



A new species of *Meriania* (Melastomataceae: Merianieae) from southeastern Ecuador

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Abstract

Meriania judithiae, a new species from the southeast of Morona Santiago in Ecuador, is described and illustrated. With this new addition, the number of species of the genus increases to 33 in this country. *Meriania judithiae* has leaves with a attenuate base extending down the petiole as wings, multiflorous inflorescences with sub-umbellate paraclades, pink-orange campanulate flowers, the calyx with conical projections, and isomorphic stamens with connectives prolonged below the thecae. It is compared with *M. cuneifolia*, its most similar species which shares the distant supra-basal venation and gradually narrowing base of the leaves. In addition, the taxonomic similarities of the new entity are discussed and information about its distribution, habitat, and conservation status is provided.

Key words: lower montane forest, Morona Santiago, northern Andes, rainforest, taxonomy

Introduction

The cosmopolitan family Melastomataceae Jussieu (1789: 328) comprises ca. 170–180 genera and around 5850 species distributed in the tropics and subtropics (Penneys *et al.* 2022; Ulloa Ulloa *et al.* 2022). Within the family, the tribe Merianieae was established by Triana (1866) and comprises 22 genera, these endemic to the neotropics (Michelangeli *et al.* 2022, Penneys *et al.* 2022). The most diverse genus in the tribe Merianieae is *Meriania* Swartz (1798: 823), containing ca. 120 species distributed from southern Mexico, through Central America, the Greater Antilles, the tropical Andes to Eastern Brazil and Bolivia, where they can be found from sea level up to 4000 m (Michelangeli *et al.* 2015, Goldenberg *et al.* 2020, Mendoza-Cifuentes 2021, Fernandez-Hilario *et al.* 2023).

Species of *Meriania* are often shrubs, trees, and seldom climbers. These are characterized by the absence of malpighiaceus trichomes, the diplostemonous (4–)5–8-merous flowers, the superior ovaries with entire, lobed, subcalyptrate or calyptrate calyx, the spreading to campanulate corollas, the anthers with a dorsally inclined pore and dorsal appendages, the capsular fruits, and the pyramidal to cuneate seeds (Michelangeli *et al.* 2015, 2022, Goldenberg *et al.* 2020, Mendoza-Cifuentes 2021, Fernandez-Hilario *et al.* 2023). Nonetheless, there are morphological similarities

with species from other genera, especially *Axinaea* Ruiz & Pavón (1794: 68), making a precise circumscription difficult for *Meriania* (Michelangeli *et al.* 2022).

The greatest diversity of *Meriania* occurs in the tropical Andes of Colombia, Ecuador and Peru (Fernandez-Hilario 2022, 2023). Of the 29 to 32 species registered in Ecuador, most of them are endemic to the Ecuadorean Andes from 1000 to 3500 m (Fernández-Fernández *et al.* 2020, Mendoza-Cifuentes 2021, Jiménez *et al.* 2024). Here we describe a new species of *Meriania* located in the eastern foothills of Ecuador, found in the province of Morona Santiago. The new taxon is illustrated and compared with its most similar species, *M. cuneifolia* Gleason (1947: 298), and information on its distribution, ecology, and conservation status is also provided.

Materials and methods

Two specimens examined were compared with the original descriptions of similar species of *Meriania* (Gleason 1947, Wurdack 1957, Fernandez-Hilario *et al.* 2022). Digital images of the holotypes of *Meriania bongarana* Fernandez, Goldenberg & Michelangeli (2022: 45) in Fernandez-Hilario *et al.* (2022: 45), *M. cuneifolia*, *M. cuneifolia* subsp. *subandina* Wurdack (1976: 7) and *M. dimorphanthera* Wurdack (1957: 101) at MO, NY and US (acronyms by Thiers, 2024) were examined online through Smithsonian National Museum of Natural History (<http://collections.nmnh.si.edu/search/botany/>), GBIF (<http://www.gbif.org>) and Tropicos (<http://tropicos.org/home>).

The new species was described following the botanical terminology by Beentje (2016). The terminology used to describe the number of flowers in the inflorescences has been reported following the considerations by Fernandez-Hilario *et al.* (2022). The types of trichomes were described based on the Atlas of hairs for Neotropical Melastomataceae by Wurdack (1986). The measurements of the vegetative and floral parts were made from living material. The fresh flowers were stored in 70% ethanol and 1% glycerol. Digital images were taken with a Nikon D3100 camera with AF-S DX Micro NIKKOR 40mm f/2.8G lens and Raynox DCR-250 Super Macro lens; complimented with two Nikon SB-700 AF speedlight flashes and a Panasonic® FZ300 camera. Images of the trichomes were obtained using a cell phone iPhone 13 Pro (12MP, f/1.6) with Celestron-NexYZ 3-axis universal smartphone adapter with Nikon SMZ445 stereo zoom microscope and ZEISS Axiolab 5 smart microscope at the herbarium of the Universidad Técnica Particular de Loja (HUTPL). The figures and the composite plate were prepared with Adobe Photoshop v. 21.1.1. The distribution map was prepared using ArcGIS Desktop 10.3. The plants of the new species were collected under permit MAATE-DBI-CM-2022-0248 granted by the Ministerio del Ambiente y Transición Ecológica de Ecuador (MAATE).

Taxonomic treatment

Meriania judithiae M.M.Jiménez & H.Garzón, *sp. nov.* (Figs. 1, 2, 4, 5A–7)

Type:—Ecuador. Morona Santiago: San Juan Bosco. San Juan Bosco, Jungle Dave's sendero al Cerro PDA, 3°34'10.18" S, 78°24'41.92" W, 1818 m, 22 Julio 2023 (fl.), *H. Garzón & M. Jiménez 216* (holotype: HUTPL 14847!).

Diagnosis. This species is most similar to *Meriania cuneifolia* subsp. *cuneifolia* but differs by the sparse furfuraceous indumentum (*vs.* hirsute), the much shorter petioles 0.3–1.0 cm long (*vs.* 2.0–3.0 cm long), the leaf blades with attenuate bases extending into the petiole as wings (*vs.* long-cuneate), the shorter calyx lobes 0.5–1.3 mm long (*vs.* 8.5 mm long) each with a conical projection that does not surpass the apex of the lobe (*vs.* distinct claw-shaped projections extending further the lobes), and the isomorphic stamens (*vs.* dimorphic).

Description. *Shrub* up to 4 m tall; indumentum consisting of a combination of very short, brownish, caducous trichomes, 0.2–0.9 mm long, elongated hairs with greatly roughened (substellate) base and dendritic hairs with short axis and few-moderate number of terete arms, these arranged sparsely on young branches, petioles; or with a stellate, scaly base, sparsely on the underside of leaf blades, densely on inflorescences, hypanthia and calyces. *Young branches* terete, 3.2–5.8 mm in diameter, furfuraceous becoming glabrous with age, nodes with faint interpetiolar lines, without flaps. *Leaves* opposite, anisopyllous, decussate; petioles very short, terete, 0.3–1.0 cm long, furfuraceous; blades coriaceous, large leaves 15.5–27.1 × 3.8–8.2 cm, small leaves (35–60% smaller) 6.1–17.7 × 1.2–5.0 cm, elliptic, apex long-acuminate, base attenuate continuing down the petiole as slightly revolute wings; margin crenulate at the apical half, venation acrodromous and suprabaasal, with 2 pairs of lateral (secondaries) nerves, first pair diverging 7–41 mm from the base of the blade, second pair diverging 15–80 mm from the base of the blade, an additional pair of faint submarginal veins running up to leaf apex, tertiary (transversal nerves) 40–60 on each side of the primary

veins, percurrent, 2–7 mm distant from each other; midvein, secondary and tertiary veins strongly impressed adaxially, salient abaxially, adaxial surface bullate, dark green, shiny, glabrous, olive-green when dry; abaxial surface greenish dirty white when dry, puberulous. *Inflorescences* terminal or rarely pseudolateral (overtopped by developing axillary bud), erect, 4.3–6.1 cm long, few-flowered to multiflorous (18–130 flowers) panicles, consisting of 4–6 levels of branching nodes; axis densely pubescent, becoming glabrate in certain parts. *Peduncle* when present 1.2–2.5 cm long, terete. *Main axis* 4.3–6.1 cm long, quadrangular, the proximal node with 1 pair of basal paraclades, the supra-proximal with 1 pair of paraclades, the subdistal and distal with an umbel of 4–8 flowers arising from more or less the same point on the pedicel. *Paraclades* simple to branching, 1.3–2.2 cm long; flowers in regular pendulous, umbels of 4–8 flowers at the end. *Bracts* foliaceous, persistent, 14.0–19.6 × 4.0–6.1 cm, petioles 0.7–1.1 cm long, shape and indumentum similar to principal leaves; sometimes with one pair of additional bracts on proximal nodes of the main axis, 6.1–12.4 × 1.2–3.5 cm, petioles ca. 0.7 cm long. *Bracteoles* absent. *Flowers* 2.3–2.4 × 0.9 cm, 5–merous, pendant, with campanulate corollas. *Pedicels* 4.8–6.1 mm long, straight to slightly arcuate, puberulent. *Hypanthium* 3.4–3.9 × 3.1–3.6 mm, cupuliform, slightly costate, outer surface puberulent, inner surface glabrous; torus glabrous. *Calyx* opening regularly, outer surface puberulent, inner surface glabrous; tube 0.5–1.5 mm long; lobes 0.5–1.3 mm high, 2.5–3.0 mm wide, subtruncate, margin sinuate, each lobe with a conical projection, 0.4–0.5 mm long free from the apex of the lobe and not surpasses it. *Corolla* campanulate, petals pinkish orange, obscurely multiveined in the adaxial surface, glabrous, concave, 11.1–11.3 × 10.2–11.4 mm, 2.0–2.4 mm wide at base, transversely obovate and slightly asymmetric, apex rotund, margin entire, somewhat revolute, base rotund to truncate, concave. *Stamens* 10, isomorphic, all bent to one side at anthesis giving the flower a zygomorphic appearance; filaments 4.4–5.8 mm long, reddish-purple, paler to the base, flat, glabrous; connectives prolonged below the thecae, reddish-purple, glabrous, with one dorsal conic, crown-shaped appendage, 0.2 mm long, acute, red to red-purple consisting of short, several blunt, irregular projections; anther 5.4–5.8 mm long, lanceolate, dark purple, glabrous, straight, opening by one dorsally inclined pore, thecae surface slightly corrugated. *Ovary* 5-locular, superior, free, 3.3 × 1.9 mm, oblong, purple, glabrous, truncate to the apex, whitish to the base, not exceeding the hypanthium length, separated 0.5 mm from the sinuate, glabrous torus; style 14.1–15.3 mm long, red, glabrous, slightly incurved at the apex and opposite to the anthers at anthesis; stigma punctiform and minutely papillate, 0.5 mm wide, purple. *Fruits* capsular, with persistent sepals and slightly costate hypanthium, mature ovary 4.0–4.7 × 4.1–4.9 mm, spheroid, sepals 1.6–1.8 mm high; fruiting pedicels 28.0–29.8 mm long. *Seeds* not seen.

Distribution and habitat:—A population of approximately 8 individuals of *Meriania judithiae* has been found in the evergreen lower montane forests at the Southeastern Cordillera of the Andes, coded as BsBn02 according to the Ecosystem Classification System from Continental Ecuador (Ministerio del Ambiente del Ecuador, 2013). This presents a complex hilly topography consisting of steep slopes, valleys, and ravines, with an average annual rainfall shy of 2600 mm (Báez *et al.* 2013). The population of the new species is located at about 1800 m a.s.l., within a private reserve near San Juan Bosco in the southern part of Morona Santiago Province, southeastern Ecuador (Figs. 3, 4). The local flora is represented by *Cabralea canjerana* (Vellozo 1829: 176) Martius (1843: 38) (Meliaceae); *Blakea subvaginata* Wurdack (1979: 347) and *Meriania neillii* H. Mendoza (2021: 85) (Melastomataceae); *Ceratostema charianthum* A.C. Smith (1950: 360), *Ceratostema* sp. and *Disterigma utleyorum* Wilbur & Luteyn in Luteyn & Wilbur (1977: 259) (Ericaceae).

Conservation status:—*Meriania judithiae* is known only from the Siete Iglesias Municipal Conservation Area (ACMSI) type locality near San Juan Bosco. At present, only a few individual living specimens are known. The regions in the eastern foothills of the Andes are acutely threatened by deforestation carried out for cattle pastures, mining activities, slash-and-burn agriculture and infrastructure works. Nonetheless, the new species might be protected because it grows within or near the ACMSI. For a better assessment of its conservation, additional data on its distribution and abundance are required. We recommend *Meriania judithiae* be characterized as Data Deficient (DD) according to the IUCN red list (IUCN 2024).

Etymology:—The new species is named after Judith A. Steck, mother of David R. Goucher who has been actively supporting botanical research, environmental education and conservation in the south of Morona Santiago province, Ecuador.

Taxonomic discussion:—*Meriania judithiae* belongs to a group of species distinguished by the campanulate, reddish-orange corollas and the lobed calyx, usually with claw-shaped dorsal projections (Fernandez-Hilario *et al.* 2021) (Fig. 5). The new species is distinguished from other members of the group by the attenuate base of the leaves continuing down the petiole as wings and the presence of conical projections in the lobes of the calyx (Figs. 6). It is most similar to *M. cuneifolia* subsp. *cuneifolia* by the distant suprabasal venation and gradually tapering base of the leaves (Fig. 7); nevertheless, *M. judithiae* can be distinguished from the latter by the elliptic, long-acuminate leaves (*vs.* oblanceolate,

abruptly acuminate), adaxially bullate (vs. flat) foliar surface, the shorter hypanthium (3.4–3.9 vs. 5.2 mm long), the calyx lobes that are not ruptured to the torus (vs. irregular ruptured to the torus), the shorter petals (11.1–11.3 vs. 13 mm long), the isomorphic (vs. dimorphic) stamens with shorter filaments no longer than 4.4–5.8 mm long (vs. 6.4–8.5 mm long), and the shorter thecae of up to 5.4–5.8 mm long (vs. thecae up to 5.3–8.3 mm long) (Gleason 1947).

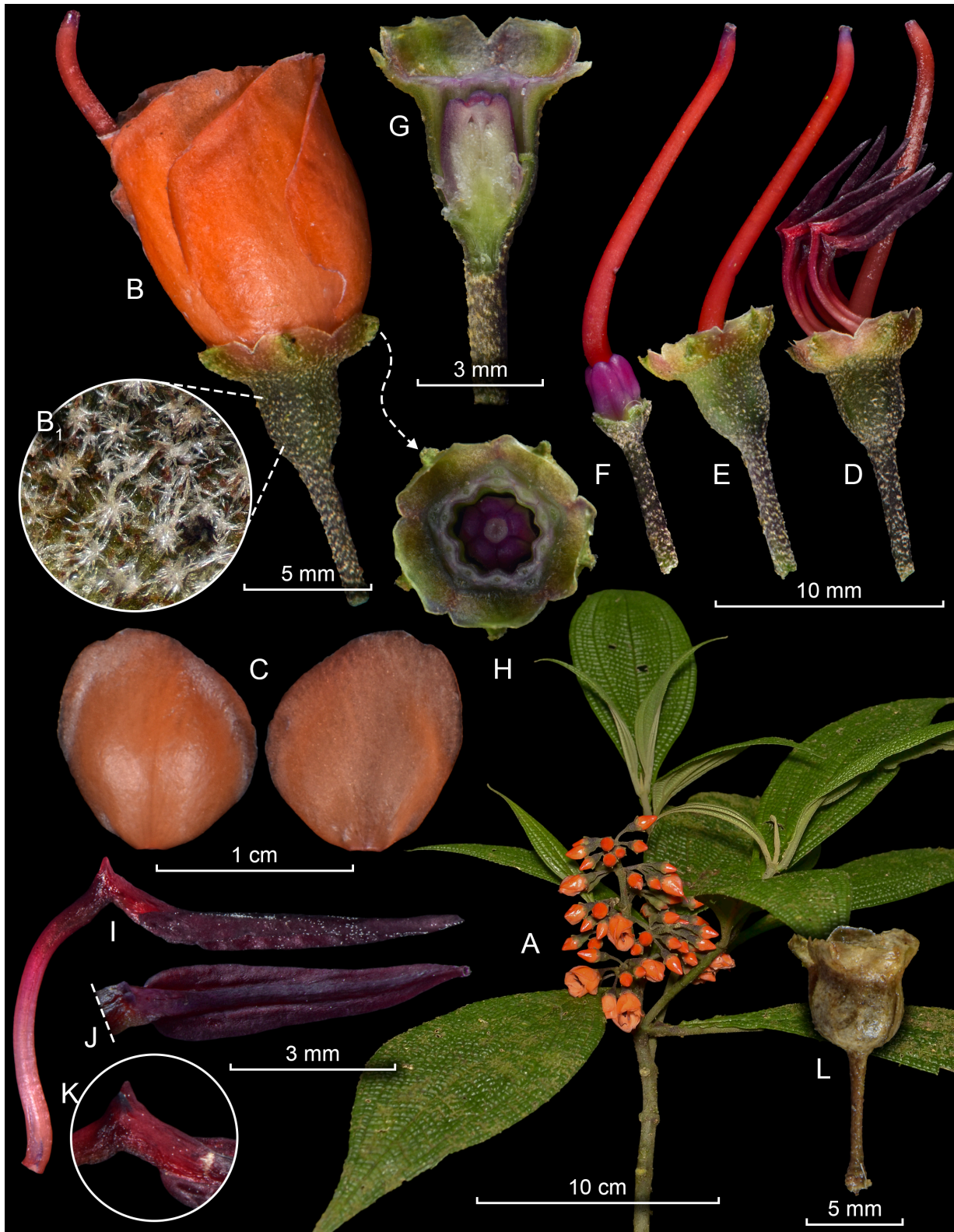


FIGURE 1. *Meriania judithiae*. **A.** Branch with inflorescence. **B.** Flower with a close-up of the indumentum on the hypanthium (B1). **C.** Petals, abaxial (left) and adaxial (right) views. **D.** Flower without petals. **E.** Hypanthium and calyx with style. **F.** Ovary with style. **G.** Longitudinal section of the calyx, hypanthium and ovary. **H.** Calyx, hypanthium and ovary, top view. **I.** Stamen. **J.** Anther with connective appendage viewed from the top. **K.** Close-up of the connective appendage. **L.** Mature fruit. Prepared by L. Ocupa-Horna from photos by H. Garzón-Suárez and Nelson Espinosa-Ortega (B1) from the holotype.

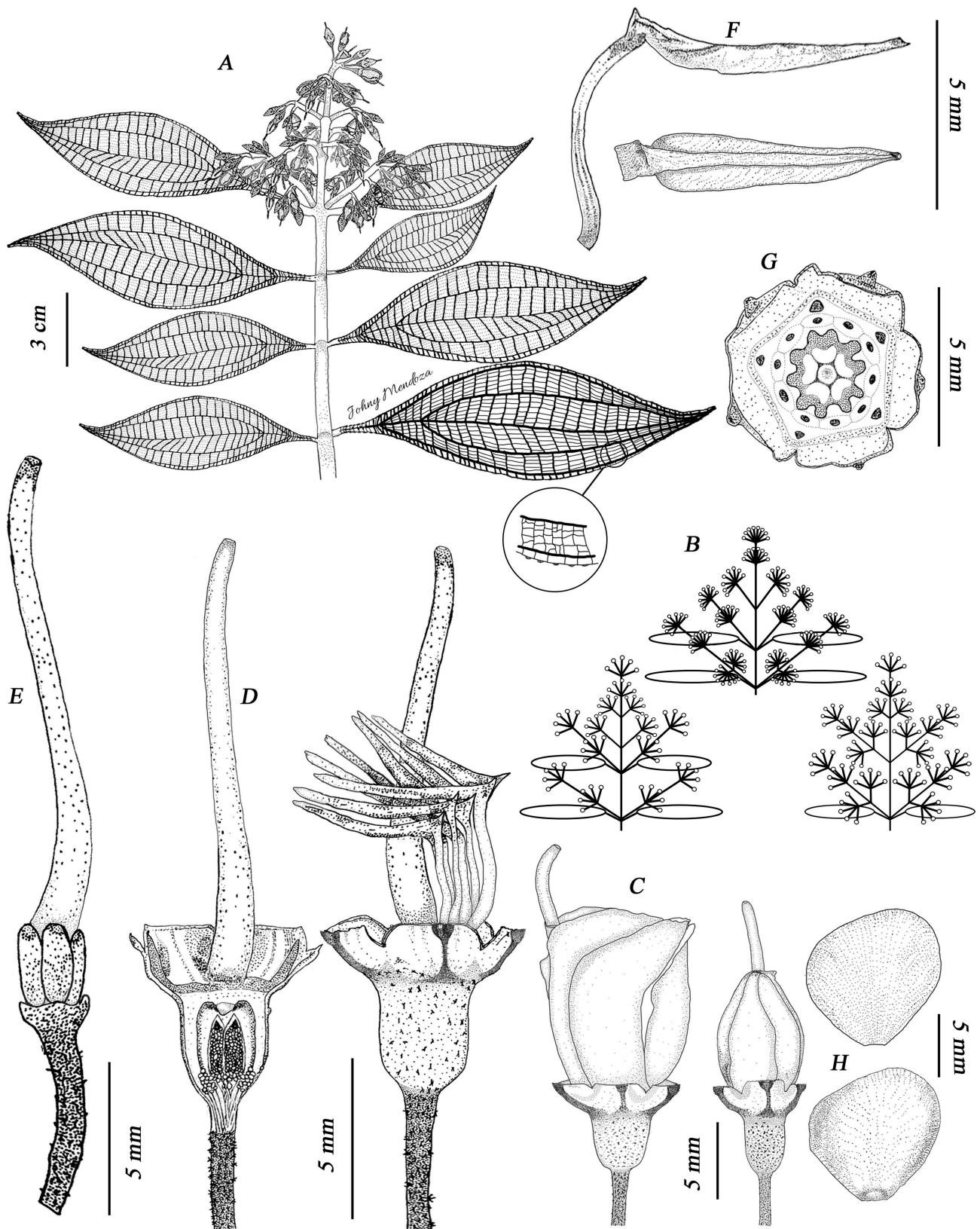


FIGURE 2. *Meriania judithiae*. A. Habit. B. Type of the inflorescences. C. Flower with floral bud. D. Hypanthium and calyx showing stamens and style, longitudinal section. E. Pedicel, ovary and style. F. Stamens, lateral and upper views. G. Calyx, hypanthium and ovary, top view. Drawing by J. Mendoza from the holotype.

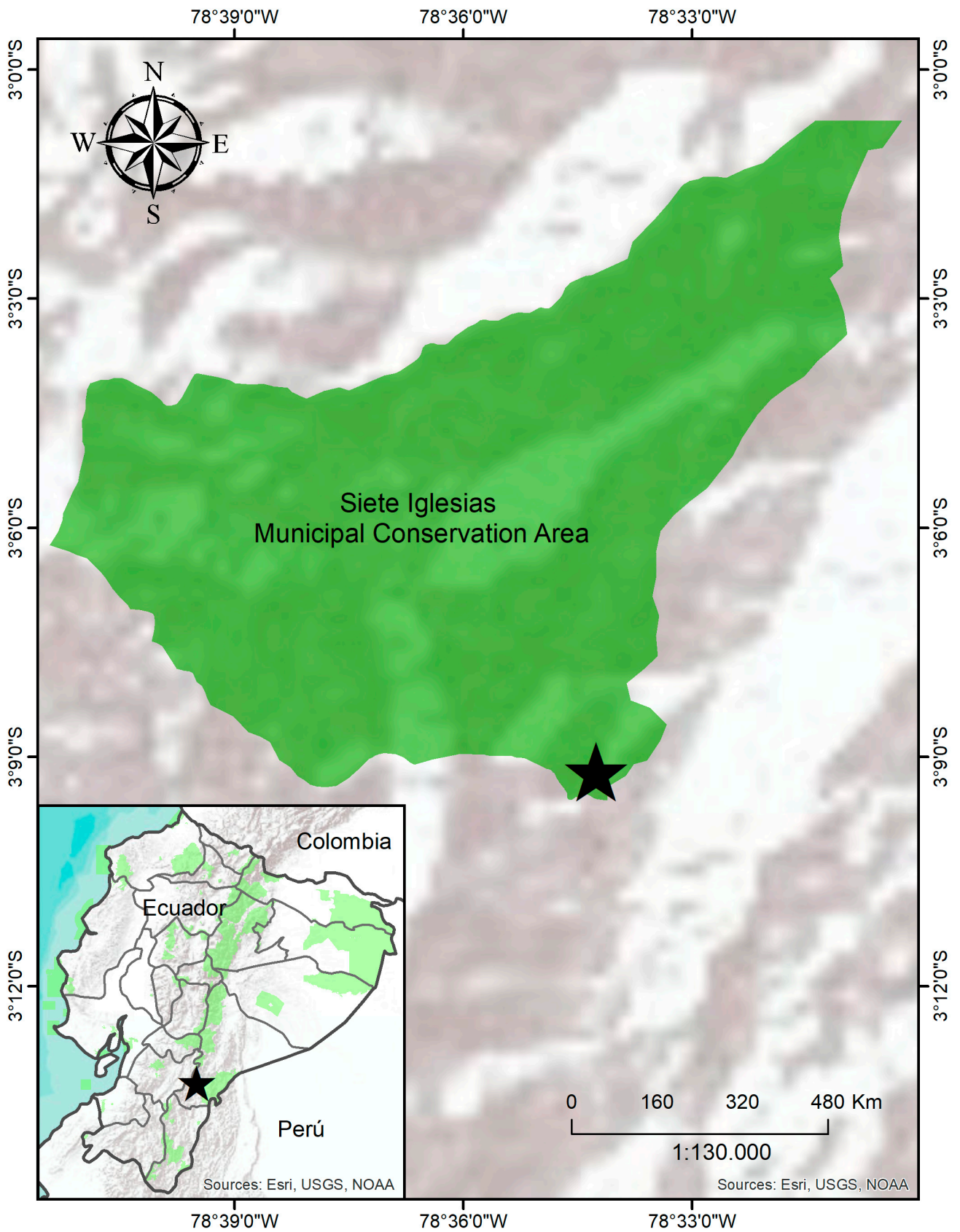


FIGURE 3. Distribution of *Meriania judithiae* in southeastern Ecuador. Prepared by Henry X. Garzón-Suárez using ArcGIS.



FIGURE 4. *Meriania judithiae* in situ. **A.** Habitat of the species. **B.** Terminal branches with inflorescences. **C** and **D.** Detail of the inflorescences. Photographs by H. Garzón-Suárez.

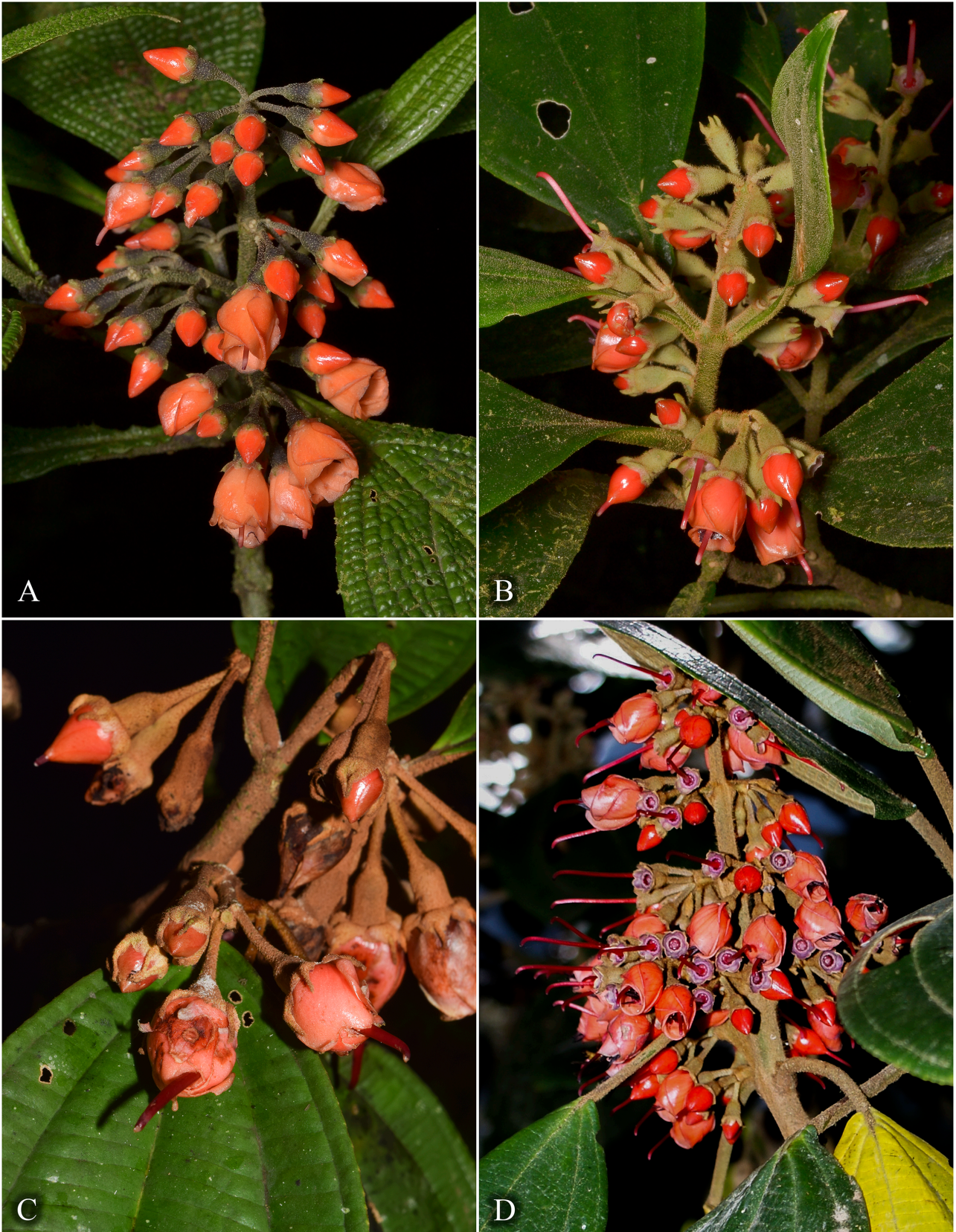


FIGURE 5. *Meriania* species with 5-nerved leaves and campanulate corollas. **A.** *Meriania judithiae* M.M. Jiménez & H. Garzón based on the type (Ecuador, Morona Santiago); **B.** *M. aff. cuneifolia* Wurdack based on *M. Jiménez 1803* (Ecuador, Morona Santiago); **C.** *M. bongarana* Rob. Fern., R. Goldenb. & Michelang. based on the type (Peru, Amazonas); **D.** *M. dimorphanthera* Wurdack based on *H. Mendoza 16675* (Colombia, Cundinamarca). Photos: by Henry Garzón-Suárez (A, B), Robin Fernandez-Hilario (C) and Humberto Mendoza-Cifuentes (D).

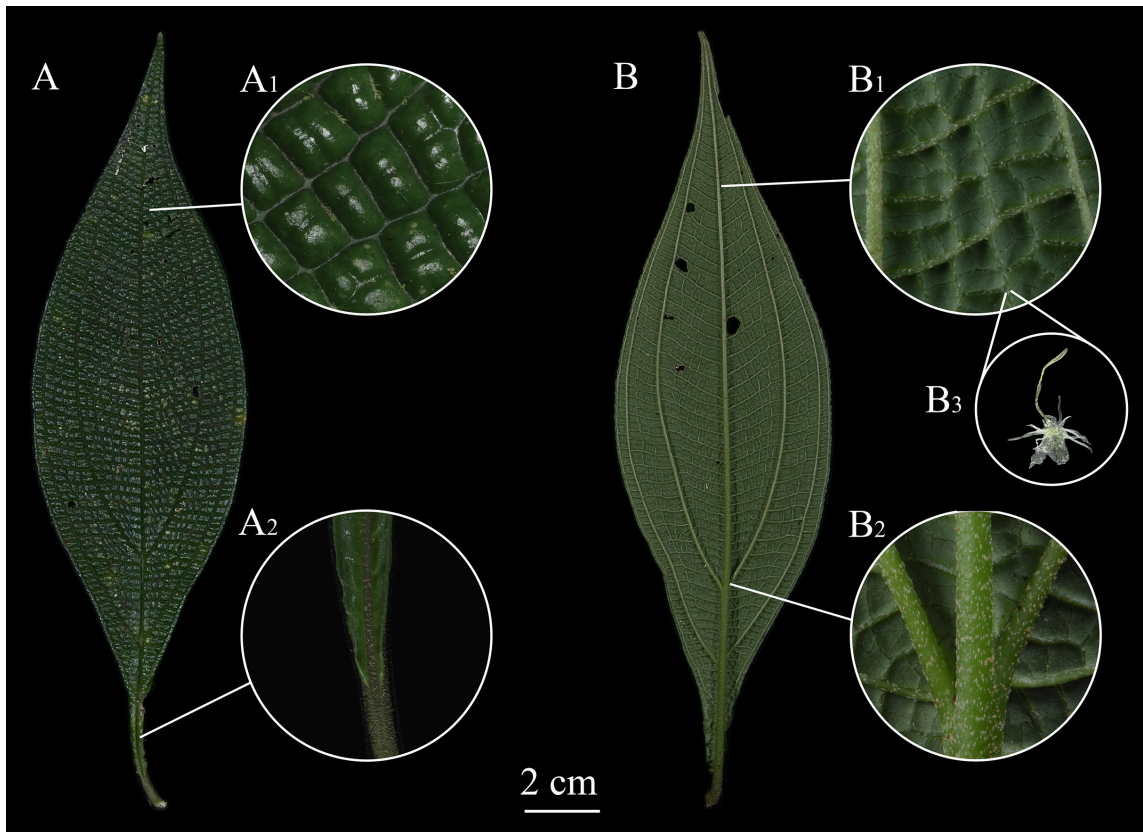


FIGURE 6. Leaves of *Meriania judithiae* with diagnostic details. **A.** Adaxial view with a close-up of the apical, bullate surface (A1) and base of the leaf (A2). **B.** Abaxial view with a close-up of the apical surface (B1) and basal portion of the leaf (B2) with trichome (B3). Photos by Henry X. Garzón-Suárez and Nelson Espinosa-Ortega (B3).

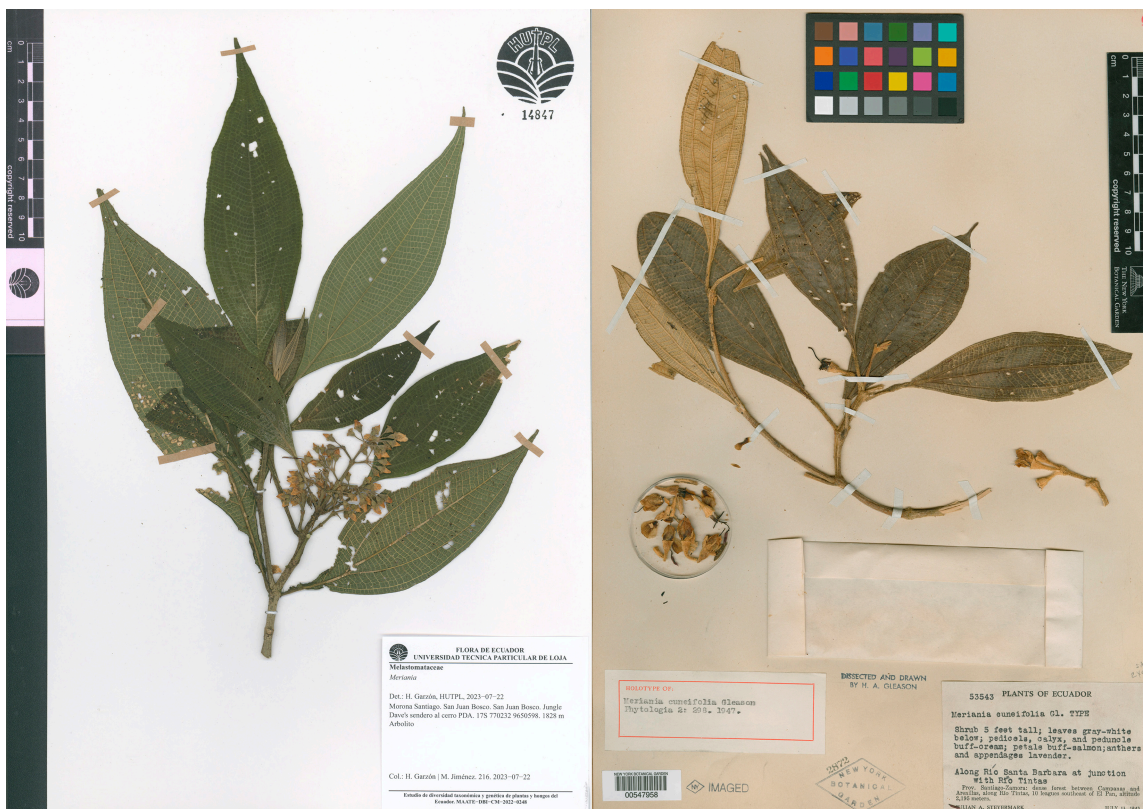


FIGURE 7. Comparison of the holotype specimens of *Meriania judithiae* (left) and *M. cuneifolia* subsp. *cuneifolia* (right). Holotype specimen of *Meriania cuneifolia* Gleason, collected in Ecuador, Morona Santiago, “Río Santa Bárbara near Río Tintas” by J.A. Steyermark in 1943. Reproduced with permission from the New York Botanical Garden Herbarium.

Both species have been reported in the southeastern Ecuadorian Andes and have not been found growing sympatrically. *Meriania judithiae* grows at elevations around 1800 m where it is restricted to the lower montane forests near the township of San Juan Bosco in Morona Santiago Province. On the other hand, according to the specimens of *J. Steyermark 53543* (NY-00547958) mentioned by Wurdack (1980) and *C. Chimbo & C. Chamba 89* (MO-1183106), *M. cuneifolia* subsp. *cuneifolia* inhabits higher elevations from 2100 to 2200 m where it grows in wet montane forests of the Morona Santiago and Zamora Chinchipe provinces. Considering the different ecological preferences, it is improbable there will be consistent gene flow between the two locations despite both being present in southeast Ecuador.

The new species is also similar to the Peruvian *Meriania bongarana* and the Colombian *M. dimorphantha*, as they are also characterized by leaves mostly elliptic, anisophyllous, acuminate, with two pairs of secondaries (lateral nerves) and the acrodromous and suprabaasal venation. However, *M. judithiae* is distinguished from *M. bongarana* by the attenuate leaf base (*vs.* cuneate), the bullate adaxial surface of the leaves (*vs.* flat), the shorter hypanthium of 3.4–3.9 mm long (*vs.* 6.5–7.0 mm long), the calyx with subtruncate lobes (*vs.* acute), each with a conical projection (*vs.* claw-shaped dorsal projection), the reddish-purple petals (*vs.* pink), the stamens with shorter filaments 5.4–5.8 mm long (*vs.* 8.0–8.5 mm long), and the red, shorter style 14.1–15.3 mm long (*vs.* magenta, 25.5–27.0 mm long) (Fernandez-Hilario *et al.* 2022).

TABLE 1. Summary of principal differences between *Meriania judithiae*, *M. cuneifolia* subsp. *cuneifolia*, *M. cuneifolia* subsp. *subandina*, *M. bongarana* and *M. dimorphantha*.

Species	<i>M. judithiae</i>	<i>M. cuneifolia</i> subsp. <i>cuneifolia</i> (Gleason 1947)	<i>M. cuneifolia</i> subsp. <i>subandina</i> (Wurdack 1976)	<i>M. bongarana</i> (Fernandez <i>et al.</i> 2022)	<i>M. dimorphantha</i> (Wurdack 1957)
Leaves	Anisophyllous, petioles 0.3–1.0 cm long; blades 6.1–27.1 × 1.2–8.2 cm, elliptic, apex long-acuminate, base cuneate-decurrent; venation suprabaasal, abaxial surface puberulous	Anisophyllous, petioles 2.0–3.0 cm long; blades 10–13 × 2.5–4.5 cm, oblanceolate, apex abruptly and sharply acuminate, base long-cuneate; venation suprabaasal, abaxial surface softly cinereous	Anisophyllous, petioles 0.7–0.9 cm long; blades 15–23 × 5–10 cm, elliptic, apex acuminate, base attenuate-decurrent; venation suprabaasal, abaxial surface sparsely stellate-setulose	Isophyllous; petioles 1.2–1.5 cm long; blades 7.5–9.5 × 3.2–4.3 cm, elliptic, apex acuminate, base acute; venation suprabaasal, abaxial surface densely pubescent	Anisophyllous, petioles 2.0–9.0 cm long; blades 7.0–24 × 3.2–14.0 cm, elliptic to oblong-elliptic; apex obtuse to shortly acuminate, base obtuse to slightly rounded; venation basal or slightly suprabaasal, abaxial surface densely rufous
Inflorescence	Multiflorous, 4.3–6.1 cm long, 4–8 flowered umbels	Few-flowered, 1.7–2.7 cm long, 3–4 flowered umbels	Submultiflorous, 6.0–7.9 cm long, 3–9 flowered umbels	Submultiflorous, 7.5–8.2 cm long, 4–5 flowered umbels	Multiflorous, 5.0–15.0 cm long, with umbels with more than 3 flowers
Hypanthium and calyx	Cupuliform, 3.4–3.9 mm long, calyx lobes 0.5–1.3 mm long, subtruncate, thickened to the apex, not extending beyond the lobes	Campanulate, 5.2 mm long, calyx lobes 8.5 mm long, acute with claw-shaped projections 6.0–7.5 mm long	Obconic, 7.3 mm long, calyx lobes 0.8–1.1 mm long, acute, subtruncate, claw-shaped projections 2.3–3.0 mm long	Campanulate, 6.5–7.0 mm long, calyx lobes 2.0–2.5 × 5–7 mm, acute with claw-shaped projections 2.0–2.5 mm long	Cupuliform, 3.5–6.0 mm long, calyx lobes broadly triangular with dorsal teeth non-visible or exceeding the length of the lobe 0.9–2.5 mm long
Corolla	Petals 11.1–11.3 mm long	Petals 13 mm long	Petals 13.1–13.4 mm long	Petals 14–15.5 × 13–16 mm long	Petals 12.0–16.0 mm long
Stamens	Isomorphic, filaments 4.4–5.8 mm long, connectives prolonged below the thecae, the dorso-basal appendage crown-shaped, thecae 5.4–5.8 mm long	Dimorphic, filaments 6.4–8.5 mm long, connectives prolonged below the thecae, the dorso-basal appendage broadly conic, obtuse or rounded, thecae 5.3–8.3 mm long	Dimorphic, filaments 8.0–9.5 mm long, connectives prolonged below the thecae, the dorso-basal appendage crown-shaped, thecae 7.6–9.7 mm long	Isomorphic, filaments 8.0–8.5 mm long, connectives prolonged below the thecae, the dorso-basal appendage slightly crown-shaped, thecae 8.5–9.0 mm long	Dimorphic, filaments 6.0–10.0 mm long, connectives prolonged below the thecae, the dorso-basal appendage dentiform, thecae 4.8–8.0 mm long
Style	14.1–15.3 mm long	21 mm long	21.5–22.4 mm long	25.5–27.0 mm long	14.0–23.0 mm long

Finally, *Meriania judithiae* is distinguished from *M. dimorphanthera* by the narrower, bullate leaf blades (*vs.* smooth) with the base being attenuate (*vs.* obtuse to rounded), the shorter hypanthium 3.4–3.9 mm long (*vs.* 3.5–6.0 mm long), the calyx lobes being subtruncate, not ruptured to the torus (*vs.* broadly triangular, subcalyprate) with a conical projection in the apex (*vs.* dorsal teeth exceeding or not the lobe), the isomorphic stamens (*vs.* dimorphic) with shorter filaments 4.4–5.8 mm long (*vs.* 6.0–10 mm long), the dorsal appendage of the connective crown-shaped (*vs.* dentiform), the shorter thecae 5.4–5.8 mm long (*vs.* 4.8–8.0 mm long), and the shorter style 14.1–15.3 mm long (*vs.* 14.0–23.0 mm long) (Mendoza-Cifuentes 2021). A summary comparing these morphological characters between *M. judithiae* and the other species as mentioned above is provided in Table 1.

Additional specimen examined (paratype):—ECUADOR. Morona Santiago: San Juan Bosco. San Juan Bosco, Jungle Dave’s sendero al Cerro PDA, 1815 m, 22 Julio 2023 (fl.), *M. Jiménez & H. Garzón 1810* (HUTPL 15146!).

Acknowledgments

A special thanks to David R. Goucher of Jungles Dave’s Science Foundation for funding botanical research in the Morona Santiago province of Ecuador. Also, Yero R. Kuethe and David R. Goucher are acknowledged for reviewing the English of this manuscript. To Jorge Armijos and Nelson Espinosa-Ortega for their valuable collaboration in this investigation. MMJ and GAI thank Universidad de Las Américas (UDLA) for funding orchid research in Ecuador which in part allowed the fieldwork (grant #527.A.XV.24). We thank the herbarium at the Universidad Técnica Particular de Loja (HUTPL) for their support in developing this research. The Ministerio del Ambiente, Agua y Transición Ecológica (MAATE) of Ecuador is acknowledged for granting the research permit MAATEDBI-CM-2022-0248. We thank Christian Villalta and Digner Medina for their support and help in the field. Thanks to Robin Fernandez-Hilario and Humberto Mendoza-Cifuentes for allowing the use of their photos. The authors also acknowledge Robin Fernandez-Hilario and Fabián Michelangeli for helping to improve this manuscript with their revisions.

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