is not clear at this time.

Acknowledgments

We thank the staffs at Parque Nacional Natural Farallones de Cali and Fundación EPSA, especially to Jaime Alberto Celis, Adriana Sarria, Yanet Mejía, and Bertulfo Quintana, for their support; Fundación Proaves and the staff at the Reserva Natural de las Aves El Pangán, especially to Luis Gabriel Mosquera for their support; Diego Alvear, José David García, Mauricio Posada, Juan Fernando Restrepo, Alexis Saa and Isaac Alegría for their help on the expeditions where these specimens were collected; Sean Vidal Edgerton for the line drawings; curators and staffs at COL, CAS, CAUP, CUVC, FMB, NY, PSO and US for access to collections under their care. This research was supported in part by the California Academy of Sciences, the M. Stanley Rundel Charitable Trust, and a grant from the U.S. National Science Foundation (DEB-0818399-Planetary Biodiversity Inventory Miconieae project). We are grateful to Parques Nacionales de Colombia, Ministerio de Ambiente y Desarrollo Sostenible, and Autoridad Nacional de Licencias Ambientales (ANLA) in Colombia for granting the research permits to collect members of the Melastomataceae for the project entitled “Sistemática y filogenia de la tribu Miconieae (Melastomataceae)”.

Literature Cited

- Almeda, F., Mendoza-Cifuentes, H., Penneys, D.S., Michelangeli, F. & Alvear, M. (In press) Melastomataceae. In: Bernal, R., Gradstein, R. & Celis, M. (Eds.) *Catalogue of the plants of Colombia*. Instituto de Ciencias Naturales - Universidad Nacional de Colombia - University of Göttingen.
- Bachman, S., Moat, J., Hill, A.W., de la Torre, J., & Scott, B. (2011) Supporting Red List threat assessments with GeoCAT: geospatial conservation assessment tool. In: Smith, V. & Penev, L., (Eds.) *e-Infrastructures for Data Publishing in Biodiversity Science*. *ZooKeys* 150: 117–126.
<http://dx.doi.org/10.3897/zookeys.150.2109>
- Don, D. (1823) An illustration of the natural family of plants called Melastomaceae. *Memoirs of the Wernerian Natural History Society* 4: 276–329.
- Fundación Proaves (2010) *Reserva Natural de las Aves El Pangán*. Available from <http://www.proaves.org/rna-el-pangan/> (accessed: 25 October 2010).
- Gamba, D. & Almeda, F. (In press) Systematics of the Octopleura clade of *Miconia* (Melastomataceae: Miconieae) in tropical America. *Phytotaxa*.
- Goldenberg, R., Penneys, D.S., Almeda, F., Judd, W.S. & Michelangeli, F.A. (2008) Phylogeny of *Miconia* (Melastomataceae): patterns of stamen diversification in a megadiverse neotropical genus. *International Journal of Plant Sciences* 169: 963–979.
<http://dx.doi.org/10.1086/589697>
- Ionta, G.M., Judd, W.S., Skee, J.D. & McMullen, C.K. (2012) Two new species of *Miconia* sect. *Sagraea* (Melastomataceae) from the

- Macaya Biosphere Reserve, Haiti, and twelve relevant new species combinations. *Brittonia* 64: 61–72.
<http://dx.doi.org/10.1007/s12228-011-9214-0>
- IUCN Standards and Petitions Subcommittee (2014) *Guidelines for using the IUCN Red List Categories and Criteria. Version 11*. Prepared by the Standards and Petitions Subcommittee, 87 pp. Downloadable from: <http://www.iucnredlist.org/documents/RedListGuidelines.pdf>
- Judd, W.S. & Majure, L.C. (2013) *Miconia becqueri*, a new species of *Miconia* (Melastomataceae) with strongly four-lobed ovaries from the Sierra Maestra, Cuba. *Brittonia* 66: 75–81.
<http://dx.doi.org/10.1007/s12228-013-9312-2>
- Judd, W.S. & Skee, J. (1991) Taxonomic studies in the Miconieae IV. Generic realignments among terminal flower taxa. *Bulletin of the Florida Museum of Natural History, Biological Sciences* 36(2): 25–84.
- Majure, L.C. & Judd, W.S. (2013) *Miconia phrynosomaderma* (Melastomataceae: Miconieae), a new species from the Massif du Nord, Haiti, and sixteen new names and combinations. *Journal of the Botanical Research Institute of Texas* 7: 265–274.
- Mendoza-C., H. & Ramírez, B. (2006) *Guía ilustrada de géneros de Melastomataceae y Memecylaceae de Colombia*. Instituto Alexander von Humboldt – Universidad del Cauca. Bogotá D.C. Colombia, 288 pp.
- Michelangeli, F.A. & Meier, W. (2013) A new anisophyllous species of *Miconia* (Melastomataceae: Miconieae) from the Coastal Cordillera in northern Venezuela. *Phytotaxa* 79: 37–44.
<http://dx.doi.org/10.11646/phytotaxa.79.1.3>
- Ocampo, G. & Almeda, F. (2014) A new species of *Miconia* (Melastomataceae: Miconieae) from the eastern slope of the Peruvian Andes. *Phytotaxa* 163(3): 166–172.
<http://dx.doi.org/10.11646/phytotaxa.163.3.3>
- Parques Nacionales Naturales de Colombia (2013) *Parque Nacional Natural Sierra Nevada de Santa Marta*. Available from <http://www.parquesnacionales.gov.co/PNN/portel/libreria/php/decide.php?patron=01.0109> (accessed: 27 November 2013).
- Ruiz, H. & Pavón, J.A. (1794) *Flora peruviana, et chilensis prodromus*. Sancha, Madrid, 152 pp.
<http://dx.doi.org/10.5962/bhl.title.11759>
- Wurdack, J.J. (1962) Certamen Melastomataceis VII. *Phytologia* 8(4): 165–175.