



## Three new species of *Monochaetum* (Melastomataceae) from Colombia

MARCELA ALVEAR<sup>1</sup> & FRANK ALMEDA<sup>1</sup>

<sup>1</sup> 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: [malvear@calacademy.org](mailto:malvear@calacademy.org); [falmeda@calacademy.org](mailto:falmeda@calacademy.org)

### Abstract

Three new species of *Monochaetum* (Melastomataceae: Melastomeae) are described from Colombia. *Monochaetum carbonoi*, known only from the Sierra Nevada de Santa Marta, is characterized by its overall pubescence of smooth and unbranched trichomes, prominent flap-like scars on the inflorescence nodes, calyx lobes that are deciduous after anthesis, glabrous hypanthia, dimorphic stamens, and sessile, oblong-ovate bracteoles. *Monochaetum longicaudatum*, known from only one population on the eastern flank of the Sierra Nevada de Santa Marta, and one population in the Central Cordillera of the Andes (Nevado del Ruíz and Santa Isabel area), is characterized by its dense and congested inflorescences, abaxial foliar surface with dense, long and divergent trichomes, ovate to ovate-elliptical petals with a broadly acute apex, deciduous calyx lobes, long filaments and appendages on the antesealous stamens, and its long setulose style. *Monochaetum perijensis*, known only from the Serranía de Perijá in the northern Cordillera Oriental of the Andes, is characterized by leaves that are basally nerved, glabrous hypanthia, ciliate petals, and persistent calyx lobes that are oblong and acute apically. Each species is illustrated, compared with presumed relatives, and provided with a conservation assessment using IUCN guidelines.

### Resumen

Se describen tres nuevas especies de *Monochaetum* (Melastomataceae: Melastomeae) de Colombia. *Monochaetum carbonoi*, conocida sólo de la Sierra Nevada de Santa Marta, se caracteriza por su pubescencia general de tricomas lisos no ramificados, cicatrices en forma de proyecciones prominentes en los nudos de la inflorescencia, lóbulos del cáliz deciduos después de la antesis, hipantio glabro, estambres dimórficos, y bractéolas sésiles, oblongo-ovadas. *Monochaetum longicaudatum*, conocida de una población en el flanco oriental de la Sierra Nevada de Santa Marta, y otra población en la Cordillera Central de los Andes (área del Nevado del Ruíz y Santa Isabel), se caracteriza por sus inflorescencias densas y congestionadas, superficie foliar abaxial con indumento denso de tricomas largos y divergentes, pétalos ovados a ovado-elípticos con el ápice ampliamente agudo, lóbulos del cáliz deciduos, estambres del verticilo antesepalar con filamentos y apéndices largos, y el estilo largo y setuloso. *Monochaetum perijensis*, conocida sólo de la Serranía de Perijá, en el Norte de la Cordillera Oriental de los Andes, se caracteriza por las hojas basalmente nervadas, hipantio glabro, pétalos ciliados, y lóbulos del cáliz persistentes, oblongos y con el ápice agudo. Para cada especie se incluye la ilustración, comparación con las presuntas especies cercanas, y una evaluación del estado de conservación con base en los criterios de la UICN.

### Introduction

*Monochaetum* (Candolle 1828: 138) Naudin (1845: 48–49), a neotropical genus of shrubs and subshrubs with about 52 species, is restricted to montane habitats from Mexico and Central America to the South American Andes of Colombia, Venezuela, Ecuador and Peru with one species reaching the Guayana Highlands of Venezuela and Guyana (Almeda 1978, 2009, Alvear & Almeda 2009, Alvear 2010). Based on the forthcoming tribal classification of Melastomataceae (Penneys *et al.* 2010, Penneys *et al.* unpublished data) as well as studies on the New World Melastomeae (Michelangeli *et al.* 2013) that employs multi-gene phylogenetic analyses it is clear that *Monochaetum* is monophyletic and it is placed within the new world Melastomeae (Tibouchineae). *Castratella*

(Naudin 1850: 110), *Chaetolepis* (Candolle 1828: 138) Miquel (1840: 72) and *Bucquetia* (Candolle 1828: 138), three other largely montane neotropical genera, are the closest relatives of *Monochaetum* based on morphological and molecular data (Renner & Meyer 2001, Fritsch *et al.* 2004, Alvear & Almeda 2009, Michelangeli *et al.* 2013, Grimm & Almeda 2013). *Monochaetum* is characterized by its 4-merous flowers, prevailing dimorphic stamens with dorsally appendiculate anthers, capsular fruits that are free from the hypanthium, and cochleate seeds (Almeda 1978, 2009). A remarkable character of *Monochaetum* among Melastomataceae with dimorphic stamens is that the antepetalous whorl is larger than the antesealous whorl. This character is shared only by *Miconia dissitiflora* Almeda (Almeda 2009), an unusual species of the tribe Miconieae, and the old world genus *Dissochaeta* (Renner 1993).

Within the neotropics, Colombia stands out as a major center of diversity for the Melastomataceae, with over 960 species in 58 genera (Almeda *et al.* submitted, Mendoza-C. & Ramírez 2006). The northern Andes are also a notable center of diversity for *Monochaetum*: over half of the described species are endemic to Andean Colombia and Venezuela (27 species) (Almeda 1978, Almeda *et al.* submitted, Alvear 2010).

The species of *Monochaetum* described here were discovered in the course of studying a large set of collections assembled for the graduate thesis of the first author. This was complemented by recent field studies conducted by the authors in connection with two research projects: “The genus *Monochaetum* in Colombia” and the “Miconieae Planetary Biodiversity Inventory” (<http://sweetgum.nybg.org/melastomataceae/>).

The Sierra Nevada de Santa Marta, the highest coastal mountain system in the world (5775 m), and the Serranía de Perijá (3750 m), have long been recognized for their high levels of biological endemism but no exhaustive inventory of the flora exists for either area and they remain little-explored and inadequately collected (Wurdack 1976, Carbonó & Lozano-Contreras 1997, Rangel-Ch. & Garzón-C. 1997, Rivera-Díaz & Fernández-Alonso 2003, Rivera-Díaz 2007). In addition to the species described here, the following 14 species of Melastomataceae appear to be endemic to the Sierra Nevada de Santa Marta: *Blakea schultzei* Markgraf (1929: 770), *Chaetolepis loricarella* (Triana 1871: 51), *Chaetolepis santamartensis* (Wurdack 1962: 165), *Huilaea kirkbridei* (Wurdack 1976: 141), *Kirkbridea pentamera* (Wurdack 1976: 143), *Kirkbridea tetramera* (Wurdack 1976: 141), *Miconia insueta* (Wurdack 1976: 139), *Miconia oreogena* (Wurdack 1976: 139), *Miconia smithii* Cogn. ex Gleason (1925b: 383), *Miconia tricaudata* (Wurdack 1976: 140), *Monochaetum laxifolium* (Gleason 1929: 121), *Monochaetum magdalenense* (Wurdack 1971a: 117), *Monochaetum rotundifolium* Cogn. ex Gleason (1925a: 333), *Monochaetum uberrimum* (Sandwith 1941 [1942]: 222) (Wurdack 1976, Carbonó & Lozano-Contreras 1997, Almeda *et al.* submitted). The Serranía de Perijá represents the northernmost extent of the Cordillera Oriental of the Andes. It straddles the Colombia-Venezuela border and like the Sierra Nevada de Santa Marta to the north, it is another hotspot for endemic species. Including the species described here, there are six endemic taxa of Melastomataceae currently known from the region: *Chaetolepis perijensis* var. *perijensis* (Wurdack 1962: 166), *Chaetolepis perijensis* var. *glandulosa* (Wurdack 1978a: 1), *Miconia berryi* (Wurdack 1978b: 158), *Miconia limitaris* (Wurdack 1978b: 155), and *Miconia perijensis* (Wurdack 1978b: 157) (Rivera-Díaz & Fernández-Alonso 2003).

### ***Monochaetum carbonoi* Alvear & Almeda, sp. nov. (Fig. 1)**

*Monochaetum carbonoi* is distinguished by its overall pubescence of smooth unbranched trichomes, prominent flap-like scars on the inflorescence nodes, deciduous calyx lobes after anthesis, glabrous hypanthia, dimorphic stamens, and oblong-ovate, sessile bracteoles.

Type:—COLOMBIA. Magdalena: Santa Marta. Camino a Nuavaca, Río Palomino, 3300 m, 10°52'10" N, 73°38'40" W, 12 February 2010 (fl & fr), E. Carbonó & D. Escribano 5094 (holotype: UTMCI; isotypes: COL! –2 sheets).

Shrub 2 m tall with exfoliating bark. Internodes terete to subquadrangular, distal internodes 0.5–3 cm long, moderately strigose, older branches glabrescent, the trichomes 0.4–1 mm long, eglandular, mostly flexuous-smooth, and frequently with a somewhat papillose base. Cauline nodes densely setose with antrorsely hirsute to divaricate trichomes 0.6–2 mm long that are eglandular and flexuous-smooth. Leaves opposite and isophyllous, petiole 4–8 mm long, semiterete, abaxially concave and adaxially channeled to flattened upwards, with the same vestiture as the internodes. Blades 18–35 × 10–20 mm, subcoriaceous, elliptic, the margin revolute and ciliate with the same trichomes as the surface, the apex acute, the base obtuse, 5–7-plinerved, with the innermost pair of

secondary veins joining at a point up to 4 mm from the base of the leaf, primary and secondary veins elevated abaxially and impressed adaxially, tertiary and further veins clearly visible abaxially. Adaxial leaf surface green, vestiture between secondary veins moderately strigose, the pubescence homogeneous throughout the blade with eglandular, flexuous-smooth, unbranched trichomes, and frequently with a somewhat papillose base, 0.4–0.7 mm long, vestiture on primary and secondary veins glabrous, forming glabrous strips of 0.5–1.3 mm. Abaxial leaf surface light green, vestiture between secondary veins sparsely strigose, with flexuous-smooth, unbranched trichomes, 0.3–0.6 mm long, vestiture on primary and secondary veins moderately strigose, with flexuous-smooth, unbranched trichomes and frequently with a somewhat papillose base, 0.8–1.3 mm long. *Inflorescence* 7–15 cm long, terminal, paniculate-thyrsoid, highly branched, floriferous shoots with twice-to thrice-compound dichasia, branches reddish, with prominent flap-like scars 0.3–1 mm thick, peduncles and floriferous branches glabrous. Lowermost floral bracts 25–30 × 1218 mm, petiole 4–6 mm long, similar to the principal leaves in shape, vestiture and color, 5-plinerved. Bracteoles 2–3 × 1–2 mm, reddish, sessile with a truncate base, oblong-ovate, with a broadly acute to obtuse apex, apically irregularly ciliate, glabrous otherwise, 1-nerved. *Flowers* 4-merous, on pedicels 5–6 mm long, glabrous. *Hypanthium* (at anthesis) 4.5–5.5 × 2.3–3 mm, campanulate to suburceolate, reddish, glabrous. *Calyx* lobes 3–4 × 2.3–3.2 mm, deciduous, shorter than the hypanthium, purplish-red, broadly ovate, ciliate, apex broadly acute to obtuse, sometimes shortly acuminate, glabrous on both surfaces, calyx tube obsolete, calyx lobes sinus glabrous. *Petals* 9–11 × 7–8.5 mm, obovate, magenta to dark pink, entire. *Stamens* 8, dimorphic and fertile. Antepetalous stamens: filaments 5–5.5 mm long, pink, pedoconnective 0.4–0.6 mm long, anthers 5.2–6 × 0.7–0.85 mm, yellow, subulate, incurved and geniculate, pore 0.3–0.4 mm in diameter, dorsally inclined; appendages 2.8–3 0.5–0.65 mm, yellow, distally falcate, strongly incurved towards the anther, basally terete, medially to apically expanded, papillose. Antesepalous stamens: filaments 4.5–5 mm long, pink, anthers 2.9–3.3 × 0.4–0.5 mm, yellow, subulate, erect, pore 0.25–0.3 mm in diameter, dorsally inclined; appendages 1.8–2 × 0.5 mm, yellow, fusiform-elliptic, flattened, papillose, upturned. *Ovary* apex densely setose with stout-smooth trichomes 0.2–0.8 mm long. Style 8.5–10 mm long. *Seeds* 0.6–0.7 × 0.3–0.4 mm, light brown to orange-brown, cochleate, surface minutely foveolate and shiny.

**Common names:**—According to indigenous people living in the area where the type was collected, this species belongs to the family of plants locally called “Taylli”.

**Phenology:**—The species has been collected in flower and fruit in early February.

**Habitat and distribution:**—Endemic to Colombia where it is known only from the type locality in the Sierra Nevada de Santa Marta, an isolated massif in the northwest of Colombia. This species grows at elevations around 3300 m.

**Conservation status:**—This species is known only from the type locality in the Sierra Nevada de Santa Marta. This area is located within the Sierra Nevada de Santa Marta National Park which has an area of 3830 km<sup>2</sup> and an elevational gradient from sea level up to 5775 m (Parques Nacionales Naturales de Colombia 2013). Based on IUCN guidelines and criteria (IUCN 2001, 2011) and our current knowledge of the distribution, this species is assigned a provisional IUCN conservation status of Endangered (EN).

**Etymology:**—We dedicate this new species to Professor Eduino Carbonó, Director of the Herbarium at the Universidad del Magdalena, notable Colombian botanist, and collector of the type specimen. We salute him for his important contributions to knowledge of the Colombian flora with an emphasis on the Sierra Nevada de Santa Marta.

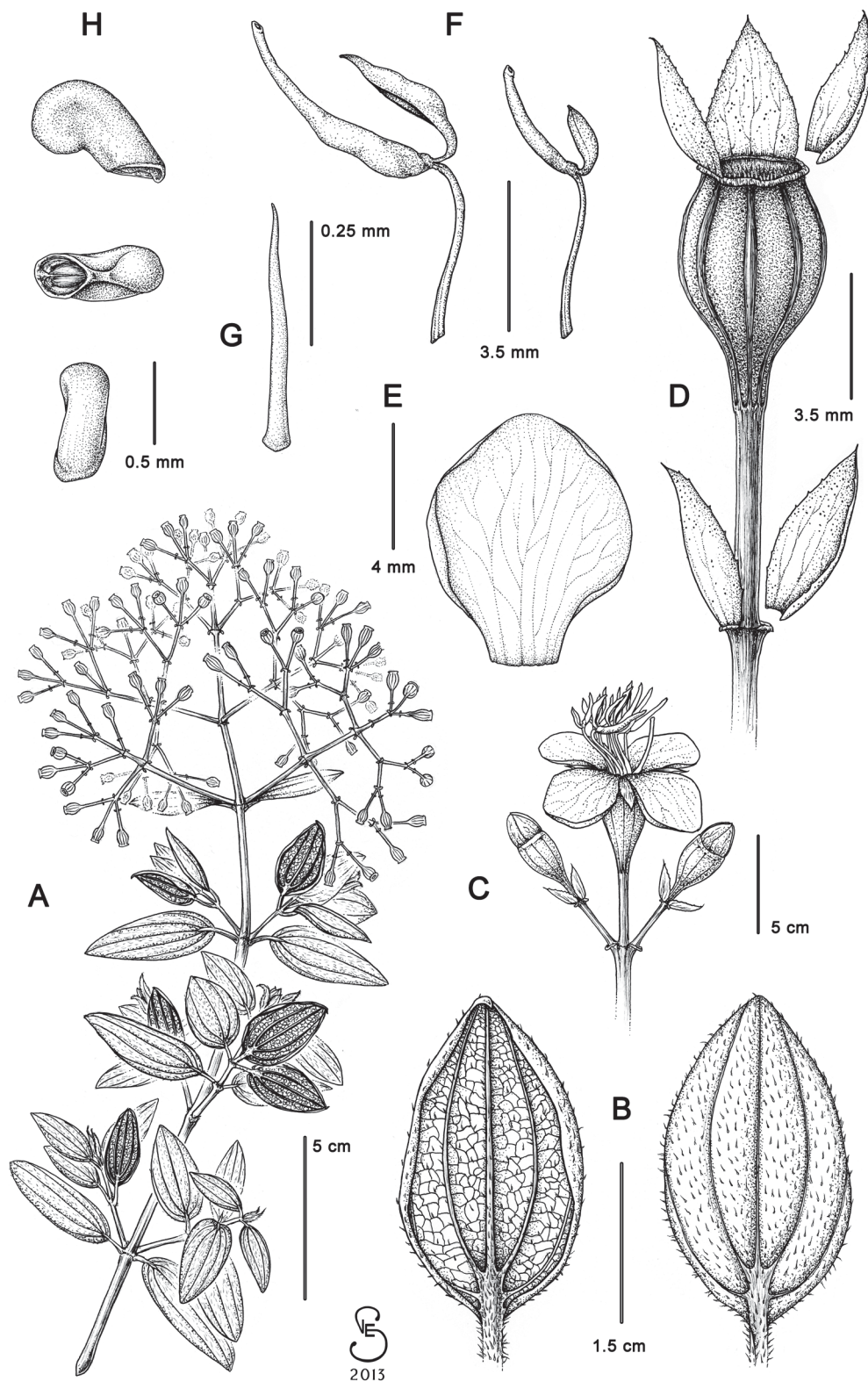
**Additional specimens examined:**—None.

**Discussion:**—*Monochaetum carbonoi* is distinguished by its overall pubescence of smooth and unbranched trichomes, prominent flap-like scars persisting once the bracts and bracteoles have fallen away on all nodes of the inflorescence, oblong-ovate sessile bracteoles, deciduous calyx lobes after anthesis, glabrous hypanthia, and dimorphic stamens with one set (the antesepalous whorl) smaller but not staminodial.

Other Sierra Nevada de Santa Marta species with deciduous calyx lobes after anthesis include *Monochaetum magdalenense* and *M. uberrimum*. They differ in having larger leaves and flowers, different overall indumentum, apiculate flower buds, and having one set of stamens that are staminodial. *Monochaetum laxifolium*, another species endemic to the Sierra Nevada de Santa Marta with deciduous calyx lobes, differs by its sprawling habit with divaricate branching, simple to once-compound dichasial inflorescences, eciliate calyx lobes, and isomorphic stamens.

The little material of this new species that was available for study reinforces the need for additional exploration of the isolated and biodiverse massif where it grows.





**FIGURE 1.** *Monochaetum carbonoi*. **A.** Fruiting branch. **B.** Leaf, abaxial surface (left) and adaxial surface (right). **C.** Simple dichasium, flower and bud detail. **D.** Fruiting hypanthium, calyx lobes and bracteoles. **E.** Petal. **F.** Stamens in profile view, antepetalous (left), antesepalous (right). **G.** Enlargement of foliar and cauline flexuous smooth trichome. **H.** Seed in profile, ventral and dorsal views (from *E. Carbonó & D. Escribano 5094*, COL., UTM).

*Monochaetum longicaudatum* Alvear & Almeda, *sp. nov.* (Fig. 2)

A species similar to *Monochaetum lindenianum* (Naudin 1850: 158), differing by its denser and more congested inflorescences, abaxial foliar surface with denser, longer and divergent trichomes, ovate to ovate-elliptic petals with a broadly acute apex, longer filaments (9.5–10.3 mm long) and appendages (8–9 mm long) on the antesealous stamens, and longer style (11–12 mm long), that is antrorsely hirsute (trichomes 0.7–1 mm long) on the basal to medial portion.

Type:—COLOMBIA. (Guajira): Sierra de Santa Marta: Surivaquito, in open páramo, 9000 ft (2743 m), 22 April 1939 (fl), *J. Hanbury-Tracy 342* (holotype: US!; isotype: K)

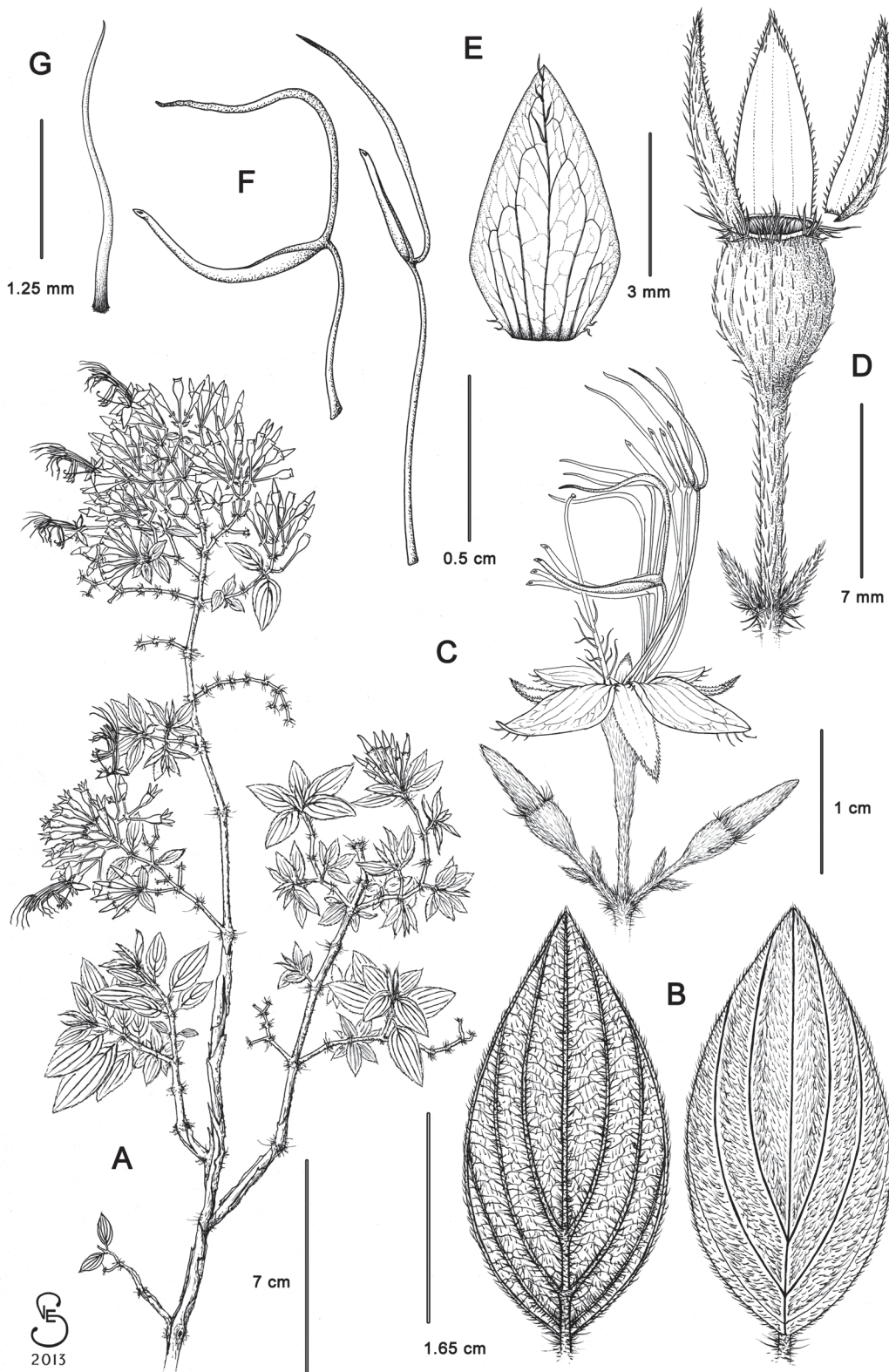
Shrub up to 3 m tall with exfoliating bark. Young internodes quadrangular, some branches with two opposite faces that are sulcate and carinate, distal internodes 0.6–1.5 cm long, densely villous with spreading or sometimes antrorsely hirsute trichomes; the trichomes 1–2 mm long, eglandular, flexuous-smooth, the pubescence usually rufescent, the older branches are glabrescent. Cauline nodes somewhat swollen and frequently with an interpetiolar ridge (usually obscured by the pubescence), densely villous with antrorsely hirsute to divaricate trichomes 2.5–4.5 mm long, eglandular, flexuous-smooth and stout-smooth, frequently with somewhat papillose base. *Leaves* opposite and isophyllous, petiole 2–3 mm long, abaxially concave and adaxially channeled, with vestiture identical to the internodes. Blades 1.6–3.5 × 1–1.8 cm, membranous-firm, ovate-elliptic to elliptic, margin entire and ciliate with trichomes like those of surface, apex acute, base obtuse to rounded, (5-)7-plinerved, with the innermost pair of secondary veins joining at a point up to 6 mm from the base of the leaf, primary and secondary veins elevated abaxially and impressed adaxially, tertiary veins percurrent and clearly visible abaxially. Adaxial foliar surface green, drying brown or dark green, with light brown pubescence, vestiture between primary and secondary veins densely antrorsely strigose, in 6–8 well-defined longitudinal belts between the veins, with flexuous-smooth basally papillose trichomes 0.8–1.4 mm long; vestiture on primary veins forming glabrous strips along the veins 0.3–0.5 mm wide, some leaves sparsely antrorsely hirsute at the junction of the main veins at the base of the leaves with trichomes like those on the surface, frequently with a few sparse orange short-stalked glandular trichomes less than 0.2 m long on the central veins. Abaxial foliar surface light green, vestiture between primary and secondary veins antrorsely hirsute with flexuous-smooth trichomes 0.6–1 mm long, vestiture on primary and secondary veins densely villous with trichomes 1–2 mm long, similar to those on the surface but ascending to divergent and longer. *Inflorescence* terminal and terminal on lateral branches, a dense and congested compound dichasium up to 6 cm long, peduncles and floriferous branches with vestiture similar to the internodes but becoming more ascending. Lowermost floral bracts 1.8–2.8 × 0.8–1.3 cm, petiole 2–4 mm long, similar to the principal leaves in shape, vestiture and color, 5–7-plinerved. Bracteoles 2–3.5 × 0.6–1 mm, sessile, oblong-lanceolate, frequently navicular, with an acute apex, ciliate, abaxially glabrous, adaxially densely strigose with flexuous-smooth trichomes, 1-nerved. *Flowers* 4-merous, on pedicels 6–8 mm long, antrorsely hirsute. *Hypanthium* (at anthesis) 4.5–5.5 × 2.4–2.8 mm, turbinate to campanulate, reddish, moderately to densely strigose, with flexuous-smooth trichomes 0.8–1.6 mm long. *Calyx* lobes deciduous, longer than the hypanthium, 6.5–7.5 × 1.8–2.2 mm, reddish, lance-triangular, ciliate, apex acuminate, adaxially glabrous, abaxially strigose with trichomes similar to the ones on the hypanthia, calyx lobes sinus surface with 2–3 longer and thicker flexuous-smooth trichomes up to 2 mm long, that commonly have a papillose base. *Petals* 5.5–6 × 3.2–3.5 mm, ovate to ovate-elliptic, pink to magenta, entire, sometimes with a seta 0.5–0.8 mm long near the apex. *Stamens* 8, dimorphic and fertile. Antepetalous stamens: filaments 7–8 mm long, pink, anthers 8.3–9 × 1–1.2 mm, yellow?, subulate, geniculate and strongly curved, pore 0.5–0.65 mm in diameter, dorsally inclined; appendages 8.5–9 × 0.7 mm, yellow?, narrowly falcate, basally terete, apically lanceolate and curly in dry specimens, upturned but strongly incurved towards the anther. Antesealous stamens: filaments 9.5–10.3 mm long, pink, anthers 4.5–6.5 × 0.6–0.7 mm, yellow?, subulate, erect, pore 0.3–0.4 mm in diameter, dorsally inclined; appendages 8–9 × 0.3–0.4 mm, yellow?, ensiform, upturned, papillose, long and curly in dry specimens. *Ovary* upper half and apex densely appressed setose with elongate smooth trichomes 0.7–2 mm long. Style 11–13 mm long, pink, basally to medially pubescent, antrorsely hirsute with elongate smooth trichomes 0.7–1.8 mm long. *Seeds* 0.5–0.7 × 0.4 mm, light brown to orange-brown, cochleate, surface minutely muriculate and shiny.

**Phenology:**—The species has been collected in flower in January, March, April, July and October, and in fruit in March.

**Habitat and distribution:**—Endemic to Colombia where it is known from five collections. Four collections are from the eastern flank of the Sierra Nevada de Santa Marta at elevations between 2000 and 3000 m and one



other collection from a disjunct population in the Central Andes at high elevations (4140–4250) on the Nevado del Ruíz and Santa Isabel (Caldas). This species grows in Andean forest, high-Andean forest and páramo; the population from Caldas reportedly grows in a high-Andean forest dominated by *Polylepis* (Ruiz & Pavón 1794: 80), one of the highest naturally occurring genera of angiosperm trees in the world (Simpson 1979).



**FIGURE 2.** *Monochaetum longicaudatum*. **A.** Flowering and fruiting branch. **B.** Leaf, abaxial surface (left) and adaxial surface (right). **C.** Simple dichasium, flower and bud detail. **D.** Fruiting hypanthium, calyx lobes and bracteoles. **E.** Petal. **F.** Stamens in profile view, antepetalous (left), antesepalous (right). **G.** Enlargement of foliar and cauline flexuous smooth trichome (A from *E. Carbonó* 3663, UTM & *J. Hanbury-Tracy* 342, US; B, F–G from *O. Rangel et al.* 1859-A, NY; C–E from *J. Hanbury-Tracy* 342, US).

**Etymology:**—The name of this new species refers to the uniqueness of its very long appendages on the antesealous stamens.

**Conservation status:**—This species is known only from two locations. One of them is situated within the Sierra Nevada de Santa Marta National Park which has an area of 3830 km<sup>2</sup> and an elevational gradient from sea level up to 5775 m (Parques Nacionales Naturales de Colombia 2013). In that region this species is only known to grow above 2000 m. The other location is within the Los Nevados National Park which has an area of 583 km<sup>2</sup> and an elevational gradient between 2600–5321 m (Parques Nacionales Naturales de Colombia 2013). At that locality this species is only known to grow above 4140 m. Based on IUCN guidelines and criteria (IUCN 2001, 2011) and our current knowledge of the distribution, this species is assigned a provisional IUCN conservation status of Endangered (EN).

**Additional specimens examined (paratypes):**—COLOMBIA. Caldas: Cordillera Central, alrededores del Nevado del Ruíz y Sta. Isabel, 4140–4250 m, 11 Octubre 1978, *O. Rangel et al. 1859-A* (COL!, NY!). Cesar: Valledupar, Laguna Naboba - Nabusimake, hacia Nabusimake, 2000 m, 15 January 1998, *E. Carbonó 3663* (UTMC!); Valledupar, corregimiento Pueblo Bello, 1200–2000 m, 13 Julio 1983, *H. Cuadros 1694-B* (COL!, US!). Magdalena: San Sebastián de Rábago, 4 Marzo 1948, *R. Romero-Castañeda 848* (COL!, US!, UTMC!).

**Discussion:**—*Monochaetum longicaudatum* is similar in appearance to *M. lindenianum* (Naudin 1850: 158). It differs in having denser and more congested inflorescences, abaxial foliar surface with denser, longer and divergent trichomes, elliptic petals with a broadly acute apex (vs. obovate), and longer filaments (9.5–10.3 mm long, vs. 6.5–7 mm long) and appendages (8–9 mm long, vs. 3–4 mm long) on the antesealous stamens. *Monochaetum longicaudatum* is unique in having the antesepalar anther appendages that are longer than the anthers (4.5–6.5 mm long), and a longer style (11–13 mm long, vs. 6–8 mm long) that is antrorsely hirsute (trichomes 0.7–1.8 mm long) on the basal to medial portion.

*Cuadros 1694* (COL, US) is a mixed collection of *Monochaetum longicaudatum* and *M. rotundifolium*. We have marked *M. longicaudatum* as *1694-B* and *M. rotundifolium* as *1694-A* on each of the two collections known to us.

### *Monochaetum perijensis* Alvear & Almeda, *sp. nov.* (Fig. 3)

A species similar to *Monochaetum humboldtianum* (Kunth & Bouché 1844: 15; Kunth & Bouché in Bouché 1844: 504) Kunth ex Walpers (1846: 702), but differs in having leaves with basal secondary veins (vs. plinerved with the innermost pair diverging from the midvein 5–8 mm from the base), glabrous hypanthia (vs. strigose), calyx lobes that are persistent, shorter (4.2–5 mm long vs. more than 10.5 mm long), oblong and with acute apex (vs. deciduous, lance-triangular and acuminate calyx lobes), and petals ciliate (vs. entire or only with an apical seta).

Type:—COLOMBIA. Magdalena (Cesar): Sierra de Perijá, E of Manaure, quebrada de Floridablanca, 2700–2800 m, 10 November 1959, (fl & fr), *J. Cuatrecasas & R. Romero-Castañeda 25172* (holotype: COL!; isotype: US!).

Shrub up to 2 m tall with exfoliating bark. *Internodes* quadrangular, red, distal internodes 2–4 cm long, sparsely strigose, older branches glabrescent, the trichomes 0.6–1.5 mm long, eglandular, mostly flexuous-smooth, and frequently with somewhat papillose base. Cauline nodes moderately to densely setose with antrorsely hirsute to divaricate trichomes 0.6–2 (–2.6) mm long, eglandular, flexuous-smooth, and frequently with a somewhat papillose base. *Leaves* opposite and isophyllous, petiole 4–11 mm long, semiterete, dark red, abaxially concave and adaxially channeled to flattened distally, abaxially with vestiture identical to the internodes, adaxially glabrescent. Blades 15–44 × 9–22 mm, membranous, elliptic to oblong-elliptic, the margin entire and ciliate with trichomes like those on the actual surface, the apex acute, the base broadly acute to obtuse, 5(–7)-nerved, sometimes with the innermost pair of veins slightly plinerved but always diverging less than 1.5 mm from the base, primary and secondary veins elevated abaxially and flat to impressed adaxially, tertiary veins ramified and not clearly visible abaxially. Adaxial surface green, vestiture between primary and secondary veins glabrous or sparsely strigulose in 6 diffuse longitudinal belts between the main nerves, with about 1–3(–4) trichomes across that are spaced and not overlapping, frequently the proximal half or one third of the leaf glabrous, and the only obvious belts of trichomes are the ones near the margins, the trichomes 0.8–1.5 mm long, stout-smooth; vestiture on the primary and secondary veins glabrous, on the more pubescent leaves forming glabrous strips along the veins 1.8–2.8 mm wide, sometimes sparsely covered with orange short-stalked glandular trichomes less than 0.2 mm long on the primaries. Abaxial foliar surface light green, vestiture between primary and secondary veins sparsely strigulose with

flexuous-smooth trichomes 0.6–0.9 mm long, sometimes also with sparse orange short-stalked glandular trichomes, less than 0.2 mm long; vestiture on primary veins moderately strigose-villous with flexuous-smooth trichomes 1–1.8 (–2) mm long, commonly with small pockets (acarodomatia?) at the junction of the primary and secondary veins. *Inflorescence* terminal or occasionally axillary on short shoots below the main inflorescence axis, a simple to once-compound dichasium, some flowers appearing solitary, peduncles and floriferous branches glabrous or with identical vestiture to the internodes. Lowermost floral bracts 5–15 × 1.5–6 mm, petiole 1–2 mm long, similar to the principal leaves in shape, vestiture and color, 3–5-nerved. Bracteoles 2–4 × 0.6–1 mm, subsessile to shortly petiolate (less than 1 mm long), oblong-elliptic to spatulate, with a broadly acute apex, ciliate, abaxially sparsely strigose, apex usually with a trichome 1.5–2 mm long, 1-nerved. *Flowers* 4-merous, on pedicels 7–9 mm long, glabrous or sometimes sparsely strigulose with flexuous-smooth trichomes 0.6–1.5 mm long. *Hypanthium* (at anthesis) 5.5–7 (–8) × (2.5–) 3–3.8 mm, subcylindric to narrowly campanulate, dark red, glabrous. Calyx lobes persistent, shorter than the hypanthium, 4.2–5 × 1.7–2 mm, red, oblong to ovate-oblong, apex broadly acute to bluntly-acute, glabrous on both surfaces but ciliate, calyx tube obsolete, calyx lobe sinus with a tuft of about 3–10 long and thick flexuous-smooth (with papillose base) trichomes 0.8–1.5 mm long. *Petals* 11–13 × 11.8–13 mm, pink, purple to magenta, widely obovate to sub-orbicular, ciliate. *Stamens* 8, dimorphic and fertile. Antepetalous stamens: filaments 8.5–9.7 mm long, pink, pedoconnective 0.8–1 mm long, anthers 10.5–12 × 0.9–1.2 mm, yellow, subulate, arcuate and strongly geniculate, pore 0.4–0.5 mm in diameter, dorsally inclined; appendages 9–11 × 0.5–0.7 mm, yellow?, distally falcate, strongly incurved towards the anther, basally terete, medially to apically expanded, papillose. Antesepalous stamens: filaments 11–13 mm long, pink, anthers 6–7.5 × 0.6–0.7 mm, yellow?, subulate, erect, pore 0.25–0.35 mm in diameter, dorsally inclined; appendages 6.5–9.5 × 0.5–0.65 mm, yellow?, fusiform-elliptic, flattened, papillose, upturned. *Ovary* apex sparsely setose with about 10–15 conic-smooth or stout-smooth trichomes 0.7–1 mm long. *Style* 15–20 mm long, glabrous. Fruiting hypanthium long-urceolate sometimes with an apical neck. *Seeds* 0.6–0.65 × 0.35–0.45 mm, light brown to orange-brown, cochleate, surface minutely muriculate and shiny.

**Phenology:**—This species has been collected in flower and fruit in November and December, with flowers in July, and with fruit in March.

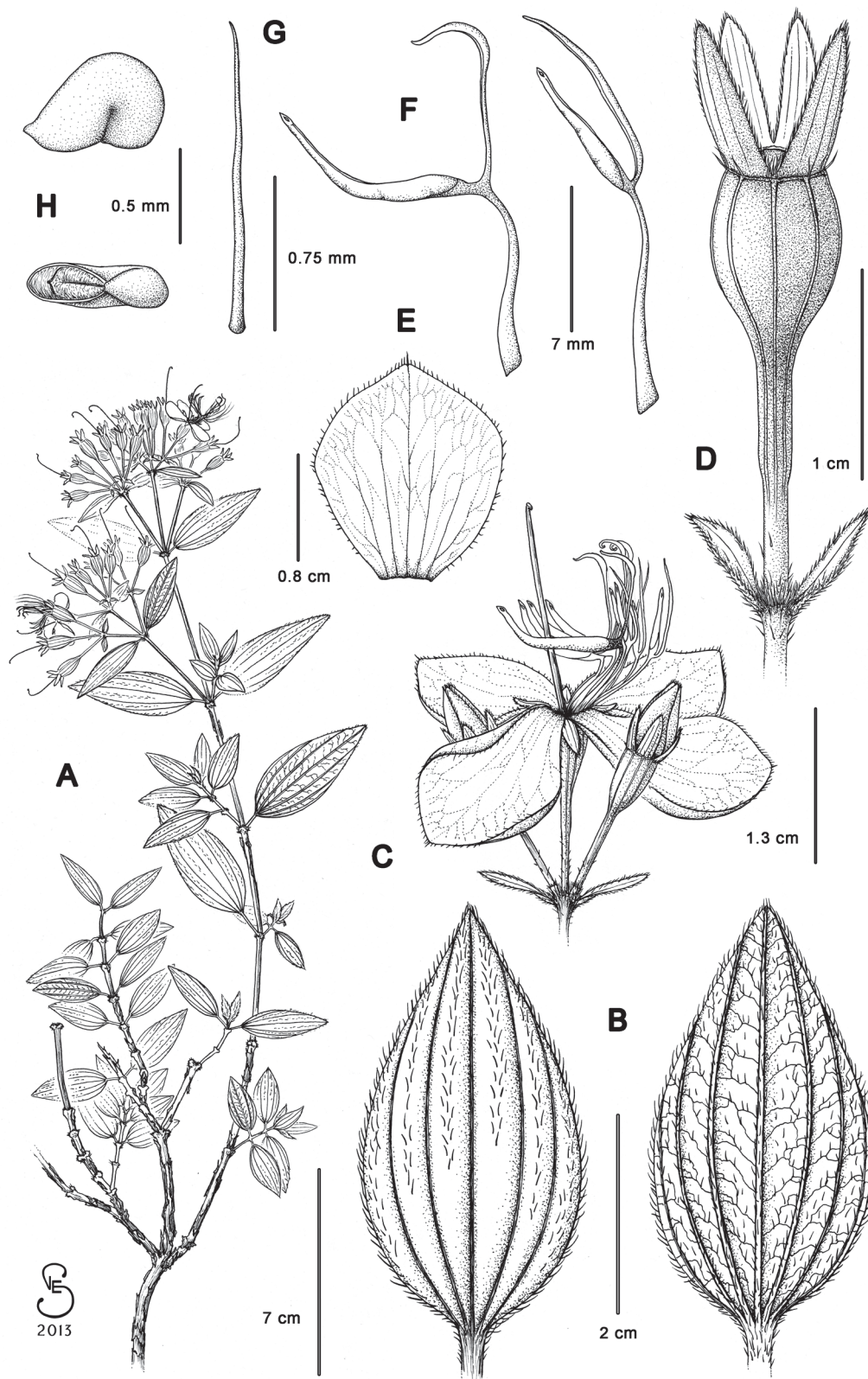
**Habitat and distribution:**—Endemic to Colombia where it is restricted to the Serranía de Perijá, the northernmost extension of the Cordillera Oriental and the northern watershed between Colombia and Venezuela. It is known from nine collections. This is a rare species occurring in Andean forests and subpáramo, between 2200 and 3250 m; it has been reported to occur in forest dominated by *Billia rosea* (Planchon & Linden 1857: 3) Ulloa & Jørgensen (2001: 287). Although this species has not been collected in Venezuela it probably occurs on the Venezuelan slopes of the Serranía de Perijá.

**Etymology:**—The name of this new species refers to the type locality Serranía de Perijá.

**Conservation status:**—This species is known only from the Colombian highlands of the Serranía de Perijá. This area currently has no protected status. Because several parts of this mountain system are home to diverse Andean forests and an ecosystem of azonal páramos with high levels of floristic endemism it is an ideal candidate for some kind of conservation status (Rivera-Díaz & Fernández-Alonso 2003, Rivera-Díaz 2007). Based on IUCN guidelines and criteria (IUCN 2001, 2011) and our current knowledge of its distribution, this species is assigned a provisional IUCN conservation status of Endangered (EN).

**Additional specimens examined (paratypes):**—COLOMBIA. Cesar: Agustín Codazzi, Serranía de Perijá, vereda Siete de Agosto, Camino al páramo de Tres Tetras, desde la Cuchilla “Macho Solo”, 1884–2551 m, 9°57'3"–9°57'24.4"N, 73°2'4.3"–73°00'58.9"W, 10 December 2005, *O. Rivera-Díaz et al.* 2877 (COL!); Mancha de subpáramo azonal, conocida localmente como Parque Natural, 2526 m, 9°59'6.5"N, 73°1'43.1"W, 13 December 2005, *O. Rivera-Díaz et al.* 2968 (COL!); 13 December 2005, *O. Rivera-Díaz et al.* 2963 (COL!); 13 December 2005, *O. Rivera-Díaz et al.* 2994 (COL!); Bosque arriba de la “Cuchilla Macho Solo”, 1884–2551 m, 9°57'9"–9°57'10.6"N, 73°1'45.9"–73°1'34.3"W, 10 December 2005, *O. Rivera-Díaz et al.* 2877 (COL!); Páramo de Sabana Rubia, 3250 m, 22 July 1987, *H. Cuadros* 3697 (MO!); Sabana Rubia, top of Serranía de Perijá, E of Manaure, 2900 m, 10°30'N, 72°55'W, 11 March 1993, *A. Gentry & H. Cuadros* 79224 (COL!, MO!, US!); Manaure, Serranía de Perijá, "El Cinco", finca "Vista Hermosa" SE de la carretera, 2200 m, 10°26'N, 72°57'W, 13 November 1993, *O. Rangel et al.* 11353 (COL!).





**FIGURE 3.** *Monochaetum perijensis*. **A.** Flowering branch. **B.** Leaf, adaxial surface (left) and abaxial surface (right). **C.** Simple dichasium, flower and bud detail. **D.** Fruiting hypanthium, calyx lobes and bracteoles. **E.** Petal. **F.** Stamens in profile view, antepetalous (left), antesealous (right). **G.** Enlargement of foliar and cauline flexuous smooth trichome. **H.** Seed in profile and ventral view (A, D, H from *J. Cuatrecasas & R. Romero-Castañeda* 25172, COL-US; B, C, E–G from *O. Rangel et al.* 11353, COL).

Discussion:—*Monochaetum perijensis* is similar to *M. humboldtianum* (Kunth & Bouché) Kunth ex Walpers but differs in having leaves with basal secondary veins (vs. plinerved with the innermost pair of secondary veins

diverging 5–8 mm above the base) and shorter and persistent calyx lobes, that are oblong and have an acute apex (vs. deciduous, lance-triangular and acuminate calyx lobes).

*Monochaetum humboldtianum* has long been known from the Cordillera de la Costa in Venezuela, where the three currently recognized varieties occur. We have not been able to verify the identity of collections that would extend its range to the Andean region (Mérida and Táchira states in Venezuela) bordering Colombia (Wurdack 1973, Michelangeli & Cotton 2008). The presence of this species along the Orinoco River, as cited in the protologue of the synonym *M. umbellatum* (Naudin 1845: 49), is certainly a mistake as noted by Wurdack (1971b, 1973). The presence of *M. humboldtianum* in Colombia is based on two historical collections by Karsten from an unspecified locality (“Columbien” is the only geographical reference on the labels). The first one is known only by a photo of a destroyed Berlin specimen (*Karsten s.n.*, photos at F!, MO!), which is apparently the type of *Grischovia hirta* (Karsten 1848: 16), the basionym of *M. humboldtianum* var. *hirtum* (Wurdack 1966: 68–69). The second one is *Karsten 13* (G!), which corresponds to *M. humboldtianum* var. *humboldtianum*. This latter taxon was also seen by Cogniaux, but he did not cite the collection number nor did he mention Colombia in his treatment of the species (Cogniaux 1891). Karsten (1848) did not mention Colombia in the description of *Grischovia*. Cogniaux and Triana (1871) cited a few *Karsten* specimens but always attributed them to Venezuela without a collection number. Karsten was a German botanist who collected extensively in Colombia and Venezuela (Stafleu & Cowan 1979, Tryon 1963). It is possible that these specimens were actually collected in Venezuela. For a discussion of the origin of some of Karsten’s collections see Alvear (2010) and Tryon (1963). All Colombian collections previously identified as *M. humboldtianum* are actually *M. perijensis*.

## Acknowledgments

We thank the curators and staffs at CAUP, COL, FMB, G, HECASA, MO, NY, PSO, US and UTMC for access to collections under their care; Sean Vidal Edgerton for the line drawings; and Elizabeth Woodgyer for sending images of the isotype of *Monochaetum longicaudatum* deposited at K. This research was supported in part by the Lakeside Foundation (U.S.A.), 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). We are grateful to the Parques Nacionales de Colombia, Ministerio de Ambiente y Desarrollo Sostenible and Autoridad Nacional de Licencias Ambientales (ANLA) in Colombia for granting the research permits for the projects entitled “The genus *Monochaetum* in Colombia” and “Sistemática y filogenia de la tribu Miconieae (Melastomataceae)”.

## Literature Cited

- Almeda, F. (1978) Systematics of the genus *Monochaetum* (Melastomataceae) in Mexico and Central America. *University of California Publications in Botany* 75: 1–134.  
<http://dx.doi.org/10.2307/2418751>
- Almeda, F. (2009) Melastomataceae. In: G. Davidse, M. Sousa-Sanchez, S. Knapp, and F. Chiang (eds.) *Flora Mesoamericana* 4: 164–338.
- Almeda, F., Alvear, M., Mendoza-Cifuentes, H., Penneys, D.S., & Michelangeli, F.A. (Submitted) Melastomataceae. In: Bernal, R., R. Gradstein & Celis, M. (Eds.) *Catalogue of the plants of Colombia*. Instituto de Ciencias Naturales - Universidad Nacional de Colombia - University of Göttingen.
- Alvear, M. (2010) *Systematics of the genus Monochaetum (Melastomataceae) in Colombia*. M.Sc. Thesis in Biology: Ecology and Systematics. San Francisco State University, San Francisco, CA, USA, 296 pp.
- Alvear, M. & Almeda, F. (2009) The genus *Monochaetum* (Melastomataceae) in Colombia (South America). *Scientific Abstracts no. 447. Botany and Mycology 2009*. July 25–29. Snowbird, Utah, USA.
- Bouché, P.C. (1844) Synoptische Zusammenstellung der Canna-Arten, so wie zweier davon getrennten Gattungen. *Linnaea* 18: 483–514.
- Candolle, A.L.P.P. de (1828) Melastomaceae. In *Prodromus systematis naturalis regni vegetabilis*, 3: 99–202. Treuttel & Würtz, Paris.
- Carbonó, E. & Lozano-Contreras, G. (1997) Endemismos y otras singularidades de la Sierra Nevada de Santa Marta, Colombia. Posibles causas de origen y necesidad de conservarlas. *Revista de la Academia Colombiana de Ciencias Exactas, Físicas y Naturales* 21: 409–419.
- Clausing, G. & Renner, S.S. (2001) Molecular phylogenetics of Melastomataceae and Memecylaceae: implications for

- character evolution. *American Journal of Botany* 88: 486–498.  
<http://dx.doi.org/10.2307/2657114>
- Fritsch, P.W., Almeda, F., Renner, S.S., Martins, A.B. & Cruz, B.C. (2004) Phylogeny and circumscription of the near-endemic Brazilian tribe Microlicieae (Melastomataceae). *American Journal of Botany* 91: 1105–1114.  
<http://dx.doi.org/10.3732/ajb.91.7.1105>
- Gleason, H.A. (1925a) Studies on the flora of northern South America VI. *Bulletin of the Torrey Botanical Club* 52: 325–340.
- Gleason, H.A. (1925b) Studies on the flora of northern South America VII. *Bulletin of the Torrey Botanical Club* 52: 383–384.
- Gleason, H.A. (1929) The genus *Monochaetum* in South America. *American Journal of Botany* 16: 502–522.  
<http://dx.doi.org/10.2307/2435706>
- Grimm, D. & Almeda, F. (2013) Systematics, phylogeny and biogeography of *Chaetolepis* (Melastomataceae). *Journal of the Botanical Research Institute of Texas* 7: 217–263.
- IUCN (2001) *IUCN Red List Categories and Criteria. Version 3.1*. IUCN Species Survival Commission, IUCN, Gland and Cambridge, 33 pp.
- IUCN (2011) *Guidelines for using the IUCN Red List Categories and Criteria. Version 9.0*. Prepared by the Standards and Petitions Subcommittee. IUCN Global Species Red List Unit, Cambridge, 87 pp. Available from <http://www.iucnredlist.org/documents/RedListGuidelines.pdf> (Accessed 5 December 2013).
- Karsten, H. (1848) Auswahl Neuer und schön blühender Gewächse Venezuela's (Ausw. Neue. Gew). Verlag. Berlin.
- Kunth, K.S. & Bouché P.C. (1844) Index Seminum in Horto Botanico Berolinensi Adn.: 15.
- Markgraf, F. (1929) Vermischte Diagnosen V. *Notizblatt des Botanischen Gartens und Museums zu Berlin-Dahlem* 10: 769–776.
- Mendoza-Cifuentes, 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. & Cotton, E. (2008) Melastomataceae. In: Hokche, R., Berry, P.E. & Huber, O. (eds.) *Nuevo Catálogo de la Flora Vasculare de Venezuela*. Fundación Instituto Botánico de Venezuela, Caracas, pp. 466–484.
- Michelangeli, F.A., Guimaraes, P., Penneys, D.S., Almeda, F. & Kriebel, R. (2013) Phylogenetic relationships and distribution of New World Melastomeae (Melastomataceae). *Botanical Journal of the Linnean Society* 171: 38–60.  
<http://dx.doi.org/10.1111/j.1095-8339.2012.01295.x>
- Miquel, F.A.W. (1840) *Chaetolepis*. *Commentarii Phytographici. Leyden* 2: 72.
- Naudin, C. (1845) Additions à la flore du Brésil méridional. Description de genres nouveaux, et rectification de quelques anciens genres appartenant à la famille des Melastomataceae. *Annales des Sciences Naturelles; Botanique, sér. 3* 4: 48–57.
- Naudin, C. (1850) Melastomatacearum. Quae in Museo Parisiensis continentur Monographica descriptionis. *Annales des Sciences Naturelles; Botanique, sér. 3* 14: 118–165.
- 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=01.022924> (accessed: 27 November 2013).
- Penneys, D.S., Almeda, F., & Michelangeli, F.A. (2010) Progress towards a comprehensive phylogenetic analysis and revised classification of the Melastomataceae. *Scientific Abstracts no. 509. Botany 2010*, July 31–August 4. Providence, Rhode Island, USA.
- Planchon, J.E. & Linden, J. (1857) *Putzeysia rosea*, Pl. et Lind. In: Linden, J. *Catalogue des plantes exotiques*. 12: 3.
- Rangel-Ch., J.O. & Garzón-C., A. (1997) Sierra Nevada de Santa Marta, Colombia. In: Davis, S.D., Heywood, V.H., Herrera-MacBryde, O., Villa-Lobos, J. & Hamilton, A.C. (eds.) *Centres of plant diversity: A guide and strategy for their conservation* (Volume 3, The Americas). WWF- World Wildlife Fund for Nature and IUCN-The World Conservation Union. IUCN Publications Unit, Cambridge, U.K. pp. 426–430.
- Renner, S.S. (1993) Phylogeny and classification of the Melastomataceae Memecylaceae. *Nordic Journal of Botany* 13: 519–540.  
<http://dx.doi.org/10.1111/j.1756-1051.1993.tb00096.x>
- Renner, S.S. & Meyer, K. (2001) Melastomeae come full circle: biogeographic reconstruction and molecular clock dating. *Evolution* 55: 1315–1324.  
<http://dx.doi.org/10.1111/j.0014-3820.2001.tb00654.x>
- Rivera-Díaz, O. (2007) Caracterización florística de la alta montaña de Perijá. In: Rangel J.O. (ed.): *Colombia Diversidad Biótica V, La alta montaña de la Serranía de Perijá*. Universidad Nacional de Colombia - Instituto de Ciencias Naturales. Bogotá, pp.71–86.
- Rivera-Díaz, O. & Fernández-Alonso, J.L. (2003) Análisis corológico de la flora endémica de la Serranía de Perijá, Colombia. *Anales del Jardín Botánico de Madrid* 60: 347–362.  
<http://dx.doi.org/10.3989/ajbm.2002.v60.i2.96>
- Ruiz, H. & Pavón, J.A. (1794) *Florae Peruvianaee et Chilensis Prodromus*. Sancha. Madrid, Spain. 154 pp.  
<http://dx.doi.org/10.5962/bhl.title.11759>
- Sandwith, N.Y. (1941–1942) Contributions to the flora of Tropical America: XLV. New plants from the Andes of Venezuela and Colombia. *Bulletin of Miscellaneous Information Kew* 1941: 218–223.  
<http://dx.doi.org/10.2307/4102524>
- Simpson, B.B. (1979) A revision of the genus *Polylepis* (Rosaceae: Sanguisorbeae). *Smithsonian Contributions to Botany* 43:



1–62.

<http://dx.doi.org/10.5479/si.0081024x.43>

Triana, J.J. (1871) Les Mélastomatacées. *Transactions of the Linnean Society of London* 28: 51. 1871[1872].

Tryon, A.F. (1963) Hermann Karsten, his collections and the Flora Columbianae. *Taxon* 12: 103–105.

<http://dx.doi.org/10.2307/1217198>

Ulloa Ulloa, C. & Jørgensen, P. (2001) *Billia rosea*: the correct name for *Billia columbiana* (Hippocastanaceae). *Novon* 11: 287.

<http://dx.doi.org/10.2307/3393068>

Walpers, G.G. (1846) *Repertorium Botanices Systematicae*. 5: 702.

<http://dx.doi.org/10.5962/bhl.title.7553>

Wurdack, J.J. (1962) Certamen Melastomataceis VII. *Phytologia* 8(4): 165–175.

Wurdack, J.J. (1966) Certamen Melastomataceis X. *Phytologia* 13: 65–80.

Wurdack, J.J. (1971a) Certamen Melastomataceis XVI. *Phytologia* 21: 115–130.

Wurdack, J.J. (1971b) Geographic errors in Bonpland collections of Melastomataceae. *Taxon* 20: 591–593.

<http://dx.doi.org/10.2307/1218260>

Wurdack, J.J. (1973) Melastomataceae. In: Lasser, T. (ed.). *Flora de Venezuela*. No. 8. Instituto Botánico, Ministerios de Agricultura y Cría, Caracas, pp. 1–819.

Wurdack, J.J. (1976) Endemic Melastomataceae of the Sierra Nevada de Santa Marta, Colombia. *Brittonia* 28: 138–143.

<http://dx.doi.org/10.2307/2805565>

Wurdack, J.J. (1978a) Certamen Melastomataceis XXIX. *Phytologia* 41: 1–10.

Wurdack, J.J. (1978b) Suplemento a las Melastomatáceas de Venezuela. *Acta Botanica Venezuelica* 13: 123–172.