

# *Miconia complanata* (Miconieae: Melastomataceae), a new species from the border between Ecuador and Peru

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**Abstract.** We describe a new species native to Ecuador and Peru, ***Miconia complanata***. This species has been collected from two different localities: Parque Nacional Podocarpus (Ecuador) and Cordillera del Cónedor (Ecuador and Peru). The strongly quadrangular to winged stem, ridged nodes and coriaceous leaves make this species distinctive even within a large genus.

**Keywords:** *Miconia sect. Cremanium*, Taxonomy.

**Resumen.** Se describe una especie nueva nativa de Ecuador y Perú, ***Miconia complanata***. Esta especie ha sido colectada en dos localidades: el Parque Nacional Podocarpus y la Cordillera del Cónedor. Los tallos fuertemente cuadrangulares a alados, nudos con línea interpeciolar marcada y hojas coriáceas hacen que esta especie sea distintiva, aun para este género tan grande.

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*Miconia* Ruiz & Pav., with almost 1100 species, is the largest genus of Melastomataceae, and the largest strictly Neotropical genus of angiosperms (Goldenberg et al., 2013). The Andes harbors more than 30% of the species of *Miconia*, many of them with very restricted distributions (Goldenberg et al., 2013). This has meant that in recent years, as botanical exploration of under collected areas continues, there has been a steady stream of new species described. Areas that were rarely explored before the 1980s, but that have yielded many new *Miconia* species throughout the border between Ecuador and Peru, are the Parque Nacional Podocarpus (Ecuador) and the Cordillera del Cónedor (Ecuador and Peru) (Ulloa Ulloa & Neill, 2006; Ulloa Ulloa & Homeier, 2008; Ulloa Ulloa et al., 2012; Michelangeli & Ulloa Ulloa, 2013; Penneys et al., 2015).

While determining recent collections from these areas we found a species of *Miconia* for which there were several collections from southern Ecuador and one from Peru that clearly all belonged to the same taxon, but did not match any known *Miconia*.

## Materials and methods

For this study, herbarium specimens were examined from MO, NY, QCNE, US and USM. Measurements of the vegetative plant body were taken with digital calipers to the nearest hundredth of a millimeter. For floral characteristics, measurements were taken from flowers preserved in 70% ethanol from the type material.

***Miconia complanata*** Jan. M. Burke, Michelangeli & D. Fernández, sp. nov. Type: Ecuador. Zamora-Chinchipe: Reserva Estación Científica San Francisco, 03°58'S, 79°04'W, 2330 m, 30 Aug 2005 (fl), J. Homeier 1578 (holotype: QCNE-195377; isotypes: GOET [n.v.], LOJA, NY). (Figs. 1, 2).

**Diagnosis:** *Miconia complanata* can be recognized by its alate to quadrangular stem; subsessile leaves; and rufous pubescence on stem, inflorescence axis, and abaxial surface of leaves.

Shrub or treelet, up to 2–4 m. Young stems quadrangular to strongly alate, bifacially flattened, the indumentum moderately scurfy, hairs



FIG. 1. *Miconia complanata* living plants. A. Flowering branch. B. Detail of stem and nodes. C. Fruiting branches. (A from Homeier 1578, B, C from Ulloa 1807).

deciduous, brown, dendritic, with many, thin arms, ca. 0.5 mm; internodes with longitudinal ridges, strongly 4-alate to bluntly quadrangular, nodal ridges present at the base of the petioles. Leaves isophyllous; petiole 0.57–1.3 cm long, indumentum tomentose, some dendritic hairs, reddish brown, stout and alate with a decurrent leaf base; blade 8.6–18.2 × 3.1–8.2 cm, oblong-elliptical, coriaceous, apex acute to obtuse, base acute to obtuse to decurrent, the margin entire, slightly revolute; 2° veins pairs without faint marginal veins, basally nerved, tertiary veins percurrent, arched at 50–90° angle from the midvein, 2–4 mm apart, reticulate, areoles 0.5 mm wide, veins slightly impressed on the adaxial surface and raised into an acute angle, up to 2.5 mm on the abaxial surface, reddish brown; adaxial surface green with yellow tinge, the surface indumentum glabrous, veins with stellate hairs with long arms, some

pigmented, 0.3–0.5 mm diam. on the 1° and 2° veins; abaxial surface green, the indumentum on the surface moderately pubescent with sessile dendritic hairs with long arms, pigmented, less than 0.5 mm diam. and sparsely to densely covered with sessile, black glands. Inflorescences terminal, few-branched panicles of dichasial units, 7.5–10.1 cm long; peduncles bifacially flattened, alate to bluntly quadrangular, reddish brown, the indumentum densely rufose with long-armed, sessile dendritic-stellate hairs, pigmented; bracts 4 × 0.75–2 cm, lanceolate, caducous, red due to pubescence; bracteoles 1.2–3 × 0.5–0.75 cm, linear, caducous, margin ciliate with branched hairs. Flowers 5-merous, hermaphroditic with pedicel 0.3–0.8 mm long. Hypothecium 1.5 mm long, urceolate, 1.8 mm wide at the torus, external indumentum covered with sessile, dendritic hairs with long arms, pigmented, internal surface indumentum of sparse hairs,

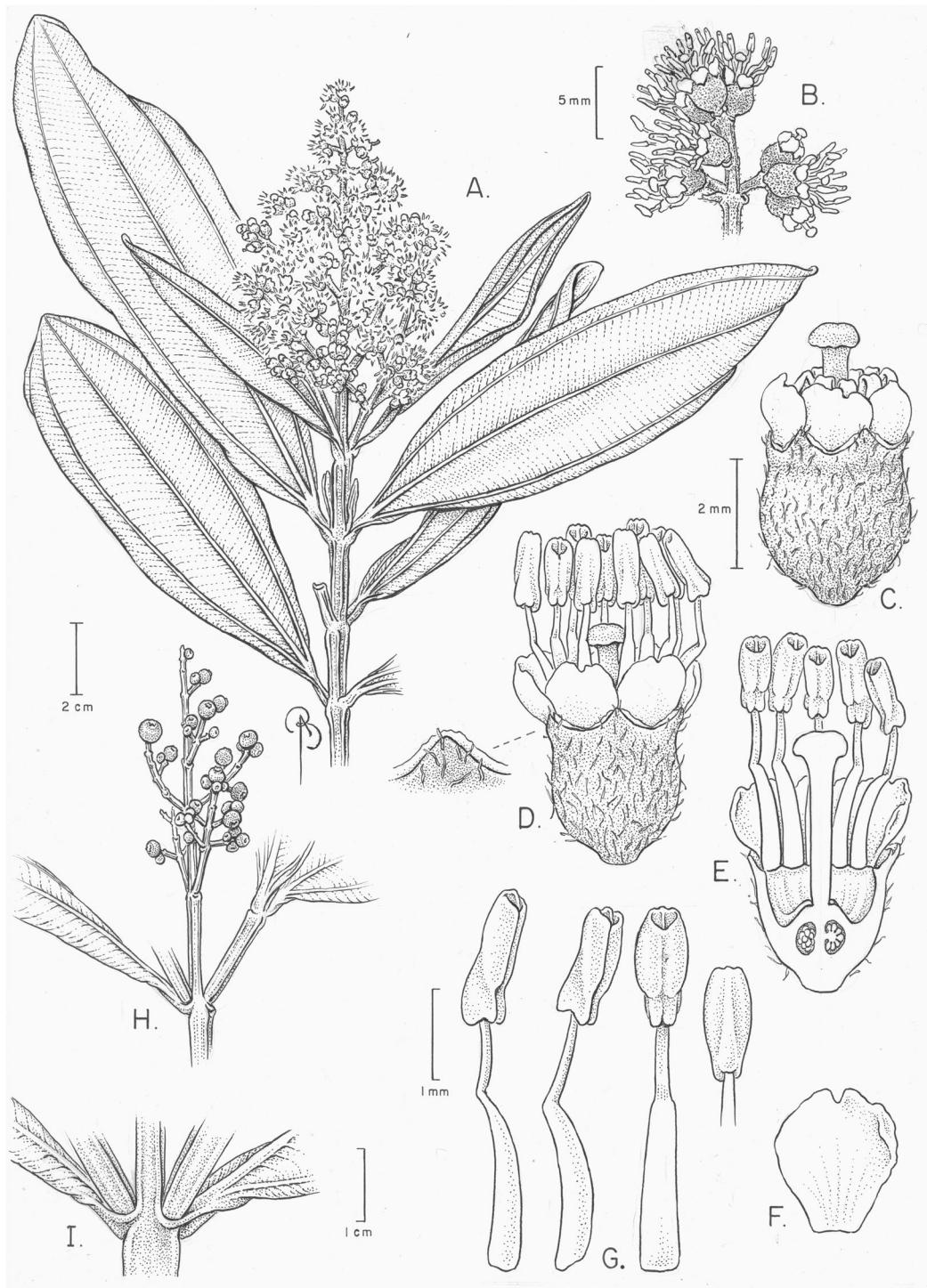


FIG. 2. *Miconia complanata*. A. Mature plant with inflorescence. B. Detail of inflorescence structure. C. Flower at anthesis with receptive stigma. D. Flower at anthesis with stamens exerted. E. Longitudinal section of flower. F. Petal. G. Stamens. H. Infructescence. I. Detail of vegetative node. (A-G drawn from the isotype, NY; H, I drawn from Penneys 1881, NY).

androecial fringe absent. Calyx open in bud, tube 0.3 mm long at anthesis, lobes  $0.5 \times 0.7$  mm, bluntly deltoid, glabrous, hyaline, margin erose; calyx teeth deltoid with an acuminate apex,  $0.5 \times 0.7$  mm, indumentum as on the hypanthium. Petals  $1 \times 1\text{--}1.25$  mm, ovate, spreading, white at anthesis (drying yellow), apex round, base attenuate, margin erose along the entire length. Stamens diplostemonous, slightly dimorphic, radially spreading, geniculate at anthesis; filament 1.7–2.2 mm long, glabrous, white, anthers with incompletely divided 4-locular thecae  $1\text{--}1.3 \times 0.5$  mm, oblong, opening by 2 truncate-apical 0.2 mm pores, white at anthesis, connective appendage present, 0.5 mm on antipodal anthers, bilobed ventral appendages and 1 pronounced dorsal appendage, glabrous. Ovary 3-locular, 2/3 inferior, the free portion projecting  $0.5 \times 1.1$  mm, conical, with ridges, indumentum of sparse, simple hairs; style 2.5–3 mm long, erect, reddish brown, glabrous; stigma peltate, 0.5 mm wide. Berries  $3.3\text{--}4 \times 3.8\text{--}4.2$  mm, spherical, red, indumentum persistent when mature, calyx persistent. Mature seeds not seen.

**Distribution.** — Humid montane forest, dwarf forest, 1900–2820 m in the provinces of Morona-Santiago and Zamora-Chinchipe, Ecuador and Amazonas, Peru (Fig. 3).

The San Francisco Scientific Station, where the type and several paratypes were collected, is located in an area with 98% natural vegetation, with the remaining 2% composed of open areas exposed by landslides due to the steepness of the terrain and the high amount of precipitation (Alvarado, 2000). The area where *Miconia complanata* has been collected is classified as Evergreen Andean Forests from the south of the Andean Eastern Cordillera (Santinana et al., 2012), with a humid to hyperhumid climate. The dominant families in these forests are Melastomataceae, Myrsinaceae, Cunoniaceae, Clusiaceae, Lauraceae, Myrtaceae, Celastraceae, Podocarpaceae and Ternstroemiaceae, including a highly diverse epiphyte flora (Madsen & Øllgaard, 1993; Bussmann, 2003). *Miconia complanata* grows along with *Graffenreida emarginata* (Ruiz & Pav.) Triana and *G. harlingii* Wurdack, two other Melastomataceae common in the area.

**Phenology.** — Flowering in August–September, fruiting year round.

**Etymology.** — The species epithet refers to the compressed appearance of the stems.

**Conservation status.** — The extent of occurrence (EOO) of *Miconia complanata* is just over

3500 km<sup>2</sup> (calculated with ArcGIS 10.4 © Esri 2016) but not the entire area is suitable for this species, as there is a wide variation in elevation and soil types, so the size of the potential habitat is much smaller and very fragmented. Even though some of the collections come from within a protected area, not all populations are inside reserves or parks. Following the IUCN guidelines (IUCN, 2012; IUCN Standards and Petitions Subcommittee, 2014), we recommend that this species be categorized as endangered using criteria B1a, b(iii).

**Additional specimens examined: ECUADOR:** Morona-Santiago: Cantón Gualaquiza, campamento Achupalla, Cordillera del Cóndor, 15 km E of Gualaquiza,  $03^{\circ}27'S$ ,  $78^{\circ}22'W$ , 2100 m, 23 Jul 1993 (fr), A. Gentry 80,364 (MO); San Juan Bosco, Cordillera del Cóndor, Centro Shuar Numpatkaim,  $3^{\circ}16'8"S$ ,  $78^{\circ}19'6"W$ , 2700–2820 m, 22 Jul 2005 (fr), T. Katan 423 et al. (QCNE), 22 Jul 2005 (fr), C. Morales 1330 & T. Embrey (QCNE). Zamora-Chinchipe: about 18 km from Loja on road to Zamora,  $03^{\circ}59.274S$ ,  $79^{\circ}06.566W$ , 2500 m, 24 Nov 2005 (fr), D. Penneys 1881 (NY); Zamora, Parroquia Sabanilla, a 30 km de Loja, Cuesta Occidental de la Cordillera del Consuelo,  $03^{\circ}58'S$ ,  $79^{\circ}04'W$ , 2000–2100 m, 22 Sep 2003 (fl), D. Fernández 1327 et al. (MO, QCNE); 9 Feb 2003 (fr), D. Fernández 1026 & J. Quesada (MO, QCNE); 18 Abr 2000 (fr), D. Fernández 240 (QCNE). Estación Científica San Francisco, km 35 vía Loja Zamora,  $03^{\circ}58'28.59S$ ,  $79^{\circ}04'23.44W$ , 1978–2350 m, 31 May 2010 (fr), C. Ulloa 1807 et al. (MO, NY), 12 Sep 2001 (fl), J. Homeier 968 (MO, QCNE); 3 Sep 2003 (fl), J. Homeier 1252 (QCNE); 1 May 1999 (fr), J. Homeier 90 (QCNE); 19 Sep 2008 (fl), J. Homeier 4080 (MO, QCNE); 25 Jan. 2009 (fr), J. Homeier 4169 & N. Cumbicus (MO, QCNE); 1 Oct 1997 (fr), R. Bussmann & S.L. s.n. Zamora, Parque Nacional Podocarpus, carretera Loja-Zamora, San Francisco, 2250 m, Jan 1995 (fr), W. Palacios 13,431 & M. Tirado (MO, QCNE). Parque Nacional Podocarpus, near El Tambo, 40 km NW of Zamora on road to Loja,  $03^{\circ}58' S$ ,  $79^{\circ}07' W$ , 2210 m, 13 Jul 1993, A. Gentry 79,919 (MO, QCNE); Footpath to Rio San Francisco (towards Parque Nacional Podocarpus) off new road Loja-Zamora, Km 23–24,  $3^{\circ}58'S$   $79^{\circ}05'W$ , 2100 m, 26 Sept 1996 (fl), B. Klitgaard 364 et al. (QCNE); San Francisco (Rd. Loja-Zamora, Km 23), Border of Parque Nacional Podocarpus,  $3^{\circ}59'S$   $79^{\circ}0'W$ , 1900 m, 15 Sep 2000 (fl), J. E. Madsen 7262 et al. (QCNE).

**PERU: Amazonas:** Prov. Códorcanqui, Cordillera del Cóndor, La cima del ‘tepui’ Cerro Machinaza, cabeceras del Río Cenepa, arriba de Puesto de Vigilancia Alfonso Ugarte, subiendo atrás y N del campamento,  $03^{\circ}52.7S$ ,  $78^{\circ}25.8W$ , 2150 m, 21 Jul 1994 (bud), H. Beltran 1153 & R. Foster (US, USM).

*Miconia complanata* can be recognized based on its strongly quadrangular stems, which are often alate and bifacially flattened, sessile leaves, and rufous pubescence throughout the plant. Two distinct populations of this species have been discovered, one from Parque Nacional Podocarpus in

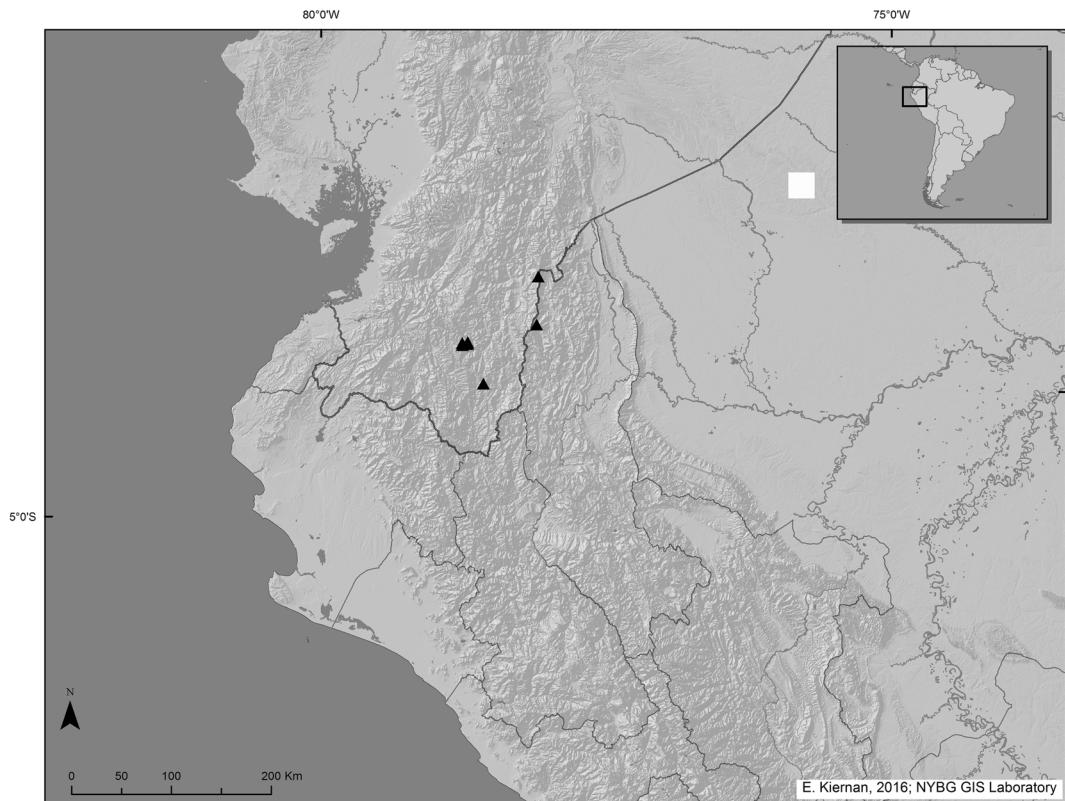


FIG. 3. Distribution of *Miconia complanata*.

Ecuador and one from the Cordillera del Cónedor, which straddles the border between Peru and Ecuador (Fig. 3). The Cordillera del Cónedor populations have stems that although quadrangular, are not as obviously winged. Additionally, the pubescence in the Cordillera del Cónedor population is sparser throughout.

Based on anther morphology and the presence of geniculate filaments, this species would be assigned to *Miconia* sect. *Cremanium* under Cogniaux's (1891, p. 156) sectional scheme. Within *M. sect. Cremanium*, *M. dissimilans* Wurdack, endemic to Ecuador, also has quadrate and slightly alate stems, but in this species the inflorescence is corymbiform, the hypanthium is glabrous and the anthers have a dorsal ascending appendage on the connective (vs. paniculate inflorescences, pubescent hypanthia and stamen connective lacking a dorsal tooth in *M. complanata*). Vegetatively, the species most similar to *M. complanata* is *M. glutinosa* Cogn. Both *M. complanata* and *M. glutinosa* have thick, coriaceous leaves and quadrangular and alate stems. However, *M. glutinosa*, which is endemic to Peru,

has wider, obovate leaves and a glutinous lower leaf surface. According to the protologue (Cogniaux, 1891) and Macbride (1941), the anthers of *M. glutinosa* have a narrow pore which would place it in *Miconia* sect. *Amblyarrhena* (Cogniaux, 1891). Unfortunately, these species have been rarely collected and these characters could not be confirmed.

At least 14 other species of *Miconia* have quadrangular and winged stems (Renner & Beck, 2003). These are found in a wide variety of environments and elevational ranges from Central America and the Antilles to Bolivia. These species belong to different sections of *Miconia* and are unlikely to be related (Goldenberg et al., 2008). Therefore, this character is an obvious convergence and must be related to the ecology of these species.

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