

See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/335312135>

# A NEW SPECIES OF DIASTEMA (GESNERIACEAE) FROM THE EASTERN ANDEAN SLOPES OF PERU

Article in *Edinburgh Journal of Botany* · August 2019

DOI: 10.1017/S0960428619000192

---

CITATIONS

0

---

READS

118

2 authors:



[John Littner Clark](#)  
University of Alabama

89 PUBLICATIONS 646 CITATIONS

[SEE PROFILE](#)



[Peter Moonlight](#)  
Royal Botanic Garden Edinburgh

25 PUBLICATIONS 255 CITATIONS

[SEE PROFILE](#)

Some of the authors of this publication are also working on these related projects:



Evolutionary biology [View project](#)



Taxonomic Revision of the Neotropical genus *Drymonia* (Gesneriaceae) [View project](#)

## A NEW SPECIES OF *DIASTEMA* (GESNERIACEAE) FROM THE EASTERN ANDEAN SLOPES OF PERU

J. L. CLARK<sup>1,2</sup> & P. W. MOONLIGHT<sup>3</sup>

A striking new species of *Diastema*, *D. fimbriatiloba*, is described from Ucayali Region, along the eastern Andean slopes in central Peru. The new species has a fimbriate lower corolla lobe, a feature not previously documented in the genus. We also provide a general comparison of the newly described species and morphologically related species in the context of the taxonomy and phylogeny of the poorly known genus *Diastema*.

*Keywords.* *Diastema*, Gesneriaceae, Peru.

### INTRODUCTION

The genus *Diastema* is endemic to the Neotropics and ranges from Bolivia to Mexico. It is one of the least-studied genera in the New World Gesneriaceae, and its most recent revision was provided by Bentham (1846). *Diastema* was described by Bentham (1844 [1845]) based on material of *Diastema racemiferum* Benth. from western Ecuador (Island of Solango, Manabí), collected on the voyage of the HMS *Sulphur* under the command of Sir Edward Belcher (1836–1842).

Recent literature of *Diastema* has been limited to floras and country checklists of vascular plants (e.g. Skog, 1978; Brako & Zarucchi, 1993; Skog, 1999; Clavijo *et al.*, 2015). Colombia, Ecuador and Peru are probably the most species-diverse countries for *Diastema* based on published checklists. In addition, these three countries have more unidentified specimens relative to neighbouring countries as represented in herbaria (e.g. COL, MO, NY, QCNE, US and USM). There are currently nine known species of *Diastema* from Ecuador (Skog, 1999), six species from Peru (Brako & Zarucchi, 1993) and six species from Colombia (Clavijo *et al.*, 2015). More recently, Chautems *et al.* (2018) discovered unidentified populations of *Diastema* in the Brazilian states of Acre, Amazonas, Rondônia and Pará. The species featured in Chautems *et al.* (2018) is referred to as '*Diastema* sp. 1' and probably represents a new species that greatly expands the geographical distribution of *Diastema* to include Brazil.

Most species of *Diastema* have broad ranges that span several countries. Species with limited geographical ranges are usually known from single collections and probably represent synonyms instead of locally rare endemics. The International Plant Names Index lists 46 published names, but most of those are synonyms. *Diastema gymnoleuca* Gilli is

<sup>1</sup> Department of Biological Sciences, The University of Alabama, Box 870345, Tuscaloosa, AL 35487, USA.

<sup>2</sup> Science Department, Lawrenceville School, 2500 Main Street, Lawrenceville, NJ 08648, USA.  
E-mail: [jclark@lawrenceville.org](mailto:jclark@lawrenceville.org)

<sup>3</sup> Royal Botanic Garden Edinburgh, 20A Inverleith Row, Edinburgh EH3 5LR, Scotland, UK.

from the western slopes of the Ecuadorian Andes and is the only species in the genus that has been described during the past six decades (Gilli, 1983).

The systematics of *Diastema* was briefly discussed in a recent doctoral dissertation on *Monopyle* (Keene, 2013) but is otherwise poorly known. A taxonomic revision and broader phylogenetic analysis that includes this group is desperately needed. There are approximately twenty currently recognised species of *Diastema* (Wiehler, 1983; Roalson *et al.*, 2005a; Weber, 2004).

Members of the *Diastema* are often-slender perennial low-growing herbs with scaly rhizomes and leaves that are isophyllous, membranous, and brittle when dry. The leaf margins are crenate to dentate. The inflorescences are derived from highly reduced pair-flowered cymes and appear racemose (e.g. *Diastema racemiferum* Benth.) or reduced to single axillary flowers (e.g. *D. affine* Fritsch). The calyx lobes are nearly free. The corollas are usually tubular, nearly straight, and typically white with a single blue spot at the base of each corolla lobe (Fig. 1). Nectaries comprise five elongate glands of equal length, and the stigma is bilabiate. Stamens are adnate to the corolla base. The ovary is semi-inferior. The fruit is an obovoid bivalved capsule that dehisces on the dorsal surface.

*Diastema* is a member of the subfamily Gesnerioideae Burnett, tribe Gesnerieae Dumort. and subtribe Gloxiniinae G. Don (Weber *et al.*, 2013). The subtribe Gloxiniinae includes 21 genera and more than 200 species, all of which are endemic to the Neotropics (Weber *et al.*, 2013). Phylogenetic analyses of molecular sequence data strongly support that most *Diastema* spp. share a recent common ancestor with *Gloxinella*, *Monopyle* and *Phinaea* (Roalson *et al.*, 2005a, 2005b). One exception is *Diastema vexans* H.E. Moore, which is morphologically similar to most *Diastema* spp. Similarities that *Diastema vexans* shares with other members of *Diastema* are tubular white corollas with a large blue spot at the base of each corolla lobe (see Fig. 1). However, the phylogenetic placement of *Diastema vexans* as sister to a clade that includes *Amalophyllon*, *Kohleria* and *Pearcea* (Roalson *et al.*, 2005a, 2005b) renders the current circumscription of the genus as polyphyletic. A reclassification of the Gloxiniinae by Roalson *et al.* (2005b) recognised *Diastema vexans* as phylogenetically different from other congeners but it was retained as a dubious member of *Diastema*.

#### TAXONOMIC TREATMENT

##### ***Diastema fimbratiloba* Moonlight & J.L. Clark, sp. nov.**

*Diastema fimbratiloba* differs from all other known congeners by the presence of fimbriations on the lower corolla lobe. – Type: Peru, Ucayali Region, Coronel Portillo Province, c.500 m beyond Margariti on path from Divisora pass, 1630 m, 09°09' 54''S, 75°47'59''W, 7 ii 2016, P.W. Moonlight & A. Daza 197 (holo MOL; iso E [E00885503], MO, USM). **Figs 2, 3.**

Small herb. *Stems* erect, 5–15 cm tall, sparsely covered with white trichomes, the internodes green. *Leaves* opposite, often appearing apically clustered on stem; blades ovate, membranous, translucent when dry, 1.5–6 × 1.2–4 cm, the apex obtuse to acute, the

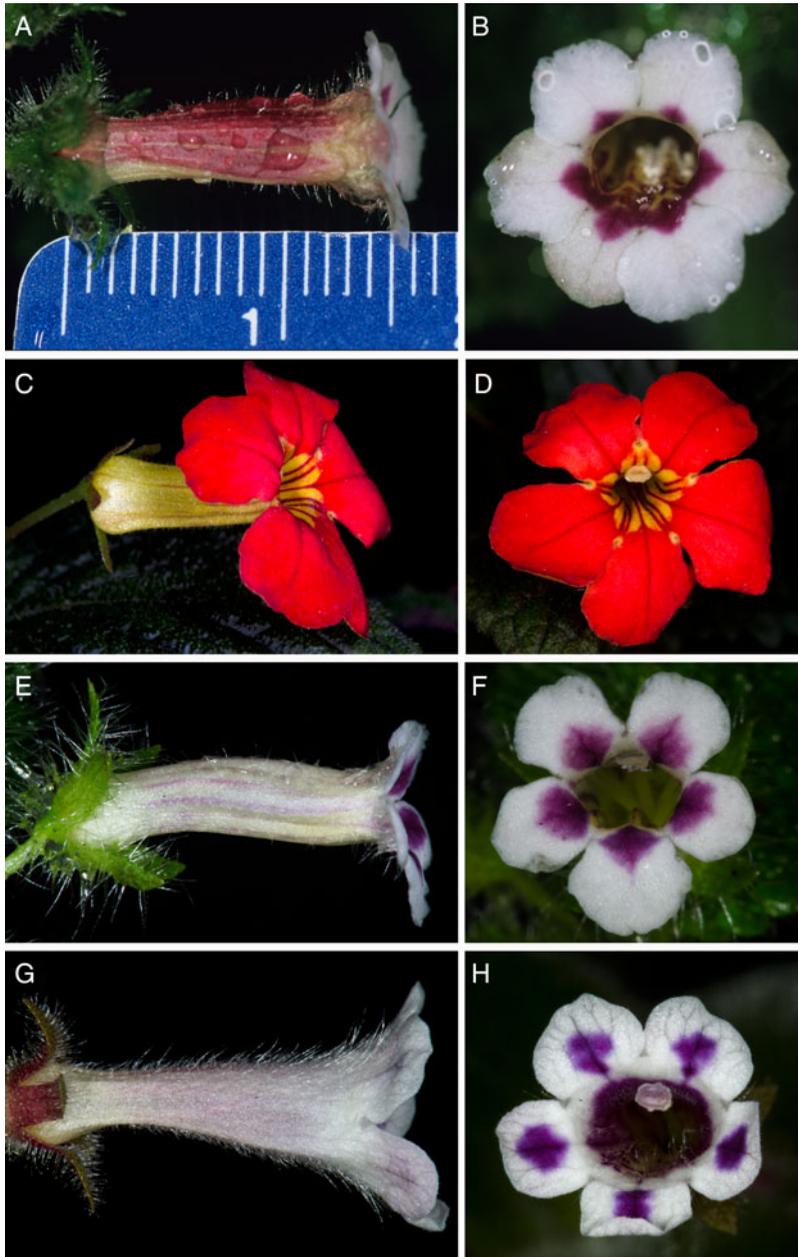


FIG. 1. Lateral and front views of corollas from a broad range of *Diastema* species. A and B, *Diastema hispidum* (DC.) Fritsch; C and D, *Diastema comiferum* (DC.) Benth. ex Walp.; E and F, *Diastema affine* Fritsch; G and H, *Diastema vexans* H.E.Moore. All photographs taken by J. L. Clark: A and B, *J.L. Clark* 8581 (US); C and D, *J.L. Clark* 13084 (US); E and F, *J.L. Clark* 13569 (US); G and H, *J.L. Clark* 13077 (US).

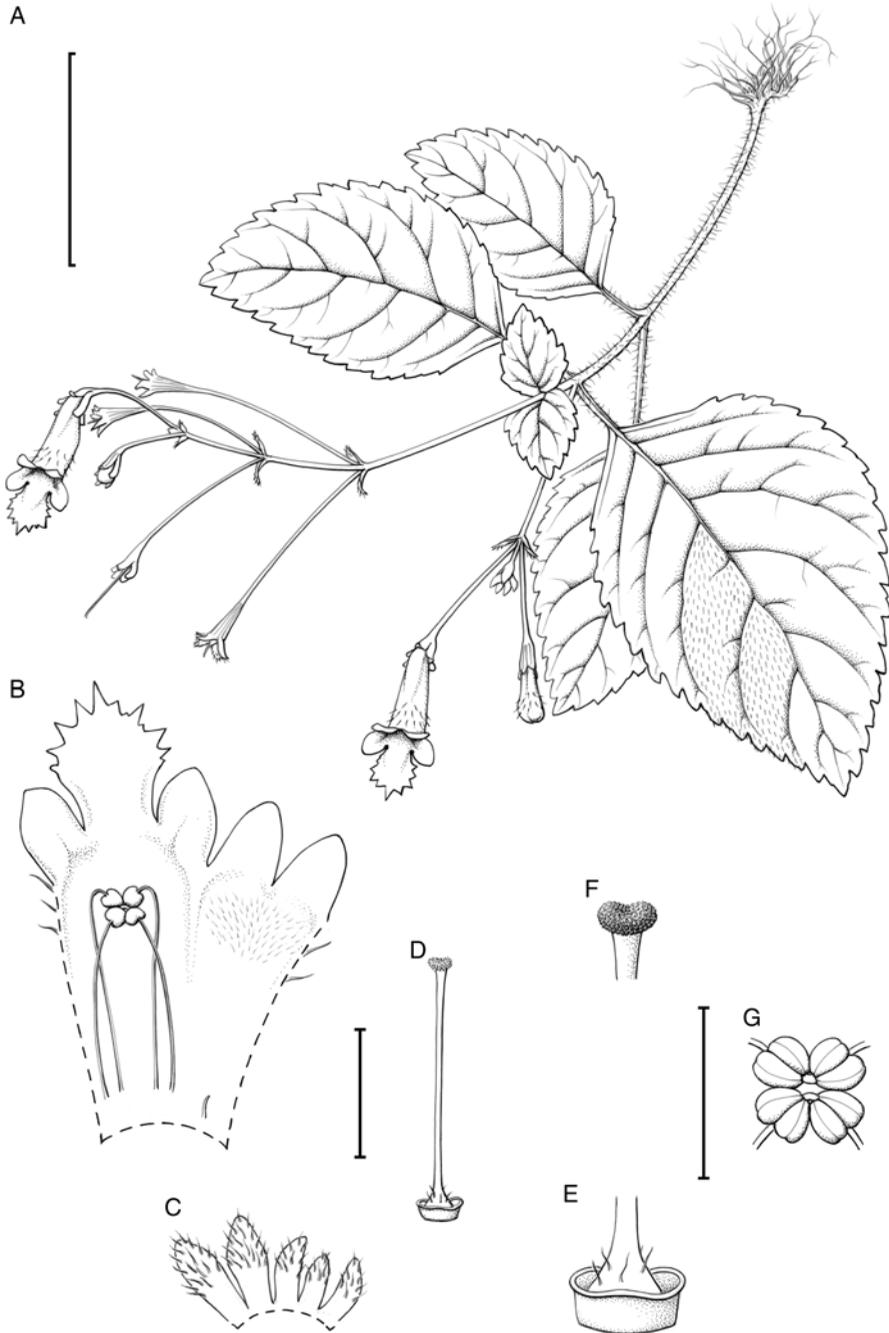


FIG. 2. *Diastema fimbratiloba* Moonlight & J.L. Clark, sp. nov. A, Habit; B, dissected corolla tube, showing the androecium; C, abaxial view of the calyx lobes; D, gynoecium, side view; E, nectary and base of the gynoecium, side view; F, stigma, side view; G, anthers, bottom view. Scale bars: A, 3 cm; B–D, 6 mm; E–G, 3 mm. Illustration by C. Banks from the type collection.



FIG. 3. *Diastema fimbriatiloba* Moonlight & J.L.Clark, sp. nov. A, Front view of flower; B, lateral view of flower; C and D, habit; E, lower leaf surface; F, upper leaf surface. All photographs taken by P. W. Moonlight of the type collection in the field.

base often oblique, cuneate to rounded, the margin serrate, above light green or dark green, sparsely pilose, beneath pale green, sparsely pilose on the veins and glabrous between the veins; petioles 0.3–2.1 cm long, green, sparsely pilose. *Inflorescences* solitary, terminal, erect, appearing racemose, 3.5–7.5 cm long; unbranched portion of peduncle to 2.8 cm, exceeding the petiole of the subtending leaf, green, glabrate, bracts and bracteoles not clasping the pedicel, lanceolate, 2–4.5 mm long and 1–2.5 mm wide; pedicels slender, to c.2 cm. *Flowers* several per inflorescence; hypanthium shallowly funnelliform at anthesis, 1–2 mm long, c.0.5 mm wide, elongating in fruit to 7 mm long, 2 mm wide, green, glabrescent; calyx lobes similar in shape and size, linear to lanceolate, c.2.5 × c.1.5 mm, acute, glabrous outside, sparsely pilose inside; corolla tube campanulate, slightly latitudinally compressed, 0.9–1.2 mm long, c.3 mm wide just above the base, broadening to c.7 mm wide below the limb, white or lilac to bronze, especially near the base outside, inside mostly purple with an elongate whitish lower strip suffused with purple spotting, glabrous with a 2 mm wide band of pilose trichomes around the upper inside region of the corolla tube, the upper four lobes triangular, 2–3 × 2–3 mm, the margins entire, lilac, the lower lobe broadly trullate, 4–7 × 4–6 mm, the margins entire to fimbriate at the apex, lilac; stamens 4, didynamous, included, the shorter two filaments c.9 mm long, the longer two filaments c.10 mm long, the anthers broadly cordate, 0.8 × 0.7 mm, dehiscing via lateral slits, the connective extended to c.0.2 mm, staminode c.1.5 mm long; nectary disc cupuliform, 1.2–2 mm wide, edges raised 0.2–0.4 mm, margin revolute, slightly undulate; ovary apex sparsely pilose, the style equalling the length of the stamens, glabrous, the stigma bilobed, reniform, papillose. *Capsule* unknown; seeds unknown.

*Distribution and ecology.* The species is known from a single, small population on the Divisora pass between Ucayali and Huánuco Regions of Peru (Fig. 4). It was found growing on a humid, moss-covered bank adjacent to a footpath in the dappled shade of a disturbed cloud forest at c.1630 m. A recently posted digital image on the image-hosting service Flickr by Shirley Sekarajasingham (Bainbridge Island, Washington, USA) features an additional species of *Diastema* with a fimbriate lower corolla lobe. The locality of the image is reported as being from the environs of Atalaya in Peru, but no collection exists.

*Phenology.* The species has been collected in flower in February.

*Etymology.* The species is named for the distinctive fimbriations on the lower corolla lobe. Fimbriations are common in several genera of New World Gesneriaceae (especially *Drymonia* Mart.), but no currently known described species in *Diastema* is known for this feature. It is possible that other species of *Diastema* have fimbriate corolla margins (cf. note above regarding the population without collection from Atalaya, Peru), but this is a difficult character to evaluate from collections, because the flowers are delicate and ephemeral. As a result, corolla features in *Diastema* are not readily available on most herbarium specimens.

*Proposed IUCN conservation assessment.* Data Deficient (DD) (IUCN, 2012). The species is known from a single collection made outside protected areas but close to the southern

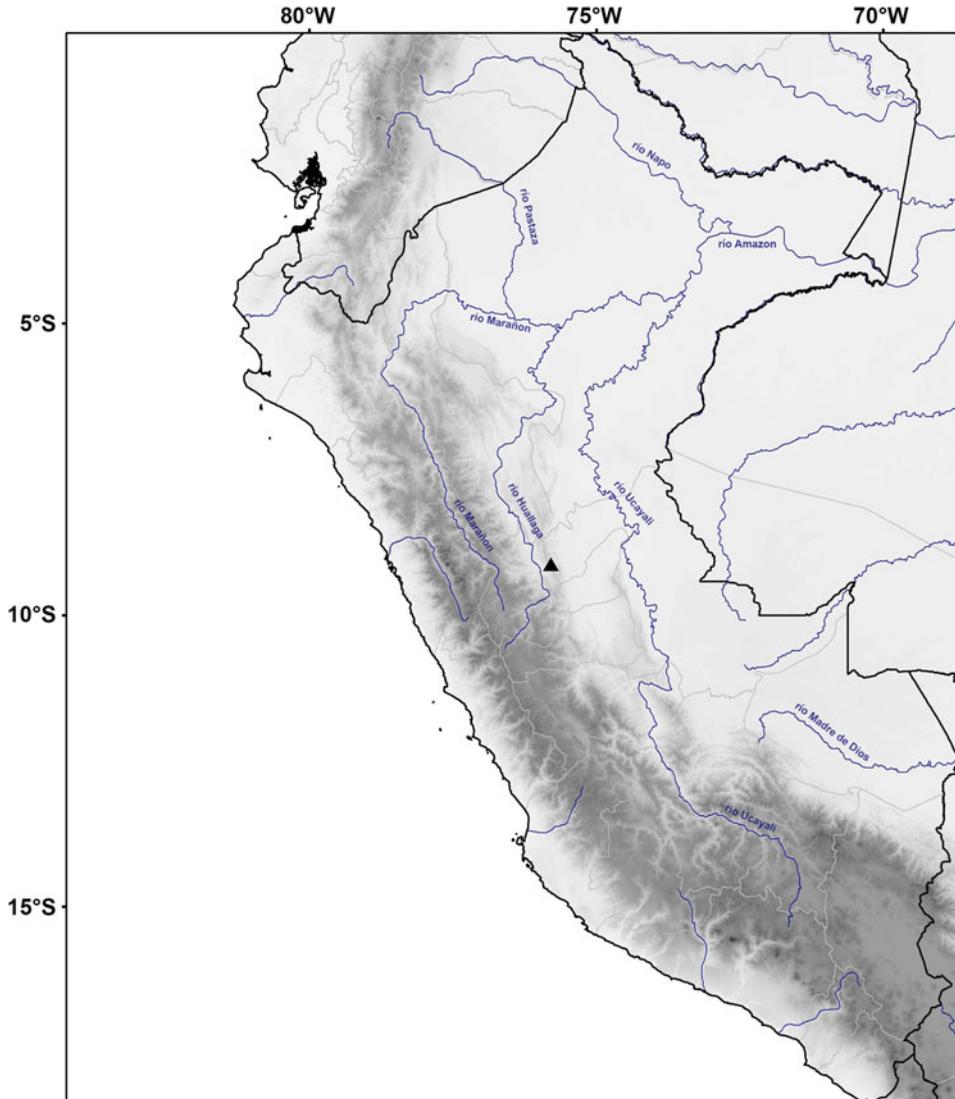


FIG. 4. Known distribution of *Diastema fimbriatiloba* Moonlight & J.L. Clark, sp. nov., showing major rivers and political divisions. Shading indicates elevation.

limits of Parque Nacional Cordillera Azul, which includes extensive and well-protected cloud forest at similar altitudes to the type locality. We consider it likely that the species is also found in the adjacent protected area. No data is available on population trends.

The new species is vegetatively similar to *Diastema affine* by the basally clustered leaves that are extremely brittle when dried. Most *Diastema* spp. have tubular white flowers

(e.g. Fig. 1E,G). In contrast, the corolla tube of *Diastema fimbriatloba* is white suffused with purple and basally amplified (Fig. 3A,B). The corolla lobes in most *Diastema* spp. have a single blue spot on each lobe (Fig. 1F,H). *Diastema fimbriatloba* differs by the dark purple ring at the throat (Fig. 3A) and the absence of a prominent blue spot (Fig. 1F,H). The most distinctive feature of *Diastema fimbriatloba* is the fimbriations on the lower corolla lobe (Figs 2B, 3D). In contrast, all other currently known species of *Diastema* have corolla lobes that are entire and similar in shape and size (see Fig. 1). Given this is the only character by which the new species differs from the generic description of *Diastema* provided above and in the absence of a well-sampled phylogeny to confirm its placement within the genus, we place *Diastema fimbriatloba* in *Diastema*.

#### ACKNOWLEDGEMENTS

We thank the Ministerio del Ambiente del Perú (MINAM) for granting us permission to conduct the fieldwork and collect specimens, and the University of Edinburgh Davis Expedition Fund, the James and Eve Bennett Trust, and the American Begonia Society for funding the fieldwork. We also thank Claire Banks for providing the artwork of *Diastema fimbriatloba*. We thank Alain Chautems and an anonymous reviewer for providing helpful comments on the manuscript.

#### REFERENCES

- BENTHAM, G. (1844) [14 April 1845]. Gesneriaceae. In: *The Botany of the Voyage of H.M.S. Sulphur*, p. 132. London: Smith, Elder.
- BENTHAM, G. (1846). *Gesneriaceae. Plantae Hartweginae*, pp. 228–236. London: W. Pamplin.
- BRAGO, L. & ZARUCCHI, J. (1993). Catalogue of the flowering plants and gymnosperms in Perú. *Monogr. Syst. Bot. Missouri Bot. Gard.* 45: 1–1286.
- CHAUTEMS, A., ARAUJO, A. O. & MAIA, I. C. (2018). Flora das cangas da Serra dos Carajás, Pará, Brazil: Gesneriaceae. *Rodriguésia* 69(3): 1135–1141.
- CLAVIJO, L., SKOG, L. E. & CLARK, J. L. (2015). *Diastema*. In: BERNAL, R., GRADSTEIN, S. R. & CELIS, M. (eds) *Catálogo de Plantas y Líquenes de Colombia*. Bogotá: Instituto de Ciencias Naturales, Universidad Nacional de Colombia.
- GILLI, A. (1983). Beiträge zur Flora von Ecuador. *Feddes Repert.* 94(5): 303–322.
- IUCN (2012). *IUCN Red List Categories and Criteria*, version 3.1, 2nd edition. IUCN Species Survival Commission. Gland, Switzerland, and Cambridge: International Union for Conservation of Nature.
- KEENE, J. L. (2013). *A reassessment of Monopyle (Gloxinieae: Gesneriaceae)*. PhD dissertation, Ohio University.
- ROALSON, E. H., BOGGAN, J. K. & SKOG, L. E. (2005a). Reorganization of tribal and generic boundaries in the Gloxinieae (Gesneriaceae: Gesnerioideae) and the description of a new tribe in the Gesnerioideae, Sphaerorrhizeae. *Selbyana* 25(2): 225–238.
- ROALSON, E. H., BOGGAN, J. K., SKOG, L. E. & ZIMMER, E. A. (2005b). Untangling Gloxinieae (Gesneriaceae). I. Phylogenetic patterns and generic boundaries inferred from nuclear, chloroplast, and morphological cladistic datasets. *Taxon* 54(2): 389–410.
- SKOG, L. E. (1978). Flora of Panama, Part IX: Family 175. Gesneriaceae. *Ann. Missouri Bot. Gard.* 65(3): 891–896.

- 
- SKOG, L. E. (1999). Gesneriaceae. In: JØRGENSEN, P. M. & LEÓN-YÁNEZ, S. (eds) *Catalogue of the Vascular Plants of Ecuador*, vol. 75, pp. 492–507. St Louis, Missouri: Missouri Botanical Garden Press.
- WEBER, A. (2004). Gesneriaceae. In: KUBITZKI, K. & KADEREIT, J. W. (eds) *The Families and Genera of Vascular Plants. Volume VII, Flowering Plants. Dicotyledons. Lamiales (except Acanthaceae including Avicenniaceae)*, pp. 63–158. Berlin: Springer-Verlag.
- WEBER, A., CLARK, J. L. & MÖLLER, M. (2013). A new formal classification of Gesneriaceae. *Selbyana* 31(2): 68–94.
- WIEHLER, H. (1983). A synopsis of the Neotropical Gesneriaceae. *Selbyana* 6: 1–219.

*Received 10 January 2019; accepted for publication 10 June 2019; first published  
online 21 August 2019*