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A new *Miconia* (Melastomataceae: Miconieae) from upland rain forest of north-western Guyana

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Abstract

Miconia angustidentata, from upland rain forest in northwestern Guyana, is described, illustrated, mapped, and compared with its superficially similar species based on morphological features. It is characterized by its ovate to elliptic 3–5-nerved entire leaves; axillary clusters of 3–5 sessile mostly 5-merous flowers; sparse cover of minute stellate trichomes on abaxial foliar surfaces, hypanthia, and calyx lobes; conspicuous oblong calyx teeth that obscure calyx lobes at anthesis and in fruit; white oblong petals that lack a subapical mucro on the abaxial surface; white stamens with ventrally inclined anther pores; (4–) 5-locular superior ovary; and ovoid-pyramidal angulate seeds with an irregularly rugulate testa and a raphe that extends about 50% the length of the seed. A conservation assessment of Endangered is recommended for this species based on IUCN Red List Categories and Criteria.

Key words: *Clidemia,* conservation, Guiana Shield, neotropics, *Ossaea*

Introduction

A proposal to conserve *Miconia* Ruiz & Pavón (1794: 60) against the much smaller genera *Maieta* Aubl. (1775: 443) and *Tococa* Aubl. (1775: 437) was recently approved by the General Committee (Wilson 2017) and ratified by the Nomenclature Session of the Nineteenth International Botanical Congress in Shenzhen, China in 2017 (Turland *et al.* 2017). Based on morphological and molecular data sets, a proposal to unite some 19 neotropical genera of Melastomataceae into a monogeneric Miconieae (Michelangeli *et al.* 2016; in prep.) will create an expanded *Miconia* with over 1900 species that is characterized by baccate fruits, terminal, axillary, or pseudoaxillary inflorescences, and the lack of anther pedoconnectives and foliar raphides. *Miconia* is therefore poised to become the largest exclusively Neotropical genus of vascular plants and one of the largest among flowering plants globally. Although the new Guyanan species proposed here has axillary inflorescences and apically acute petals that would place it in the traditionally recognized genera *Clidemia* D. Don (1823: 306) or *Ossaea* DC. (1828: 168) respectively, we here describe it in an expanded *Miconia* in line with the practice adopted by a majority of specialists working with the tribe Miconieae (Ionta *et al.* 2012; Majure & Judd 2013; Michelangeli & Meier 2013; Gamba & Almeda 2014; Ocampo & Almeda 2014; Michelangeli *et al.* 2016).

The Guiana Shield includes all of the Guianas and the adjacent states of Amazonas, Bolívar, and Delta Amacuro in Venezuela and has a rich melastome flora. About 148 species of *Miconia,* 62 species of *Clidemia,* and four species of *Ossaea* have been reported from the region (Funk *et al.* 2007) but none of these are a match for the new species described here. A study of recently described species of *Miconia* from the adjoining northern border of Brazil and adjacent French Guiana (Goldenberg & Hinoshita 2017) and the northern Andes (Gamba & Almeda 2014) has also failed to uncover any species with the characters of *Miconia angustidentata.*

It is estimated that 70 to 90 percent of the Guianas (Guyana, French Guiana, and Suriname) are still covered by exceptionally rich pristine rain forests that are related to, but distinct from, rain forests of the Amazon (Wilson 2016). The incidence of vascular plant endemism in these forests is estimated to be about 40–50% (Mittermeir *et al.* 1990; Funk *et al.* 2007) but much of the region is still little-known since these forests are among the least explored

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on the planet (Boggan *et al.* 1997; Funk *et al.* 2007). In addition to the species described here, many other new Melastomataceae are likely to be discovered as the rain forests in the region become more readily accessible.

Materials and methods

Measurements of gross morphological characters were based on dried material of the type and other cited collections. Seed measurements were done with a Mitutoyo digimatic caliper with 0.1 mm precision. The distribution map was constructed in Quantum GIS using coordinates provided on specimen labels. The conservation status was assessed using IUCN guidelines (IUCN 2017). GeoCAT (Bachmann *et al.* 2011) was used to calculate the extent of occurrence and area of occupancy with a user-defined cell width of 2 km.

Taxonomic Treatment

Miconia angustidentata Almeda & Penneys, sp. nov. (Figure 1)

Diagnosis: Distinguished by its 3–5-basally nerved entire leaves; axillary clusters of 3–5 sessile, mostly 5-merous flowers; sparse cover of minute stellate trichomes on abaxial foliar surfaces, hypanthia, and calyx lobes; conspicuous narrowly oblong calyx teeth that greatly exceed and obscure calyx lobes at anthesis and in fruit; white oblong apically acute petals that lack a subapical mucro on the abaxial surface; white stamens with ventrally inclined apical pores; and (4–) 5-locular superior ovary.

Type:—GUYANA. Cuyuni-Mazaruni region: Paruima, 5 km W; near camp on trail to Ararata savanna, 5°48'N, 61°06'W, 685 m elevation, 2 July 1997, fl., *D. Clarke, T. Hollowell, K. David, C. Chin & C. Perry 5181* (holotype: CAS!; isotypes: BRG!, NY!, US!).

Laxly branched shrub 1–2 m tall, cauline nodes of upper branchlets somewhat swollen, the internodes rounded-quadrate and somewhat canaliculate on the wider side, glabrous throughout. Leaves of a pair equal to markedly unequal in size, the smaller leaf often 1/3 the length of the larger but commonly deciduous; petioles 0.5–2 cm long; blades 4–10 × 1.3–4.7 cm, ovate to elliptic, apex acuminate, base acute to obtuse or broadly rounded, margin entire, 3–5-basally nerved with a midvein and 1–2 pairs of secondary veins, adaxially glabrous, abaxially glabrous to sparingly beset with sessile stellate trichomes. Inflorescence an axillary, sessile, subsessile or short-pedunculate (1.5 mm) cluster of 3–5 sessile flowers on one side of each node. Bracts and bracteoles 1 × 0.7–1.5 mm, persistent or tardily deciduous, broadly triangular to ovate or oblong-ovate, glabrous adaxially but minutely short-ciliate apically, abaxial surface glabrous to sparsely covered with sessile stellate trichomes that are sometimes intermixed with somewhat elongate barbed trichomes. Flowers (4–) 5-merous, perfect; hypanthia oblong-subcylindric, 2.5 mm long from the base to the glandular-ciliate torus (vascular ring); calyx tube 0.5 mm long, the calyx lobes 1 × 1.5 mm, triangular, sparsely covered with minute stellate trichomes on both surfaces like those on the hypanthia, and with a few minute glandular trichomes on the margins; calyx teeth green flushed with pink apically, sparingly covered with stellate trichomes, oblong and ± terete, the free distal portions 3 mm long, the basal portion completely fused to the calyx lobes; petals 3–4 × 0.5–0.75 mm, white, glabrous, oblong, apically acute and lacking a subapical mucro on the abaxial side. Stamens (8) 10 (–11), isomorphic, filaments 2–2.5 mm long, glabrous, white and conspicuously geniculate distally below the thecae at the filament insertion; anthers 2–3 mm long, oblong-subulate, arcuate with the distal portion curved outward and away from the style, white but drying yellow, the thecae conspicuously undulate (when dry), the apical pores ventrally inclined; connective somewhat thickened and prolonged just below the thecae for ca. 0.5 mm but unappendaged. Ovary (4–) 5-locular, completely superior, apex vaguely and inconspicuously elevated into a sparsely stellulate-puberulent lobulate collar 0.5 mm high. Style 5–6 mm long, white, straight and glabrous; stigma truncate to subcapitate. Berry 7–9 × 6–7 mm when dry, gray-blue to gray-purple or pale purple when ripe. Seeds ovoid to pyramidal and somewhat angulate on the antiraphal side, dark brown, 0.18–0.23 mm long and 0.01–0.07 mm wide, lateral and antiraphal symmetrical planes ovate, the highest point typically toward the ± truncate chalazal side, raphal zone oblong to ovate, ca. 50% the length of the seed, testa vaguely rugulate and sometimes inconspicuously papillate along the chalazal side.

Phenology:—*Miconia angustidentata* has been collected in flower in March and July and in fruit in May, July, October, and November.

Habitat and distribution:—*Miconia angustidentata* is known only from the Cuyuni-Mazaruni region of northwestern Guyana where it grows in dense rain forest on brown sand or lateritic to clayey soils at 500–1200 m elevation (Figure 2).

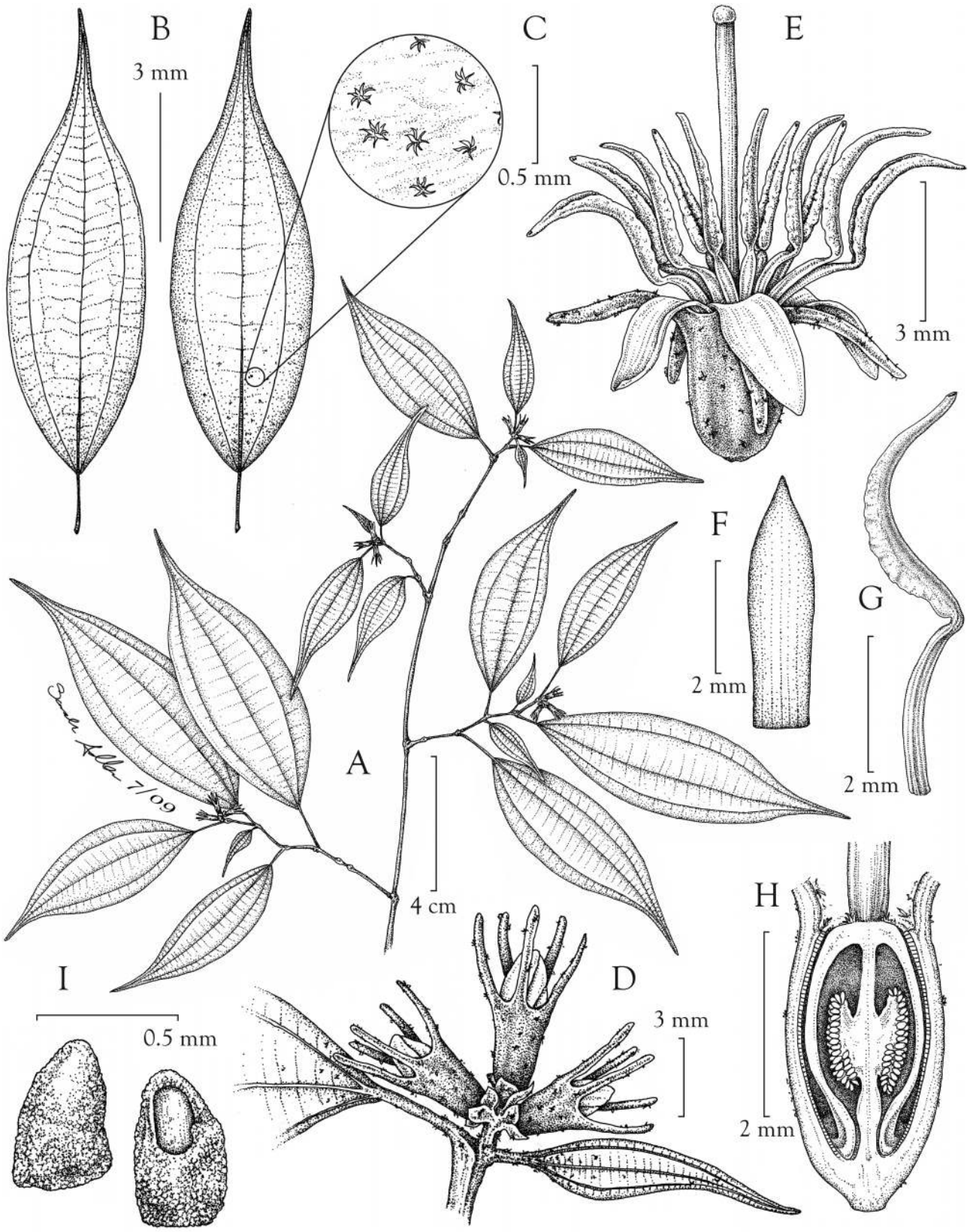

FIGURE 1. *Miconia angustidentata.* A. Habit. B. Representative larger leaves at a node (adaxial surface on left and abaxial surface on right). C. Enlargement of indumentum detail on abaxial leaf surface. D. Inflorescence showing flower buds and bracts. E. Flower (profile view) showing hypanthium, petals, stamens, and style. F. Representative petal (adaxial surface). G. Representative stamen (profile view). H. Longitudinal section of flower showing hypanthium and superior ovary with ovules. I. Representative seeds. All drawn from *Clarke et al. 5181.*

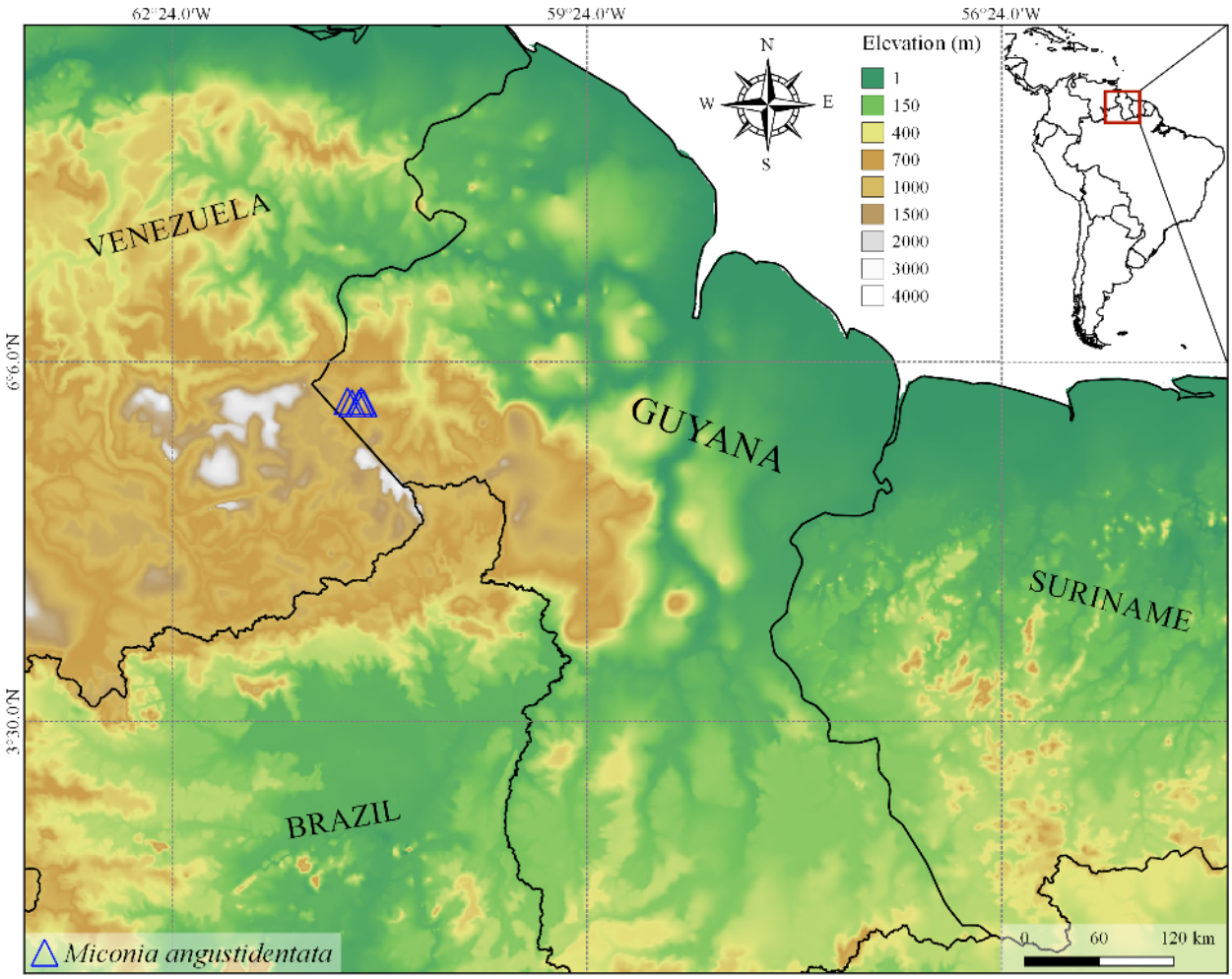

FIGURE 2. Geographic distribution of *Miconia angustidentata*.

Conservation status:—*Miconia angustidentata* is known from a limited area in upland rainforest west of the Mazaruni river with populations east and west of the Kamarang river as it flows in a north-south direction in northwestern Guyana. *Miconia angustidentata* has not been collected in adjacent regions of Venezuela, Suriname, or Brazil. The EOO is 20 km² and the AOO is 20 km². None of the collections of this species grow within a protected area. Because of its limited range, highly concentrated population structure in what amounts to fewer than five localities, and possible threat of habitat degradation or destruction in the future, we recommend a classification of Endangered (EN): B2ab(v).

Etymology:—The epithet for this species, *angustidentata,* draws attention to the narrow oblong calyx teeth that are fused to and largely obscure the abaxial surfaces of the inconspicuous calyx lobes at anthesis and in fruit.

Additional specimens examined:—GUYANA. Cuyuni-Mazaruni region: Paruima, 5 km W; near camp on trail to Ararata savanna, 5°48'N, 61°06'W, 685 m elevation, 2 July 1997, fl., *Clarke et al. 5171* (BRG!, CAS!, MO!, NY!, US!); Cuyuni-Mazaruni region, Paruima, 9 km W, 0.5–1 km E of Ararata scrub area, 5°49'N, 61°08'W, 780 m elevation, 6 July 1997, fl., *Clarke et al. 5430* (BRG!, CAS!, US!); Cuyuni-Mazaruni region, Paruima, 1.5 km S, summit of Konuktipu, 5°48'N, 61°03'W, 600 m elevation, 22 July 1997, fr., *Clarke et al. 5959* (BRG!, CAS!, NY!, US!); Tamakay landing, Mazaruni river, Morabukea forest, 4 March 1949, fl., *Forest Dept. of British Guiana F2855* (K!); Pakaraima mountains, Paruima Mission, 5°48'N, 61°01'W, 550 m elevation, 12 October 1981, fr., *Maas et al. 5593* (U, US-00615248!, US-00615249!); Kamarang river-Wenamu trail, Moruka Creek, Morabukea forest, 1200 m elevation, 9 November 1951, fr., *Maguire & Fanshawe 32465* (NY-03166002, digital image!, US!); Farm of Lloyd Anselmo, across Kamarang river from Paruima village, 5°49'N, 61°02'W, 500 m elevation, 28 May 1990, fr., *McDowell & Gopaul 2928* (US!).

Discussion:—*Miconia angustidentata* is readily recognized by its 3–5-nerved entire leaves; axillary, sessile, subsessile, or short-pedunculate cluster of 3–5 sessile flowers with persistent or tardily deciduous, broadly triangular

to ovate or oblong-ovate bracts and bracteoles; oblong-subcylindric hypanthia with a glandular-ciliate torus; triangular calyx lobes covered with minute stellate trichomes on both surfaces; oblong and ± terete calyx teeth that conceal the calyx lobes; ventrally inclined apical anther pores; superior ovary; and gray-blue to gray-purple or pale purple mature berries. The flowers are typically 5-merous and the ovaries are mostly 5-locular but a few flowers on the specimens available for study are 4-merous and at least a couple of ovaries are 4-locular in 4-merous flowers. The significance of this variation is difficult to gauge in view of the limited number of flowers and fruits on specimens studied. The specimen label on one collection (*Maas et al. 5593*) describes the leaves as green adaxially and wine-colored abaxially. We were unable to determine the consistency of this color difference on opposing leaf surfaces because all of the collections that were available for study turned dark upon drying.

Miconia angustidentata does not key satisfactorily to any of the species of *Clidemia, Ossaea,* or *Miconia* in the most recent accounts of Melastomataceae for the Guianas (Wurdack *et al.* 1993). It also does not match any of the described species of these genera included in other regional accounts for northern South America (Macbride 1941; Wurdack 1973, 1980; Berry 2001; Holst 2001) or the Mesoamerican region (Almeda 2009). *Miconia angustidentata* most closely resembles *Clidemia sessiliflora* (Naudin 1851: 311) Cogniaux (1888: 505) based on overall leaf shape and the congested axillary inflorescences. *Clidemia sessiliflora* differs most notably from *M. angustidentata* by it 5-plinerved leaf blades (vs. 3–5-basally nerved), uniformly 4-merous flowers (vs. modally 5-merous), ovate to semicircular calyx lobes (vs. triangular), shorter (0.75–1 mm long) calyx teeth (vs. 3 mm long) that do not obscure the calyx lobes, petals with a subapical mucro on the abaxial surface (vs. no mucro), dorsally inclined anther pores (vs. ventrally inclined), and a 2/3 inferior ovary that is 3-locular (vs. superior ovary that is modally 5-locular). *Clidemia sessiliflora* is also unlike *M. angustidentata* in its wider geographic range (Costa Rica, Panama, Colombia, and Venezuela to Bolivia). Another species that is only superficially similar to *M. angustidentata* in overall leaf shape, venation, and the clustered axillary flowers is *Clidemia minutiflora* (Triana 1872: 137) Cogniaux (1888: 507). Based on DNA sequence data the latter is actually a *Graffenrieda* DC. (1828: 105) (fide F. A. Michelangeli, pers. comm.). It differs in having consistently 4-merous flowers, anthers with a short pedoconnective and dorso-basal staminal appendages, diminutive external calyx teeth, a 3-locular ovary that is ½ inferior, and a dry capsular fruit unlike other axillary-flowered species of *Miconia.*

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References

Almeda, F. (2009) Melastomataceae. *In*: Davidse, G., Sousa-Sánchez, M., Knapp, S. & Chiang, F. (Eds.) *Flora Mesoamericana* 4 (1): 164–338.

Aublet, J.B.C.F. (1775) *Histoire des plantes de la Guiane françoise*. 4 vols. London & Paris.

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. *ZooKeys* 150: 117–126. https://doi.org/10.3897/zookeys.150.2109.

Berry, P.E. (2001) *Miconia. In:* Berry, P.E., Yatskievych, K. & Holst, B.K. (Eds.) *Flora of the Venezuelan Guayana.* Vol. 6, Liliaceae-Myrsinaceae, Missouri Botanical Garden Press, St. Louis, pp. 387–467.

Boggan, J., Funk, V., Kelloff, C., Hoff, M., Cremers, G. & Feuillet, C. (1997) Checklist of the plants of the Guianas (Guyana, Suriname, French Guiana). 2nd Edition. Biological Diversity of the Guianas Program. Washington, DC., 238 pp.

Candolle, A.L.P.P. de (1828) Melastomaceae. *In:* Candolle, A.L.P.P. de (Ed.) *Prodromus systematis naturalis regni vegetabilis* 3. Paris, Treuttel et Wurtz, pp. 99–202.

Cogniaux, C.A. (1888) Melastomaceae. *In*: Martius, C.F.P. & Eichler, A.G. (Eds.) *Flora brasiliensis* 14 (4): 1–655.

Don, D. (1823) An illustration of the natural family of plants called Melastomaceae. *Memoirs of the Wernerian Natural History Society*

4 (2): 276–329.

Funk, V.A., Hollowell, T., Berry, P.E., Kelloff, C. & Alexander, S.N. (2007) Checklist of the plants of the Guiana Shield (Venezuela: Amazonas, Bolívar, Delta Amaçuro; Guyana, Surinam, French Guiana). *Contributions from the United States National Herbarium* 55: 1–584.

Gamba, D. & Almeda, F. (2014) Systematics of the Octopleura clade of *Miconia* (Melastomataceae: Miconieae) in Tropical America. *Phytotaxa* 179: 1–174.
https://doi.org/10.11646/phytotaxa.179.1.1

Goldenberg, R. & Hinoshita, L.K.R. (2017) Two new species of *Miconia* (Melastomataceae, Miconieae) from the Brazilian northern border and adjacent French Guiana. *Brittonia* 69: 535–543.
https://doi.org/10.1007/s12228-017-9488-y

Holst, B.K. (2001) *Clidemia. In:* Berry, P.E., Yatskievych, K. & Holst, B.K. (Eds.) *Flora of the Venezuelan Guayana.* Vol. 6, Liliaceae-Myrsinaceae. Missouri Botanical Garden Press, St. Louis, pp. 295–310.

IUCN (2017) *Guidelines for using the IUCN Red List Categories and Criteria*. Version 13. Prepared by the Standards and Petitions Subcommittee. http://www.iucnredlist.org/documents/RedListGuidelines.pdf (accessed April–May 2018)

Ionta, G.M., Judd, W.S., Skean, 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.
https://doi.org/10.1007/s12228-011-9214-0

Macbride, J.F. (1941) Melastomataceae. *In*: Macbride, J.F. (Ed.) Flora of Peru. *Publications of the Field Museum of Natural History, Botanical Series* 13 (4): 1–566.

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.

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.
https://doi.org/10.11646/phytotaxa.79.1.3

Michelangeli, F.A., Almeda, F., Alvear, M., Bécquer, E.R., Burke, J., Caddah, M.K., Goldenberg, R., Ionta, G.M., Judd, W.S., Majure, L.C., Meirelles, J., Nicolas, A.N., Ocampo, G., Penneys, D.S., Skean, J.D. & Ulloa Ulloa, C. (2016) (2462) Proposal to conserve *Miconia*, nom. cons. against the additional names *Maieta* and *Tococa* (Melastomataceae: Miconieae). *Taxon* 65 (4): 892–893.

Mittermeier, R.A., Malone, S.A., Plotkin, M.J., Baal, F., Mohadin, K., MacKnight, J., Werkhoven, M. & Werner, T.B. (1990) Conservation Action Plan for Suriname. World Wildlife Fund –US, 45 pp.

Naudin, C. (1851) Melastomacearum. Quae in Museo Parisiensi continentur Monographicae descriptionis. *Annales des Sciences Naturelles, Botanique, sér.* 3 17 (5): 305–382.

Ocampo, G. & Almeda, F. (2014) A new species of *Miconia* (Melastomataceae: Miconieae) from the eastern slope of the Peruvian Andes. *Phytotaxa* 163: 166–172.
https://doi.org/10.11646/phytotaxa.163.3.3

Ruiz, H. & Pavón, J.A. (1794) *Flora Peruviana, et Chilensis Prodromus.* Imprenta de Sancha, Madrid, 67 pp.
https://doi.org/10.5962/bhl.title.11759

Triana, J.J. (1872) ["1871"] Les Mélastomacées. *Transactions of the Linnean Society of London* 28: 1–188.
https://doi.org/10.1111/j.1096-3642.1871.tb00222.x

Turland, N.J., Wiersema, J.H., Monro, A.M., Deng, Y.-F. & Zhang, L. (2017) XIX International Botanical Congress: Report of Congress action on nomenclature proposals. *Taxon* 66: 1234–1245.
https://doi.org/10.12705/664.25

Wilson, E.O. (2016) *Half-Earth: Our planet's fight for life.* Liveright Publishing Corporation. New York & London, 259 pp.

Wilson, K.L. (2017) Report of the General Committee: 18. *Taxon* 66: 742–744.
https://doi.org/10.12705/664.14

Wurdack, J.J. (1973) Melastomataceae. *In*: Lasser, T. (Ed.) *Flora de Venezuela,* Vol. 8. Instituto Botánico, Caracas, Venezuela, 819 pp.

Wurdack, J.J. (1980) Melastomataceae. *In*: Harling, G. & Sparre, B. (Eds.) *Flora of Ecuador,* Vol. 13. University of Göteborg & Swedish Museum of Natural History, Göteborg & Stockholm, Sweden, 406 pp.

Wurdack, J.J., Renner, S.S. & Morley, T. (1993) Melastomataceae. *In*: Görts van Rijn, A.R.A. (Ed.) *Flora of the Guianas 13.* Koeltz Scientific Books, Koenigstein, 425 pp.