



## A new species of *Miconia* (Melastomataceae: Miconieae) from the eastern slope of the Peruvian Andes

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### Abstract

*Miconia glandulipetala* is described as a new species from the eastern slope of the central Peruvian Andes. This new species is recognized as a member of the “*Leandra* + *Ossaea* (scorpioid)” clade based on its secund flowers and ovoid seeds with testa cells in an aligned pattern and par-convex periclinal walls. The taxon is easily recognized by the presence of 4-merous flowers, 4-locular ovaries, and a subapical glandular hair formed on the margin of each petal.

### Resumen

Se describe a *Miconia glandulipetala* como una especie nueva proveniente del área central de los Andes peruanos. El taxón nuevo se identifica como un miembro del clado “*Leandra* + *Ossaea* (escorpioide)” debido a la presencia de flores secundas y semillas ovoides con células dispuestas en un patrón alineado y con paredes anticlinales par-convexas. La especie se reconoce fácilmente por tener flores tetrámetras, ovarios tetraloculares y un pelo glandular subapical formado en el margen de cada pétalo.

Study of herbarium specimens for the Miconieae Planetary Biodiversity Inventory project allowed us to detect an undescribed species from Peru that is a member of the tribe Miconieae. The species, which is known from only one collection, can be placed in *Ossaea* Candolle sect. *Diclemia* (Naudin) Cogniaux (1891: 1062) because of its lateral inflorescences, secund 4-merous flowers with acute petals, and 4-locular ovaries. Molecular analyses have shown that the genera of Miconieae, including *Ossaea* Candolle (1828: 168), are not monophyletic (Goldenberg et al. 2008). One possible solution to this problem includes the recircumscription of *Miconia* Ruiz & Pavón (1794: 60) to incorporate the total range of morphological variation found within the tribe (Ionta et al. 2012). This approach will require the creation of numerous new names and transfers to the genus *Miconia*, which will add to the already complicated taxonomic history of the genus (see Goldenberg et al. 2013 for an account of *Miconia* names). However, Ionta et al. (2012) argue that this may be the best solution to avoid non-monophyly within Miconieae because it would include a clade within the tribe that is diagnosed by the synapomorphy of berry fruits. Because of the large number of accepted *Miconia* names (more than half of the species of the Miconieae), an expanded circumscription under *Miconia* would create less nomenclatural instability than transferring the remaining species names to *Maieta* Aublet (1775: 443) or *Tococa* Aublet (1775: 437), names that have priority under the current code of botanical nomenclature (McNeill et al. 2012). Additionally, *Miconia* is already a conserved name against *Tamonea* Aublet (1775: 411), *Leonicenia* Scopoli (1777: 212), *Lieutatia* Buchoz (1779: 10), and *Zulatia* Necker (1790: 117) (Farr et al. 1979, Goldenberg et al. 2013). An alternative scenario would necessitate the disintegration of large genera into smaller ones, but this approach would likely create dozens of morphologically ill-defined monophyletic genera (Michelangeli et al. unpublished data). Here we opted for describing the new species under *Miconia*, following the expanded *Miconia* approach adopted in the recent literature (e.g., Ionta et al. 2012, Judd & Majure 2013, Majure & Judd 2013, Michelangeli & Meier 2013; but see Goldenberg & Reginato 2013, Reginato & Goldenberg 2013).

## Materials and methods

Herbarium specimens were studied with a Wild Heerbrugg M5A dissecting scope (Leica Geosystems, Heerbrugg, Switzerland). For scanning electron microscopy (SEM) observation, seed samples were sputter-coated with a mixture of gold-palladium and studied with a Zeiss/LEO 1450VP SEM (LEO, Cambridge, UK).

## Results

### Description of the new species

*Miconia glandulipetala* Ocampo & Almeda, *sp. nov.*

*Miconia glandulipetala* resembles *Leandra caquetensis* because of the presence of 4-merous flowers and 4-locular ovaries, but it is recognized by its axillary inflorescences and petals with subapical glandular hairs.

TYPE:—PERU. Junín: 3–5 km NW of Chequitavo, 1200 m, 10°45'S, 74°23'W, 3 April 1984, *D.N. Smith 6710* (holotype: USM!; isotypes: CAS!, MO!). Figures 1–2.

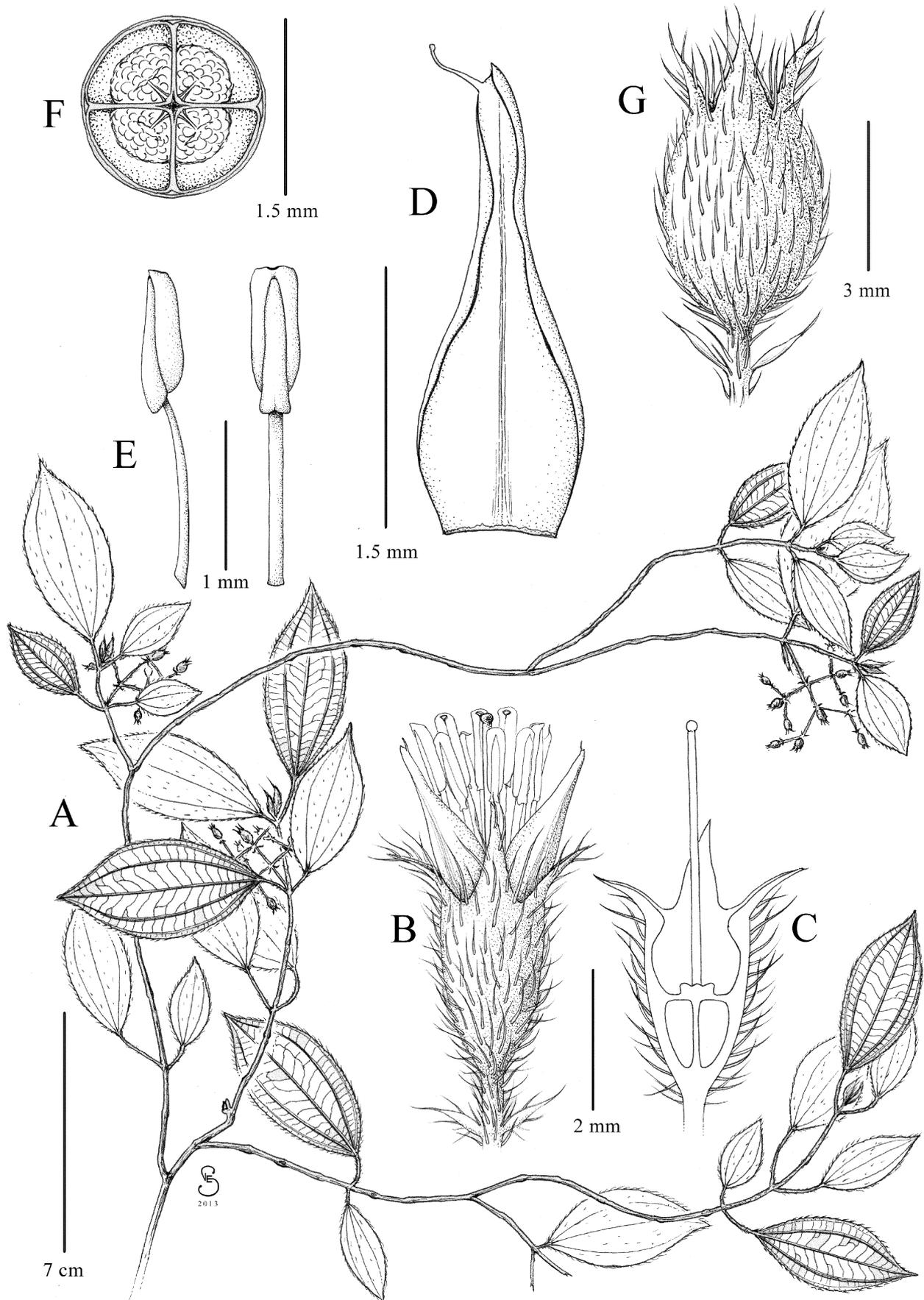
Shrub 0.5–0.8 m tall, the uppermost cauline internodes, inflorescence branches, and hypanthia moderately to densely covered with simple, appressed, strigillose hairs (0.3–)0.7–1.6 mm long, and with an inconspicuous layer of glandular hairs < 0.1 mm long. Leaves of a pair subequal to up to 30% unequal in size; petioles (0.5–)0.8–2.1 cm long, the blades 2–7 cm long, (0.9–)1.3–3.4(–3.7) cm wide, 5-nerved or if 5-plinerved then the innermost pair of secondary veins diverging from the midvein up to 0.5 cm above the blade base, the blades elliptic to ovate-elliptic, the apex short acuminate, the base acute to widely acute, the margin crenulate to sometimes crenulate-dentate, ciliate, sparsely pubescent on both sides. Inflorescence an axillary pauciflorous panicle (up to 12 flowers) with cymose helicoid branches, 1.8–2.5 cm long, 1.5–2 cm wide; flowers 4-merous, secund, on pedicels 0.5–1.2 mm long; the bracteoles 1.0–1.5 mm long, 0.3–0.5 mm wide, ovate to obtrullate, the apex long acuminate, persistent. Calyx tube up to 0.2 mm long, the calyx lobes 0.35–0.5 mm long, 0.7–0.9 mm wide, rounded, the calyx teeth 1.4–1.7 mm long, ca. 0.5 mm wide at the base, lanceolate. Petals 2.4–2.6 mm long, 0.5–0.9 mm wide, lanceolate, the apex acute, with a subterminal glandular hair formed on the margin, 0.2–0.4 mm long, oriented toward the abaxial surface of the petal. Stamens 8, filaments glabrous, 1.3–1.7 mm long, anthers 1–1.1 mm long, 0.25–0.3 mm wide, isomorphic, oblong, 2-celled with a ventrally inclined pore, connective prolonged ca. 0.1 mm at the base, slightly bilobed. Ovary 4-locular, 9/10 inferior to fully inferior, covered by inconspicuous glandular hairs < 0.08 mm long, collar ca. 0.2 mm long. Styles 3.0–3.5 mm long, glabrous, stigma punctiform. Berries 3.5–4.2 mm long, 2.5–3.1 mm wide when dry, botuliform. Seeds ovoid, 0.25–0.3 mm long, 0.17–0.2 mm wide; lateral symmetrical plane ovate, the highest point toward the chalazal side or the central part of the seed, antiraphal symmetrical plane ovoid to elliptic; raphal zone elliptic to obovate, > 70% the length of the seed; appendage absent, but sometimes a small protuberance on the chalazal side may be present; cells arranged in an aligned pattern; individual cells elongated, anticlinal boundaries channeled, undulate, with U- and  $\Omega$ -type patterns; periclinal walls par-convex, par-domed, microrelief verrucose.

**Distribution**—*Miconia glandulipetala* is only known from the type locality, described as a “perturbed primary forest” on the eastern slope of the central Peruvian Andes at 1200 m. According to Pennington et al. (2004) this corresponds to the lower montane wet forest that occurs between 500–1500 m on the lower Amazonian slopes of the Andes, which is similar to and shares many species and genera with lowland Amazonian forests.

**Phenology**—The few available flowers and abundant fruits suggest that April may correspond to the late flowering season.

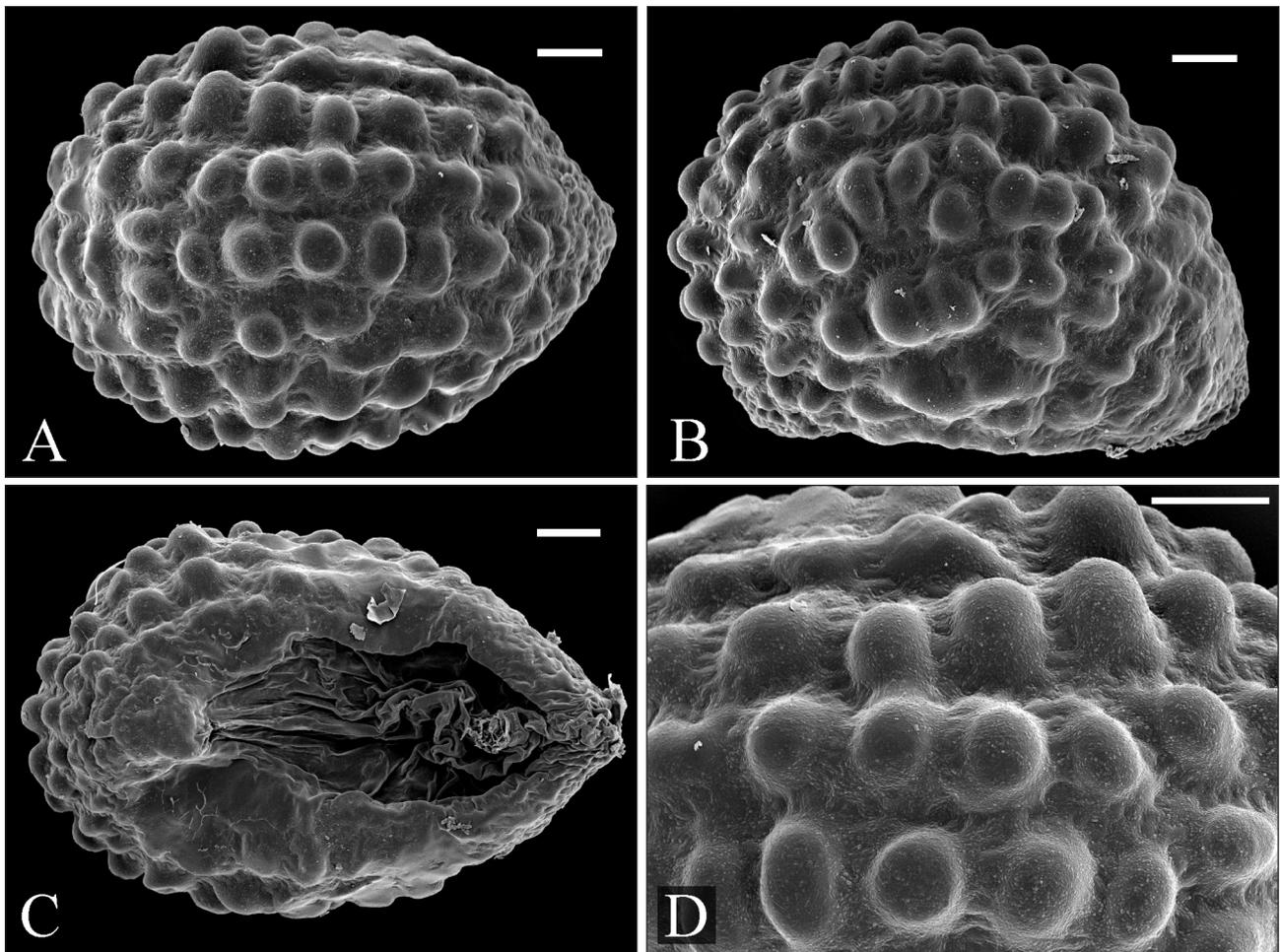
**Etymology**—The specific epithet refers to the subterminal glandular hair that is present on the margin of the petals, a distinctive feature among the species of the “*Leandra* + *Ossaea* (scorpioid)” clade (see below).

**Discussion**—The morphological features of *M. glandulipetala* agree with those of *Ossaea* sect. *Diclemia*, which have 4-locular ovaries and 4-merous flowers arranged on one side of the branches of the panicle. Analyses of DNA sequence data have shown that species of this section and taxa that belong to *Leandra* Raddi sect. *Secundiflorae* (Candolle) Cogniaux (1886: 192) form a strongly supported clade, which has been informally named



**FIGURE 1.** *Miconia glandulipetala* Ocampo & Almeda. **A.** Branches with infructescences. **B.** Flower at anthesis. **C.** Longitudinal section of a flower (petals and stamens removed). **D.** Petal showing a subapical glandular hair. **E.** Stamens in lateral (left) and dorsal (right) views. **F.** Transversal section of an ovary. **G.** Mature berry.

as the “*Leandra + Ossaea* (scorpioid)” clade (Goldenberg et al. 2008, Martin et al. 2008). The clade consists of ca. 30 shrubby species distributed from southern Mexico to northern South America. A number of them have wide distribution ranges [e.g., *L. dichotoma* (Pavón ex. D.Don) Cogniaux (1886: 200), *L. granatensis* Gleason (1937: 319), *L. longicoma* Cogniaux (1886: 202), *Ossaea quadrisulca* (Naudin) Wurdack (1973: 408)], while some others are narrow endemics [e.g., *L. neblinensis* Wurdack (1964: 163), *L. rotundifolia* J.F. Macbride (1941: 339), *Ossaea secundiflora* Cogniaux (1907: 361)]. The members of this clade can be distinguished by the presence of a combination of characters such as the presence of ovoid seeds with cells arranged in an aligned pattern, with parconvex periclinal walls [except *O. capillaris* (D.Don) Cogniaux (1888: 550)], and flowers arranged in a cymose helicoid pattern. This arrangement has been termed as “scorpioid” for the members of this clade (Goldenberg et al. 2008, Martin et al. 2008, Martin & Michelangeli 2009), which describes an inflorescence with flowers that develop, alternately, on both sides of the rachis. As the flowers of these species are born on one side of the branches, the term “helicoid cyme” should be used for describing the branch architecture of the inflorescences in this clade (Radford et al. 1976, Sousa & Zárate 1988).



**FIGURE 2.** Scanning electron microscopy images of the seeds of *Miconia glandulipetala* Ocampo & Almeda. **A.** Antiraphal view. **B.** Lateral view. **C.** Raphal view. **D.** Close-up of the testa cells. Scale bars = 0.03 mm.

*Miconia glandulipetala* is morphologically similar to *L. caquetensis* Gleason (1930: 64), a taxon ranging from southern Colombia to Peru that is traditionally considered a member of *Leandra* sect. *Secundiflorae*. Similarities between both species include the presence of 4-merous flowers, 4-locular ovaries, and petals with a subapical hair. However, the petal subapical hairs of *M. glandulipetala* are glandular, a character that is not present in other known members of the “*Leandra + Ossaea* (scorpioid)” clade. In addition, those two species differ in the position of the inflorescence, as well as in the size and shape of other foliar and floral characters (Table 1). Species of this clade

like *L. dichotoma*, *L. retropila* Cogniaux (1886: 198), *L. secunda* (D. Don) Cogniaux (1886: 199), and *Ossaea quadrisulca* (Naudin) Wurdack (1973: 408) may co-occur with *M. glandulipetala*, but they can be discriminated from the new taxon by a number of morphological characters (Table 1). Because the new species can be diagnosed by a unique combination of morphological traits, it can fit the morphological-phenetic (Judd 2007) and phylogenetic (Wheeler & Platnick 2000) species concepts.

The flowers are only known from the isotype deposited at CAS. It is noteworthy that one flower had an anther with a basal-dorsally inserted glandular hair on the connective, ca. 0.6 mm long. However, the rest of the anthers, like the anthers from a second flower, lacked the glandular hair, so it is likely that its presence in only one anther is due to a developmental anomaly. Further collections may clarify if the glandular hairs found on the flowers are a consistent trait present in all individuals of *M. glandulipetala*.

**TABLE 1.** Characters that discriminate *Miconia glandulipetala* from the morphologically similar *Leandra caquetensis* and four other species of the “*Leandra* + *Ossaea* (scorpioid)” clade that may co-occur with the new taxon.

Character / species	<i>M. glandulipetala</i>	<i>L. caquetensis</i>	<i>L. dichotoma</i>	<i>L. retropila</i>	<i>L. secunda</i>	<i>Ossaea quadrisulca</i>
Leaf shape	elliptic to ovate-elliptic	lanceolate	elliptic-ovate to ovate	elliptic-ovate to ovate	elliptic-ovate to ovate	elliptic to ovate-elliptic
Leaf apex	short acuminate	gradually acuminate	gradually acuminate	gradually acuminate	short acuminate	gradually acuminate
Inflorescence position	axillary	terminal	terminal	terminal	terminal	axillary
Inflorescence length	1.8–2.5 cm	4–13 cm	9–20 cm	2–6 cm	4–10 cm	4–11 cm
Bracteole shape	ovate to obtrullate	subulate	ovate to obtrullate	subulate	oblong to subulate	lanceolate to subulate
Flower merosity	4	4	5	5	5	5
Calyx teeth length	1.4–1.7 mm	0.9–1 mm	1–1.5 mm	0.8–1 mm	0.5–0.8 mm	0.7–1.2 mm
Petal subterminal hair	glandular	eglandular	absent	absent	absent	absent
Anther filament length	1.3–1.7 mm	2–2.3 mm	2.5–3.5 mm	2.2–2.5 mm	2.5–2.8 mm	1.5–2.5 mm
Anther length	1–1.1 mm	0.6–0.7 mm	1–1.5 mm	1–1.3 mm	0.9–1.3 mm	0.9–1.5 mm
Ovary locules	4	4	5	5	5	(3–)4–5
Known distribution	Peru	Colombia, Ecuador, Peru	Central America, Colombia, Ecuador, Peru, Bolivia, and Brazil.	Ecuador, Peru, and Brazil	Colombia, Ecuador, Peru, Venezuela, and Brazil	Costa Rica, Colombia, Ecuador, Peru, Bolivia, Brazil, and French Guiana

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