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Drymonia betancurii (Gesneriaceae), a new species from northwestern Colombia

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Abstract

A new species of Gesneriaceae from the Pacific slopes of the Colombian Andes is described and illustrated. The new species, *Drymonia betancurii*, is differentiated from other congeners by the following combination of characters: upper leaf surface with papillose-hispid trichomes, dark green and often covered with white spots; lower surface pitted; and corolla lobes orange-red with white to yellow margins.

Resumen

Se describe e ilustra una nueva especie de Gesneriaceae de la vertiente pacífica de los Andes Colombianos. La nueva especie, *Drymonia betancurii*, se diferencia de las otras especies del género por la siguiente combinación de caracteres: haz con indumento papiloso-hispido, verde oscuro y usualmente con manchas blancas; envés con pequeñas depresiones; y lóbulos de la corola anaranjado-rojo con margen blanca a amarilla.

Introduction

The flowering plant family Gesneriaceae Richad & Jussieu in Candolle (1816: 182) is represented in the Neotropics by more than 1200 species (Weber *et al.* 2013). The highest diversity is found in Colombia with 32 genera and over 400 species (Kvist *et al.* 1998), followed by Ecuador with 29 genera and 240 species (Skog & Kvist 1997), and Brazil with 28 genera and 207 species (Forzza *et al.* 2010). The third largest genus in the Neotropics is *Drymonia* Martius (1829: 57) with 75+ species (Möller & Clark 2013) where most of them are in northwestern South America, particularly along the Pacific slopes of the Andes in Colombia and Ecuador (Clark *et al.* 2006, Clavijo & Clark 2009). In Colombia the genus is distributed from sea level to 3000 m, and the highest species richness is in the Tropical rain forest (bp-T) and the Premontane Rain forests (bp-PM) (Holdridge 1978) at low to mid-elevations (0–1400 m).

Drymonia is one of the most morphologically diverse genera among the members of the neotropical Gesneriaceae (Clark *et al.* 2012; Clark *et al.* 2015), displaying a wide range of habits, such as herbs, subshrubs, shrubs, and lianas that can be terrestrial, hemiepiphytic, or epiphytic (facultative or obligate). Corolla shapes can be campanulate, funnellform, tubular, laterally compressed, urceolate, or hypocyrtoid (with a ventral pouch). Fruit types range from fleshy bivalved capsules to indehiscent berries. The most distinctive characteristic of *Drymonia* is the presence of basal poricidal anther dehiscence (Fig. 2G), which is lost in several lineages within the genus (Clark *et al.* 2006; Clark *et al.* 2015). Recent transfers from *Nautilocalyx* Linden *ex* Hanstein (1854: 207) (Clark *et al.* 2011) and *Alloplectus* Martius (1829: 55) (Clark 2005) have been supported by molecular sequence data that strongly support a monophyletic *Drymonia* represented by highly divergent morphologies in the above mentioned vegetative and reproductive characters.

High humidity, and a heterogeneous landscape associated with the Andean orogeny have promoted the diversification of several plant lineages on the Pacific slopes of the Andes (Gentry 1989), which are considered among the most biologically diverse regions on the planet with numerous endemic taxa (Gentry 1982, 1989, Mittermeier *et al.* 2004). Recent expeditions to poorly explored areas on the Pacific slopes of the Andes have resulted in the discovery and description of several new species of Gesneriaceae (*e.g.*, Amaya-Márquez 2010, Amaya-Márquez & Marín-Gómez 2012, Amaya-Márquez & Smith 2012, Smith *et al.* 2013), including three new species of *Drymonia* (Clavijo & Clark 2010, 2012, 2014). In this paper we describe a new species from the Pacific slopes of the Colombian Andes and discuss its morphological similarities with other congeners.

Taxonomy

Drymonia betancurii Clavijo & J.L. Clark, *sp. nov.* (Figs. 1 & 2)

Diagnosis: Differs from other species of *Drymonia* by the presence of papillose-hispid trichomes on upper leaf surface and pitted on the lower surface; upper leaf surface dark green, often covered with white spots; calyx lobes densely pilose on both surfaces; corolla limb orange-red with white to yellow lobe margins; style with glandular trichomes.

Type:—COLOMBIA. Antioquia: Municipio Frontino, Parque Nacional Natural Las Orquídeas, vereda Venados Abajo, sector de Venados, sitio Arenales. 6°32'25.2"N, 76°18'38.7"W, 950–1000 m, 26 July 2011 (fl), *J. Betancur, P. Pedraza-Peñalosa, M.F. González, R. Arévalo, D. Sanín, A. Zuluaga, J. Serna & A. Duque 15434* (holotype COL!, isotypes HUA!, NY!).

Herb, subshrub, or liana; terrestrial, hemiepiphyte, or epiphyte. Stem prostrate, scandent or appressed to tree, herbaceous to subwoody, with adventitious roots, branched, subquadrangular in cross-section, 2.5–3.9 mm in diameter, scarcely pilose to pilose basally, pilose to lanate apically; trichomes whitish, 1–2 mm long, unbranched; internodes 4.4–10.2 cm long. Leaves opposite, evenly spaced, decussate, subequal in a pair; petiole 0.5–2.5 cm long, terete in cross-section, green, with a gland at the base, densely pilose to lanate, trichomes 0.8–1.6 mm long; blade ovate to oblong, 3.1–8.1 × 2.5–6.0 cm, cartaceous, upper surface dark green, usually with white spots along the veins and sometimes with the venation light green, lower surface purple with light green venation, apex acuminate, base rounded to truncate, usually oblique, margin crenate to serrulate, upper surface papillose-hispid, lower surface pitted; 5–6 (–7) pairs of secondary veins, only evident abaxially, main vein sparsely pilose adaxially, densely pilose abaxially, secondary veins glabrate adaxially, densely pilose abaxially, higher order of venation only evident abaxially, pilose. Inflorescence reduced to an axillary solitary flower; bracts absent; flowers protandrous. Pedicel perpendicular or oblique relative to stem, 8–29 mm long, green, densely pilose. Calyx green to green suffused with red, membranous, venation conspicuous; calyx lobes 5, 4 nearly equal, dorsal lobe slightly reduced, free to nearly free, when nearly free fused at base for 2–5 mm, apex acute, base rounded to truncate, margin serrate, reflexed when in bud, pilose, dense at base on both surfaces; ventral and lateral lobes 13–26 × 7–18 mm, rhombic, ovate or oblong, dorsal lobe 12–19 × 6–13 mm, ovate to oblong. Corolla zygomorphic, 4.7–5 cm long, oblique to perpendicular relative to calyx, infundibuliform; tube constricted at base, 2.8–3.2 cm long, 1.3–1.6 cm wide, outer surface white, sometimes pink ventrally, pilose, inner surface orange-red; base gibbous, 6–5 mm in diameter, gibbosity 6–7 mm long; throat 17–19 mm in diameter, outer surface white and pilose, inner surface orange-red with short glandular trichomes dorsally; corolla lobes subequal, orange-red, margin white to yellow, 9–12 × 9–14 mm, orbicular, apex rounded, margin slightly erose, glabrous, ventral lobe slightly larger, lateral and dorsal lobes spreading, sometimes reflexed. Androecium of 4 stamens, didynamous, filaments 26–32 mm long, adnate to the corolla tube for 13–15 mm, white, glabrous, coiling after anthesis; staminode absent; anthers oblong, coherent by the lateral walls, dehiscence by basal pores that develop into longitudinal slits, 6–7 × 2–3 mm. Gynoecium with a single dorsal nectary gland, ovate, apex acute, 2–3 mm long, glabrous; ovary superior, 5–6 × 4–5 mm, ovate, orange, sericeous; style 17–19 mm long with sparse glandular trichomes, stigma stomatomorphic. Fruit not observed.

Distribution and habitat:—*Drymonia betancurii* is endemic to Colombia and is only known from the Pacific slopes of the Cordillera Occidental in the departments of Antioquia and Chocó, between 480 and 1000 m. *Drymonia betancurii* grows in scattered populations in open areas that are often near forest edges or in the shade of intact forests.

Phenology:—Flowers recorded from March to July; fruits not seen.

Etymology:—This species is named in honor of the Colombian botanist Julio Betancur, expert on Bromeliaceae and Heliconiaceae of Colombia, who has made monumental contributions to the knowledge of Colombian flora and has mentored several generations of Colombian botanists.

Additional specimens examined (paratypes):—COLOMBIA. Antioquia: Municipio Frontino, Corregimiento de Encarnación, Parque Nacional Natural Las Orquídeas, sector Venados, bosques cercanos a la cabaña de Parques Nacionales, 11 April 2011, *J. Betancur, P. Pedraza-Peñalosa, J.M. Vélez-Puerta, A. Orjuela & A. Duque 15165* (COL!, HUA!, NY!); Parque Nacional Natural Las Orquídeas, sector Venados, vereda Venados Abajo, sitio La Esperanza, cuenca de la quebrada Arenales, 6°42'6.8"N, 76°18'46.03"W, 880–920 m, 29 July 2011, *P. Pedraza-Peñalosa, J. Betancur, M.F. González, R. Arévalo, D. Sanín, A. Zuluaga, A. Duque & J. Serna 2443* (COL!, NY!); Parque Nacional Natural Las Orquídeas, sector Venados, vereda Venados Abajo, sitio La Esperanza, cuenca de la quebrada Arenales, 6°42'6.8"N, 76°18'46.03"W, 880–920 m, 20 July 2011, *P. Pedraza-Peñalosa, J. Betancur, M.F. González, R. Arévalo, D. Sanín, A. Zuluaga, A. Duque & J. Serna 2486* (COL!, NY!, UNA!); vereda Cruces, sitio Piñares, camino a Perdidas,

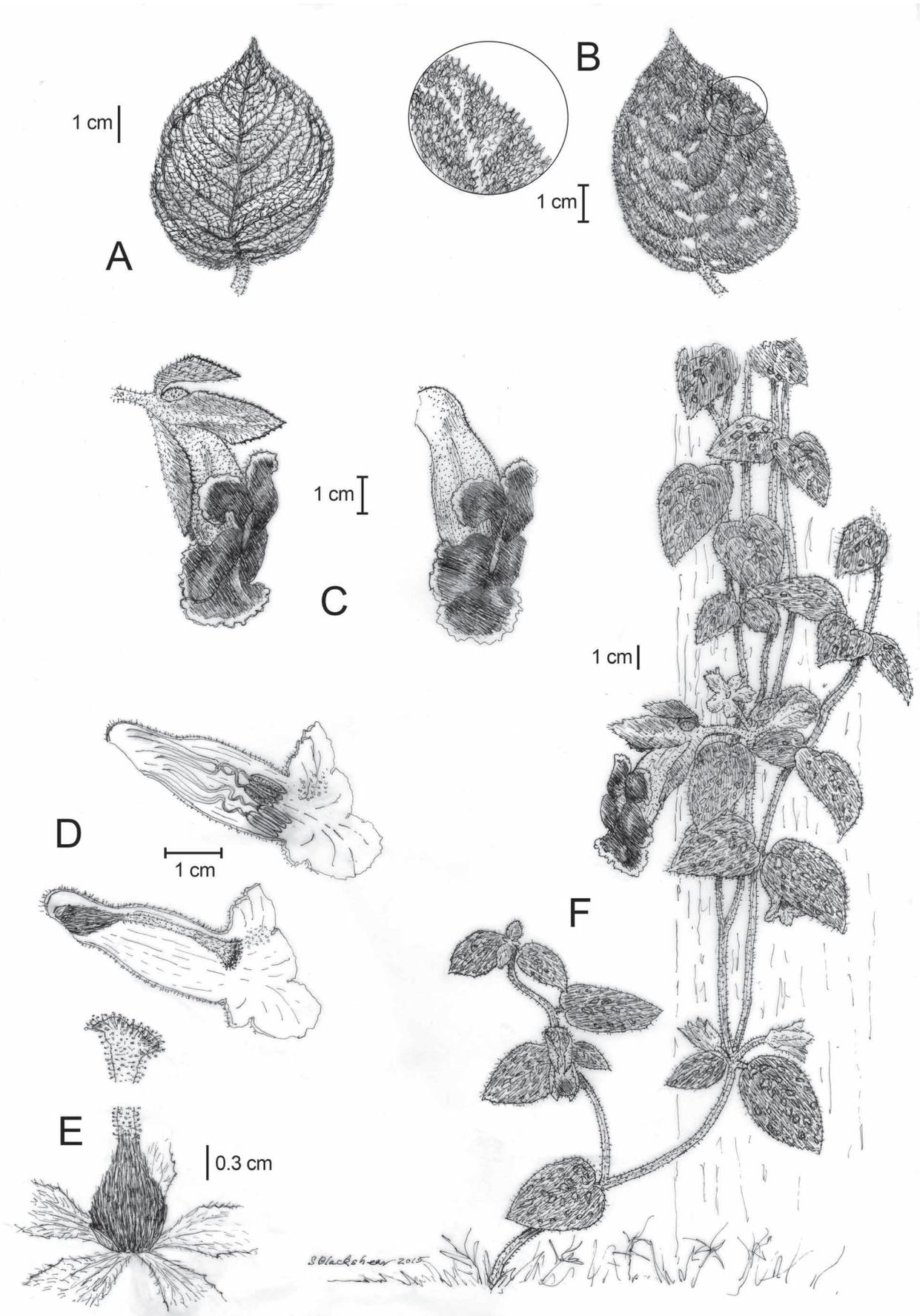


FIGURE 1. *Drymonia betancurii*. A. Lower leaf surface. B. Upper leaf surface with inset showing the papillose-hispid indument. C. Lateral view of flower. D. Lateral view of flower showing androecium and gynoecium. E. Gynoecium showing single dorsal nectary gland, glandular trichomes on style, and stomatomorphic stigma. F. Habit. (from the holotype, *J. Betancur 15434*, and *P. Pedraza-Peñalosa 2443*).

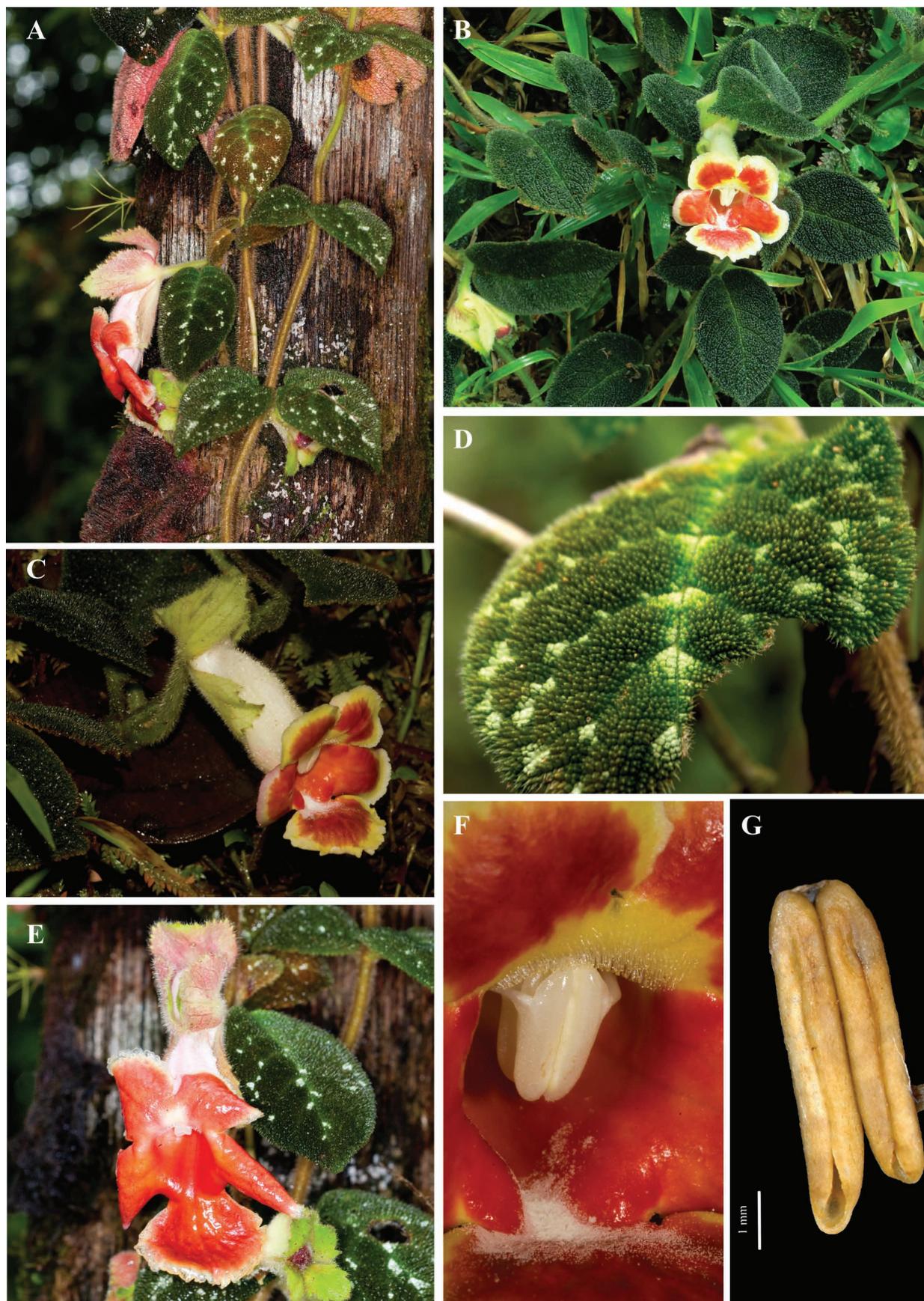


FIGURE 2. *Drymonia betancurii*. A–B. Habit. C. Lateral view of flower. D. Upper leaf surface. E. Front view of flower. F. Front view of flower showing anthers and glandular hairs. G. Anther (from *P. Pedraza-Peñalosa* 2443).

poco después de la escuela La Esperanza, orilla izquierda del río Calles, Parque Nacional Natural Las Orquídeas, bosque poco perturbado, 6°28'35.5"N, 76°19'39.5"W, 980 m, 3 May 2013, S.E. Hoyos-Gómez, J. Betancur, R. Arévalo, M.F. González, M.S. Jaimes, F. Gómez, A. Duque, C. Rivera, W. Quinceno & F. Pino 2289 (COL!, NY!); Municipio Urrao, vereda Cruces, camino al río Penderisco desde la escuela La Esperanza, alrededores de la quebrada La Balsora, margen izquierda del río Calles, Parque Nacional Natural Las Orquídeas, bosque al lado de una quebrada y potrero al lado del camino, 6°27'58"N, 76°19'19.11"W, 880–900 m, 7 May 2013, J. Betancur, R. Arévalo, S.E. Hoyos-Gómez, M.S. Jaimes, A. Duque, W. Quinceno & F. Pino (COL!, NY!). Chocó: Along road from Quibdó to Tutunendo, 1 hour past Tutunendo, vereda 21, at Alto de Veinte, hacienda of Ruben Jaramillo, 1/2 hour walk down hill from roadside; rain forest 18 km NE of Tutunendo, 480 m, 15 March 1987, H. Wiehler 8730B (SEL!).

Drymonia betancurii is similar to *D. variegata* Uribe (1952: 1), but they are readily differentiated when fertile. The two species are similar in their diverse habits and foliage (e.g., dark green, papillose-hispid trichomes on upper blade surface, and pitted and purple lower blade surface). *Drymonia betancurii* is differentiated from *D. variegata* by the presence of white spots on the upper surface, although, at least one population of *D. betancurii* have light green venation and lack white spots. When sterile, the non-spotted populations of *D. betancurii* are similar to *D. variegata*. The two species are differentiated by the following characters in *D. betancurii*: petiole 0.5–2.5 cm long (vs. ca. 5 cm long); blades ovate to oblong to 8.1 cm long (vs. lanceolate to elliptic to 15.2 cm long); calyx lobes rhombic, ovate or oblong, 7–18 mm wide (vs. lanceolate, 1–6 mm wide); and corolla lobes orange with white to yellow margin (vs. white with maroon or purple lines). *Drymonia variegata* is widely distributed from Panama to Ecuador, while *D. betancurii* is restricted to the Pacific slopes of the Colombian Andes in the departments of Antioquia and Chocó, where these two species are sympatric. Hans Wiehler and the Gesneriad Research Foundation team made the first known collection of *D. betancurii* (H. Wiehler 8730B) during their expedition to Colombia in 1987, and although they noticed the unusual white spots on the leaves they identified the collection as *D. variegata* (Milewiski 1987).

Drymonia betancurii and *Drymonia droseroides* J.L. Clark & Clavijo (2010: 190) are similar because of their dark green and bullate foliage. The two species are differentiated by the following characters in *D. betancurii*: habit of prostrate herb, liana, epiphyte or hemiepiphytic shrub (vs. terrestrial shrub); petioles 0.5–2.5 cm long (vs. 6–7.7 cm long); leaves 3.1–8.1 × 2.5–6.0 cm (vs. 16.5–21.1 × 11.6–13 cm); calyx lobes rhombic, ovate or oblong and pilose (vs. spatulate with glandular hairs); and an infundibuliform corolla with an orange-red limb (vs. campanulate with limb yellow to pink).

The stem indument and the habit of *D. betancurii* are similar to *D. alloplectoides* Hanstein (1865: 358). However, *D. betancurii* is differentiated by dark green, papillose-hispid leaves (vs. green, villous), calyx serrate (vs. entire), corolla lobes orange-red with the margin white to yellow (vs. white), and ventral corolla lobe slightly erose (vs. fimbriate).

Acknowledgments

We thank Mateo Jaimes (COL), Julio Betancur (COL) and Paola Pedraza-Peñalosa (NY) for providing access to collections, and to Sue Blackshear for the illustration. We acknowledge the following botanists for providing images: Paola Pedraza-Peñalosa (Figs. 2AE), David Sanín (Fig. 2B), María Fernanda González (Fig. 2C), and Mateo Jaimes (Figs. 2DF). Collections of this species were made during expeditions for the project “Flora of Las Orquídeas National Park” funded by the National Science Foundation (DEB 1020623) to Paola Pedraza-Peñalosa and Julio Betancur. Steve Ginzburg (UNA) and two anonymous reviewers are gratefully acknowledged for providing helpful feedback.

References

- Amaya-Márquez, M. (2010) Novedades taxonómicas en el género *Columnea* (Gesneriaceae). *Revista de la Academia Colombiana de Ciencias Exactas, Físicas y Naturales* 34: 301–307.
- Amaya-Márquez, M. & Marín-Gómez, O.H. (2012) *Columnea rangellii* (Gesneriaceae), a new species from the Serranía de los Paraguas in the Colombian Andes. *Caldasia* 34: 69–74.
- Amaya-Márquez, M. & Smith, J.F. (2012) A rare new species of *Columnea* (Gesneriaceae) from “Cordillera Occidental” in the Colombian Andes. *Revista de la Academia Colombiana de Ciencias Exactas, Físicas y Naturales* 36: 13–16.
- Candolle, A.P. de (1816) *Essai sur les Propriétés Médicales des Plantes*. Second edition. Crochard, Paris, 397 pp.

- Clark, J.L. (2005) A monograph of *Alloplectus* (Gesneriaceae). *Selbyana* 25: 182–209.
- Clark, J.L., Herendeen, P.S., Skog, L.E. & Zimmer, E.A. (2006) Phylogenetic relationships and generic boundaries in the Episcieae (Gesneriaceae) inferred from nuclear, chloroplast, and morphological data. *Taxon* 55: 313–336.
<http://dx.doi.org/10.2307/25065580>
- Clark, J.L., Skog, L.E. & Barrie, F.R. (2011) Novae Gesneriaceae Neotropicarum XVII: New Combinations and Typifications. *Novon* 21: 413–423.
<http://dx.doi.org/10.3417/2011002>
- Clark, J.L., Funke, M.M., Duffy, A.M. & Smith, J.F. (2012) Phylogeny of a neotropical clade in the Gesneriaceae: More tales of convergent evolution. *International Journal of Plant Sciences* 173: 894–916.
<http://dx.doi.org/10.1086/667229>
- Clark, J.L., Clavijo, L. & Muchhala, N. (2015) Convergence of anti-bee pollination mechanisms in the Neotropical plant genus *Drymonia* (Gesneriaceae). *Evolutionary Ecology* 29: 355–377.
<http://dx.doi.org/10.1007/s10682-014-9729-4>
- Clavijo, L. & Clark, J.L. (2009) El género *Drymonia* (Gesneriaceae). Guide #244. Rapid Color Guides, Environmental and Conservation Programs, The Field Museum, Chicago, IL. Available from: <http://fm2.fieldmuseum.org/plantguides/guideimages.asp?ID=371>
- Clavijo, L. & Clark, J.L. (2010) *Drymonia droseroides* (Gesneriaceae), a new species from the Pacific Andean Forests of Colombia. *Selbyana* 30: 190–194.
- Clavijo, L. & Clark, J.L. (2012) *Drymonia atropurpurea* (Gesneriaceae), a new species from northwestern South America. *Journal of the Botanical Research Institute of Texas* 6: 71–74.
- Clavijo, L. & Clark, J.L. (2014) *Drymonia crispa* (Gesneriaceae), a new species from northwestern Colombia. *Brittonia* 66: 65–69.
<http://dx.doi.org/10.1007/s12228-013-9310-4>
- Forzza, R.C., Leitman, P.M., Costa, A., Carvalho, A.A Jr., Peixoto, A.L., Walter, B.M.T., Bicudo, C., Zappi, D., Costa, D.P., Lleras, E., Martinelli, G., Lima, H.C., Prado, J., Stehmann, J.R., Baumgratz, J.F.A., Pirani, J.R., Sylvestre, L.S., Maia, L.C., Lohmann, L.G., Paganucci, L., Silveira, M., Nadruz, M., Mamede, M.C.H., Bastos, M.N.C., Morim, M.P., Barbosa, M.R., Menezes, M., Hopkins, M., Secco, R., Cavalcanti, T. & Souza, V.C. (2010) *Catálogo de plantas e fungos do Brasil, vols 1 and 2*. Instituto de Pesquisas Jardim Botânico do Rio de Janeiro, Rio de Janeiro, 169 pp.
- Gentry, A.H. (1982) Neotropical floristic diversity: Phytogeographical connections between Central and South America, Pleistocene climatic fluctuations, or an accident of the Andean orogeny? *Annals of the Missouri Botanical Garden* 69: 557–593.
<http://dx.doi.org/10.2307/2399084>
- Gentry, A.H. (1989) Speciation in tropical forests. In: Holm-Nielsen, L.B., Nielsen, I.C. & Balslev, H. (Eds.) *Tropical Forests: Botanical Dynamics, Speciation and Diversity*. Academic Press, San Diego, pp. 113–134.
<http://dx.doi.org/10.1016/b978-0-12-353550-4.50017-4>
- Hanstein, J. (1854) Die Gesneraceen des Königlichen Herbariums und der Gärten zu Berlin, nebst Beobachtungen über die Familie im Ganzen I. Abschnitt. *Linnaea* 26: 145–216, figs. 1–68.
- Holdridge, L.R. (1978) *Life zone ecology*. Tropical Science Center. San José, Costa Rica, 144 pp.
- Kvist, L.P., Skog, L.E. & Amaya-Márquez, M. (1998) Los géneros de Gesneriaceae de Colombia. *Caldasia* 20: 12–28.
- Martius, C.F.P. (1829) Gesneriaceae. In: *Nova Genera et Species Plantarum*, Vol. 3. Munich, Germany: Impensis Auctoris, pp. 27–73, pls. 212–226.
- Milewiski, R.G. (1987) The Gesneriad Research Foundation study trip to Colombia. *Gloxinian* 37: 17–23.
- Mittermeier, R.A., Robles-Gil, P., Hoffman, M., Pilgrim, J., Brooks, T., Mittermeier, C.G., Lamoreux, J. & da FONSECA, G.A.B. (2004) *Hotspots Revisited*. CEMEX, S.A., Mexico, 392 pp.
- Möller, M. & Clark, J.L. (2013) The state of molecular studies in the family Gesneriaceae: A review. *Selbyana* 31: 95–125.
- Skog, L.E. & Kvist, L.P. (1997) The Gesneriaceae of Ecuador. In: Valencia, R. & Balslev, H. (Eds.) *Estudios sobre Diversidad y Ecología de Plantas, Memorias del II Congreso Ecuatoriano de Botánica*. Quito, Ecuador: Pontificia Universidad Católica del Ecuador, Quito, pp. 13–23
- Smith, J.F., Amaya-Márquez, M., Marín-Gómez, O.H. & Clark, J.L. (2013) Four new species of *Columnea* (Gesneriaceae) with primary distributions in Colombia. *Journal of the Botanical Research Institute of Texas* 7: 667–679.
- Uribe-Uribe, L. (1952) Contribuciones a la Flora Colombiana, Gesneriaceae. *Mutisia* 11: 1–2.
- Weber, A., Clark, J.L. & Möller, M. (2013) A new formal classification of Gesneriaceae. *Selbyana* 31: 68–94.