A New *Miconia* (Melastomataceae) from Bolivia, with Remarks on Angular-branched Species in the Andes

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ABSTRACT. A new species of Melastomataceae from Bolivia is described, illustrated, and placed in a phenetic context within *Miconia*, a genus of 1000 species and about 2000 published names. *Miconia quadrialata* is readily distinguished from its congeners by two-colored leaves and sharply four-angular and winged branchlets. A search for quadrangular-branched miconias revealed that 12 of 15 such species (in four sections), including the new species, occur in cloud forest in the Andes, raising the question of the adaptive significance of quadrangular branchlets.

Key words: adaptive significance, Andes, angular branches, Bolivia, Melastomataceae, *Miconia*, montane forest.

In the context of an ongoing floristic project at the Missouri Botanical Garden, the first author visited the Bolivian National Herbarium in La Paz (LPB) and the National Herbarium in Washington (US), which together contain the most complete collections of Bolivian and Neotropical Melastomataceae. These visits, and an excursion in the La Paz area, brought to light material of a new species of *Miconia* Ruiz & Pavón. *Miconia* is among the largest genera of flowering plants, with 1000 species in the best-curated collection (US) and some 2000 published names. In addition, *Miconia* is unlikely to be monophyletic (Michelangeli, 2002), and several medium-sized genera, such as *Clidemia* D. Don, *Leandra* Raddi, *Ossaea* DC., and *Tococa* Aublet, may have arisen from within it. The entire genus is unlikely to ever be revised, and over the past 100 years, it has gradually become a black hole in which species are described never to be found again. The new species described here can only be placed in a phenotypic and geographic context. It is known from seven collections, all made within a few hours by car from La Paz, the first by Alwyn Gentry and colleagues 18 years ago. Over the past 11 years, the second author collected fertile material in various stages and has sought to determine the species' ecological amplitude. The two-colored leaves and sharply four-winged branches (see color photo at http://www.umsl.edu/~biosrenn/ under Melastomataceae: Taxonomy) of *M. quadrialata* are highly distinct, and after searching through type collections, photos, and protologues at US, we feel confident that it has not already been named.

Miconia quadrialata Renner & Beck, sp. nov. TYPE: Bolivia. La Paz: Prov. Nor Yungas, Chuspipata, hacia ex Estación Ferrocarril, Campamento Andrade, 16°18′S, 67°48′W, 3010 m, 21 Oct. 2001, *S. G. Beck 25988* (holotype, LPB; isotypes, AAU, CAS, MO, US). Figure 1.

Distinctissima foliis coriaceis discoloribus subtus albis vel stramineis ramisque quadrangularibus.

Shrub or treelet, to 7 m tall; young branchlets sharply quadrangular, sometimes subsulcate, winged, the wings 1–2 mm wide; branchlets, inflorescences, and hypanthia glabrous. Leaf blades 11.5–15 × 6–7 cm, 3-nerved, elliptic, the apex shortly acuminate, rarely obtuse, the base acute or obtuse, rigid chartaceous, above glabrous, below covered by an appressed tan to white cobwebby minute dentritic-stellulate pubescence, the margin often drying slightly revolute; petioles (0.5)1–2 cm long. Panicle 8–13 cm long, with decussate branchlets. Floral hypanthium 3.5–4 mm long, the calyx lobes 1 mm long, persistent long after anthesis; petals 5, white, about 2 mm long and 1.5 mm broad, their apex emarginate; stamens isomorphic, white; the anthers 1.6–2 mm long, truncate and bi-porate, the connective simple, not lobed or appendaged. Berries subglobose, mature blue, dry 5–6 mm diam.

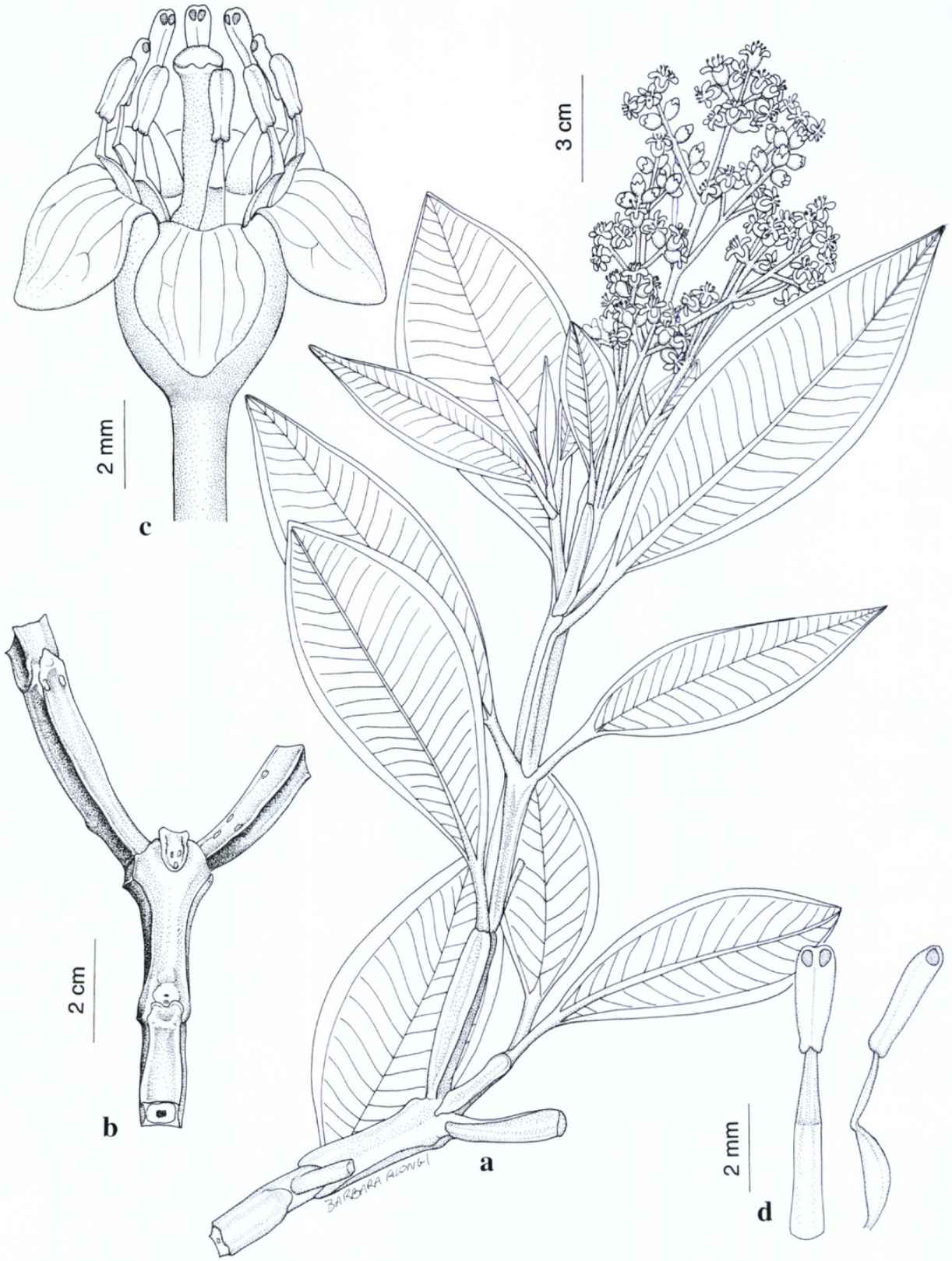

Figure 1. *Miconia quadrialata* Renner & Beck, drawn from *Beck & Renner 25967* and *Beck 25988* (MO). —a. Habit. —b. Branchlet. —c. Flower. —d. Stamens.

Distribution, habitat, and phenology. *Miconia quadrialata* is only known from the Nor Yungas in Bolivia, where it occurs in cloud forests at 2500–3100 m alt. with species of *Freziera* Willdenow (Ternstroemiaceae), *Weinmannia* L. (Cunoniaceae), *Hedyosmum* Swartz (Chloranthaceae), as well as many Eriaceae and other Melastomataceae. Most collections so far come from rocky outcrops. *Mi-*

conia quadrialata flowers between mid August and November, and fruits from January to May. The Yungas formation is restricted to west-central Bolivia and extreme southeastern Peru and is characterized by constant high humidity from water droplets and rain deposited by northern trade winds (Beck et al., 1993).

Etymology. The epithet alludes to the species' 4-angular and winged branchlets.

Miconia quadrialata is unique in combining whitish or tan lower leaf surfaces with sharply quadrangular branchlets that have 1–2 mm wide wings. In leaf shape and venation, it resembles the Peruvian *M. floccosa* Cogniaux, but that species has obtusely quadrate branches that are densely covered with a felt-like stellate tomentum, which also covers the lower leaf surfaces. Thorough searches in MO and US revealed that 14 other species of *Miconia* have strongly quadrangular (sometimes in addition winged or sulcate) stems, but that none at the same time have bi-colored leaves. The geographic and altitudinal ranges of the 14 quadrangular-branched species (given below) suggest that this character may be particularly common in montane forests, although four of the species also occur below 500 m. An intriguing question is what may select for the evolution of angular and winged branches, and if as many instances of parallel evolution are involved as suggested by the current assignment of these species to 4 of the 11 sections of *Miconia* (Cogniaux, 1891). A possible adaptive value (T. Feild, pers. comm., May 2002) is that the square internodes relate to how branchlets break during trauma. Many Chloranthaceae in similar habitats also have square stems coupled with septate-modular branchlets, such that they break in predictable ways when traumatized by falling canopy debris. (The 14 quadrangular-branched species of *Miconia* so far known are *M. alata* DC. from 50 to 1000 m alt. in Venezuelan Amazonia and adjacent Brazil; *M. aligera* Wurdack from cloud forest at 2080 m in the department of Cuzco, Peru; *M. dissimulans* Wurdack from cloud forest at 2700–3350 m in southern Ecuador; *M. flaccida* Gleason from 1200 to 1900 m in Huánuco and Pasco, Peru; *M. floccosa* Cogniaux from 2500 to 3000 m in Pasco; *M. glutinosa* Cogniaux from 2400 m in Puno, Peru; *M. incachacana* Wurdack from 2200 m in Cochabamba, Bolivia; *M. monzoniensis* Cogniaux from 2400 m in Huánuco [this includes *M. pterogona* Gleason]; *M. pterocaulon* Triana from 120 to 950 m in Costa Rica, Venezuela, Colombia, Ecuador, and Peru; *M. quadrangularis* (Swartz) Naudin from 500 to 2300 m in Jamaica; *M. reducens* Triana from 50 to 1500 m in Nicaragua southeast to Ecuador and Venezuela; *M. robinsoniana* Cogniaux from 400 to 500 m elevation on the Galapagos islands but also occurring at 2500–3000 m in Panama; *M. subnodosa* Triana from 150 to 1700 m in Colombia, Ecuador, and Bolivia; and *M. sulcata* Macbride from around 2000 m in Junín, Peru. At least three of the listed species, *Miconia reducens*, *M. robinsoniana*, and *M. subnodosa*, are part of a messy species complex that also includes *M. aponeura* Triana from 1400 m in central Colombia, with winged internodes [F. Almeda, pers. comm.]. Sharply two-winged branchlets are known from *M. micayana* Wurdack [= *Amphitoma flavescens* Gleason], occurring from 1800 to 2300 m in Cauca, Colombia, and from *M. paradoxa* Triana, occurring from 500 to 1000 m Minas Gerais, Brazil.)

Paratypes. BOLIVIA. **La Paz:** Nor Yungas, near Chuspipata, 2800 m, 13 Jan. 1984, *Gentry et al. 44195* (LPB, MO, US); 22.5 km above Yolosa towards Chuspipata, 2560 m, 27 Feb. 1990, *Beck 14995* (LPB, US); past Unduavi, Cotapata, 1 hr. along downhill trail, 3100 m, 29 May 1994, *Beck 21386* (LPB, US); past Unduavi, Cotapata, 3000 m, 11 Sep. 1994, *Beck 21457* (LPB, M, MO, NY, QCA US); between Cotapata and Chuspipata, 3000 m, 2 Nov. 1996, *Beck 22775* (LPB, US), Cotapata, 3000 m, 5 Aug. 2001, *Beck & Renner 25967* (LPB, MO).

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Literature Cited

Beck, S. G., T. J. Killeen & E. García E. 1993. Vegetación de Bolivia. Pp. 6–25 *in* T. J. Killeen, S. G. Beck & E. García E. (editors), Guía de Arboles de Bolivia. Herbario Nacional de Bolivia, La Paz, and Missouri Botanical Garden, St. Louis.

Cogniaux, A. 1891. Melastomaceae. *In* A. & C. de Candolle, Monographie phanerogamarum 7: 1–1256.

Michelangeli, F. A. 2002. Phylogenetic relationships in the Miconieae: Evidence from morphological and ITS sequence data. 2002 AIBS meetings, abstract published online at http://www.botany2002.org/.